CHAPTER 5
Growth Inducing Effects

5.1 Introduction

The California Environmental Quality Act (CEQA) *Guidelines* (Section 15126.2(d)) require that an Environmental Impact Report (EIR) evaluate the growth inducing impacts of a proposed project. The CEQA Guidelines provide the following guidance for the discussion and consideration of growth-inducing impacts:

> "Discuss the ways in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a waste water treatment plant might, for example, allow for more construction in service areas). Increase in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also discuss the characteristic of some projects which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment."

A project can have direct and/or indirect growth inducement potential. Direct growth inducement potential would result if a project involved construction of new housing. Indirect growth inducement potential would occur if a project would establish substantial new permanent employment opportunities (e.g., commercial, industrial or governmental enterprises), or even if it would involve a substantial construction effort with substantial short-term employment opportunities and indirectly stimulate the need for additional housing and services to support the new employment demand. Similarly, a project would have an indirect growth inducement effect by removing an obstacle to additional growth and development, such as by removing a constraint on a required public service or utility.

Water supply service is an important public service needed to support development. Groundwater from the Eastern San Joaquin County Groundwater Basin supplies a large majority of the water used in San Joaquin County. Implementation of the Integrated Conjunctive Use Program (ICU Program) would help ensure the long-term sustainability of water resources in the San Joaquin Region through a series of conjunctive use projects. The primary goal of the ICU Program is to recharge groundwater supplies in order to discontinue current overdraft in the Eastern San Joaquin County Groundwater Basin. While providing recharge water to alleviate existing overdraft of the

basin, each of the four ICU Program Alternatives (A-D) would also result in the supply of recharge water to prevent future overdraft that could result from planned growth within the County.

The ICU Program is intended to provide water for recharge but the individual projects that would be implemented under the ICU Program Alternatives could also result in additional water supply. Consequently, the ICU Program would remove an obstacle to growth by increasing the future availability of surface and groundwater supplies in the Study Area. In accordance with the CEQA definition, implementation of the ICU Program would therefore have indirect growth inducement potential.

As indicated in the CEQA definition above, growth inducement itself is not necessarily an adverse impact. It is the potential consequences of growth, the secondary effects of growth, which may have an environmental impact. Potential secondary effects of growth include increased demand on other community and public services and infrastructure, increased traffic and noise, and adverse environmental impacts such as degradation of air and water quality, degradation or loss of plant and animal habitats, and conversion of agricultural and open space land to developed uses.

This chapter analyzes the nature and extent of growth inducement potential for the ICU Program, inside and outside of the Study Area. This analysis includes an assessment of existing and projected population levels, and existing and projected water supply and demand, as well as a discussion of conformance with regional and local general plans. Finally, this chapter assesses the secondary effects of growth and addresses the responsible agencies and mitigation policies and measures available to reduce these impacts.

5.2 Growth and Development Trends

Within the Study Area

Implementation of the ICU Program would not have a direct growth inducement effect because the program would not involve development of new housing to attract additional population. Implementation of the ICU Program would, however, create construction employment opportunities, and a small number of permanent employment opportunities associated with operation of the proposed facilities. Because the employment pool available within the Study Area is large, it is anticipated that the employment opportunities created by the ICU Program would be filled by existing workers already residing in the Study Area, and would not result in an additional growth inducement effect.

Implementation of the ICU Program has indirect growth inducement potential because it would help remove the lack of water supply availability as one potential obstacle to growth in the region. The primary objective of the ICU Program would be to recharge groundwater in the Eastern San Joaquin Groundwater Basin, while continuing to meet water demands in the Study Area through 2030. The Integrated Regional Water Management Plan (IRWMP) identifies 140,000 to 160,000 acre-feet per year (AF/yr) as the optimal amount of groundwater recharge supply water that would result in acceptable water levels/fluctuations in accordance with Basin Operations Criteria,

in addition to providing additional supply to meet the demands of planned growth (GBA, 2007). Basin Operations Criteria were developed as a quantitative management framework used to accurately monitor and predict changes in basin conditions and gauge ICU Program operations in the Groundwater Management Area. The IRWMP also took into account future population growth water demand as identified by the individual jurisdictions within the Study Area. Each of the four ICU Program Alternatives proposes to utilize excess/flood water flows or unused capacity from reservoirs, rivers, and other sources in the region but also identifies projects that would reduce water demand and improve operational efficiency and transfers. All of the ICU Program Alternatives also include new water rights applications.

The target recharge rate of 140,000 to 160,000 AF/yr was developed based on the needs of restoring the Eastern San Joaquin County Groundwater Basin to historic levels and of meeting future urban water demand, as identified by urban water management plans (UWMPs) prepared for each municipality. Development of the target recharge rate took both existing and future water demands into consideration. The target recharge rate assumes that demand for groundwater supplies in the Eastern San Joaquin County Groundwater Basin would remain constant.

The following sections summarize how future water demand projections were developed for the 2007 IRWMP, and demonstrate that they are consistent with planned growth within the Study Area.

Regional Overview

The Study Area covers a large portion of San Joaquin County extending from the foothills along the eastern edge of the County to the northern boundary with Sacramento County to the southern boundary with Stanislaus County and to the west along Interstate 5 (I-5). This area includes a number of incorporated and unincorporated communities, including the Cities of Lodi, Stockton, Lathrop, Manteca, Escalon, and Ripon. This region has experienced rapid population growth in part as a result of San Francisco Bay Area commuters moving to the San Joaquin Valley.

2007 IRWMP

In the 2007 IRWMP, population estimates and projections were determined for the Study Area based on San Joaquin Council of Governments (SJCOG) data (GBA, 2007). These population numbers are presented in **Table 5-1**. The SJCOG, the region's local transportation agency, has been designated as the Metropolitan Planning Agency for the region and is required by federal law to periodically develop population projections for the region. Table 5-1 summarizes the population projections for the six incorporated cities in the Study Area, unincorporated areas of the Study Area (including organized communities), and San Joaquin County as a whole.

The 2007 IRWMP bases its "current" conditions, for planning purposes, on 2005 conditions for urban and agricultural water uses, and a 2030 planning horizon for "future" conditions. The IRWMP assumes that urban growth will occur entirely within the municipal spheres of influence (SOI) delineated in the latest general plans revisions. Population projections for San Joaquin County were most recently adopted in 2004 for SJCOG. These population projections were used in the IRWMP.

TABLE 5-1
SAN JOAQUIN COUNCIL OF GOVERNMENTS POPULATION PROJECTIONS (2000-2030)

	2000	2005	2010	2015	2020	2025	2030	Annual Growth Rate
Escalon	5,963	6,712	7,526	8,422	9,410	10,524	11,782	2.3 %
Lathrop	10,455	12,369	15,453	19,475	24,144	31,073	41,556	4.7 %
Lodi	56,999	60,913	65,028	69,055	73,130	77,253	81,717	1.2 %
Manteca	49,258	57,499	66,210	75,653	85,605	96,607	108,719	2.7 %
Ripon	10,146	11,794	13,615	15,429	17,413	19,543	21,756	2.6 %
Stockton	243,771	268,270	298,267	331,278	366,332	401,997	438,770	2.0 %
Unincorporated	130,087	141,278	153,657	166,696	180,478	194,564	209,443	1.6 %
Study Area Total	506,679	558,835	619,756	686,008	756,512	831,561	913,743	2.3 %

SOURCE: IRWMP 2007

The 2007 IRWMP bases its "current" conditions, for planning purposes, on 2005 conditions for urban and agricultural water uses, and a 2030 planning horizon for "future" conditions. The IRWMP assumes that urban growth will occur entirely within the municipal spheres of influence (SOI) delineated in the latest general plans revisions. Population projections for San Joaquin County were most recently adopted in 2004 for SJCOG. These population projections were used in the IRWMP.

