Section 21
Climate Change and Greenhouse Gas Emissions

This section addresses impacts related to climate and greenhouse gas (GHG) emissions resulting from projects and actions encouraged by the Proposed Project and action alternatives, and it describes the study area, environmental setting, environmental impacts, and proposed mitigation measures to address significant impacts. A discussion of air quality and related impacts is presented in Section 9. Some of the predominant sources of GHG emissions in the study area are discussed in other sections of this document (e.g., Section 6, Land Use and Planning; Section 7, Agriculture and Forestry Resources; Section 18, Recreation; Section 19, Transportation, Traffic, and Circulation; and Section 20, Utilities and Service Systems).

The Delta Plan (the Proposed Project) does not propose implementation of any particular physical project; rather it seeks to encourage, either through limited policy regulation or through recommendations, other agencies to take certain actions that would lead to achieving the coequal goals of Delta ecosystem protection and water supply reliability. Those actions, if taken, could lead to physical changes in the environment. A description of the actions proposed under the Proposed Project and action alternatives, and description of the overall approach to assessing impacts are presented in more detail in part 2.1 of Section 2A, Proposed Project and Alternatives, and in Section 2B, Introduction to Resource Sections, respectively.

21.1 Study Area

GHGs and climate impacts are not limited to specific geographic locations, but occur on global or regional scales. Nevertheless, for purposes of studying the causes and effects of climate change and GHG emissions due to the Delta Plan and alternatives, the study area is concentrated on, but not exclusively limited to, the primary planning area (Delta and Suisun Marsh) and where facilities, projects, and actions influenced by the recommendations of the Delta Plan would most likely be located. In this section, the existing conditions and observed trends, as well as potential effects of Delta Plan implementation, are discussed at the global, regional, and local levels.

21.2 Regulatory Framework

Appendix D provides an overview of the plans, policies, and regulations relating to GHGs within the State and the study area. GHGs are subject to federal and California regulations, and will increasingly be subject to State and local plans and other requirements intended to reduce overall GHG emissions to 1990 levels. The California Environmental Quality Act (CEQA) requires lead agencies to consider the

reasonably foreseeable adverse environmental effects of projects they are considering for approval. GHG emissions have the potential to adversely affect the environment because they contribute to global climate change. In turn, global climate change has the potential to raise sea levels, affect rainfall and snowfall, and affect habitat (DWR 2010a, pp. 5-6).

The Climate Change Scoping Plan (August 2008) adopted by the California Air Resources Board (ARB) states that local governments are "essential partners" in the effort to reduce GHG emissions. The Scoping Plan also acknowledges that local governments have "broad influence and, in some cases, exclusive jurisdiction" over activities that contribute to significant direct and indirect GHG emissions through their planning and permitting processes, local ordinances, outreach and education efforts, and municipal operations. Many of the proposed measures to reduce GHG emissions rely on local government actions. The Scoping Plan encourages local governments to reduce GHG emissions by approximately 15 percent from current levels by 2020 (ARB 2008 as cited in DWR 2010a, p. 10).

On the State level, ARB is tasked with regulating GHG emissions as directed by AB 32, the California Global Warming Solutions Act of 2006. In the absence of a fully structured regulatory environment for GHG emissions (e.g., significance thresholds, specific analysis guidance, emission reduction requirements, etc.), local air districts have taken the initiative to develop GHG guidance and programs to assist lead agencies to evaluate, analyze, and reduce GHG emissions from plans and projects.

The primary effect of these district programs will be a requirement for Delta Plan elements, and covered actions encouraged by the Delta Plan, to be consistent with the goals and objectives of the State and local programs. Individual projects undertaken as part of the Delta Plan implementation will be required to estimate emissions and compare project-related emissions to CEQA significance thresholds, and provide mitigation for impacts deemed significant.

21.3 Background and Terminology

In January 2010, the Department of Water Resources (DWR) CEQA Climate Change Committee (C4) developed guidance documents for addressing climate change in DWR CEQA documents, quantifying GHG emissions, determining significance, and analyzing climate change impacts, for use by DWR staff and consultants in support of environmental documentation (DWR 2010a, p. 1; 2010b, p. 1; and 2010c, p. 1). The following sections contain information from DWR guidance and from regulatory agency web sites, publications, and databases.

Global warming is the name given to the increase in the average temperature of the Earth's near-surface air and oceans since the mid-20th century and its projected continuation. Warming of the climate system is now considered to be unequivocal (DWR 2010a, p. 2) with global surface temperature increasing approximately 1.33 °F over the last one hundred years. Continued warming is projected to increase global average temperature between 2 and 11 °F over the next one hundred years.

The causes of this warming have been identified as both natural processes and as the result of human actions. The Intergovernmental Panel on Climate Change (IPCC) concludes that variations in natural phenomena such as solar radiation and volcanoes produced most of the warming from pre-industrial times to 1950 and had a small cooling effect afterward. However, after 1950, increasing GHG concentrations resulting from human activity such as fossil fuel burning and deforestation have been responsible for most of the observed temperature increase. These basic conclusions have been endorsed by more than 45 scientific societies and academies of science, including all of the national academies of science of the major industrialized countries. Since 2007, no scientific body of national or international standing has maintained a dissenting opinion.

Increases in GHG concentrations in the Earth's atmosphere are thought to be the main cause of human induced climate change. GHGs naturally trap heat by impeding the exit of solar radiation that has hit the Earth and is reflected back into space. Some GHGs occur naturally and are necessary for keeping the Earth's surface inhabitable. However, increases in the concentrations of these gases in the atmosphere during the last hundred years have decreased the amount of solar radiation that is reflected back into space, intensifying the natural greenhouse effect and resulting in the increase of global average temperature (DWR 2010a, p. 2).

The principal GHGs are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), perfluorocarbons (PFC), and hydrofluorocarbons (HFC). [Health and Safety Code section 38505(g).] Each of the principal GHGs has a long atmospheric lifetime (one year to several thousand years). In addition, the potential heat-trapping ability of each of these gases vary significantly from one another. CH_4 is 23 times as potent as CO_2, while SF_6 is 22,200 times more potent than CO_2. Conventionally, GHGs have been reported as carbon dioxide equivalents (CO_2e). CO_2e takes into account the relative potency of non-CO_2 GHGs and converts their quantities to an equivalent amount of CO_2 so that all emissions can be reported as a single quantity.

The primary man-made processes that release these gases include: burning of fossil fuels for transportation, heating and electricity generation; agricultural practices that release CH_4, such as livestock grazing and crop residue decomposition; and industrial processes that release smaller amounts of high global warming potential gases such as SF_6, PFCs, and HFCs. Deforestation and land cover conversion have also been identified as contributing to global warming by reducing the Earth's capacity to remove CO_2 from the air and altering the Earth's albedo or surface reflectance, allowing more solar radiation to be absorbed (DWR 2010a, p. 2).

21.4 Environmental Setting

21.4.1 Global, Regional, and Local Setting

21.4.1.1 Global Climate Trends and Associated Impacts

The rate of increase in global average surface temperature over the last hundred years has not been consistent; the last three decades have warmed at a much faster rate – on average 0.32°F per decade. Eleven of the twelve years from 1995 to 2006, rank among the twelve warmest years in the instrumental record of global average surface temperature (going back to 1850) (DWR 2010a, p. 3).

Increased global warming has occurred concurrent with many other changes have occurred in other natural systems. Global sea levels have risen on average1.8 millimeters per year; precipitation patterns throughout the world have shifted, with some areas becoming wetter and other drier; tropical storm activity in the North Atlantic has increased; peak runoff timing of many glacial and snow fed rivers has shifted earlier; as well as numerous other observed conditions. Though it is difficult to prove a definitive cause and effect relationship between global warming and other observed changes to natural systems, there is high confidence in the scientific community that these changes are a direct result of increased global temperatures (DWR 2010a, p. 3).

21.4.1.2 California Climate Trends and Associated Impacts

Maximum (daytime) and minimum (nighttime) temperatures are increasing almost everywhere in California but at different rates. The annual minimum temperature averaged over all of California has increased 0.33°F per decade during the period 1920 to 2003, while the average annual maximum temperature has increased 0.1°F per decade (DWR 2010a, p. 3).

With respect to California's water resources, the most significant impacts of global warming have been changes to the water cycle and sea level rise. Over the past century, the precipitation mix between snow and rain has shifted in favor of more rainfall and less snow (DWR 2010a, p. 3) and snow pack in the Sierra Nevada is melting earlier in the spring (DWR 2010a, p. 3). The average early spring snowpack in the Sierra Nevada has decreased by about 10 percent during the last century, a loss of 1.5 million acre-feet of snowpack storage (DWR 2010a, p. 3). These changes have significant implications for water supply, flooding, aquatic ecosystems, energy generation, and recreation throughout the state.

During the same period, sea levels along California's coast have risen. The Fort Point tide gauge in San Francisco was established in 1854 and is the longest continually monitored gauge in the United States. Sea levels measured at this gauge and two other West Coast gauges indicate that the sea levels have risen at an average rate of about 7.9 inches/century (0.08 inch/year) over the past 150 years (BCDC 2011). Continued sea level rise associated with global warming may threaten coastal lands and infrastructure, increase flooding at the mouths of rivers, place additional stress on levees in the Sacramento-San Joaquin Delta, and intensify the difficulty of managing the Sacramento-San Joaquin Delta as the heart of the state's water supply system (DWR 2010a, p. 3). For a discussion of water resources and flood management in the Delta and Suisun Marsh, see Section 3, Water Resources, and Section 5, Delta Flood Risk, of this Environmental Impact Report (EIR).

The following information on California's GHG emission inventory is taken from Appendix C of the Bay Area Air Quality Management District (BAAQMD) CEQA Guidelines (Sample Air Quality Setting) (BAAQMD, 2010a, pp. C-18 – C-19).

> *California produced 474 million gross metric tons (MMT) of CO2 equivalent (CO2e) averaged over the period from 2002-2004. …Combustion of fossil fuel in the transportation sector was the single largest source of California's GHG emissions in 2002-2004, accounting for 38 percent of total GHG emissions in the state. This sector was followed by the electric power sector (including both in-state and out-of-state sources) (18 percent) and the industrial sector (21 percent)… The 1990 GHG emissions limit is approximately 430 MMT CO2e, which must be met in California by 2020 per the requirements of AB 32. ARB's GHG inventory for all emissions sectors would require an approximate 28 percent reduction in GHG emissions from projected 2020 forecasts to meet the target emissions limit (equivalent to levels in 1990) established in AB 32.*

21.4.1.3 Local Climate

Local climate and meteorological conditions in each of the air basins in the primary planning area (Delta and Suisun Marsh) are described below. The primary planning area is located within a portion of three California air basins: the Sacramento Valley Air Basin (SVAB), the San Joaquin Valley Air Basin (SJVAB), and the San Francisco Bay Area Air Basin (SFBAAB). The SVAB includes portions of Sacramento, Yolo, and Solano counties and is under the jurisdiction of the Sacramento Metropolitan Air Quality Management District (SMAQMD) and the Yolo Solano Air Quality Management District (YSAQMD). Portions of the primary planning area lie in San Joaquin County, in the SJVAB, which is overseen by the San Joaquin Valley Air Pollution Control District (SJVAPCD). The Delta and Suisun Marsh include portions of Alameda, Contra Costa, and southern Solano counties in the SFBAAB, which is overseen by the BAAQMD.

21.4.1.3.1 Sacramento Valley Air Basin

The SVAB is bounded by the northern Coast Ranges on the west and the northern Sierra Nevada on the east. The intervening terrain is flat. The mountains surrounding the Sacramento Valley create a barrier to airflow that can trap air pollutants in the valley under certain meteorological conditions. The highest frequency of air stagnation occurs in the autumn and early winter when large, high-pressure cells lie over the valley. The lack of surface winds during these periods and the reduced vertical mixing due to less surface heating reduce the influx of outside air and allow air pollutants to become concentrated in a stable volume of air. The surface concentrations of pollutants are highest when these conditions are combined with smoke from agricultural burning or when temperature inversions trap cool air, fog, and pollutants near the ground.

Hot, dry summers and mild, rainy winters characterize the Mediterranean climate of the Sacramento Valley. During the year, the temperature ranges from 25°F to 105°F, with average annual rainfall about 20 inches and snowfall very rare (CIMIS 2011 and WRCC 2011). The prevailing winds are moderate in strength and vary from moist, clean breezes from the south to dry-land flows from the north (SMAQMD 2009, pp 1-7).

21.4.1.3.2 San Joaquin Valley Air Basin

The SJVAB, which is approximately 250 miles long and averages 35 miles wide, is the second-largest air basin in the state. The SJVAB is bounded by the Sierra Nevada Mountains to the east (8,000 to 14,000 feet in elevation), the Coast Ranges to the west (averaging 3,000 feet in elevation), and the Tehachapi Mountains to the south (6,000 to 8,000 feet in elevation). The valley is essentially flat with a slight downward gradient to the northwest. The valley opens to the sea at the Carquinez Strait, where the San Joaquin–Sacramento Delta empties into San Francisco Bay (SJVAPCD 2005, pg 4-30).

Although marine air generally flows into the basin from the Delta, the region's topographic features restrict air movement through and out of the basin. The Coast Ranges hinder wind flow into the San Joaquin Valley from the west, the Tehachapi Mountains restrict airflow to and from the south and the high Sierra Nevada range is a significant barrier to the east. These topographic features result in weak airflow, which becomes blocked vertically by high barometric pressure over the San Joaquin Valley. As a result, the SJVAB is highly susceptible to pollutant accumulation over time. Most of the surrounding mountains are above the normal height of summer inversion layers (1,500 to 3,000 feet) (SJVAPCD 2005, pg 2-2).

During the summer, wind usually originates in the north end of the San Joaquin Valley and flows in a south-southeast direction through the San Joaquin Valley through the Tehachapi Pass into the Southeast Desert Air Basin. Data also indicate that, during the winter, wind occasionally originates from the south end of the San Joaquin Valley and flows in a north-northwest direction. Also during the winter months, the San Joaquin Valley experiences light, variable winds of less than 10 mph (SJVAPCD 2005, pg 2-3).

The SJVAB has an "inland Mediterranean" climate and averages more than 260 sunny days per year. The valley floor is characterized by warm, dry summers and cooler winters. Summer high temperatures typically range from 90°F to 94°F in the northern valley and from 95°F to 99°F in the south. The daily summer temperature variation can be as much as 30°F (SJVAPCD 2005, pg 2-1).