Department of Finance

The California Department of Finance also tracks and estimates growth in the Study Area using a separate methodology from that of the SJCOG. Department of Finance data indicate that over the past eight years, all of the cities in San Joaquin County have shown growth rates higher than those in the unincorporated County. **Table 5-2** below shows the Department of Finance's population estimates for 2000 through 2007. Over this time period, Lathrop had the highest average annual growth rate at 7.2 percent, and Lodi had the lowest (1.4 percent). Although Stockton's growth rate was one of the lowest, the City had the highest overall population (43 percent of 2007 County total) of all the cities in San Joaquin County. Much of this growth was fueled by Bay Area workers seeking more affordable housing and economic development within the Central Valley. The Department of Finance projects the County's total population to nearly double by 2030 from the estimated population of 679,687 in 2007to 1,205,198 in 2030 (California Department of Finance, 2007a). The Department of Finance does not provide population projections for individual municipalities.

The Department of Finance population estimates for the previous eight years differ from the projected estimates prepared by SJCOG for the individual cities within San Joaquin County. SJCOG's projected population growth rates for the San Joaquin County's incorporated cities show lower expected growth than the growth the Department of Finance has estimated for the past eight years. In fact, the Department of Finance projects that the total County population will grow at a faster rate through 2030, at a rate of 3.4 percent, than the rate it has estimated for the past eight years. The Department of Finance projects that the County's 2030 population will exceed 1.2 million. SJCOG population projections fall just short of the Department of Finance's at a population of just over 1.1 million.

TABLE 5-2
CALIFORNIA DEPARTMENT OF FINANCE POPULATION ESTIMATES FOR SAN JOAQUIN COUNTY (2000-2007)

	2000	2001	2002	2003	2004	2005	2006	2007	Annual Growth Rate
Escalon	5,963	6,151	6,400	6,622	6,702	6,918	7,044	7,091	2.4 %
Lathrop	10,445	10,824	11,655	12,135	12,530	12,849	14,627	16,479	7.2 %
Lodi	57,011	58,353	59,835	60,951	61,848	62,520	62,828	63,395	1.4 %
Manteca	49,255	51,658	55,338	57,596	60,258	61,981	63,716	65,076	4.0 %
Ripon	10,158	10,676	11,242	11,665	12,388	13,252	13,911	14,575	5.4 %
Stockton	243,771	249,091	255,464	262,934	271,491	279,623	285,966	289,789	2.4 %
Tracy	56,929	61,114	66,081	70,122	74,757	78,374	84,477	80,505	5.2 %
Unincorporated	130,061	132,215	133,825	135,449	136,126	138,508	136,690	142,777	1.2 %
County Total	**563,593**	**580,082**	**599,840**	**617,474**	**636,100**	**654,025**	**669,259**	**679,687**	**2.6 %**

SOURCE: California Department of Finance, 2007b.

General Plans

Several of the General Plans for the jurisdictions within the Study Area were updated in the last five years. The City of Stockton updated its General Plan in December 2007. The City of Lodi is in the process of updating its General Plan. **Table 5-3** shows the population projections identified in each of the General Plans for municipalities located in the Study Area.

TABLE 5-3
GENERAL PLAN PREDICTED POPULATION GROWTH

	Initial General Plan Population (Base Year)	General Plan Projected Population (Horizon Year)
Escalon	6,700 (2004)	11,950 (2025)
Lathrop	6,997 (1991)	30,000 (2012)
Lodi	45,794 (1987)	70,741 (2007)
Manteca	53,924 (2003)	94,378 (2023)
Ripon	13,241 (2005)	40,000 (2040)
Stockton	280,000 (2005)	580,000 (2035)
Unincorporated[1]	118,625 (2000)	138,056 (2020)
Study Area Total (2000)	**544,827 (2000)**	**821,851 (2020)**

1 The unincorporated populations are based on the San Joaquin County General Plan
Parentheses indicate the base year or horizon year considered in each document.

SOURCES: City of Escalon, 2003; City of Lathrop, 2004; City of Lodi, 1991; City of Manteca, 2003; San Joaquin County, 2005; City of Stockton, 2007; City of Ripon, 2005.

The General Plans' expected buildout populations for the Cities of Escalon, Lathrop, and Lodi exceed the SJCOG population projections for the corresponding years. The City of Manteca General Plan population projections seem to be similar, because the projected population falls within the 2020 and 2025 projections prepared by SJCOG. The population projections identified in the General Plans for the cities of Ripon and Stockton are greater than the projections prepared by SJCOG.

Each of these cities projects its buildout population to exceed SJCOG's 2030 respective population projections. SJCOG's population projections for the County's unincorporated population and total population exceed the buildout populations identified in the San Joaquin County General Plan.

5.3 Study Area Water Demand Projections

Urban Water Demand

Water use within the urban areas of the Study Area is summarized based on current UWMPs, water production data obtained from water service providers, and other general planning documents. **Table 5-4** summarizes the current and projected water demands, urban footprint acreage, and water use per acre.

The net increase in annual urban demand for municipal areas in the Study Area from 2005 to 2030 projected to be 121,417 AF. Several agencies are implementing best management practices and demand management measures. In many cases, the 2030 demand projections reflect reductions attributed to the implementation of current and future conservation programs. Changes in population density, infill development, subsequent general plan revisions, and increased water conservation may ultimately affect the accuracy of the projected water demand.

TABLE 5-4
CURRENT AND PROJECTED MUNICIPAL URBAN WATER DEMANDS IN THE STUDY AREA (2005 AND 2030)

City	2005 Water Demand (acre-feet)	2005 City Limit (acres)	2005 Water Use Per Acre (acre-feet/acre)	Projected 2030 Water Demand (acre-feet)	2030 SOI (acres)	Projected 2030 Water Use Per Acre (acre-feet/acre)	Projected Net Water Use Increase (acre-feet)
Escalon	1,657	1,500	1.1	3,200	2,145	1.5	1,543
Lathrop	4,514	12,357	0.4	19,041	15,654	1.2	14,527
Lodi	17,300	8,209	2.1	21,300	10,653	2.0	4,000
Manteca	15,491	11,086	1.4	35,735	14,472	2.5	20,244
Ripon	5,860	3,231	1.8	16,620	6,696	2.5	10,760
Stockton	67,157	38,278	1.8	137,500	68,167	2.0	70,343
Total	**111,979**	**74,661**	**Overall 1.5**	**233,396**	**117,787**	**Overall 2.0**	**121,417**

SOURCE: IRWMP, 2007

Future water demand in the urban water management plans is based on planned population growth in the municipalities. **Table 5-5** shows the population projections through 2030 that were used in each of the urban water management plans. When compared with the population projections provided by SJCOG and identified in the general plans for each municipality, the Urban Water Management Plan (UWMP) population projections fall shorter than the SJCOG and General Plan projections. Consequently, the amount of water demand projected for 2030 by the UWMPs will likely support less growth than that identified by the general plans in the Study Area.

The 2007 IRWMP determined the necessary water supply for the ICU Program based on a combination of the UWMP future water demands and the future population projections provided by SJCOG; the water demand estimated in the IRWMP is derived from these existing plans. Implementation of the ICU Program would therefore support planned growth within San Joaquin County. Additionally, the ICU Program is based on water demand for 2030 population projections that do not meet the planned populations of the municipalities in the County or SJCOG. Therefore, while implementation of the ICU Program will support planned growth in San Joaquin County, it is not anticipated to support additional growth in the County.

TABLE 5-5
URBAN WATER MANAGEMENT PLAN POPULATION PROJECTIONS (2005-2030)

	2005	2010	2015	2020	2025	2030
Escalon[1]	n/a	n/a	n/a	n/a	n/a	n/a
Lathrop[2]	12,300	12,900	13,600	14,200	14,800	n/a
Lodi	62,647	67,295	72,496	78,098	84,134	90,636
Manteca	61,500	72,600	85,900	101,500	119,950	141,778
Ripon	14,600	19,700	24,800	29,900	35,000	40,100
Stockton	279,513	312,930	343,810	377,737	415,011	455,964
San Joaquin County[3]	580,000	n/a	n/a	n/a	n/a	1,060,000

1 Escalon is not required to prepare a UWMP. Consequently, there were no population projections available for Escalon.
2 Lathrop's UWMP planning timeframe extends to 2025.
3 Only 2005 and 2030 populations were available for San Joaquin County.

SOURCES: City of Lathrop, 2005; City of Lodi, 2006; City of Manteca, 2005; City of Ripon, 2004; City of Stockton, 2005; San Joaquin County, 2001.

Implementation of the ICU Program will not result in delivery of additional water to users in the portions of the Study Area that are located in Stanislaus and Calaveras counties. Therefore, no net increase in water use would be facilitated in those counties, and growth in those counties would not be induced as a result of ICU Program implementation.

Agricultural Water Demand

Agricultural water use and future demand within the Study Area is summarized in **Table 5-6**. These estimated demands are taken from the IRWMP, and are based on theoretical applied water requirements, averaged over 1998 through 2003, and reported by the Department of Water Resources Division of Planning and Local Assistance (GBA, 2007). Areas of overlap between city limits, spheres of influence, and water districts may cause variation in the reported quantities of applied water. The quantity of water actually pumped, diverted, and applied may differ due to a variety of factors including distribution system inefficiencies and losses (ranging from 10 to 20 percent), climate, and soil conditions among other factors. Changes in cropping patterns, irrigation methods, and development of agriculture lands in areas historically un-irrigated have not been quantified. The urban spheres of influence reflect an estimated 2030 level of development as specified in either adopted or draft general planning documents. Development outside of these spheres of influence is not considered in the analysis.

As described in the IRWMP, by 2030, applied water demand for agricultural uses for is expected to decline by 158,945 AF, as compared to 2005 (GBA, 2007). The projected decrease in water demand for agriculture is anticipated to result from the replacement of some agricultural use areas with urban land uses. These changes would result in a net decrease in the total amount of water used for agriculture, and a net increase in the amount of water used to support urban land uses, as discussed above for urban water use projections. As discussed above, these changes are considered to be within the scope of planned growth within the Study Area, and would not be anticipated to include additional growth.

Implementation of the ICU Program would not result in any additional water being delivered to the portions of the Study Area that are located outside of San Joaquin County. Therefore, no changes to agricultural water use in Calaveras or Stanislaus counties would result from ICU Program implementation.

TABLE 5-6
ESTIMATED AND PROJECTED AGRICULTURAL WATER DEMANDS FOR THE STUDY AREA (2005 AND 2030)

Agency (Area within the Study Area Only)	2005 Estimated Applied Water Demand (acre-feet per year)	2030 Projected Applied Water Demand (acre-feet per year)
Central Delta Water Agency	111,369	93,451
South Delta Water Agency	55,921	32,793
North San Joaquin WCD	152,853	148,738
Woodbridge ID	71,513	58,392
Stockton East WD	206,217	165,449
Central San Joaquin WCD	140,289	126,855
Oakdale ID	32,554	32,554
South San Joaquin ID	200,031	161,437
Unorganized County Areas	99,270	91,403
Total	**1,070,017**	**911,072**

SOURCE: IRWMP, 2007.

5.4 Regional Growth Control Policies and Standards

The following text provides an overview of regional growth control policies and standards that are relevant to the urban areas and jurisdictions of San Joaquin County.

City of Escalon

The City of Escalon General Plan (2005) contains an Urban Boundary Element that defines the limits for extending City services and infrastructure while accommodating development anticipated within the General Plan's timeframe. This Element establishes growth rings within which new development will be phased over time. Growth accommodation strategies include the following:

- The City shall provide for an orderly and efficient transition from rural to urban uses and minimize urban sprawl within the City's Urban Growth Boundaries. Growth areas within

the City shall be served by logical extensions of infrastructure. (Urban Boundary Element Urban Boundaries Objectives A, B, and C and Policies 1 and 6)

- The City shall implement policies that guide the timing, type, and location of growth, preserve resource lands, and protect natural features and open space. These policies shall establish the Planning Area Boundary and Urban Development Boundary within which adequate infrastructure shall be provided to meet the needs of orderly growth that will be phased over time. (Urban Boundary Element Growth Objective A and Policies 1, 2, 3, 4, and 5)

City of Lathrop

The City of Lathrop General Plan (2004) identifies key strategies that address growth accommodation. Growth accommodation strategies include the following:

- Rather than adhering to a fixed percentage of annual growth as a matter of policy, the City shall be responsible for managing growth in relation to the physical and financial capabilities for municipal service. (Growth Management Policies and Procedures Policies 4 and 5)

City of Lodi

The City of Lodi General Plan (1991) contains goals, objectives, and policies that address growth accommodation. Growth accommodation strategies include the following:

- Growth within the City shall be orderly, well-planned, and balance growth consistent with the limits imposed by the City's infrastructure and ability to accommodate new growth. (Land Use and Growth Management Element Goal A)
- The City has established a growth management ordinance that will maintain a population-based housing growth rate of 2.0 percent per year. (Land Use and Growth Management Element Policies 2)
- The City shall maintain an adequate level of service for the City's water, sewer collection and disposal, and drainage system to meet the needs of existing and projected development in accordance with the City's Water, Wastewater, and Drainage Master Plans. (Land Use and Growth Management Element Goal J and Policy 1)

City of Manteca

The City of Manteca General Plan (2003) contains goals and policies that address growth accommodation. Growth accommodation strategies include the following:

- Growth within the City shall be orderly, well-planned and occur within the limits of the City's infrastructure and ability to accommodate new development. The City has established Primary and Secondary Urban Services Boundaries that will facilitate orderly development contiguous with the City's boundaries and will be served by available public services and facilities. (Land Use Element Goal LU-1 and Policies LU-P-3, LU-P-4, LU-P-5, LU-P-6, LU-P-7, and LU-P-8 and Implementation Measure LU-I-1)
- The City shall manage the rate and type of growth in Manteca in accordance with the growth management plan that provides for an annual allocation of residential, commercial, and industrial development. The growth management program takes into consideration the capacities of City facilities and services and the ability of the community to accommodate

new development. Specific plans will be encouraged in order to ensure orderly, well-planned growth. (Land Use Element Policies LU-P-11 and LU-P-12)

City of Ripon

The City of Ripon General Plan (2006) contains goals and policies that address growth accommodation. Growth accommodation strategies include the following:

- The City shall balance development with jobs, housing, educational, and recreational needs by setting a maximum rate of growth to occur within a 3 percent to 6 percent growth rate. (Land Use and Growth Accommodations Element Goal A and Policy A8)

City of Stockton

The City of Stockton General Plan (2007) contains goals, objectives, and policies that address growth accommodation. Growth accommodation strategies include the following:

- The City shall manage foreseeable population growth by identifying City boundaries that reflect realistic growth assumptions with the objective that new development will proceed in an orderly fashion within the City's boundaries in order to avoid impacts to sensitive resources, critical habitats, and scenic resources. The City shall also maximize infill development within the City's boundaries. (Land Use Element objectives)
- The City shall phase growth based on the availability of adequate water supplies and market demand. The timing shall also correspond to approval and construction of transportation, water supply, and other public services and utilities infrastructure. Additionally, the provision of City services and utilities shall occur within an established urban service area boundary. (General Plan Policies LU-1.2, LU-1.3, LU-1.13, PFS-2.4)

San Joaquin County

The San Joaquin County General Plan (1992) identifies key strategies that address growth accommodation. Growth accommodation strategies include the following:

- Urban communities shall be planned to accommodate most of the County's projected growth. Development shall be orderly and compact utilizing infill areas before expanding beyond the existing developed areas of a community. While rural communities shall be planned to have minimal growth, mainly infill development, with expansion discouraged. (Community Development Element Growth Accommodation Policies 1, 2, 5, and 6)
- Expansion of public facilities and services shall occur based on current needs and projected growth patterns. Improvements to infrastructure should be made to support growth without promoting growth where it is not planned. (Community Development Element Growth Accommodation Policies 26 and 27)
- Planned growth shall occur in conjunction with the availability of a long-term, reliable potable water supply. (Community Development Element Water Supply Policies 1 and 7)

Growth Inducement Potential Associated with Water Banking

As discussed in **Chapter 3, Project Description**, the ICU Program would allow for groundwater banking and extraction for water users outside the Study Area. Over time, a decreasing amount

of the initial banked water would be available to the banking partners. After 20 years, no water would be available from the initial water deposit.