In winter, as the cyclonic storm track moves southward, the storm systems moving in from the Pacific Ocean bring a maritime influence to the San Joaquin Valley. The high mountains to the east prevent the cold, continental air masses of the interior from influencing the valley. Thus, winters are mild and humid. Average high temperatures in the winter range from 50°F to 55°F, but temperatures can range from 30°F to 40°F on days with persistent fog and low cloudiness. The average daily low temperature is 45°F (SJVAPCD 2005, pg 2-2).

Precipitation in the SJVAB is confined primarily to the winter, with some also occurring in late summer and fall. Average annual rainfall for the entire San Joaquin Valley is approximately 12 inches (CIMIS 2011 and WRCC 2011). Stockton in the north receives about 15 inches of precipitation per year, Fresno in the center receives about 10 inches per year, and Bakersfield at the southern end of the valley receives less than 6 inches per year (SJVAPCD 2005, 2-3).

21.4.1.3.3 San Francisco Bay Area Air Basin

The SFBAAB is characterized by complex terrain consisting of coastal mountain ranges, inland valleys, and bays. Elevations of 1,500 feet are common in the higher terrain of this area. The climatological subregion of the SFBAAB that is located along the western boundary of the primary planning area is the Carquinez Strait subregion. The Carquinez Strait extends from Davis Point in Rodeo to Martinez and ends at Suisun Bay. At sea level, the strait is about 1 mile wide, with terrain immediately north and south reaching 500 to 600 feet (BAAQMD 2010a, pp C-5).

Prevailing winds are from the west in the Carquinez Strait, particularly during the summer. During summer and fall, high pressure offshore, coupled with thermal low pressure in the Central Valley, sets up a pressure pattern that draws marine air eastward through the Carquinez Strait almost daily. The wind is strongest in the afternoon because that is when the pressure gradient between the East Pacific high and the Valley thermal low is greatest. Afternoon wind speeds of 15 to 20 mph are common throughout the strait subregion, accelerated by the venturi effect created by the surrounding hills. Annual average wind speeds are 8.2 mph in Martinez and 9.5 to 10 mph farther east (BAAQMD 2010b, pp C-5).

Air temperatures measured in areas near the Carquinez Strait do not appear to be noticeably affected by the proximity of these areas to the strait or by the passage of oceanic airflows. Average daily maximum temperatures for Martinez and Antioch range from 55°F to 59°F in the winter and from 85°F to 89°F in the summer, similar to temperatures in Concord, which is located farther away from the strait. Average minimum temperatures range from 30°F to 40°F in the winter and from 50°F to 55°F in the fall (BAAQMD 2010a, pp C-5).

Rainfall amounts in this region vary depending on the type of nearby terrain. In areas with flat, open terrain, such as Fairfield, the annual rainfall is 22 inches. In areas where moderate-sized terrain to the west and south create a rain shadow, as in Martinez, the rainfall is 18.5 inches per year. Farther east in Antioch, the annual rainfall is only 13 inches. This low amount is due to the rain shadow effects of Mount Diablo and the surrounding high terrain southwest of Antioch (BAAQMD 2010a, pp C-2).

21.5 Impacts Analysis of Project and Alternatives

21.5.1 Assessment Methods

The Proposed Project (Delta Plan) and alternatives would not directly result in construction or operation of projects or facilities, and therefore would result in no direct climate change or GHG emissions impacts. This subsection describes the assessment method approaches for GHG and climate change.

21.5.1.1 GHG Assessment Methods

The Proposed Project and alternatives could result in implementation of actions or development of projects, such as facilities or infrastructure, as described in Section 2A, Proposed Project and Alternatives. Examples of potential actions include land use changes, conversion of agricultural lands, or land fallowing. Projects may include water and wastewater treatment plants; conveyance facilities, including

pumping plants; surface water or groundwater storage facilities; ecosystem restoration projects; flood control levees; or recreation facilities. Implementation of these types of actions and construction and operation of these types of projects could result in GHG emissions at levels that may have a significant impact on the environment. In addition to the potential of the Proposed Project and alternatives to generate GHG emissions and contribute to the impacts of climate change, future climate change may have the potential to affect implementation and performance of project components. The precise magnitude and extent of project-specific GHG emissions and climate change-related impacts would depend on the type of action or project being evaluated, its location, its total size, its timing, and a variety of project- and site-specific factors that are undefined at the time of preparation of this program-level study. Project-specific GHG emissions and climate change-related impacts would be addressed in project-specific environmental studies conducted by the lead agency at the time the projects are proposed for implementation.

In this program-level assessment, impacts from implementation of the alternatives were evaluated in terms of how project components could generate GHG emissions that might contribute to climate change-related environmental impacts. Because project-level details of project construction and operation needed to determine quantities and timing of GHG emissions are unknown, impacts for the alternatives were qualitatively evaluated for significance based on the estimated magnitude and types of emissions that might result. Potential impacts were also evaluated based on a review of environmental documents from other projects with components or including activities of a size and type similar to those expected to be included in projects that may be encouraged by the Delta Plan.

Construction and operations of future projects would result in GHG emissions, primarily from combustion of fuels in construction equipment and material transport trucks. Similar emissions, at lower levels of activity, may result from fuels and electricity used to support maintenance and operation. In addition, potential actions such as land use changes, conversion of agricultural lands, or land fallowing could result in either reducing or generating GHG emissions. Implementation of standard best management practices during construction and operation would reduce GHG emissions and the potential for climate change impacts. Potential GHG emissions impacts that could result from construction and operation of projects are discussed and mitigation measures are identified in Impact 21-1. These impacts are discussed on a qualitative basis because of the uncertainties associated with the size, timing, and locations of potential facilities and land use-related actions.

Consistency of potential projects with applicable plans, policies, or regulations adopted for the purpose of reducing GHG emissions is discussed in Impact 21-2.

The GHG emissions impact analysis for the Proposed Project was structured to allow more detailed analysis of impacts as they relate to the five Delta Plan policy elements (Reliable Water Supply, Delta Ecosystem Restoration, Flood Risk Reduction, Water Quality Improvement, and Protection and Enhancement of Delta as an Evolving Place). To avoid unnecessary repetition in the analysis of impacts that could occur under the alternatives to the Proposed Project, each impact is discussed only once for each alternative.

21.5.1.1 Climate Change and Sea Level Rise Assessment Methods

The potential impacts of climate change and sea level rise on the Proposed Project or alternatives would be dependent on many variables and unknowns, the detailed evaluation of which would be too speculative at this time.

Climate change is anticipated to change the ratio of rainfall to snowfall and the timing of storm events. One difficulty that arises in implementing climate change into long-term water resources planning is that the natural variability is often greater than the magnitude of change expected over several decades. In many water resource management areas, there is a need to combine the climate change signal with the range of natural variability observed in the historical record. The Bay Conservation and Development

Commission (BCDC) recently considered results from the California Climate Action Team (CAT) that projected increased temperatures throughout California with both drier and wetter precipitation conditions. Increased temperatures generally could cause earlier snowmelt and less snowfall (BCDC 2011). This EIR analysis considered a worst-case range of potential impacts from increased frequency of severe rainfall events with less snowfall to less frequent rainfall events.

Global and regional sea levels have been increasing steadily over the past century and are expected to continue to increase throughout this century. Recent, work by Stefan Rahmstorf (an IPCC co-author) suggests that the sea level rise may be substantially greater than the IPCC projections. In the CAT's most recent assessment in 2009, sea level rise projections were derived based on empirical relationships between global mean surface air temperature and global mean sea level, as described by Rahmstorf (2007). The Sea-Level Rise Task Force of the Coastal and Ocean Working Group of the California Climate Action Team (CO-CAT) developed interim guidance for State agencies to incorporate sea-level rise projections into planning projects (CO-CAT 2010). The CO-CAT interim guidance indicated that most climate models projected similar amounts of sea level of rise through 2050 and become more uncertain for projections between 2050 and 2100. The interim guidance indicated that climate change model projections ranged from 5 to 8 inches (with an average of 7 inches) for 2030 above 2000 sea level elevations, and 10 to 17 inches (with an average of 14 inches) for 2050 above 2000 sea level elevations. These projections did not consider additional sea level rise that could occur with catastrophic ice melting such as issues due to dynamic instability in the ice sheets of Greenland and Antarctica. For this EIR, sea level rise was considered through the defined study period that ends in 2030. The following impact assessment also considered the combination of sea level rise with more extreme storms during high runoff events (either due to high rainfall amounts or snowpack runoff). The extreme storm events frequently include high winds and waves that cause storm surge (BCDC 2011).

Because of the long-term nature of climate change and sea level rise, impacts related to climate change and sea level rise are considered in this EIR only as operations effects.

This EIR proposes mitigation measures for GHG emission impacts. The ability of these measures to reduce impacts to less-than-significant levels depends on project-specific environmental studies; enforceability of these measures depends on whether or not the project being proposed is a covered action. This is discussed in more detail in Section 2B, Introduction to Resource Sections.

21.5.2 Thresholds of Significance

Based on Appendix G of the State CEQA Guidelines, an impact related to GHG emissions is considered significant if the proposed project, the Delta Plan, or future projects associated with implementing the Delta Plan, would do either of the following:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment;
- Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

Among the applicable plans, policies, or regulations evaluated in this section of the EIR is the Scoping Plan adopted by ARB pursuant to AB 32, California Global Warming Solutions Act of 2006, to provide an overall direction for reducing GHG emissions in California to 1990 levels by 2020. In addition, project-specific analyses should address the environmental effects of GHG emissions. The cumulative effect of human activities has been clearly linked to quantifiable changes in the composition of the atmosphere, which in turn have been shown to be the main cause of global climate change (DWR 2010c, p.12).

An impact related to climate change and sea level rise is also considered significant in this EIR if the Proposed Project or future projects associated with implementing the Proposed Project would conflict with operations of proposed facilities due to climate change and sea level rise.

The following discussion of environmental impacts is limited to those potential impacts that could result in some level of potentially significant environmental change, as defined by CEQA. As individual projects are proposed, these individual projects will need to be evaluated in site-specific environmental documents prepared by the lead agencies.

21.5.3 Proposed Project

21.5.3.1 Reliable Water Supply

As described in Sections 2A, Proposed Project and Alternatives and 2B, Introduction to Resource Sections, the Delta Plan does not direct the construction of specific projects, nor would projects be implemented under the direct authority of the Delta Stewardship Council (Council). However, the Delta Plan seeks to improve water supply reliability by encouraging various actions, which if taken could lead to completion, construction and/or operation of projects that could provide a more reliable water supply. Such projects and their features could include the following:

- Surface water projects (water intakes, treatment and conveyance facilities, reservoirs, hydroelectric facilities)
- Groundwater projects (wells, wellhead treatment, conveyance facilities)
- Ocean desalination projects (water intakes, brine outfalls, treatment and conveyance facilities)
- Recycled wastewater and stormwater projects (treatment and conveyance facilities)

Water transfers and water use efficiency and conservation programs are also activities that could be encouraged by the Proposed Project, but GHG emissions would not be expected from these activities.

The number and location of all potential projects that would be implemented is not known at this time. However, the Proposed Project specifically names the DWR Surface Water Storage Investigation, which includes the North-of-the-Delta Offstream Storage Investigation (aka Sites Reservoir), Los Vaqueros Reservoir Project (Phase 2), and the Upper San Joaquin River Basin Storage Investigation Plan (aka Temperance Flat Reservoir). The Proposed Project also encourages the update of Bulletin 118 that could lead to more sustainable groundwater planning and use.

21.5.3.1.1 Impact 21-1a: Construction and Operations of Projects Could Result in an Increase in GHG Emissions That May Have a Significant Impact on the Environment

Construction Effects

Construction-related GHG emissions for water supply reliability projects associated with the implementation of the Delta Plan would primarily result from fuel combustion in construction equipment, trucks, worker vehicles, and dredging equipment. Construction-related activities for large surface water reservoirs, such as the Sites, Los Vaqueros, or Temperance Flat Reservoir projects described in Section 2A, Proposed Project and Alternatives, could require extensive use of heavy equipment, such as excavators, graders, scrapers, bulldozers, backhoes, and concrete mixing and pumping trucks. Haul trucks would be used to move borrow and/or spoils and other materials. This type of reservoir project could also include construction of related facilities, such as conveyance networks, hydroelectric facilities, water intakes, pumping plants, service roads, dams, and buildings. Less extensive use of heavy equipment and smaller construction footprints would be needed for smaller storage and regulating reservoirs, reservoir

modifications, ocean desalination projects, recycled wastewater and stormwater treatment plants, and groundwater storage facilities that might be constructed to improve water supply reliability. These projects could be located in one or more air basins, and would be located in the Delta or in areas outside the Delta, as described in Section 2A, Proposed Project and Alternatives.

Projects encouraged by the Delta Plan to improve water supply reliability have the potential to result in GHG emissions impacts. The nature and magnitude of impacts would depend on the construction details and operating characteristics of the proposed projects, and the specific mitigation measures adopted by the implementing agencies.

Few previously completed environmental reviews for similar projects considered as part of the preparation of this EIR included an assessment of climate change or GHG emissions impacts. For those studies that did address climate change and GHGs, comparison of the findings is difficult. The approaches used to assess and mitigate project-related GHG emissions impacts have evolved over time, following the enactment of SB 97 in August 2007 and the adoption of CEQA guidelines amendments addressing GHGs in December 2009. There is no adopted statewide quantitative significance threshold for GHGs under CEQA, so findings regarding the significance of impacts of similar projects may vary geographically. Some local air districts do not have CEQA guidance related to GHG emissions, whereas others, such as BAAQMD, have recently finalized and updated their CEQA thresholds of significance and guidance (BAAQMD 2010a, 2010b, 2011).

In some situations, according to previously completed environmental reviews for similar projects considered as part of the preparation of this EIR, feasible mitigation exists to reduce significant impacts for these types of projects to a less-than-significant level. In other cases, studies found that GHG emissions might exceed the applicable air district significance levels, even with mitigation.

Documents reviewed to help identify potential GHG impacts included EIRs for the Los Vaqueros Reservoir Expansion Project Draft and Final EIS/EIR (Reclamation et al. 2009) and Calaveras Dam Replacement Project Final EIR (SFPUC 2011), which are illustrative of some of the types of GHG emissions impacts associated with surface water storage projects (see Appendix H). The Final EIS/EIR for the Los Vaqueros Reservoir project indicated that impacts would be less than significant. The Final EIR for the Calaveras Dam project stated that the project's construction activities would likely exceed the draft threshold of significance proposed by the BAAQMD for GHG emissions. The Final EIR concluded that the project's GHG emissions would not contribute to significant cumulative GHG emissions.