Banked water would be used for agricultural or urban supply, or for a combination of the two. Banked water that is used for agricultural purposes would be used for irrigation of land outside of the Study Area and would not be anticipated to contribute to growth inducement. It is anticipated that banked water used for urban supplies would be used primarily as emergency supply during drought periods. Specifically, water would be recharged during periods of high water availability (e.g. wet years), stored, and then extracted during dry or drought years to support urban water supply reliability. However, the ICU Program would not place restrictions on the final use of banked groundwater. To the contrary, it is presumed that banking partners would plan internally for the use of banked groundwater from the ICU Program. Therefore, the use of banked groundwater by banking partners would support planned growth within the banking partner's service area.

5.5 Environmental Effects of Growth

The local jurisdictions that govern land use and development in the Study Area include San Joaquin County and the cities of Lodi, Stockton, Lathrop, Manteca, Escalon, and Ripon. Each land use jurisdiction within the Study Area has adopted a General Plan to guide the type, location, and level of land use and development within its purview. Additionally, each jurisdiction implements its own development approval process that determines the timing and specific nature, intensity and location of development and other land use.

These municipalities have assessed the growth-related impacts associated with the planned land use and growth allowed under their General Plans and the CEQA EIRs they have prepared on those plans. These growth-related impacts, associated with land use and growth planned, and approved by the local land use jurisdictions, constitute the secondary effects of growth associated with the ICU Program. The following discussion briefly summarizes these growth-related impacts, and provides an overview of the applicable regulations and mitigation measures set forth by agencies with jurisdiction in the Study Area.

Impact 5-1: Implementation of projects and management actions under the ICU Program would accommodate planned growth in the Study Area and in the service areas of groundwater banking partners that provide urban supply. Planned growth would result in secondary environmental effects. The effects of planned growth have been identified and addressed in the EIRs prepared for General Plans for municipalities within the Study Area. Local land use jurisdictions have identified several significant and unavoidable impacts associated with planned growth including impacts to aesthetics, agricultural resources, air quality, biological resources, geology and soils, hydrology and water quality, noise, and transportation and traffic.

The General Plan EIRs within the Study Area identify significant and unavoidable impacts associated with planned growth in several areas: aesthetics, agricultural resources, air quality, biological resources, geology and soils, hydrology and water quality, noise, and transportation and traffic. Impacts from growth in years beyond that evaluated in the EIRs for adopted land use plans would occur due to an increased density of development or the use of additional land area. Impacts from

increased density could include additional traffic congestion, air pollution, noise, and demand on public services. Land area (or "footprint") impacts could include the loss of agricultural resources and open space, impacts on wildlife habitat and other biological resources, disturbance of cultural resources, increased soil erosion, and water quality impacts from increased urban runoff.

The ICU Program would support some of the planned growth in the jurisdictions within the Study Area. In general, development planned and approved through the general plan process in the Study Area would have environmental impacts. The environmental consequences of this planned growth have been addressed in local plans and the associated CEQA review as well as in other, project-specific documentation. A summary of each of the potentially significant secondary growth inducing effects is provided below.

Discussion of Secondary Effects of Growth and Mitigation

Following is a discussion of the key environmental areas where secondary effects of growth are expected to occur. As described above, these impacts have been addressed in detail in the EIRs prepared for each city's General Plan and the San Joaquin County General Plan; the reader is referred to those General Plan EIRs for further information.

Aesthetics

Future growth within the Study Area will result in development along the edges of urban areas as infill land within cities and communities is developed. This development into rural and agricultural areas would result in the conversion of open space and farmland to urban uses. This will result in changes in views along the urban edge, views along major highways, the visual environment, and new sources of light and glare within the existing urban areas.

The County and municipalities have identified a number of strategies and mitigation measures to minimize the impacts to aesthetics/visual resources. These include:

- Policies to preserve agricultural land.
- Establishment of urban growth boundaries and urban services boundaries.
- Standards for the design of new development, streetscapes, and gateways to urban areas as well as the establishment of buffer areas and greenbelts between cities and between urban and rural areas.

Although implementation of these policies and mitigation measures would reduce growth-related impacts on aesthetics, impacts may remain significant.

Agricultural Resources

Population growth within San Joaquin County will result in conversion of farmland for urban development. As available infill land is developed within cities and people continue to move into San Joaquin County, development will be directed towards the edges of the cities where farmland is located. Development adjacent to agricultural areas creates conflicts between agricultural and

urban uses, including dust, smoke, pesticides, and noise from agricultural operations, as well as potential trespass, vandalism, and litter from the urban population.

The County and municipalities have identified a number of strategies and mitigation measures to minimize the impacts to agriculture. These include:

- Adoption of ordinances for San Joaquin County and the cities of Stockton, Manteca, Lathrop, and Tracy that establish farmland conversion fees and required farmland preservation mitigation; and
- Establishment of urban growth boundaries or urban service area boundaries that restrict urban sprawl and the inefficient conversion of farmland.

Although implementation of these policies and mitigation measures would reduce growth-related impacts on agriculture, impacts may remain significant.

Air Quality

Population growth in the Study Area would result in continued intermittent construction activities for new development scattered throughout the region. These construction activities would result in emission of air pollutants. Increased development in the region would also result in an increase in operational emissions of industrial developments. Additionally, increases in regional population would also increase traffic in the region, resulting in increased vehicle emissions. With these factors contributing to air quality degradation, growth is generally considered to have a significant and unavoidable impact on air quality.

Air quality is primarily regulated at the state and regional levels. The California Air Resources Board (CARB), the State air quality management agency, is responsible for establishing and reviewing the state ambient air quality standards, compiling the California State Implementation Plan (SIP) and securing approval of that plan from U.S. Environmental Protection Agency. The regional agency primarily responsible for regulating air quality in the San Joaquin Valley Air Basin (SJVAB) is the San Joaquin Valley Air Pollution Control District (SJVAPCD). The SJVAPCD has primary responsibility for regulating stationary sources of air pollution situated within its jurisdictional boundaries. To this end, the District implements air quality programs required by State and Federal mandates, enforces rules and regulations based on air pollution laws, and educates businesses and residents about their role in protecting air quality.

The County and municipalities generally support efforts to minimize air quality degradation with policies that:

- Pledge cooperation between local, regional, and state agencies to establish comparable air quality elements and implementation programs;
- Support and expand public transit to reduce emissions from vehicle trips;
- Provide incentives to reduce work-related vehicle trips (including HOV lanes); and,
- Support legislation to promote cleaner fuels.

Although implementation of these policies and mitigation measures would reduce growth-related impacts on air quality, impacts may remain significant.

Biological Resources

Development associated with growth would remove vegetation and result in the loss of habitat for some biological species. Growth would result in the conversion of open spaces to developed uses, potentially resulting in fragmentation of existing wildlife corridors. Additionally, increased development may result in a loss of riparian and wetland habitats. Existing biological communities in the Study Area that may be affected are described in more detail in Section 4.5, Biological Resources.

The San Joaquin County Multi-Species Conservation and Open Space Plan (SJMSCP) has been adopted as a 50-year plan that provides a strategy for balancing the need to conserve open space and the need to convert open space to other use while providing for the long-term management of plant, fish, and wildlife species. A Joint Powers Authority (JPA) implements the SJMSCP. The JPA is responsible for conducting all required preconstruction surveys, informing an applicant of "Incidental Take" minimization measures, confirming "Incidental Take" minimization measures have been implemented prior to site-disturbance, and collecting development fees. San Joaquin County and all seven cities in the County participate in the SJMSCP.

Local jurisdictions, including the municipalities and the County, have developed policies and mitigation measures through their general plans and the associated EIRs that help identify and preserve biological communities. Policies include:

- Requiring biological surveys of land prior to approval of development;
- Protecting sensitive resources during construction activities; and,
- Requiring adequate mitigation for developments that would adversely affect listed rare, threatened, or endangered species.

Additionally, federal and state agencies, including the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG), require permitting and otherwise restrict construction or development activities within areas containing sensitive biological species.

Although implementation of these policies and mitigation measures would reduce growth-related impacts on biological resources, impacts may remain significant.

Geology and Soils

Geological impacts that could result from population growth include the construction of developments on land that is susceptible to geological hazards such as seismic ground-shaking, fault rupture, liquefaction, landslide, erosion, subsidence, settlement, and expansive soils. The risks from many geologic hazards can be successfully mitigated through a combination of land use and developmental standards, engineering, and construction. The municipalities in the Study

Area and the County, therefore, have developed policies and mitigation measures including but not limited to:

- Improving the knowledge of sites of geologic hazards (including seismic and non-seismic hazards) and incorporating newly acquired data into mapping and local policies;
- Requiring all facilities to meet appropriate codes; and,
- Requiring geologic reports for certain proposed development projects, establishing standard guidelines for geologic reports, and developing standard mitigation measures.

The California Geological Survey also provides data concerning mapping of geologic hazards. Additionally, the California Uniform Building Code of the California Code of Regulations provides standards for the construction of all new facilities to ensure safety during seismic hazards.

Although implementation of these policies and mitigation measures would reduce growth-related impacts on geology and soil, impacts may remain significant.

Noise

Population growth may result in increased noise levels in developed areas. Construction activities for development projects would contribute to increases in noise levels. Where development results in a higher density of municipal or urban land uses, noise levels could also be expected to increase. Additionally, increased traffic would result in increased noise levels. Study Area municipalities reduce these noise impacts through policies that:

- Establish interior and exterior noise standards for different land uses and ensure that construction and operation of new developments do not exceed those standards;
- Establish land use compatibility standards to ensure that noise sensitive developments are not impacted by nearby noise-generating land uses; and,
- Require the inclusion of noise buffering measures in the design of new roadways and transportation corridors.

Although implementation of these policies and mitigation measures would reduce growth-related impacts on noise levels, impacts may remain significant.

Population and Housing

The General Plans for the municipalities in the Study Area plan for population growth by establishing land use plan maps. These maps identify the locations and densities of residential development. However, in the event that unplanned growth occurs, it is possible that adequate housing is not available for all economic segments of the community because the General Plans have not set aside enough land for housing, or did not identify enough diversification of housing densities. Study Area municipalities mitigate these impacts through the following:

- The Housing Element of each municipality's General Plan identifies adequate housing sites to be made available to supply housing for all income levels.

- The General Plan for each municipality contains growth management strategies that include timing development with market demand and availability of public services and utilities.

Although implementation of these policies and mitigation measures would reduce growth-related impacts on population and housing, impacts may remain significant.

Public Services

Unplanned growth within the Study Area could result in unanticipated demand on public services. These services include solid waste disposal, law enforcement, fire protection and emergency services, school facilities, parks and recreation, utilities, and library services. Public services and facilities may not have available capacity or resources to meet the needs of unplanned growth. Study Area municipalities have established the following policies and strategies to mitigate impacts from unplanned growth on public services and facilities:

- Establishment of urban growth boundaries and urban services boundaries, beyond which growth would be prohibited due to the lack of public services and facilities infrastructure;
- Development is required to show that adequate public services and facilities are available to serve the development prior to approval;
- New growth in municipalities will be consistent with the availability of new public services and facilities infrastructure.

Although implementation of these policies and mitigation measures would reduce growth-related impacts on public services, impacts may remain significant.

Transportation and Traffic

As population in the region grows, the number of vehicles on roadways throughout the region would increase. Accommodating increased traffic volumes would generally require increasing the transportation infrastructure in the region. SJCOG's Regional Transportation Plan (RTP) offers long-term planning and management guidelines for the regional transportation system. The RTP EIR provides mitigation measures to off-set the impacts of growth projected in the region. Additionally, Study Area municipalities have set forth general plan policies to:

- Improve and maintain roadways to accommodate existing and projected traffic volumes;
- Ensure that the roadway system is safe and efficient; and,
- Provide diverse and effective public transit to reduce traffic volumes.

Although implementation of these policies and mitigation measures would reduce growth-related impacts on traffic, impacts may remain significant.

CHAPTER 6
Other CEQA Issues

6.1 Climate Change and Water Resources

This section provides a discussion of the potential effects of climate change, as estimated via a series of recent studies forwarded by the California Department of Water Resources, the California Energy Commission, the US National Weather Service, the Intergovernmental Panel on Climate Change, and various university and institutional researchers. This analysis focuses on effects of the emission of CO_2 and other climate forcing factors, that could result in a series of effects on water resources in California, as indicated by the referenced studies and summarized below.

Emissions of greenhouse gases associated with the Integrated Conjunctive Use Program (ICU Program) Alternatives are discussed in **Section 4.12, Air Quality**, including the potential for the ICU Program to contribute to climate change. The following additional discussion provides a review of potential changes associated with water resources and water resources availability, storage, and similar issues, as relevant to climate change in California. This section also provides a review of how the ICU Program would exacerbate or mitigate the anticipated effects of climate change on water resources, as relevant to the Study Area and GBA member agencies.

6.1.1 Climate Change and Water Resources Background

Current scientific research indicates that observed climate change is most likely a result of increased emission of greenhouse gases (GHGs) associated with human activity (IPCC, 2007a, 2007b). Prominent GHGs, including carbon dioxide (CO_2), methane (CH_4), ozone (O_3), water vapor, nitrogen oxides (NO_x), and chlorofluorocarbons (CFCs), are emitted during combustion of fossil fuels and other activities associated with transportation, industrial/manufacturing, utility, residential, and agricultural sectors (California Energy Commission, 2006). These gases, once released to the atmosphere, trap heat near the earth's surface, resulting in an overall increase in average global temperature.

Global climate change is anticipated to affect water resources in California, including the Study Area, via sea-level rise, more extreme weather patterns causing increases in the intensity of stormwater runoff and flooding events, and changes in the availability of water for beneficial use.

Sea-level Rise

According to an overview provided by the California Department of Water Resources (DWR), mean sea level at the Golden Gate Bridge has risen by at least 8 inches since 1900 (DWR, 2006). This is in general agreement with Intergovernmental Panel on Climate Change (IPCC) estimates, which indicate average increases of 3.9 to 7.9 inches globally during the last century. The observed sea-level rise likely results from a combination of factors, including melting of polar and terrestrial ice and snow, and thermal expansion of ocean water as the earth's temperature increased gradually over time (IPCC, 2007b).

The IPCC has attempted to predict the amount of sea-level rise that is likely to occur in the future under various worldwide GHG emissions scenarios over the next century. Results from that study indicate that global sea level could increase by an estimated 7 to 23 inches by 2099, or about 0.6 to 3.8 inches every 10 years (IPCC, 2007b). While several other assessments have been made and there is some disagreement and uncertainty about sea-level rise projections (Munk, 2002), the 2007 IPCC report contains what is probably the most highly regarded of projections published to date.