The Supplemental EIR/EIS for the Riverside-Corona Feeder Pipeline (WMWD and Reclamation 2011) concluded that impacts associated with construction-related GHG emissions would be less than significant.

Other documents reviewed for potential impacts included EIRs and/or EISs for the Carlsbad Precise Development Plan and Desalination Plant Project (City of Carlsbad 2005), the Seawater Desalination Project at Huntington Beach (City of Huntington Beach 2005), the Davis-Woodland Water Supply Project (City of Davis et al. 2007), and the Lower Yuba River Accord (DWR et al. 2007). None of these studies assessed climate change or GHG emissions impacts.

Based on the available examples, it is possible that GHG emissions impacts of projects encouraged by the Delta Plan may be less than significant, or could be mitigated to a less-than-significant level. The details of many of the aspects of these projects, however, are not currently known, and it is possible that significant and unavoidable impacts on GHG emissions could occur. Impacts of large-scale surface water storage projects may be more difficult to avoid or mitigate to a less-than-significant level because of the magnitude of the construction and the required levels of operations and maintenance. Therefore, one or more of the water supply projects encouraged by the Delta Plan might result in a significant and unavoidable GHG emissions impacts. This is particularly true for construction impacts, because

construction is likely to be the largest source of GHG emissions associated with water supply reliability projects, especially in the near term.

Project-specific construction emissions are likely to be substantial if large infrastructure projects are implemented. In this program-level study, construction-related GHG emissions from future water supply reliability projects are considered significant, because of uncertainties regarding size, timing, and locations of potential projects, as well as the applicable jurisdictional air quality management district (AQMD) or air pollution control district (APCD) regulations, CEQA guidance, and thresholds of significance.

Effects of Project Operations

GHG emissions associated with operations of water supply reliability projects would depend on several factors, such as the size and type of project, the amount and the source of the electricity used, the number of employees and types of equipment, the increased traffic on the local and regional roadway network (including additional trucks and worker vehicles), and the level and frequency of operations and maintenance activities. Emissions similar to those expected during construction, but at lower levels, would likely result from maintenance and operation of projects.

Previously completed environmental studies for similar projects were considered as part of the preparation of this EIR. As indicated previously, the Draft and Final EIS/EIR for the Los Vaqueros Reservoir project concluded that impacts would be less than significant. The Supplemental EIR/EIS for the Riverside-Corona Feeder Pipeline (WMWD and Reclamation 2011) concluded that operations-related GHG emissions would result in significant and unavoidable impacts. In this study, the Preferred Alternative included four pump stations and up to 20 wells (only five operating at one time). The estimated total CO_2 emissions exceeded the State (ARB) and local (SCAQMD) draft GHG thresholds for industrial projects, although there were no comparable thresholds for infrastructure projects of this nature. The exact reductions in energy consumption provided by the mitigation measures were not known, so to be conservative, the study evaluated GHG impacts against the industrial threshold and concluded that impacts would be significant and unavoidable.

Quantification of operational emissions would be too speculative at this program level because of unknown project details, localized variables, and operational considerations. Project-specific GHG emissions impacts would be addressed in project-specific environmental studies conducted by the lead agency at the time projects are proposed for implementation, and required mitigation and operating conditions would be reflected in needed permits and approvals for the projects.

In addition to emissions quantification, the DWR CEQA guidance recommends definition of qualitative criteria to determine the significance of a project's GHG-related impacts. As one such qualitative criterion, the DWR guidance suggests that project-specific impact assessments should evaluate whether the proposed project has the potential to contribute to a lower carbon future, for example:

- whether the design of the proposed project is inherently energy efficient;
- whether all applicable best management practices that would reduce GHG emissions are incorporated into the proposed project design;
- whether the proposed project implements or funds its fair share of a mitigation strategy designed to alleviate climate change; and
- whether there are process improvements or efficiencies to be gained by implementing the Proposed Project (DWR 2010a, p.13-14).

The benefits of long-term operation of some potential projects, such as hydroelectric power generation, could reduce GHG emissions if the produced electricity replaces that generated using carbon-based fuels.

These reductions are unlikely to offset all of the increased emissions from construction and operation of water supply reliability projects under the Proposed Project. Therefore, the Proposed Project would have limited potential to contribute to a lower carbon future.

Conclusion

It is unclear at this time how implementation of the Proposed Project would result in construction and operations of water supply reliability projects, including the location, number, capacity, operational criteria, and methods and duration of construction activities. Because of the uncertainties underlying these future projects, and as a result, this program-level assessment, GHG emissions impacts cannot be accurately quantified. Project-level impacts would be addressed in future site-specific environmental analysis conducted at the time such projects are proposed by lead agencies.

For projects that would result in significant or potentially significant environmental impacts from GHG emissions, lead agencies should prepare and include a project-specific technical report on climate change and GHG emissions as part of the environmental documentation, prior to approval of the projects. The technical report should include an analysis of potential environmental impacts from GHG emissions, including:

- Quantification of GHG emissions;
- An analysis to determine whether construction- and operation-related GHG emissions would exceed applicable air district thresholds;
- Evaluation of the effect of climate change on the project; and
- Recommended emission reduction measures, including but not limited to potential actions that could sequester or reduce GHG emissions.

Preparation of the technical report should be based on the climate change or GHG emissions management plans, policies, and regulations of the appropriate local air district(s) and should identify compliance with applicable Best Management Practices (BMPs) and requirements as part of the project. The technical report should identify and estimate project GHG emissions from construction and operation of permitted (stationary) and non-permitted (mobile and area) sources, and identify mitigation measures to reduce significant emissions to below the applicable thresholds of significance. If needed GHG reductions cannot be achieved through the identified mitigation measures, then additional environmental review, additional mitigation strategies, and/or a statement of over-riding considerations may be required for an individual project.

Because the implementation of projects and activities that would be encouraged by the Delta Plan has the potential to generate GHG emissions caused by related construction activities, the impacts of implementation of potential projects are considered significant. Mitigation measures for Impact 21-1 are identified later in this section to suggest methods to reduce GHG emissions impacts that may be significant on a project-specific level. These mitigation measures should be considered by lead agencies during specific project planning and development, and specific mitigation measures should be adopted that are consistent with the Delta Plan coequal goals and the purposes of the site-specific projects. Not all mitigation measures will be applicable to all projects, because site-specific projects will vary in purpose, location, and timing.

In most cases, implementation of mitigation measures would reduce GHG emissions impacts associated with water supply reliability projects to a less-than-significant level. In some cases, construction or operations emissions may exceed the applicable significance levels, even with mitigation, and could result in a significant, unavoidable impact. This situation is most likely to occur during construction of large infrastructure projects, and may be temporary in nature. GHG emissions that would result from projects

after implementation of mitigation would be less than the maximum estimated amounts, but the emissions and climate change impacts that would ultimately occur remain uncertain.

Project-level impacts would be addressed in future site-specific environmental analysis conducted at the time such projects are proposed by lead agencies. However, because the implementation of projects and activities that would be encouraged by the Proposed Project has the potential to generate substantial GHG emissions, the potential impacts are considered **significant**.

21.5.3.1.2 Impact 21-2a: Construction and Operations of Projects Could Conflict with an Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing Emissions of GHGs

Based on the size, scope, and purpose of water supply reliability projects, the following criteria could be used to evaluate whether a proposed project is consistent with plans or state goals to reduce or mitigate GHGs, including:

- ARB's recommendations and policy guidance in its Climate Change Scoping Plan(ARB 2008);
- Regulations or requirements adopted by ARB and others to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions, or;
- Whether the proposed project is part of a plan that includes overall reductions in GHG emissions.

The six key elements of the Climate Change Scoping Plan include energy efficiency, renewable energy, a cap and trade program, targets for transportation-related GHG emissions, implementation of measures pursuant to existing State laws and policies, and targeted fees, including a public goods charge on water use. ARB's 39 recommended actions in the Climate Change Scoping Plan include six measures aimed at continuing water use efficiency and using cleaner energy sources to move and treat water. These measures and the key elements of the plan will be reflected in requirements adopted in the future. On the local level, projects would be expected to comply with applicable city or county plans, policies, or recommendations adopted to reduce GHG emissions. The Proposed Project would directly support several GHG reduction measures recommended by ARB (e.g., water use efficiency, water recycling, reuse of urban runoff), which would also be beneficial in meeting any local jurisdiction reduction goals.

Previously completed environmental studies for similar projects were considered as part of the preparation of this EIR. As indicated previously, the Calaveras Dam Replacement Project Final EIR (SFPUC 2011), concluded that the project's GHG emissions would not contribute to significant cumulative GHG emissions. The Supplemental EIR/EIS for the Riverside-Corona Feeder Pipeline (WMWD and Reclamation, 2011), which includes pipeline construction that would likely have features similar to some of the water supply reliability projects encouraged by the Proposed Project, concluded there would be less-than-significant short-term construction-related GHG emissions. It also concluded that long-term emissions of GHG would be less than significant due to consistency with the ARB Scoping Plan, and that total CO2 emissions for would not exceed the CARB and SCAQMD draft GHG thresholds for industrial projects.

Project-level actions are not addressed in existing plans to reduce or mitigate GHGs; rather the plans recommend broader goals and actions for statewide evaluation and implementation. As long as individual projects incorporate the recommended measures and evaluate consistency with the applicable plans as part of project-specific environmental documentation, projects would not be in conflict with or inconsistent with applicable plans. Therefore, the impact would be **less than significant**.

21.5.3.1.3 Impact 21-3a: Conflict with Operations of Proposed Facilities Due to Climate Change and Sea Level Rise

Because of the long-term nature of climate change and sea level rise, impacts related to climate change and sea level rise are considered in this EIR only as operations effects.

The Proposed Project would encourage the development of surface water intakes/diversions, reservoirs, wells, ocean desalination projects, and stormwater projects. Surface water elevations at intakes/diversion structures for surface water treatment plants and ocean desalination projects and diversion facilities for stormwater recycling facilities could increase due to both sea level rise and more frequent extreme rainfall or snowmelt events. The amount of water surface elevation increase could be reduced during non-rainfall periods which could be more extended in duration due to climate change. If the intakes/diversions were not constructed for variable surface water elevations, there could be periods of time when the facilities would not be operable because the surface water elevation would either be too high or too low for the intakes/diversions facilities.

If water supply reliability facilities are located at elevations below the highest projected surface water elevation, the facilities may not be operable due to local flooded conditions.

Long-term operations of wells and wellfields also could be interrupted if the groundwater recharge is reduced. As described in Section 3, groundwater is frequently recharged through rainfall on the area with wells or wellfields or from flows in adjacent stream channels. If the climate change results in a drier climate and less rainfall, groundwater recharge from direct rainfall could be reduced. If the climate change results in a reduction of snowmelt runoff flows or snowmelt that occurs when streams are flowing full, the additional water could remain in the stream for a short period of time, which would reduce the amount of groundwater recharge.

Project-level impacts would be addressed in future site-specific environmental analysis conducted at the time such projects are proposed by lead agencies, and these analyses will include more information on impacts resulting from climate change and sea level rise. During the project-level analyses, these impacts will be identified by hydrology and hydraulic studies, as they depend on various site-specific factors and on the proximity of the site to surface waters and groundwater recharge mechanisms. However because water supply reliability projects encouraged by the Proposed Project could be affected by operations interruption, flooding due to climate change and sea level rise, or reduced groundwater recharge amounts, the potential impacts are considered **significant.**

21.5.3.2 Delta Ecosystem Restoration

As described in Sections 2A, Proposed Project and Alternatives, and 2B, Introduction to Resource Sections, the Delta Plan does not direct the construction of specific projects, nor would projects be implemented under the direct authority of the Council. However, the Delta Plan seeks to improve the Delta ecosystem by encouraging various actions and projects, which if taken could lead to completion, construction and/or operation of projects that could improve the Delta ecosystem.

Features of such projects and actions that could be implemented as part of efforts to restore the Delta ecosystem include the following:

- Floodplain restoration
- Riparian restoration
- Tidal marsh restoration
- Ecosystem stressor management
- Invasive species management (including removal of invasive vegetation)

The number and location of all potential projects that could be implemented is not known at this time. Five projects or project locations, however, are known to various degrees and are named in the Delta Plan. These are:

- Cache Slough Complex (includes Prospect Island Restoration Project)
- Cosumnes River-Mokelumne River Confluence: North Delta Flood Control and Ecosystem Restoration Project
- Lower San Joaquin River Bypass Proposal
- Suisun Marsh Habitat Management, Preservation, and Restoration Plan (includes Hill Slough Restoration Project)
- Yolo Bypass

Of these five, the North Delta Flood Control and Ecosystem Restoration Project and the Suisun Marsh Habitat Management, Preservation, and Restoration Plan have undergone project-specific environmental review.

In addition to these projects, the policies and recommendations of the Proposed Project could influence several named programs including the Water Quality Control Plan Update for the San Francisco Bay/ Sacramento-San Joaquin Delta Estuary (water flow objectives update), the Delta Conservancy Strategic Plan, the variance for the U.S. Army Corps of Engineers (USACE) Vegetation Policy, and California Department of Fish and Game's (DFG's) Stage Two Actions for Nonnative Invasive Species. These actions focus on monitoring, study, and coordination, and encouragement of the continuation of these actions under the Proposed Project would not generate significant GHG emissions relative to existing conditions.

21.5.3.2.1 Impact 21-1b: Construction and Operations of Projects Could Result in an Increase in GHG Emissions That May Have a Significant Impact on the Environment

Construction Effects

Construction-related GHG emissions for ecosystem restoration projects associated with the implementation of the Delta Plan would primarily result from fuel combustion in construction equipment, trucks, worker vehicles, and dredging equipment. Projects encouraged by the Delta Plan would include the construction of ecosystem restoration areas, including floodplain, riparian, tidal marsh, and wetland restoration areas, along with management of ecosystem stressors (e.g., nonnative invasive species), and modification of levees and associated infrastructure. Construction of restoration sites could involve topographic grading, removal or relocation of levee sections, exposure of bare soil, dredging, and changes in vegetation. Restoration would introduce habitat types such as tidal marsh, riparian corridors, and grassland to areas that are currently dominated by agricultural fields and, to a lesser extent, urban land uses.

Construction-related activities for large Delta ecosystem restoration projects would require use of heavy equipment, such as excavators, graders, scrapers, bulldozers, backhoes, and dredges. Haul trucks would be used to move borrow and/or spoils and other materials. Less extensive use of heavy equipment and smaller construction footprints would be needed for smaller ecosystem restoration projects. The locations of these projects would most likely be in the Delta. Projects could be located in one or more air basins, and could be located in or near the Delta, Suisun Marsh, Cache Slough, Yolo Bypass, or the San Joaquin River, as described in Section 2A, Proposed Project and Alternatives.

Ecosystem restoration projects encouraged by the Delta Plan have the potential to result in GHG emissions impacts and benefits. The nature and magnitude of impacts and benefits would depend on the

construction details and operating characteristics of the proposed projects, the applicable thresholds of significance, and the specific mitigation measures adopted by the implementing agencies.

While the specific impacts of projects encouraged by the Delta Plan, if they go forward, are yet to be determined, projects recently evaluated under CEQA with similar characteristics provide analogous information about the impacts expected from construction.

Documents reviewed to help identify potential impacts included the final EIRs\ for the North Delta Flood Control and Ecosystem Restoration Project (DWR 2010), which analyzed proposed flood management and ecosystem restoration projects in the Delta, and the Suisun Marsh Habitat Management, Preservation, and Restoration Plan Draft EIS/EIR (Reclamation, USFWS, DFG 2010), which addressed ecosystem restoration in the Suisun Marsh. GHG emissions impacts for the North Delta Flood Control Project, which included floodplain restoration that would likely have features similar to restoration actions encouraged by the Proposed Project, were determined to be less than significant. The construction-related GHG impacts of the Suisun Marsh project GHG emissions impacts were less than significant. The Final Davis-Woodland Water Supply Project EIR did not assess climate change or GHG emissions impacts (City of Davis et al. 2007).

Based on these examples, it is possible that GHG emissions impacts of ecosystem restoration projects encouraged by the Delta Plan may be less than significant, could be mitigated to a less-than-significant level, or may be beneficial. The details of many of the aspects of these projects, however, are not currently known. Impacts of large-scale ecosystem restoration projects may be more difficult to avoid or mitigate to a less-than-significant level because of the magnitude of the construction. Therefore, one or more of the ecosystem restoration projects encouraged by the Delta Plan might result in a significant and unavoidable impact on GHG emissions. This is particularly true for temporary construction impacts in areas with stringent thresholds of significance for GHG emissions.

Project-specific construction emissions are likely to be substantial if large infrastructure projects are implemented. In this program-level study, construction-related GHG emissions from Delta ecosystem restoration projects are considered significant, because of uncertainties regarding size, timing, and locations of potential projects, as well as the applicable jurisdictional AQMD or APCD regulations, CEQA guidance, and thresholds of significance.

Effects of Project Operations

GHG emissions associated with operations and maintenance of ecosystem restoration projects would likely be similar to those expected during construction, but at much lower levels. GHG emissions would depend on several factors, such as the size and type of project, the number of employees and types of equipment used, the increased traffic on the local and regional roadway network (including additional trucks and worker vehicles), and the level and frequency of activities.

Long term operation of some potential projects, such as ecosystem habitat, tule farms, and conversion or fallowing of agricultural land could sequester or reduce GHG emissions. These reductions are unlikely to offset all of the increased emissions from construction and operation of ecosystem restoration projects under the Proposed Project. Therefore, the Proposed Project would have limited potential to contribute to a lower carbon future.

Quantification of operational emissions would be too speculative at this program level because of unknown project details, localized variables, and operational considerations. Project-specific GHG emissions impacts would be addressed in project-specific environmental studies conducted by the lead agency at the time projects are proposed for implementation, and required mitigation and operating conditions would be reflected in needed permits and approvals for the projects.

Previously completed environmental studies for similar projects were considered as part of the preparation of this EIR. The long term operations-related GHG impacts of the Suisun Marsh project were determined to be beneficial, resulting in permanent changes in GHG sources and sinks, and reducing degradation of wetland habitat and ecosystem health as a result of inundation associated with sea level rise. Other reviewed documents did not assess operations-related climate change or GHG emissions impacts.

Conclusion

It is unclear at this time how implementation of the Proposed Project would result in construction and operations of Delta ecosystem restoration projects, including the location, number, capacity, operational criteria, and methods and duration of activities. Because of the uncertainties underlying this program-level assessment, GHG emissions impacts and benefits associated with ecosystem restoration projects cannot be accurately quantified. Project-level impacts and benefits would be addressed in future site-specific environmental analysis conducted at the time such projects are proposed by lead agencies.

In most cases, project-related benefits, compliance with required permits and approvals, and implementation of mitigation measures would reduce impacts associated with projects to a less-than-significant level. In some cases, construction or operations emissions may exceed the applicable air district significance levels, even with mitigation, and could result in a significant, unavoidable impact. This situation is most likely to occur during construction of large Delta ecosystem restoration projects, and may be temporary in nature.

Project-level impacts would be addressed in future site-specific environmental analysis conducted at the time such projects are proposed by lead agencies. However, because the implementation of projects and activities that would be encouraged by the Proposed Project has the potential to generate substantial GHG emissions, the potential impacts are considered **significant**.

21.5.3.2.2 Impact 21-2b: Construction and Operations of Projects Could Conflict with an Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing Emissions of GHGs

Project-level actions are not addressed in existing plans to reduce or mitigate GHGs; rather the plans recommend broader goals and actions for statewide evaluation and implementation. None of previously completed environmental reviews for similar projects considered as part of the preparation of this EIR included an assessment of consistency with applicable plans, policies, or regulations adopted for the purpose of reducing emissions of GHGs.

As long as individual ecosystem restoration projects result in GHG emissions reductions and/or incorporate the recommended reduction measures and evaluate consistency with applicable plans as part of project-specific environmental evaluations, projects would not be in conflict with or inconsistent with applicable plans. Therefore, the impact would be **less than significant**.

21.5.3.2.3 Impact 21-3b: Conflict with Operations of Proposed Facilities Due to Climate Change and Sea Level Rise

Because of the long-term nature of climate change and sea level rise, impacts related to climate change and sea level rise are considered in this EIR only as operations effects.

The Proposed Project would encourage the development of floodplain restoration, riparian restoration, and tidal marsh restoration. Increased surface water elevations of up to 7 inches at 2030 during non-storm events at floodplain, riparian, or tidal marsh restoration sites and greater increases during storm events with high flows and storm surge may not substantially change ecosystems especially in floodplains and along riparian corridors. Deep portions of tidal marsh could become subtidal marsh with higher surface

water elevations and this could lead to a change in species composition within the habitat. BCDC projected that climate change and sea level rise could affect the ecosystem around and adjacent to the San Francisco Bay (including Suisun Marsh as well as the western Delta) by inundating or eroding wetlands and transitional habitats due to changes in water quality and wave dynamics which could lead to changes in species composition (BCDC 2011). BCDC also indicates that future facilities to protect adjacent land uses from flooding due to climate change and sea level rise could result in structures being placed along shorelines that would prevent shoreline ecosystems from migrating to higher elevations. Therefore, establishment of floodplain restoration, riparian restoration, and tidal marsh restoration could protect adjacent areas for future ecosystem migration.

Project-level impacts would be addressed in future site-specific environmental analysis conducted at the time such projects are proposed by lead agencies, and these analyses will include more information on impacts resulting from climate change and sea level rise. During the project-level analyses, these impacts will be identified by hydrology and hydraulic studies and ecological surveys, as they depend on various site-specific factors and on the specific location of the site along surface water bodies. However because Delta ecosystem restoration projects encouraged by the Delta Plan could be affected by increased surface water elevations due to climate change and sea level rise, the potential impacts are considered **significant**.

21.5.3.3 Water Quality Improvement

As described in Sections 2A, Proposed Project and Alternatives and 2B, Introduction to Resource Sections, the Delta Plan does not direct the construction of specific projects, nor would projects be implemented under the direct authority of the Council. However, the Delta Plan seeks to improve water quality by encouraging various actions and projects, which if taken could lead to completion, construction and/or operation of projects that could improve water quality.

Actions would include implementation of plans/programs that lead to reduced constituents from agricultural runoff and wastewater treatment plants.

Associated projects could include construction and operation and maintenance of:

- Water treatment plants
- Conveyance facilities (pipelines and pumping plants)
- Wastewater treatment and recycle facilities
- Municipal stormwater treatment facilities
- Agricultural runoff treatment (eliminate, capture and treat/reuse)
- Wellhead treatment facilities
- Wells (withdrawal, recharge, and monitoring)

The number and location of all potential actions and projects that could be implemented is currently not known. Various projects or actions, however, are known to some degree and are named in the Delta Plan. These are:

- Central Valley Drinking Water Policy
- Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS)
- Water Quality Control Plan Update for the San Francisco Bay/ Sacramento-San Joaquin Delta Estuary (water flow objectives update)
- State Water Resources Control Board/Central Valley Regional Water Quality Control Board Strategic Workplan book
- Central Valley Pesticide Total Maximum Daily Load and Basin Plan Amendment for diazinon and chlorpyrifos

- Central Valley Pesticide Total Maximum Daily Load and Basin Plan Amendment for pyrethroids
- Total Maximum Daily Load and Basin Plan Amendments for selenium and methylmercury
- North Bay Aqueduct Alternative Intake Project

21.5.3.3.1 Impact 21-1c: Construction and Operations of Projects Could Result in an Increase in GHG Emissions That May Have a Significant Impact on the Environment

Construction Effects

Construction-related GHG emissions for water quality improvement projects associated with the implementation of the Delta Plan would primarily result from fuel combustion in construction equipment, trucks, worker vehicles, and dredging equipment. Water quality improvement projects encouraged by the Delta Plan would include new and expanded water and wastewater treatment plants and conveyance facilities (pipelines and pumping plants). Projects to improve water quality may include modified or new treatment plants for surface water, groundwater, wastewater, stormwater, or agricultural runoff. Construction-related activities to build large water treatment facilities and other projects to improve water quality could require the use of heavy equipment, such as excavators, graders, scrapers, bulldozers, backhoes, and concrete mixing and pumping trucks. Haul trucks would be used to move borrow and/or spoils and other materials. This type of project would also include construction of related facilities, such as pipelines, pumping plants, service roads, buildings, or other facilities. Less extensive use of heavy equipment and smaller construction footprints would be needed for smaller projects that might be constructed to improve water quality. These projects could be located in one or more air basins. They may be located in the Delta, but may more likely be located in areas outside the Delta, as described in Section 2A, Proposed Project and Alternatives.

It is unclear at this time how implementation of the Proposed Project would result in construction of water quality improvement projects, including the location, number, capacity, and methods and duration of construction activities. However, the Delta Plan encourages implementation of the North Bay Aqueduct Alternative Intake Project. The new alternative intake structure would be located on the Sacramento River in a rural area of Sacramento or Yolo County and the new pipeline would extend from the new intake structure to the existing North Bay Regional Water Treatment Plant. The diversion/intake structure and water conveyance pipeline are similar to the Davis-Woodland Water Supply Project. The Delta Plan also encourages implementation of the Central Valley Drinking Water Policy, the Water Quality Control Plan Update for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary, the State Water Resources Control Board/Central Valley Regional Water Quality Control Board Strategic Workplan, and CV SALTS. Also encouraged would be completion of regulatory processes, research, and monitoring to support several amendments to the Central Valley Pesticide Total Maximum Daily Load and Basin Plan, i.e., the amendments for diazinon and chlorpyrifos, pyrethroids, and selenium and methylmercury. These studies could result in additional requirements for new or modified water treatment facilities and infrastructure.

Projects encouraged by the Proposed Project to improve water quality have the potential to result in GHG emissions impacts. The nature and magnitude of impacts would depend on the construction details and operating characteristics of the proposed projects, and the specific mitigation measures adopted by the implementing agencies.

Few previously completed environmental reviews for similar projects considered as part of the preparation of this EIR included an assessment of climate change or GHG emissions impacts. For those studies that did address climate change and GHGs, comparison of the findings is difficult. The approaches used to assess and mitigate project-related GHG emissions impacts have evolved over time, following the enactment of SB 97 in August 2007 and the adoption of related CEQA guidelines amendments in

December 2009.There is no adopted statewide quantitative significance threshold for GHGs under CEQA, so findings regarding the significance of GHG impacts of similar projects may vary geographically. Some local air districts do not have CEQA guidance related to GHG emissions, whereas others, such as BAAQMD, have recently finalized and updated their CEQA thresholds of significance and guidance (BAAQMD 2010a, 2010b, 2011).

In some situations, according to previously completed environmental reviews for similar projects and available CEQA guidelines, feasible mitigation exists to reduce significant impacts for these types of projects to a less-than-significant level.

Documents reviewed to help identify potential impacts included the Draft and Final EIS/EIR for the Grasslands By-Pass project (Reclamation and San Luis & Delta-Mendota Water Authority 2008). This study may be illustrative of some of the types of GHG emissions impacts associated with water quality improvement projects, because it addresses such project components as agricultural runoff treatment that may be similar to components of projects encouraged by the Delta Plan (see Appendix H). The EIS/EIRs concluded that construction-related GHG emissions impacts would be less than significant. The Davis-Woodland Water Supply Project EIR (City of Davis et al. 2007) did not assess climate change or GHG emissions impacts.

Based on the available examples, it is possible that GHG emissions impacts of water quality improvement projects encouraged by the Delta Plan may be less than significant, or could be mitigated to a less-than-significant level. The details of many of the aspects of these projects, however, are not currently known, and it is possible that significant and unavoidable impacts on GHG emissions could occur. Impacts of large-scale surface water storage projects may be more difficult to avoid or mitigate to a less-than-significant level because of the magnitude of the construction and the required levels of operations and maintenance. Therefore, one or more of the water quality improvement projects encouraged by the Delta Plan might result in significant and unavoidable GHG emissions impacts.

Project-specific construction-related GHG emissions are likely to be substantial if large infrastructure projects are implemented. In this program-level study, construction-related emissions from future projects to improve water quality are considered significant, because of uncertainties regarding size, timing, and locations of potential projects, as well as the applicable jurisdictional AQMD or APCD regulations, CEQA guidance, and thresholds of significance.