Precipitation and Flooding

Most precipitation in northern California, including the Study Area, occurs during the October through April rainy season, with the largest amount of water falling between November and March. A recent analysis by the United States National Weather Service (USNWS), using data from 1931 through 2005, indicates a long-term trend of increasing annual precipitation in California, especially in northern California, where data show an increase of up to 1.5 inches per decade (USNWS, 2008). A second investigation completed by DWR indicates a statistically significant trend towards increased total precipitation in northern and central California since the late 1960s (DWR, 2006). An investigation of rainfall during November through March of 1930 through 1997 indicates significant increases in California rainfall (distinct from snowfall) (Mote, 2005). A single investigation by Bardini et al. (2001) indicates potentially decreasing annual precipitation in California. However, this result is likely an artifact of the specific subset of data that the Bardini study relied upon, with extremes at the beginning or end of the time series data substantially affected the identified trend (DWR, 2006).

There is also evidence that the amount of precipitation that occurs on an annual basis is becoming more variable. That is, periods of both high and low rainfall are becoming more common. Specifically, a study performed by DWR (2006) indicates that present-day variability in annual precipitation is about 75 percent greater than that of the early 20th century.

In terms of flooding, an analysis by DWR reviewed historic flows in three California rivers that are tributary to the Delta: the Feather, American, and Tuolumne Rivers (DWR, 2006). The investigation divided in half a century-long dataset to compare pre-1955 to post-1955 data. Results indicated that the 100-year 3-day peak flows have more than doubled in the American (111 percent increase) and Tuolumne (102 percent increase) Rivers, and increased by 51 percent in the Feather River. Comparing the pre- to post-1955 periods, only one major flood event occurred prior to 1955

in the three rivers, while four occurred during the post-1955 period. Thus, annual peak 3-day mean discharges in these northern California watersheds are becoming larger and more variable. Independent climate modeling efforts predict that these trends toward more variable river and stream flows, including more frequent flooding events, will continue as a result of climate change (Dettinger et al., 2004).

Water Supply

As discussed above, existing climate change research generally indicates climate change will result in increases in peak winter flows and decreases in spring and early summer runoff. At present, California's snow pack acts as a short-term storage reservoir: during the winter months, a substantial portion of California's precipitation falls as snow, which collects and is stored in the Sierra snow pack. In spring, this stored snow slowly melts, releasing water to rivers and slowly filling reservoirs, and providing an extended window during which municipal, agricultural, and other users can draw from California's rivers for water supply.

When the effects of climate change are included, the situation is somewhat different, and California would receive less winter snowfall and more winter rainfall. Under this scenario, winter stream flows would be higher, while spring stream flows, which are fed primarily by snowmelt, would be lower. As a result, water available for filling reservoirs during the spring would be reduced, while winter reservoir management could require additional precautions to account for increased flood risk, including more aggressive allocation of reservoir capacity for flood control purposes. Additionally, agricultural withdrawals, municipal withdrawals, and withdrawals in support of the State Water Project (SWP) and Central Valley Project (CVP) would have a reduced spring baseflow from which to draw, as a result of reduced spring snowmelt.

A report prepared by DWR (2006) presents the most current complete analysis of changes to SWP and CVP operations that would be anticipated to occur as a result of climate change. The report analyzes the potential impacts of climate change on SWP and CVP operations and deliveries and on Delta water quality and water levels, based on runs of CALSIM II, (described in more detail in **Section 4.2, Surface Water**).

Results from the study indicated substantial changes in SWP and CVP operations (DWR, 2006). Due to shifts in seasonal and annual average runoff, the amount of water delivered by the SWP and CVP was reduced considerably. Under three of the four climate change scenarios, dead storage was reached during 21 to 31 months for Shasta, and 20 to 28 months for Folsom during the period of record, as compared to 1 month for each reservoir under the base case scenario. During these months, streamflow requirements were not met on the Sacramento and American rivers. While it is presumed that these modeled effects are a result of too much risk being incorporated into the CALSIM II model, and the study further suggests that reductions to dead storage could be avoided by including operational flexibility, the overall projected trend shows a decrease in water availability within the system as a result of climate change (DWR, 2006).

6.1.2 ICU Program Effects

ICU Program and Sea Level Rise

As discussed in greater detail in **Section 4.2, Surface Water**, the Delta is a tidally-influenced estuary, with tidal influence extending along the lower Sacramento River, the lower San Joaquin River, the lower Mokelumne River, and lower reaches of other Study Area waterways that discharge into the Delta. Because these areas are tidally influenced, it is anticipated that sea level rise in San Francisco Bay will concurrently affect Delta water levels. Assuming that sea level rise in San Francisco Bay will continue in accordance with projections made by the IPCC, or at a rate of up to 3.8 inches every decade, mean water levels in the Delta in or adjacent to the lower portions of the Study Area could rise by up to a foot in approximately 30 years. As a result, it is anticipated that flooding potential within affected portions of the Study Area and the Delta could increase. Additionally, strain on existing levee systems would be anticipated to increase, as would the potential for levee overtopping during storm events occurring during high tide events.

Implementation of the ICU Program (e.g., Alternatives A-D) would potentially include installation of facilities within areas that would be affected by sea level rise, particularly within low-lying and Delta areas. Sea level rise could result in periodic or unintended inundation of intakes and other facilities installed in these areas. However, implementation of **Mitigation Measure 6.1-1** would ensure that such facilities are designed to withstand the projected effects of sea level rise.

Study Area and Climate-Induced Precipitation and Flooding

Confounding the issue flooding associated with sea level rise are the potential effects of increasing the proportion of winter precipitation that would fall as rain. As discussed above, under the anticipated climate change scenarios, a higher proportion of winter precipitation would fall as rain, which would result in greater peak storm flows, greater peak flood flows, and added annual probability of flooding. Additionally, greater variation in the intensity of storm events, including projected increases in the frequency of intense precipitation events, would result in additional peak stormwater flows being conveyed through existing stormwater facilities. This situation, in turn, is anticipated to further increase flood potential, by increasing the amount of stormwater discharged to Study Area watersheds.

Within this framework, it is anticipated that a greater portion of the Study Area would be subjected to flooding under a future climate change scenario, as compared to present day conditions. This additional flooding would be anticipated to result from both increases in flow along rivers within the Study Area due to increased winter rainfall, and also from increased street and surface flooding within the Study Area due to increased frequency of intense precipitation events.

Implementation of one of the ICU Program Alternatives (A-D) would include installation of facilities that would divert water during flood flows and other periods of increased river flows. Specifically, the ICU Program Alternatives would include installation of facilities for the withdrawal of water during high flow periods from the Mokelumne River, the Stanislaus River, Littlejohns Creek, and

the Sacramento River. Withdrawal of water from affected rivers during flood events, or prior to flood events such that additional reservoir flood storage capacity is made available, could result in reduced flooding potential downstream, as compared to the climate change scenario without implementation of the ICU Program. Therefore, implementation of the ICU Program would be anticipated to provide some amount of additional flood protection to downstream areas, and would serve to partially mitigate the effects of climate change associated with increased flooding of rivers.

ICU Program and Climate-Induced Water Supply and Groundwater

As discussed in detail in Chapter 3.0, implementation of one of the ICU Program Alternatives (A-D) would result in the installation of diverse facilities for the capture and storage of water from rivers and streams. Specifically, the ICU Program Alternatives would result in storage and groundwater recharge or surface water delivery from a combination of the Mokelumne River, the Delta, Littlejohns Creek, the Stanislaus River under Alternatives A and D, and the Sacramento River under Alternatives B and C. As discussed previously, Alternatives A, B, and D would include new surface storage facilities (e.g., the Duck Creek Reservoir or the South Gulch Reservoir), and all alternatives would include substantial groundwater banking and injection facilities, in order to facilitate groundwater recharge and support conjunctive use. Additionally, many of the proposed facilities and surface water diversion projects would be designed to withdraw, convey, and store stormflows, flood flows, and water from other wet-season storm or intensive runoff events.