Effects of Project Operations

Projects to improve water quality may include modified or new treatment plants for surface water, groundwater, wastewater, stormwater, or agricultural runoff. GHG emissions associated with operations of projects to improve water quality would depend on several factors, such as the size and type of project, the number and types of emission sources (e.g., boilers and generators) needed to support operations, required chemical use, the amount and the source of the electricity used, the number of employees and types of equipment, the increased traffic on the local and regional roadway network (including additional haul trucks and workers), types and volumes of generated wastes, and the level of operations activities.

Few previously completed environmental reviews for similar projects considered as part of the preparation of this EIR included an assessment of climate change or GHG emissions impacts. Documents reviewed for potential impacts included the Draft and Final EIS/EIR for the Grasslands By-Pass project (Reclamation and and San Luis & Delta-Mendota Water Authority 2008). This study may be illustrative of some of the types of GHG emissions impacts associated with water quality improvement projects. The EIS/EIR concluded that the project would result in increased electrical power consumption, but GHG emissions impacts would be less than significant. The Davis-Woodland Water Supply Project EIR (City of Davis, et al. 2007) did not assess climate change or GHG emissions impacts.

Quantification of operational emissions would be too speculative at this program level because of unknown project details, localized variables, and operational considerations. Project-specific GHG emissions impacts would be addressed in project-specific environmental studies conducted by the lead agency at the time projects are proposed for implementation, and required mitigation and operating conditions would be reflected in needed permits and approvals for the projects.

Conclusion

It is unclear at this time how implementation of the Proposed Project would result in construction and operations of projects to improve water quality, including the location, number, capacity, operational criteria, and methods and duration of activities. Because of the uncertainties underlying this program-level assessment, GHG emissions impacts cannot be accurately quantified. Project-level impacts would be addressed in future site-specific environmental analysis conducted at the time such projects are proposed by lead agencies.

In most cases, compliance with required permits and approvals and implementation of mitigation measures would reduce impacts associated with projects to a less-than-significant level. In some cases, GHG emissions from construction or operations may exceed the applicable air district significance levels, even with mitigation, and could result in a significant, unavoidable impact. This situation is most likely to occur during construction of large infrastructure projects.

Project-level impacts would be addressed in future site-specific environmental analysis conducted at the time such projects are proposed by lead agencies. However, because the implementation of projects and activities that would be encouraged by the Proposed Project has the potential to generate substantial GHG emissions, the potential impacts are considered **significant**.

21.5.3.3.2 Impact 21-2c: Construction and Operations of Projects Could Conflict with an Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing Emissions of GHGs

Based on the size, scope, and purpose of water quality improvement projects, the following criteria could be used to evaluate whether a proposed project is consistent with plans or State goals to reduce or mitigate GHGs, including:

- ARB's recommendations and policy guidance in the Climate Change Scoping Plan;
- Regulations or requirements adopted by ARB and others to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions, or;
- Whether the proposed project is part of a plan that includes overall reductions in GHG emissions.

The six key elements of the Climate Change Scoping Plan include energy efficiency, renewable energy, a cap and trade program, targets for transportation-related GHG emissions, implementation of measures pursuant to existing State laws and policies, and targeted fees, including a public goods charge on water use. ARB's 39 recommended actions in the Climate Change Scoping Plan include 6 measures aimed at continuing water use efficiency and using cleaner energy sources to move and treat water. These and other measures will be adopted to achieve GHG reductions in keeping with the Scoping Plan. On the local level, projects would be expected to comply with applicable City or County plans, policies, or recommendations adopted to reduce GHG emissions. The Proposed Project would directly support several GHG reduction measures recommended by ARB (e.g., water use efficiency, water recycling, reuse of urban runoff), which would also be beneficial in meeting any local jurisdiction reduction goals.

Project-level actions are not addressed in existing plans to reduce or mitigate GHGs; rather the plans recommend broader goals and actions for statewide evaluation and implementation. None of the

previously completed environmental documents for similar projects considered as part of the preparation of this EIR included an assessment of consistency with applicable plans, policies, or regulations adopted for the purpose of reducing emissions of GHGs.

As long as individual water quality improvement projects incorporate the recommended measures and evaluate consistency with the applicable plans as part of project-specific environmental documentation, projects would not be in conflict with or inconsistent with applicable plans. Therefore, the impact would be **less than significant**.

21.5.3.3.3 Impact 21-3c: Conflict with Operations of Proposed Facilities Due to Climate Change and Sea Level Rise

Because of the long-term nature of climate change and sea level rise, impacts related to climate change and sea level rise are considered in this EIR only as operations effects.

The Proposed Project would encourage the development of surface water intakes/diversions, reservoirs, wastewater treatment facilities, stormwater treatment facilities, agricultural runoff treatment facilities, and wells. Surface water elevations at intakes/diversion structures for surface water treatment plants, diversion facilities for stormwater recycling facilities, and outfalls for wastewater treatment and agricultural runoff treatment facilities could increase due to both sea level rise and more frequent extreme rainfall or snowmelt events. The amount of water surface elevation increase could be reduced during non-rainfall periods which could be more extended in duration due to climate change. If the intakes/diversions and outfalls were not constructed for variable surface water elevations, there could be periods of time when the facilities would not be operable because the surface water elevation would either be too high or too low for the facilities.

If water supply reliability facilities are located at elevations below the highest projected surface water elevation, the facilities may not be operable due to local flooded conditions.

Long-term operations of wells and wellfields also could be interrupted if the groundwater recharge is reduced. As described in Section 3, Water Resources, groundwater is frequently recharged through rainfall on the area with wells or wellfields or from flows in adjacent stream channels. If the climate change results in a drier climate and less rainfall, groundwater recharge from direct rainfall could be reduced. If the climate change results in a reduction of snowmelt runoff flows or snowmelt that occurs when streams are flowing full, the additional water could remain in the stream for a short period of time, which would reduce the amount of groundwater recharge.

Project-level impacts would be addressed in future site-specific environmental analysis conducted at the time such projects are proposed by lead agencies, and these analyses will include more information on impacts resulting from climate change and sea level rise. During the project-level analyses, these impacts will be identified by hydrology and hydraulic studies, as they depend on various site-specific factors and on the proximity of the site to surface waters and groundwater recharge mechanisms. However because water quality improvement projects encouraged by the Delta Plan could be affected by operations interruption, flooding due to climate change and sea level rise, or reduced groundwater recharge amounts, the potential impacts are considered **significant.**

21.5.3.4 Flood Risk Reduction

As described in Sections 2A, Proposed Project and Alternatives, and 2B, Introduction to Resource Sections, the Delta Plan does not direct the construction of specific projects, nor would projects be implemented under the direct authority of the Council. However, the Delta Plan seeks to reduce the risk of floods in the Delta by encouraging various actions, which if taken could lead to completion,

construction and/or operation of projects that could reduce flood risks in the Delta. Such projects and their features could include the following:

- Setback levees
- Floodplain expansion
- Levee maintenance
- Levee modification
- Dredging
- Stockpiling of rock for flood emergencies
- Subsidence reversal
- Reservoir reoperation

The number and location of all potential projects that would be implemented is not known at this time. One possible project, however, is known to some degree and is named in the Delta Plan, specifically the Sacramento River Deep Water Ship Channel and Stockton Deep Water Ship Channel Dredging (the United States Army Corps of Engineer's *Delta Dredged Sediment Long-Term Management Strategy* included in Appendix C, Attachment C-7 of this EIR). The Proposed Project also names DWR's *A Framework for Department of Water Resources Investments in Delta Integrated Flood Management*, which could, upon completion, provide guidance on the prioritization flood protection investments.

21.5.3.4.1 Impact 21-1d: Construction and Operations of Projects Could Result in an Increase in GHG Emissions That May Have a Significant Impact on the Environment

Construction Effects

Construction-related GHG emissions for flood risk reduction projects associated with the implementation of the Delta Plan would primarily result from fuel combustion in construction equipment, trucks, worker vehicles, and dredging equipment. Flood risk reduction projects encouraged by the Delta Plan would include the construction of levees and operable barriers along the levees, levee maintenance, levee modification, expansion of floodplains, subsidence reversal projects, and sediment removal from channels. Construction would include removal of vegetation and disturbance of soil in facilities footprints and borrow/spoils areas. Implementing the Proposed Project could increase investments in levee improvements in the Delta. The improvements could primarily be to existing levees and typically would not alter their basic shape and configuration, except for the use of setback levees. Setback levees could extend the levee footprint and width into the landside of an area and increase riparian habitat on the waterside of the levee.

Construction-related activities for projects to reduce risk of floods in the Delta, such as construction of levees, floodplain expansion, or dredging of waterways would require the use of heavy equipment, such as excavators, graders, scrapers, bulldozers, backhoes, and dredges. Haul trucks would be used to move borrow and/or spoils and other materials. Less extensive use of heavy equipment and smaller construction footprints would be needed for smaller projects. The locations of these projects would most likely be in the primary study area. Projects could be located in one or more air basins, and could be located in the Delta or on rivers in the Delta Watershed, as described in Section 2A, Proposed Project and Alternatives.

It is unclear at this time how implementation of the Proposed Project would result in construction of flood risk reduction projects, including the location, number, capacity, and methods and duration of construction activities. However, the Delta Plan encourages implementation of the Sacramento River Deep Water Ship Channel and Stockton Deep Water Ship Channel Maintenance Projects, as described in the *Delta Dredged Sediment Long-Term Management Strategy* (USACE 2007). An ongoing project that also involves hydraulic dredging is the North Delta Flood Control and Ecosystem Restoration Project (DWR 2010d). The Delta Plan also encourages the DWR Framework for Investments in Delta Flood

Management, which may in turn encourage projects to improve levee maintenance and flood control facilities, enhance ecosystems, reverse subsidence, and improve emergency preparedness.

Flood risk reduction projects encouraged by the Delta Plan have the potential to result in GHG emissions impacts. The nature and magnitude of impacts would depend on the construction details and operating characteristics of the proposed projects, the applicable thresholds of significance, and the specific mitigation measures adopted by the implementing agencies.

While the specific impacts of projects encouraged by the Delta Plan, if they go forward, are yet to be determined, projects recently evaluated under CEQA with similar characteristics provide analogous information about the impacts expected from construction.

Documents reviewed to help identify potential impacts included EIRs for the North Delta Flood Control and Ecosystem Restoration Project (DWR 2010d), which analyzes proposed flood management and ecosystem restoration projects in the Delta, and the USACE Draft Supplemental EIS/EIR for the Sacramento River Deep Water Ship Channel (USACE 2011). GHG emissions impacts for the North Delta Flood Control project were determined to be less than significant. The EIS/EIR for the Sacramento River Deep Water Ship Channel project did not assess climate change or GHG emissions impacts.

Based on these examples, it is possible that GHG emissions impacts of flood risk reduction projects encouraged by the Delta Plan may be less than significant or could be mitigated to a less-than-significant level. The details of many of the aspects of these projects, however, are not currently known. Impacts of large-scale flood risk reduction projects may be more difficult to avoid or mitigate to a less-than-significant level because of the magnitude of the construction. Therefore, one or more of the projects encouraged by the Delta Plan might result in a significant and unavoidable impact on GHG emissions. This is particularly true for temporary construction impacts in areas with stringent thresholds of significance for GHG emissions.

Project-specific construction-related GHG emissions are likely to be substantial if large infrastructure projects are implemented. In this program-level study, construction-related emissions from future projects to reduce risk of floods in the Delta are considered significant, because of uncertainties regarding size, timing, and locations of potential projects, as well as the applicable jurisdictional AQMD or APCD regulations, CEQA guidance, and thresholds of significance.

Effects of Project Operations

GHG emissions associated with operations and maintenance of flood risk reduction projects would likely be similar to those expected during construction, but at much lower levels. None of the previously completed environmental reviews for similar projects considered as part of the preparation of this EIR included an assessment of operations-related GHG emissions impacts.

Emissions associated with operations and maintenance would depend on several factors, such as the size and type of project, the number of employees and types of equipment, the increased traffic on the local and regional roadway network (including additional haul trucks and workers), and the level and frequency of activities. GHG emissions impacts may not be significant, but quantification of operational emissions would be too speculative at this program level because of unknown project details, localized variables, and operational considerations. Project-specific GHG emissions impacts would be addressed in project-specific environmental studies conducted by the lead agency at the time projects are proposed for implementation, and required mitigation and operating conditions would be reflected in needed permits and approvals for the projects.

Conclusion

It is unclear at this time how implementation of the Proposed Project would result in construction and operations of projects to reduce the risk of floods in the Delta, including the location, number, capacity, operational criteria, and methods and duration of activities. Because of the uncertainties underlying this program-level assessment, GHG emissions impacts cannot be accurately quantified. Project-level impacts would be addressed in future site-specific environmental analysis conducted at the time such projects are proposed by lead agencies.

In most cases, compliance with required permits and approvals and implementation of mitigation measures would reduce impacts associated with projects to a less-than-significant level. In some cases, construction or operations emissions may exceed the applicable air district significance levels, even with mitigation, and could result in a significant, unavoidable impact. This situation is most likely to occur during construction of large projects to reduce risk of floods in the Delta, and may be temporary in nature.

Project-level impacts would be addressed in future site-specific environmental analysis conducted at the time such projects are proposed by lead agencies. However, because the implementation of projects and activities that would be encouraged by the Proposed Project has the potential to generate substantial GHG emissions, the potential impacts are considered **significant**.

21.5.3.4.2 Impact 21-2d: Construction and Operations of Projects Could Conflict with an Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing Emissions of GHGs

Project-level actions are not addressed in existing plans to reduce or mitigate GHGs; rather the plans recommend broader goals and actions for statewide evaluation and implementation. None of the previously completed environmental reviews for similar projects considered as part of the preparation of this EIR included an assessment of consistency with applicable plans, policies, or regulations adopted for the purpose of reducing emissions of GHGs.

As long as individual flood risk reduction projects incorporate the recommended GHG emission reduction measures and evaluate consistency with the applicable plans as part of project-specific environmental documentation, projects would not be in conflict with or inconsistent with applicable plans. Therefore, the impact would be **less than significant**.

21.5.3.4.3 Impact 21-3d: Conflict with Operations of Proposed Facilities Due to Climate Change and Sea Level Rise

Because of the long-term nature of climate change and sea level rise, impacts related to climate change and sea level rise are considered in this EIR only as operations effects.