These proposed facilities would provide additional storage capacity and enable additional operational flexibility in support of water resources management. Specifically, (1) either of the proposed reservoirs would provide additional storage capacity, which would facilitate capture of additional water during peak river flow/peak runoff periods and support operational flexibility of water storage relevant to the Study Area; (2) the proposed groundwater banking system would also provide additional water storage capacity, and would provide a water supply during drought or other periods when water is needed; (3) the proposed groundwater recharge system would enable storage of water during periods of peak river flow/peak runoff, facilitating basin recharge. These anticipated benefits of implementing the ICU Program would serve to partially counter the reductions in water supply availability that are anticipated to occur as a result of climate change.

6.1.3 Mitigation Measures

Mitigation Measure 6.1-1. The proponents of individual projects implemented under Alternatives A-D shall ensure that all facilities not intended to be submerged, which would be installed within tidal areas of the Delta and its tributaries, shall be installed at a height of at least three feet above the maximum anticipated tidal height during the projected lifetime of the facility. Maximum anticipated tidal height shall be calculated based on IPCC or other estimates of sea level rise, as available at the time of environmental review and engineering design for each relevant project.

6.2 Cumulative Effects

6.2.1 Introduction

Under CEQA, an EIR is required to assess the cumulative impact of a project when the project's incremental effect is cumulatively considerable. According to 14 CCR §15130, 15355, a "cumulative impact" consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other closely related past, present and reasonably foreseeable future probable projects causing related impacts. Additionally, cumulative impacts can result from individually minor or less than significant, but collectively significant projects taking place over a period of time (14 CCR §15355(c)).

Section 15130(b)(1) of the CEQA Guidelines describes the following elements as being necessary for an adequate discussion of cumulative impacts. Either:

A. A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or

B. A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact. Any such planning document shall be referenced and made available to the public at a location specified by the lead agency.

Table 6-1 summarizes the cumulative analysis conducted by local jurisdictions for their General Plans. Most of the Study Area jurisdictions conclude that implementation of their plans will result in cumulatively significant impacts to regional resources including aesthetics, agricultural resources, air quality, biological resources, transportation and traffic, and public services. The same jurisdictions also concluded that, with implementation of General Plan policies and programs, there would be less than significant impacts related to cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, land use planning, noise, population and housing, recreation and open space, and utilities and service systems.

Since the ICU Program is a regional resource plan, analysis contained in Chapter 4 of this PEIR is similar to a cumulative analysis. The setting encompasses a broad area, and regional resources affected are scattered throughout the Study Area. The cumulative baseline includes the effects associated with implementing local General Plans in addition to the effects of the ICU Program. Additionally, the cumulative baseline for the analysis of water resources also includes the effects associated with implementing other surface water diversion projects located along the Sacramento River, Delta, and Study Area rivers, as relevant. The following sections evaluate the cumulative baseline condition and compare it to cumulative effects identified in local General Plan EIRs and relevant water project documentation.

TABLE 6-1
SUMMARY OF CUMULATIVE IMPACT ANALYSIS FROM LOCAL JURISDICTION GENERAL PLANS

Issue Area	San Joaquin County	City of Escalon	City of Lathrop	City of Lodi	City of Manteca	City of Ripon	City of Stockton
Aesthetics	LS	-	SU	SU	SU	-	LS
Agricultural Resources	SU	SU	SU	SU	SU	SU	LS
Air Quality	LS	SU	SU	LS	SU	SU	LS
Biological Resources	LS	-	LS	LS	SU	LS	LS
Cultural Resources	LS	LS	LS	-	LS	LS	LS
Geology and Soils	LS	-	LS	LS	LS	LS	LS
Hazards and Hazardous Materials	LS	-	LS	LS	LS	LS	LS
Hydrology and Water Quality	LS	-	LS	LS	LS	LS	LS
Land Use and Planning	LS	-	LS	LS	LS	LS	LS
Mineral Resources	LS	-	-	-	-	-	-
Noise	LS	-	LS	LS	LS	SU	LS
Population and Housing	LS	-	-	LS	LS	-	LS
Public Services	LS	-	-	LS	SU	LS	LS
Recreation and Open Space	-	-	LS	LS	-	LS	LS
Transportation / Traffic	LS	SU	LS	LS	LS	LS	LS
Utilities and Service Systems	LS	-	LS	LS	-	LS	LS

SU = Significant Unavoidable
LS = Less Than Significant
Dash (-) indicates impact not assessed.

SOURCES: City of Escalon 2005; City of Lathrop 1991, as revised 2004; City of Lodi 1991; City of Manteca, 2003; City of Ripon, 2006; City of Stockton 2006; San Joaquin County, 1992.

6.2.2 Water Resources

Most of the local General Plan EIRs indicate that local water demand contributes significantly to the cumulative water demand in the region (see Table 6-1). A primary objective of the ICU Program is to accommodate projected future water demand. Through implementation of the ICU Program, the GBA acts as a regional resource manager with responsibilities to mitigate the significant cumulative impacts to water supplies identified individually by local cities within the Study Area.

The ICU Program identifies a group of projects and management actions that would achieve a regional water balance. As such, the analysis of the project itself provides a cumulative assessment of the regional groundwater resource. In addition to this regional assessment, the cumulative baseline condition may include projects implemented independently by local jurisdictions that could affect local groundwater basins. The following discussions evaluate the cumulative impacts for water resources.

Surface Water Quality

Surface water quality is affected by contaminated runoff from urban and industrial land uses and by construction activities. As noted in **Section 4.2, Surface Water**, the ICU Program could potentially contribute to the regional condition during construction of facilities, but potential contributions would be reduced to less than significant levels via mitigation indicated in that section. Therefore, implementation of the ICU Program **would *not* result in a considerable contribution to the cumulative impact** on surface water quality.

Surface Water Hydrology of the Delta and Delta Tributaries

As discussed in **Section 4.2, Surface Water**, the analysis of the effects of the ICU Program on surface water hydrology relied on a detailed comparison to previously completed model runs for affected rivers. A unique CALSIM analysis was not completed in support of the ICU Program because, due to the programmatic nature of this PEIR, detailed project-level information that would be needed to successfully complete CALSIM modeling is not presently available for the ICU Program Alternatives (A-D). Additional discussion on this matter is provided in Section 4.2.

As a result, a modeled hydrologic analysis for the assessment of changes in flows associated with the ICU Program, in consideration of the cumulative effects of other similar water withdrawal projects that are in process or otherwise anticipated, is not available for this PEIR. Instead, this analysis relies on the conclusion reached in Section 4.2 regarding potential impacts to river flows, Delta hydrology, reservoir operations, and water supply, as well as existing and anticipated conditions in the Delta and its tributaries.

As discussed in **Chapter 3, Project Description**, and Section 4.2, implementation of the ICU Program would result in the withdrawal of surface water from the Mokelumne River, the Delta, Littlejohns Creek, and in some cases, the Stanislaus and Sacramento rivers. Although ICU Program diversions would occur primarily during periods of high flow, as discussed in Section 4.2, these diversions would still be anticipated to result in potentially significant impacts on downstream hydrology, in particular with respect to the Mokelumne River.

Delta hydrology, including flows available for water supply, is anticipated to be affected by additional surface water diversion and management projects, which are currently being implemented or which are anticipated to be implemented. Within this framework, implementation of the ICU Program would be anticipated to contribute to significant impacts to the hydrology of the Delta and its tributaries. Therefore, and because no mitigation measures are available to avoid this impact, implementation of the ICU Program ***would*** **result in a considerable contribution to the cumulative impact** on the surface water hydrology of the Delta and its tributaries.