The Proposed Project would encourage the development of setback levees, floodplain expansion, levee modifications, and reservoir reoperation. Surface water elevations within floodplains and along levees could increase due to both sea level rise and more frequent extreme rainfall or snowmelt events and overtop the levees or cause levee failures.

Climate change could increase the frequency and amount of rainfall upstream of the reservoirs which could cause increased frequency of reservoir becoming full and releasing water into the downstream channels. If the reservoirs are frequently full, there will be little flexibility for reoperation to reduce flood potential downstream of the reservoir, including in the Delta, even if the downstream channels have high surface water elevations due to climate change and sea level rise.

Project-level impacts would be addressed in future site-specific environmental analysis conducted at the time such projects are proposed by lead agencies, and these analyses will include more information on impacts resulting from climate change and sea level rise. During the project-level analyses, these impacts

will be identified by hydrology and hydraulic studies, as they depend on various site-specific factors and on the proximity of the site to surface waters and groundwater recharge mechanisms. However because projects to reduce risk of flood potential in the Delta encouraged by the Delta Plan could be affected by climate change, the potential impacts are considered **significant.**

21.5.3.5 Protection and Enhancement of Delta as an Evolving Place

As described in Sections 2A, Proposed Project and Alternatives, and 2B, Introduction to Resource Sections, the Delta Plan does not direct the construction of specific projects, nor would projects be implemented under the direct authority of the Council. However, the Delta Plan seeks to protect and enhance the Delta as an evolving place by encouraging various actions and projects, which if taken could lead to completion, construction and/or operation of associated projects. Features of such actions and could include the following:

- Gateways, bike lanes, parks, trails, and marinas and facilities to support wildlife viewing, angling, and hunting opportunities
- Additional retail and restaurants in legacy towns to support tourism

The number and location of all potential projects that could be implemented is not currently known. However, three possible projects are known to some degree and are named in the Delta Plan, which are new State Parks at Barker Slough, Elkhorn Basin, and in the southern Delta.

21.5.3.5.1 Impact 21-1e: Construction and Operations of Projects Could Result in an Increase in GHG Emissions That May Have a Significant Impact on the Environment

Construction Effects

Construction-related GHG emissions for Delta enhancement projects associated with the implementation of the Delta Plan would primarily result from fuel combustion in construction equipment, trucks, worker vehicles, and dredging equipment. These projects could be located in one or more air basins, and would be located in the Delta, as described in Section 2A, Proposed Project and Alternatives. It is unclear at this time how implementation of the Proposed Project would result in construction of Delta enhancement projects, including the location, number, capacity, and methods and duration of construction activities. However, the Delta Plan encourages implementation of future State Parks at Barker Slough and Elkhorn Basin. The Delta Plan also encourages an Economic Sustainability Plan with recommendations and planning for public safety, flood protection and flood management, recreation investment, socioeconomic sustainability of Delta agriculture and legacy communities, and encouragement of recreational investment along key river corridors.

Projects to protect and enhance the unique resources and values of the California Delta as an evolving place, such as construction of recreational or tourism facilities or State Parks have the potential to result in GHG emissions impacts. The nature and magnitude of impacts would depend on the construction details and operating characteristics of the proposed projects, the applicable thresholds of significance, and the specific mitigation measures adopted by the implementing agencies. The details of many of the aspects of these projects, however, are not currently known. While it is possible that GHG emissions impacts of projects encouraged by the Delta Plan may be less than significant, or could be mitigated to a less-than-significant level, it is also possible that significant and unavoidable GHG emissions impacts could occur.

Review of previously completed documents for similar projects included the Initial Study/Negative Declaration (IS/ND) for the Bidwell-Sacramento River State Park project (The Nature Conservancy and Department of Parks and Recreation 2008). This project would include a parking area, picnic sites, restrooms, and trails, and would restore 25 acres of native habitat and 7 acres of riparian habitat. The project would include standard requirements for measures to reduce emissions associated with

construction-related fugitive dust and equipment exhaust. The IS/ND did not assess climate change or GHG emissions impacts.

Project-specific construction-related GHG emissions may be substantial if large infrastructure projects are implemented. In this program-level study, construction-related GHG emissions from future projects to protect and enhance the unique resources and values of the California Delta as an evolving place, such as construction of recreational or tourism facilities or State Parks, are considered significant, because of the uncertainties regarding size, timing, and locations of potential projects, as well as the applicable jurisdictional AQMD or APCD regulations, CEQA guidance, and thresholds of significance.

Effects of Project Operations

Emissions associated with operations and maintenance of recreational, tourism, or other Delta enhancement projects would depend on several factors, such as the size and type of project, the number of employees and types of equipment, the amount and the source of the electricity used, the increased traffic on the local and regional roadway network, and the level and frequency of operations and maintenance activities. GHG emissions impacts may not be significant, but quantification of operational emissions would be too speculative at this program level because of unknown project details, localized variables, and operational considerations. Project-specific GHG emissions impacts would be addressed in project-specific environmental studies conducted by the lead agency at the time projects are proposed for implementation, and required mitigation and operating conditions would be reflected in needed permits and approvals for the projects.

Conclusion

It is unclear at this time how implementation of the Proposed Project would result in construction and operations of recreational, tourism, or other Delta enhancement projects, including the location, number, capacity, operational criteria, and methods and duration of activities. Because of the uncertainties underlying this program-level assessment, GHG emissions impacts cannot be accurately quantified. Project-level impacts would be addressed in future site-specific environmental analysis conducted at the time such projects are proposed by lead agencies.

In most cases, compliance with required permits and approvals and implementation of mitigation measures would reduce impacts associated with projects to a less-than-significant level. In some cases, construction or operations emissions may exceed the applicable air district significance levels, even with mitigation, and could result in a significant impact. This situation is most likely to occur during construction of large projects, and may be temporary in nature.

Project-level impacts would be addressed in future site-specific environmental analysis conducted at the time such projects are proposed by lead agencies. However, because the implementation of projects and activities that would be encouraged by the Proposed Project has the potential to generate substantial GHG emissions, the potential impacts are considered **significant**.

21.5.3.5.2 Impact 21-2e: Construction and Operations of Projects Could Conflict with an Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing Emissions of GHGs

Project-level actions are not addressed in existing plans to reduce or mitigate GHGs; rather the plans recommend broader goals and actions for statewide evaluation and implementation. The previously completed environmental review for the Bidwell-Sacramento River State Park project (The Nature Conservancy and Department of Parks and Recreation 2008) did not include an assessment of consistency with applicable plans, policies, or regulations adopted for the purpose of reducing emissions of GHGs.

As long as individual Delta enhancement projects incorporate the recommended GHG emission reduction measures and evaluate consistency with the applicable plans as part of project-specific environmental documentation, projects would not be in conflict with or inconsistent with applicable plans. Therefore, the impact would be **less than significant**.

21.5.3.5.3 Impact 21-3e: Conflict with Operations of Proposed Facilities Due to Climate Change and Sea Level Rise

Because of the long-term nature of climate change and sea level rise, impacts related to climate change and sea level rise are considered in this EIR only as operations effects.

The Proposed Project would encourage the development of gateways; bike lanes; parks; trails; marinas; facilities to support wildlife viewing, angling, and hunting opportunities; and retail and restaurants in legacy towns. If future projects to protect and enhance the unique resources and values of the California Delta as an evolving place are located at elevations below the highest projected surface water elevation, the facilities may not be operable due to local flooding conditions. In addition, if sea level rise increases water depths or changes water quality that results in changes in fish and wildlife species composition, angling and hunting opportunities could be reduced.

Project-level impacts would be addressed in future site-specific environmental analysis conducted at the time such projects are proposed by lead agencies, and these analyses will include more information on impacts resulting from climate change and sea level rise. During the project-level analyses, these impacts will be identified by hydrology and hydraulic studies, as they depend on various site-specific factors and on the proximity of the site to surface waters. However because projects to protect and enhance the unique resources and values of the California Delta as an evolving place encouraged by the Delta Plan could be affected by flooding due to climate change and sea level rise or related fish and wildlife species composition, the potential impacts are considered **significant**.

21.5.3.6 Mitigation Measures

Any covered action that would have one or more of the significant environmental impacts listed above shall incorporate the following features and/or requirements related to such impact (i.e., mitigation of GHG emissions impacts from construction and operation of proposed projects).

With regard to covered actions implemented under the Delta Plan, these mitigation measures would reduce the impacts of the proposed action. Project-level analysis by the agency proposing the covered action would determine whether the measures are sufficient to reduce those impacts to a less-than-significant level. Generally speaking, many of these measures are considered standard and in many cases would reduce impacts to a less-than-significant level, as discussed below in more detail. This is not certain, however, and would be determined on a case-by-case basis by the agency proposing the covered action.

With regard to actions taken by other agencies on the basis of Delta Plan recommendations (i.e., activities that are not covered actions), the implementation and enforcement of these measures would be within the responsibility and jurisdiction of public agencies other than the Council. Those agencies can and should adopt these measures as part of their approval of such actions, but the Council does not have the authority to require their adoption. Therefore, significant impacts of noncovered actions could remain significant and unavoidable.

How mitigation measures in this EIR relate to covered and uncovered actions is discussed in more detail in Section 2B, Introduction to Resource Sections.

For projects with the potential to result in significant environmental impacts from GHG emissions, lead agencies should prepare and include a project-specific technical report on climate change and GHG

emissions as part of the environmental documentation, prior to approval of the projects. The technical report should include an analysis of potential environmental impacts from GHG emissions, including:

- Quantification of GHG emissions;
- An analysis to determine whether construction- and operation-related GHG emissions would exceed applicable air district thresholds;
- Evaluation of the effect of climate change on the project; and
- Recommended emission reduction measures, including but not limited to potential actions that could sequester or reduce GHG emissions.

The technical report should be based on the climate change or GHG emissions management plans, policies, and regulations of the appropriate local air district(s), should document consistency with applicable State and local plans to reduce GHG emissions, and should identify compliance with applicable BMPs and requirements. The technical report should identify project emissions from construction and operation of permitted (stationary) and non-permitted (mobile and area) sources, and mitigation measures that would be implemented to reduce significant emissions to below the applicable thresholds of significance. If these thresholds cannot be met with mitigation, then the individual project could require additional environmental review, additional mitigation measures, and/or a statement of over-riding considerations.

21.5.3.6.1 Mitigation Measure 21-1: To Be Implemented When Construction and Operations of Projects Could Result in an Increase in GHG Emissions That May Have a Significant Impact on the Environment

The following mitigation strategies should be considered by lead agencies, as applicable, to develop specific mitigation measures for future projects.

Construction

Implement GHG mitigation measures listed in the most recent California Air Pollution Control Officers Association (CAPCOA), BAAQMD, and other air district guidance documents (e.g., CAPCOA 2010, p. 210-232; BAAQMD 2011, p. 8-6). Current versions of such guidance documents list the following for construction:

1. Use alternative fuels for construction equipment.
2. Use electric and hybrid construction equipment.
3. Limit construction equipment idling beyond regulatory requirements.
4. Institute a heavy-duty off-road vehicle plan.
5. Implement a construction vehicle inventory tracking system.
6. Use local building materials of at least ten percent.
7. Recycling or reusing at least 50 percent of construction waste or demolition materials.

In addition, the California Attorney General's Office has developed a list of various measures that may reduce GHG emissions at the individual project level. A selected list of those proposed measures that could be applied to DWR projects was appended to the DWR guidance document, titled *Guidance for Quantifying Greenhouse Gas Emissions and Determining the Significance of their Contribution to Global Climate Change for CEQA Purposes* (DWR 2010c, Appendix B). As appropriate, the measures can be included as design features of a project, required as changes to the project, or imposed as mitigation (whether undertaken directly by the project proponent or funded by mitigation fees). The measures are examples; the list is not intended to be exhaustive. The following may serve as BMPs to be considered and implemented (as applicable) during design, construction, operation, and maintenance of project facilities.

Efficiency

1. Design buildings to be energy efficient. Site buildings to take advantage of shade, prevailing winds, landscaping and sun screens to reduce energy use.
2. Install efficient lighting and lighting control systems. Use daylight as an integral part of lighting systems in buildings.
3. Install light colored "cool" roofs, cool pavements, and strategically placed shade trees.
4. Install energy efficient heating and cooling systems, appliances and equipment, and control systems.
5. Install light-emitting diodes for street and other outdoor lighting.
6. Limit the hours of operation of outdoor lighting.
7. Provide education on energy efficiency.

Renewable Energy

1. Install solar and wind power systems and energy-efficient heating ventilation and air conditioning.
2. Install solar panels over parking areas.
3. Use combined heat and power in appropriate applications.

Water Conservation and Efficiency

1. Create water-efficient landscapes.
2. Install water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls.
3. Use reclaimed water for landscape irrigation. Install the infrastructure to deliver and use reclaimed water.
4. Design buildings to be water-efficient. Install water-efficient fixtures and appliances.
5. Restrict watering methods (e.g., prohibit systems that apply water to non-vegetated surfaces) and control runoff.
6. Restrict the use of water for cleaning outdoor surfaces and vehicles.
7. Implement low-impact development practices that maintain the existing hydrologic character of the site to manage stormwater and protect the environment. (Retaining stormwater runoff on-site can drastically reduce the need for energy-intensive imported water at the site.)
8. Devise a comprehensive water conservation strategy appropriate for the project and location. The strategy may include many of the specific items listed above, plus other innovative measures that are appropriate to the specific project.
9. Provide education about water conservation.

Solid Waste Measures

1. Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).

2. Provide interior and exterior storage areas for recyclables and green waste and adequate recycling containers located in public areas.

3. Recover by-product methane to generate electricity.

Transportation and Motor Vehicles

1. Limit idling time for commercial vehicles, including delivery and construction vehicles.

2. Use low or zero-emission vehicles, including construction vehicles.

3. Institute a heavy-duty off-road vehicle plan and a construction vehicle inventory tracking system for construction projects.

4. Promote ride sharing.

5. Provide the necessary facilities and infrastructure to encourage the use of low or zero-emission vehicles (e.g., electric vehicle charging facilities and conveniently located alternative fueling stations).

6. Increase the cost of driving and parking private vehicles by, e.g., imposing tolls and parking fees.

7. Provide shuttle service to public transit/[work sites].

8. Provide information on all options for individuals and businesses to reduce transportation-related emissions.

Carbon Offsets

1. If, after analyzing and requiring all reasonable and feasible on-site mitigation measures for avoiding or reducing greenhouse gas-related impacts, the lead agency determines that additional mitigation is required, the agency may consider additional off-site mitigation. The project proponent could, for example, fund off-site mitigation projects (e.g., alternative energy projects, or energy or water audits for existing projects) that will reduce carbon emissions, conduct an audit of its other existing operations and agree to retrofit, or purchase carbon "credits" from another entity that will undertake mitigation.

2. The topic of offsets can be complicated, and a full discussion is outside the scope of this summary document. Issues that the lead agency should consider include:

    a. The location of the off-site mitigation. (If the off-site mitigation is far from the project, any additional, non-climate related benefits of the mitigation will be lost to the local community.)

    b. Whether the emissions reductions from off-site mitigation can be quantified and verified.

    c. Whether the mitigation ratio should be greater than 1:1 to reflect any uncertainty about the effectiveness of the offset.

SmartWay Truck Efficiency

The strategy involves requiring existing trucks/trailers to be retrofitted with the best available "SmartWay Transport" and/or ARB approved technology. Technologies that reduce GHG emissions from trucks may include devices that reduce aerodynamic drag and rolling resistance. Aerodynamic drag may be reduced using devices such as cab roof fairings, cab side gap fairings, cab side skirts, and on the trailer side, trailer side skirts, gap fairings, and trailer tail. Rolling resistance may be reduced using single wide tires or low-rolling resistance tires and automatic tire inflation systems on both the tractor and the trailer.

Tire Inflation Program

The strategy involves actions to ensure that vehicle tire pressure is maintained to manufacturer specifications.

Blended Cements

The strategy to reduce CO2 emissions involves the addition of blending materials such as limestone, fly ash, natural pozzolan and/or slag to replace some of the clinker in the production of Portland cement.

Anti-idling Enforcement

The strategy guarantees emission reductions as claimed by increasing compliance with anti-idling rules, thereby reducing the amount of fuel burned through unnecessary idling. Measures may include enhanced field enforcement of anti-idling regulations, increased penalties for violations of anti-idling regulations, and restriction on registrations of heavy-duty diesel vehicles with uncorrected idling violations.

In most cases, compliance with required permits approvals and implementation of mitigation measures would reduce impacts associated with projects to a less-than-significant level and demonstrate consistency with applicable plans. In some cases, construction or operations emissions may exceed the applicable air district significance levels, even with mitigation, and could result in a significant, unavoidable impact. This situation is most likely to occur during construction of large infrastructure projects, and may be temporary in nature. Emissions of GHG emissions may be cumulatively considerable when more than one project is being constructed or operated at the same time, in the same vicinity, region, or air basin.

Because it is not known whether mitigation measures would reduce the GHG emissions impacts associated with construction and operation of projects to a less-than-significant level, this potential impact is considered **significant** and may be **unavoidable**.

21.5.3.6.2 Mitigation Measure 21-2

The following mitigation measures would reduce the effects of Impacts 21-3a, 21-3c, and 21-3e, Conflict with Operations of Proposed Facilities Due to Climate Change and Sea Level Rise:

- Prepare a drainage or hydrology and hydraulics study that would assess the need and provide a basis for the design for flood protection of the facilities constructed along waterways. Prepare the study in accordance with applicable standards of Federal Emergency Management Agency (FEMA), USACE, DWR, Central Valley Flood Protection Board, BCDC, as well as the local reclamation districts and flood control agencies and the counties and cities. Design subsequent mitigation measures in accordance with the final study and with the applicable standards of FEMA, USACE, DWR, Central Valley Flood Protection Board, and BCDC.

- Design intakes/diversions and outfalls to be operated at multiple surface water elevations between existing conditions and maximum projected surface water elevations during a high flow event with sea level rise for the life of the facility.

- Prepare a hydrogeologic study that would assess long-term groundwater recharge and safe yield of wells and wellfields under a sustainable groundwater management plan. If the wells can be used to a greater degree in some years in a manner that would support the sustainable groundwater management plan to avoid long-term groundwater overdraft, wells could be drilled to deeper depths than would be required under existing conditions.

These mitigation measures are commonly employed on a variety of projects in which surface water elevations are projected to increase. In many cases, they reduce significant climate change and sea level

rise impacts to less-than-significant levels. Implementation of these mitigation measures would reduce the significance of operations-related climate change and sea level rise impacts by site-specific hydrology and hydraulic studies and hydrogeologic studies. In some cases it will not be feasible to fully implement the mitigation measures in a manner that completely eliminates climate change and sea level rise related impacts due to local hydrology and topography. Moreover, as discussed above, with regard to actions taken by other agencies on the basis of Delta Plan recommendations (i.e., activities that are not covered actions), the implementation and enforcement of these measures would be within the responsibility and jurisdiction of public agencies other than the Council. For these reasons, operations-related climate change and sea level rise impacts would remain **significant**.

21.5.3.6.3 Mitigation Measure 21-3

The following mitigation measures would reduce the effects of Impacts 21-3b, Conflict with Operations of Proposed Facilities Due to Climate Change and Sea Level Rise:

- Prepare a drainage or hydrology and hydraulics study that would assess the need and provide a basis for the design for ecosystem habitat restoration, including adjacent areas that would allow for migration of the habitat to higher elevations as the surface water elevations increase. Prepare the study in accordance with applicable standards of FEMA, USACE, DWR, and BCDC. Design subsequent mitigation measures in accordance with the final study and with the applicable standards of FEMA, USACE, DWR, Central Valley Flood Protection Board, and BCDC.

These mitigation measures are commonly employed on a variety of projects in which surface water elevations are projected to increase. In many cases, they reduce significant climate change and sea level rise impacts to less-than-significant levels. Implementation of these mitigation measures would reduce the significance of operations-related climate change and sea level rise impacts by site-specific hydrology and hydraulic studies. In some cases it will not be feasible to fully implement the mitigation measures in a manner that completely eliminates climate change and sea level rise related impacts due to local hydrology and topography. Moreover, as discussed above, with regard to actions taken by other agencies on the basis of Delta Plan recommendations (i.e., activities that are not covered actions), the implementation and enforcement of these measures would be within the responsibility and jurisdiction of public agencies other than the Council. For these reasons, operations-related climate change and sea level rise impacts would remain **significant**.

21.5.3.6.4 Mitigation Measure 21-4

The following mitigation measures would reduce the effects of Impacts 21-3d, Conflict with Operations of Proposed Facilities Due to Climate Change and Sea Level Rise:

- Prepare a drainage or hydrology and hydraulics study that would assess the need and provide a basis for the design for projects that reduce risks of floods in the Delta. Prepare the study in accordance with applicable standards of FEMA, USACE, DWR, and BCDC. Design subsequent mitigation measures in accordance with the final study and with the applicable standards of FEMA, USACE, DWR, Central Valley Flood Protection Board, and BCDC.

- Based on the results of the drainage or hydrologic and hydraulic study, arrange the length of flood management facilities in the direction of the floodplain flow to maximize surface flows under flood conditions.

- Install setback levees or bypass channels to maintain channel capacity and to mitigate hydraulic impacts of high flow events and higher surface water elevations due to climate change and sea level rise.

- Channel modifications for restoration actions would be required to be implemented to maintain or improve flood management functions and would be coordinated with the USACE, DWR, Central Valley Flood Protection Board, BCDC, and other flood control agencies to assess the desirability and feasibility for channel modifications. To the extent consistent with floodplain land uses and flood control requirements, if applicable, woody riparian vegetation would be allowed to naturally establish.

These mitigation measures are commonly employed on a variety of projects in which surface water elevations are projected to increase. In many cases, they reduce significant climate change and sea level rise impacts to less-than-significant levels. Implementation of these mitigation measures would reduce the significance of operations-related climate change and sea level rise impacts by site-specific hydrology and hydraulic studies. In some cases it will not be feasible to fully implement the mitigation measures in a manner that completely eliminates climate change and sea level rise related impacts due to hydrology, hydraulics, and topography. Moreover, as discussed above, with regard to actions taken by other agencies on the basis of Delta Plan recommendations (i.e., activities that are not covered actions), the implementation and enforcement of these measures would be within the responsibility and jurisdiction of public agencies other than the Council. For these reasons, operations-related climate change and sea level rise impacts would remain **significant**.

21.5.4 No Project Alternative

As described in Section 2A, Proposed Project and Alternatives, the No Project Alternative is based on the continuation of existing plans and policies, the continued operation of existing facilities into the future, and permitted and funded projects. Several ongoing projects have been identified as part of the No Project Alternative. The list of projects included in the No Project Alternative is presented in Table 2-2.

Compared to the Proposed Project, the No Project Alternative would involve less construction and operation of projects to protect reliable water supply, restore Delta ecosystems, improve water quality, reduce flood risks, and enhance the Delta. This would reduce the GHG emissions impacts associated with construction and operation of projects, as described above for the five Delta Plan elements, compared to the Proposed Project.

Four water supply projects, one tidal marsh restoration project, and one surface water storage reservoir expansion project would move forward under the No Project Alternative, as described in Section 2A, Proposed Project and Alternatives. These projects generally would have GHG emissions impacts similar to those for some of the projects encouraged by the Proposed Project. However, the Delta Plan would not be in place to encourage various other projects to move forward. To the extent that the absence of the Delta Plan results in those projects not happening, there would be no GHG emissions impacts associated with their construction and operations. GHG emissions and related impacts under the No Project Alternative would be **less than** those impacts identified for the Proposed Project, and would most likely be **less than significant** with mitigation.

BCDC completed an analysis of potential impacts on Suisun Marsh and San Francisco Bay (BCDC 2011). The results indicated that portions of Suisun Marsh along the boundaries of the City of Suisun City, portions along the northwestern boundaries of Suisun Marsh, portions of the City of Pittsburg shoreline, Browns Island located in the San Joaquin River north of the City of Pittsburg, and areas with low elevations within Suisun Marsh would be vulnerable to inundation with 16 inches of sea level rise that could occur after 2050. Many of these areas are currently within the 100-year flood level but would be more frequently inundated with sea level rise (BCDC 2011). The BCDC report also includes projections that by 2060, water quality in the Suisun Marsh and western Delta would become more saline in summer months than under existing conditions (BCDC 2011).

21.5.5 Alternative1A

Under Alternative 1A, the construction and operation of surface water projects (water intakes, treatment and conveyance facilities, and reservoirs) would be the same as the Proposed Project. As described in Section 2A, Proposed Project and Alternatives, there would be fewer groundwater projects (wells, wellhead treatment, conveyance facilities), ocean desalination projects, and recycled wastewater and stormwater projects (treatment and conveyance facilities). Other water supply projects, such as water transfers and water use efficiency programs, would not be expected to generate GHG.

Projects to restore the Delta ecosystem would be reduced relative to the Proposed Project and projects and actions to improve water quality would be the same as under the Proposed Project. Flood risk reduction projects also would be the same as the Proposed Project, except that less emphasis would be placed on levee maintenance and modification that protect agricultural land rather than on levees that protect water supply corridors, which could result in an overall reduction in these activities. Projects to protect and enhance the Delta as an evolving place would be the same as the Proposed Project.

21.5.5.1.1 Impact 21-1: Construction and Operations of Projects Could Result in an Increase in GHG Emissions That May Have a Significant Impact on the Environment

In consideration of the uncertainties regarding size, timing, and locations of potential projects, as well as the applicable jurisdictional AQMD or APCD regulations, CEQA guidance, and thresholds of significance, the same types of GHG emissions impacts from construction and operations would occur under Alternative 1A and the Proposed Project. However, GHG emissions would likely be reduced relative to the Proposed Project because construction and operation of projects to provide reliable water supply and restore the ecosystem would be less likely to occur. In addition, a potential reduction in the construction of levees in the Delta under Alternative 1A could result in a reduction in GHG emissions relative to the Proposed Project. However, Alternative 1A would involve more pumping and water transfers (particularly over the southern California mountains) than the Proposed Project, which is energy/GHG intensive.

On balance, significant impacts related to increased GHG emissions under Alternative 1A would likely be the **same as** under the Proposed Project.

As compared to existing conditions, the impacts related to increased GHG emissions under Alternative 1A would be **significant**.

21.5.5.1.2 Impact 21-2: Construction and Operations of Projects Could Conflict with an Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing Emissions of GHGs

The same type of GHG emissions impacts for projects would occur under Alternative 1A as described under the Proposed Project. As long as individual projects incorporate the recommended measures and evaluate consistency with the applicable plans as part of project-specific environmental documentation, projects would not be in conflict with or inconsistent with applicable plans.

Overall, significant impacts related to conflicts with applicable plans, policies, or regulations adopted for the purpose of reducing emissions of GHGs under Alternative 1A would be **less than** under the Proposed Project.

As compared to existing conditions, the impacts related to conflicts with applicable plans, policies, or regulations adopted for the purpose of reducing emissions of GHGs under Alternative 1A would be **less than significant**.

21.5.5.1.3 Impact 21-3: Conflict with Operations of Proposed Facilities Due to Climate Change and Sea Level Rise

The same type of climate change and sea level rise impacts for projects would occur under Alternative 1A as described under the Proposed Project. However, construction of intakes/diversions for surface water treatment plants, ocean desalination projects, and stormwater projects, and wells for groundwater projects would be less likely under Alternative 1A than the Proposed Project due to fewer projects or actions because many of the policies in the Proposed Project only would be recommendations under Alternative 1A. Therefore, the impacts of climate change and sea level rise on new facilities would be less than under the Proposed Project.

Impacts associated with ecosystem restoration also would be reduced because fewer projects would be constructed. Therefore, the impacts of climate change and sea level rise on new facilities would be less than under the Proposed Project.

Projects and actions to improve water quality would be the same as under the Proposed Project.

Flood risk reduction projects also would be the same as under the Proposed Project, except that there would be less emphasis on levee modification for levees that protect many agricultural lands and more emphasis on levees that protect water supply corridors, which could result in an overall reduction in these activities. Therefore, the impacts of climate change and sea level rise on new facilities would be less than under the Proposed Project.

Projects to protect and enhance the Delta as an evolving place would be the same as for the Proposed Project.

Given the reduced number and magnitude of actions under the Alternative 1A, climate change and sea level rise impacts on facilities encouraged by Alternative 1A would be **less than** those under the Proposed Project.

As compared to existing conditions, the climate change and sea level rise impacts related to operation of new facilities under Alternative 1A would be **significant**.

21.5.5.2 Mitigation Measures

Mitigation measures for Alternative 1A would be the same as described for Impacts 21-1through 21-3 for the Proposed Project. Because it is not known whether the mitigation measures listed above would reduce impacts to a less-than-significant level, this impact is considered **significant and may be unavoidable.**

21.5.6 Alternative 1B

Under Alternative 1B, the construction and operation of surface water projects (water intakes, treatment and conveyance facilities, and reservoirs) would be the same as the Proposed Project. As described in Section 2A, Proposed Project and Alternatives, there would be fewer groundwater projects (wells, wellhead treatment, and conveyance facilities), recycled wastewater and stormwater projects (treatment and conveyance facilities). There would be no ocean desalination projects.

Projects to restore the Delta ecosystem would be reduced in extent relative to the Proposed Project and would not emphasize restoration of floodplains in the lower San Joaquin River. Flood risk reduction would place greater emphasis on levee modification/maintenance and dredging than the Proposed Project, but there would be no setback levees or subsidence reversal projects. Floodplain expansion projects would be fewer or less extensive. Actions to protect and enhance the Delta as an evolving place would be consistent with the Economic Sustainability Plan, but the locations for new parks, as encouraged by the Proposed Project, would not be emphasized.

21.5.6.1.1 Impact 21-1: Construction and Operations of Projects Could Result in an Increase in GHG Emissions That May Have a Significant Impact on the Environment

In consideration of the uncertainties regarding size, timing, and locations of potential projects, as well as the applicable jurisdictional AQMD or APCD regulations, CEQA guidance, and thresholds of significance, the same types of GHG emissions impacts from construction and operations would occur under Alternative 1B and the Proposed Project. However, GHG emissions would likely be reduced relative to the Proposed Project because construction and operation of projects to provide reliable water supply and restore the ecosystem would be less likely to occur. In addition, a potential reduction in the construction of levees in the Delta under Alternative 1B could result in a reduction in GHG emissions relative to the Proposed Project. However, Alternative 1B would involve more pumping and water transfers (particularly over the southern California mountains) than the Proposed Project, which is energy/GHG intensive.

On balance, significant impacts related to increased GHG emissions under Alternative 1B would likely be the **same as** under the Proposed Project.

As compared to existing conditions, the impacts related to increased GHG emissions under Alternative 1B would be **significant**.

21.5.6.1.2 Impact 21-2: Construction and Operations of Projects Could Conflict with an Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing Emissions of GHGs

The same type of emissions impacts for projects would occur under Alternative 1B as described under the Proposed Project. As long as individual projects incorporate the recommended measures and evaluate consistency with the applicable plans as part of project-specific environmental documentation, projects would not be in conflict with or inconsistent with applicable plans.

Overall, significant impacts related to conflicts with applicable plans, policies, or regulations adopted for the purpose of reducing emissions of GHGs under Alternative 1B would be **less than** under the Proposed Project.

As compared to existing conditions, the impacts related to conflicts with applicable plans, policies, or regulations adopted for the purpose of reducing emissions of GHGs under Alternative 1B would be **less than significant**.

21.5.6.1.3 Impact 21-3: Conflict with Operations of Proposed Facilities Due to Climate Change and Sea Level Rise

The same type of climate change and sea level rise impacts for projects would occur under Alternative 1B as described under the Proposed Project. However, construction of intakes/diversions for surface water treatment plants, ocean desalination projects, and stormwater projects, and wells for groundwater projects would be less likely under Alternative 1B than the Proposed Project due to fewer projects or actions under Alternative 1B. Therefore, the impacts of climate change and sea level rise on new facilities would be less than under the Proposed Project.

Impacts associated with ecosystem restoration also would be reduced because fewer projects would be constructed. Therefore, the impacts of climate change and sea level rise on new facilities would be less than under the Proposed Project.

Water quality improvement projects, including water treatment plants, conveyance facilities, and wells and wellhead treatment facilities, would be less emphasized relative to the Proposed Project, and greater emphasis would be placed on the construction and operation of wastewater treatment and recycle facilities and municipal stormwater treatment facilities. Therefore, the impacts of climate change and sea level rise

on new intakes/diversions facilities would be less than under the Proposed Project and impacts on outfalls would be greater.

Flood risk reduction projects also would be the same as under the Proposed Project, except that there would be less emphasis on levee modification for levees that protect many agricultural lands and more emphasis on levees that protect water supply corridors, which could result in an overall reduction in these activities. Therefore, the impacts of climate change and sea level rise on new facilities would be less than under the Proposed Project.

Projects to protect and enhance the Delta as an evolving place would be less than for the Proposed Project. Therefore, the impacts of climate change and sea level rise on new facilities would be less than under the Proposed Project.

Given the reduced number and magnitude of actions under the Alternative 1B, climate change and sea level rise impacts on facilities encouraged by Alternative 1B would be **less than** those under the Proposed Project.

As compared to existing conditions, the climate change and sea level rise impacts related to operation of new facilities under Alternative 1B would be **significant**.

21.5.6.2 Mitigation Measures

Mitigation measures for Alternative 1B would be the same as those described for Impacts 21-1 through 21-3 for the Proposed Project. Because it is not known whether the mitigation measures listed above would reduce impacts to a less-than-significant level, this impact is considered **significant and may be unavoidable.**

21.5.7 Alternative 2

As described in Section 2A, Proposed Project and Alternatives, Alternative 2 would place greater emphasis on groundwater, ocean desalination, and recycled water projects and less emphasis on surface water projects. The surface storage reservoirs considered under the DWR Surface Water Storage Investigation would not be encouraged; instead, the surface storage in the Tulare Basin would be emphasized. Ecosystem restoration projects similar to, but less extensive than those encouraged by the Proposed Project, would be emphasized.

Actions to improve water quality would be similar to or increased relative to the Proposed Project, especially the treatment of wastewater and agricultural runoff. Actions to reduce flood risk under Alternative 2 would emphasize floodplain expansion and reservoir reoperation rather than levee construction and modification. The encouragement of subsidence reversal projects would be the same as the Proposed Project, as would actions to protect and enhance the Delta as an evolving place.

21.5.7.1.1 Impact 21-1: Construction and Operations of Projects Could Result in an Increase in GHG Emissions That May Have a Significant Impact on the Environment

In consideration of the uncertainties regarding size, timing, and locations of potential projects, as well as the applicable jurisdictional AQMD or APCD regulations, CEQA guidance, and thresholds of significance, the same types of GHG emissions impacts from construction and operations would occur under Alternative 2 and the Proposed Project. However, there would be no construction of the major storage facilities considered in the DWR Surface Water Storage Investigation under Alternative 2. This would avoid construction and operation of these projects; however, the Tulare Lake Basin Surface Storage project would be encouraged under Alternative 2. By comparison to the Proposed Project, Alternative 2 would be more likely to result in lower levels of GHG emissions because of the reduced emphasis on levee construction and modification and less water pumping/movement, although this could

be offset by an increase in emissions resulting from the operation of wastewater treatment plants and ocean desalination facilities.

On balance, significant impacts related to increased GHG emissions under Alternative 2 would likely be the **same as** under the Proposed Project.

As compared to existing conditions, the impacts related to increased GHG emissions under Alternative 2 would be **significant**.

21.5.7.1.2 Impact 21-2: Construction and Operations of Projects Could Conflict with an Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing Emissions of GHGs

The same type of GHG emissions impacts for projects would occur under Alternative 2 as described under the Proposed Project. As long as individual projects incorporate the recommended measures and evaluate consistency with the applicable plans as part of project-specific environmental documentation, projects would not be in conflict with or inconsistent with applicable plans.

Overall, significant impacts related to conflicts with applicable plans, policies, or regulations adopted for the purpose of reducing emissions of GHGs under Alternative 2 would be **less than** under the Proposed Project.

As compared to existing conditions, the impacts related to conflicts with applicable plans, policies, or regulations adopted for the purpose of reducing emissions of GHGs under Alternative 2 would be **less than significant**.

21.5.7.1.3 Impact 21-3: Conflict with Operations of Proposed Facilities Due to Climate Change and Sea Level Rise

The same type of climate change and sea level rise impacts for projects would occur under Alternative 2 as described under the Proposed Project. However, construction of intakes/diversions for surface water treatment plants, ocean desalination projects, and stormwater projects, and wells for groundwater projects would be more likely under Alternative 2 than the Proposed Project due to more projects or actions under Alternative 2. Therefore, the impacts of climate change and sea level rise on new facilities would be greater than under the Proposed Project.

Impacts associated with ecosystem restoration also would be reduced because fewer projects would be constructed. Therefore, the impacts of climate change and sea level rise on new facilities would be less than under the Proposed Project.

Water quality improvement projects would be similar under Alternative 2 as under Proposed Project. Therefore, the impacts of climate change and sea level rise on new intakes/diversions facilities would be similar as under the Proposed Project.

Flood risk reduction projects would have less emphasis on levee construction and modification and more emphasis on floodplain expansion and reservoir reoperation. Therefore, the impacts of climate change and sea level rise on new facilities would be less than under the Proposed Project; however opportunities for reservoir reoperation would be limited due to climate change.

Projects to protect and enhance the Delta as an evolving place would be the same as for the Proposed Project. Therefore, the impacts of climate change and sea level rise on new facilities would be the same under the Proposed Project.

Given the reduced number and magnitude of actions under the Alternative 2, climate change and sea level rise impacts on facilities encouraged by Alternative 2 would be **less than** those under the Proposed Project.

As compared to existing conditions, the climate change and sea level rise impacts related to operation of new facilities under Alternative 2 would be **significant**.

21.5.7.2 Mitigation Measures

Mitigation measures for Alternative 2 would be the same as those described for Impacts 21-1 through 21-3 for the Proposed Project. Because it is not known whether the mitigation measures listed above would reduce impacts to a less-than-significant level, this impact is considered **significant and may be unavoidable.**

21.5.8 Alternative 3

As described in Section 2A, Proposed Project and Alternatives, the water supply reliability projects and actions under Alternative 3 would be similar to those of the Proposed Project, although there would less emphasis on surface water projects. Ecosystem restoration (floodplain restoration, riparian restoration, tidal marsh restoration, and floodplain expansion) would be reduced relative the Proposed Project and emphasize restoration on public lands, especially in Suisun Marsh and the Yolo Bypass. There would be more stressor management actions (e.g., programs for water quality, water flows) and more management for nonnative invasive species. Water quality improvements would be the same as the Proposed Project. Actions under Alternative 3 to reduce flood risk would not include setback levees or subsidence reversal, but would result in greater levee modification/maintenance and dredging relative to the Proposed Project. Activities to protect and enhance the Delta as an evolving place would be the same as the Proposed Project.

21.5.8.1.1 Impact 21-1: Construction and Operations of Projects Could Result in an Increase in GHG Emissions That May Have a Significant Impact on the Environment

In consideration of the uncertainties regarding size, timing, and locations of potential projects, as well as the applicable jurisdictional AQMD or APCD regulations, CEQA guidance, and thresholds of significance, the same types of GHG emissions impacts from construction and operations would occur under Alternative 3 and the Proposed Project. However, when compared to the Proposed Project, GHG emissions under Alternative 3 likely would be reduced because construction and operation of surface water projects, treatment projects, and ecosystem restoration would not be emphasized. By contrast, Alternative 3 could result in increased emissions if levee modification and maintenance activities are increased consistent with the flood risk emphasis of this alternative.

The difference in the number or size of projects is not known at this time, but if fewer and/or smaller projects are constructed and operated, lower levels of GHG emissions from construction and operations would occur. Individual projects under this alternative may be of sufficient size that their construction and operation emissions would exceed applicable significance thresholds when compared to existing conditions.

Overall, significant impacts related to increased GHG emissions under Alternative 3 would be **less than** under the Proposed Project.

As compared to existing conditions, the impacts related to increased GHG emissions under Alternative 3 would be **significant**.

21.5.8.1.2 Impact 21-2: Construction and Operations of Projects Could Conflict with an Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing Emissions of GHGs

The same type of emissions impacts for projects would occur under Alternative 3 as described under the Proposed Project. As long as individual projects incorporate the recommended measures and evaluate

consistency with the applicable plans as part of project-specific environmental documentation, projects would not be in conflict with or inconsistent with applicable plans.

Overall, significant impacts related to conflicts with applicable plans, policies, or regulations adopted for the purpose of reducing emissions of GHGs under Alternative 3 would be **less than** under the Proposed Project.

As compared to existing conditions, the impacts related to conflicts with applicable plans, policies, or regulations adopted for the purpose of reducing emissions of GHGs under Alternative 3 would be **less than significant**.

21.5.8.1.3 Impact 21-3: Conflict with Operations of Proposed Facilities Due to Climate Change and Sea Level Rise

The same type of climate change and sea level rise impacts for projects would occur under Alternative 3 as described under the Proposed Project. However, construction of intakes/diversions for surface water treatment plants, ocean desalination projects, and stormwater projects, and wells for groundwater projects would be less likely under Alternative 3 than the Proposed Project due to fewer projects or actions under Alternative 3. Therefore, the impacts of climate change and sea level rise on new facilities would be less than under the Proposed Project.

Impacts associated with ecosystem restoration also would be reduced because fewer projects would be constructed. Therefore, the impacts of climate change and sea level rise on new facilities would be less than under the Proposed Project.

Water quality improvement projects would be less emphasized relative to the Proposed Project. Therefore, the impacts of climate change and sea level rise would be less than under the Proposed Project.

Flood risk reduction projects also would be the same as under the Proposed Project, except that there would be less emphasis on levee modification for levees that protect many agricultural lands, which could result in an overall reduction in these activities. Therefore, the impacts of climate change and sea level rise on new facilities would be less than under the Proposed Project.

Projects to protect and enhance the Delta as an evolving place would be the same as for the Proposed Project. Therefore, the impacts of climate change and sea level rise on new facilities would be the same as under the Proposed Project.

Given the reduced number and magnitude of actions under the Alternative 3, climate change and sea level rise impacts on facilities encouraged by Alternative 3 would be **less than** those under the Proposed Project.

As compared to existing conditions, the climate change and sea level rise impacts related to operation of new facilities under Alternative 3 would be **significant**.

21.5.8.2 Mitigation Measures

Mitigation measures for Alternative 3 would be the same as those described for Impacts 21-1 through 21-3 for the Proposed Project. Because it is not known whether the mitigation measures listed above would reduce impacts to a less-than-significant level, this impact is considered **significant and may be unavoidable.**

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