Delta Water Quality

As discussed above for surface water hydrology of the Delta and Delta tributaries, surface water modeling in support of the ICU Program is not available for this PEIR. **Section 4.2, Surface Water**, which relies on a comparison of the overall effects of the ICU Program to previously completed surface water modeling, indicates that implementation of the ICU Program would result in a less than significant effect on Delta water quality. However, the cumulative impact analysis must consider existing water quality in the Delta, as well as potential additional changes in Delta water quality that would occur as a result of implementing anticipated surface water diversion and management projects. Within this framework, even though the ICU Program would be anticipated to have only minor impacts on Delta water quality, it is anticipated that even these minor impacts would contribute to the overall state of degraded water quality within the Delta. Therefore, and because no additional mitigation measures are available to avoid this impact, implementation of the ICU Program ***would*** **result in a considerable contribution to the cumulative impact** on the water quality of the Delta.

Groundwater Quality

As discussed in **Section 4.3, Groundwater Resources**, implementation of the ICU Program could affect groundwater quality due to potential subsurface contamination and the increased groundwater infiltration rates associated with the ICU Program, which could increase the migration of subsurface contaminants. Groundwater quality is also affected locally by faulty septic tanks, leach fields, and naturally occurring minerals. Since the recharge projects proposed in the ICU Program would be located throughout the GBA Study Area, they would contribute considerably to the cumulative baseline. As noted in Section 4.3, impacts to groundwater quality would be less than significant with mitigation. Implementation of the ICU Program would assist in maintaining groundwater quality to avoid a significantly degraded regional condition, and **would *not* result in a considerable contribution to the cumulative impact** associated with groundwater quality.

Groundwater Levels

The cumulative effect of groundwater extraction in the region has resulted in a regional overdraft condition, associated with historic, current, and projected future groundwater pumping/withdrawal practices for agricultural or municipal and industrial supply. As discussed in Section 4.3, the ICU Program substantially supports groundwater recharge within the Study Area, in order to alleviate the existing condition of groundwater overdraft, by establishing mechanisms to equitably maintain regional water balance. As such, the ICU Program supports the groundwater recharge and **would *not* result in a considerable contribution to the cumulative impact** associated with groundwater overdraft.

6.2.3 Flooding and Drainage

Flooding and drainage, while addressed separately within this PEIR, are addressed within the hydrology and water quality, and/or the hazards and hazardous materials sections of the General Plans indicated in Table 6-1. As shown, hazards and hazardous materials and hydrology and water quality impacts of relevant General Plans would be less than significant in all cases. As discussed in **Section 4.4, Flooding and Drainage**, implementation of the ICU Program would result in impacts associated with placement of structures in a floodplain and increased exposure to flooding due to levee or dam failure, which would be mitigated to less than significant levels with the implementation of mitigation prescribed in Section 4.4. Implementation of the ICU Program would also result in potentially significant increases in erosion and siltation during operations, as well as potentially significant alterations along the course of streams and rivers within the Study Area. These changes could contribute to regional flooding and drainage problems within the Study Area, much of which is subject to 100-year flooding and other drainage issues, as discussed in Section 4.4. Therefore, and in the event that no additional mitigation measures to reduce the intensity of these impacts are identified during the environmental review of the individual projects that would be implemented under the ICU Program, implementation of the ICU Program ***could potentially*** **result in a considerable contribution to the cumulative impact** associated with flooding and drainage.

6.2.4 Biological Resources

Only the General Plan of Manteca (see Table 6-1) identifies impacts to biological resources from planned growth as being significant and unavoidable. The projects identified in the ICU Program could result in clearing multiple acres of open space that may support biological resources, in particular, open space located within the footprint of a proposed reservoir. Also, as discussed in **Section 4.5, Biological Resources**, installation of water withdrawal, conveyance, and recharge facilities could also result in the clearing of areas that support biological resources. However, as discussed in Section 4.5, implementation of the indicated mitigation measures would reduce impacts to biological resources to less than significant levels. Additionally, prior to construction, implementing agencies would comply with permitting requirements if sensitive habitats or species were anticipated to be adversely affected. Permits could require providing replacement habitats in areas more critical to the species' survival. Therefore, implementation of the indicated mitigation, along with compliance with permit requirements, would be anticipated to reduce potential impacts to biological resources, as relevant.

As indicated in Section 4.5, operation of the ICU Program would include potentially significant impacts on fisheries resources as a result of altered hydrology within the Delta and other relevant waterways. Even with implementation of the mitigation prescribed in Section 4.5, these impacts would remain potentially significant. Therefore, in consideration of the current status of many relevant fish species in the Delta and its tributaries, and because no additional mitigation measures are available to avoid or further reduce the intensity of this impact, implementation of the ICU Program ***could potentially*** **result in a considerable contribution to the cumulative impact** to fisheries resources.

6.2.5 Land Use and Agriculture

Implementation of the ICU Program would include installation of groundwater recharge basins and, potentially, a surface water reservoir, as well as various pipelines and other water conveyance, supply, and treatment infrastructure. The projects would be compatible with local General Plan policies to manage groundwater basins to support planned growth, and, with implementation of the mitigation prescribed in **Section 4.6, Land Use and Agricultural Resources**, would not be anticipated to contribute to regional conflicts with existing uses.

As shown in Table 6-1, all but one of the General Plans relevant to the Study Area would result in a significant unavoidable impact to agriculture. This impact arises primarily as a result of urban encroachment onto adjacent, agricultural lands. Similarly, Section 4.6 indicates that implementation of the ICU Program would result in a significant and unavoidable impact to agriculture, associated with permanent conversion of farmland to other uses, as well as conflicts with Williamson Act contracts. These impacts would result primarily from installing and using the proposed groundwater basins and surface water storage facilities that would be implemented under Alternatives A-D. Because no mitigation is available that would sufficiently reduce the level of impact of the ICU

Program on agriculture, implementation of the ICU Program ***would*** **result in a considerable contribution to the cumulative impact** associated with loss of agricultural land.

6.2.6 Cultural Resources

As shown in Table 6-1, the General Plans relevant to the Study Area would all result in less than significant impacts to cultural resources. Similarly, as discussed in **Section 4.7, Cultural Resources**, the potential impacts to cultural resources that would result from implementation of the ICU Program would be mitigable to less than significant levels with implementation of the mitigation measures indicated in that section. Therefore, implementation of the ICU Program is not anticipated to contribute to cumulative regional impacts associated with cultural resources, and the ICU Program **would *not* result in a considerable contribution to the cumulative impact** to cultural resources.

6.2.7 Geology, Soils, and Seismicity

The General Plans identified above indicate less than significant impacts associated with geology, soils, and seismicity (Table 6-1). As discussed in **Section 4.8, Geology, Soils, and Seismicity**, potential geologic hazards affect the entire region, and individual projects may encounter or result in specific geologic hazards such as unstable or expansive soils, earthquake fault rupture, or erosion and soil loss. However, the implementation of mitigation prescribed in Section 4.8 would reduce the intensity of these potential impacts, and implementation of the ICU Program **would *not* result in a considerable contribution to the cumulative impact** associated with geology, soils, or seismicity.

6.2.8 Public Services and Utilities

As shown in Table 6-1, only the City of Manteca's General Plan would result in significant and unavoidable impacts associated with public services and utilities. Overall, implementation of the ICU Program would provide substantial additional water supply, storage, and conveyance facilities within the Study Area, and these facilities would serve the Study Area municipalities as well as agricultural users. As discussed in **Section 4.9, Public Services and Utilities**, implementation of the ICU Program could conflict with other utilities. However, implementation of prescribed mitigation would reduce the potential for conflict to a less than significant level. Therefore, it is anticipated that implementation of the ICU Program would not contribute to regional impacts associated with public services and utilities. Therefore, implementation of the ICU Program **would *not* result in a considerable contribution to the cumulative impact** to public services and utilities, and the ICU Program would serve to mitigate the cumulative effects of city and county planning on water supply infrastructure.

6.2.9 Recreation

As discussed in **Section 4.10, Recreation**, the ICU Program identifies projects that could alter waterborne recreation opportunities or restrict or otherwise limit the availability of recreational facilities in the Study Area. However, these potential changes would be mitigable to less than significant levels by implementing the indicated mitigation, as discussed in Section 4.10. Similarly, all relevant General Plans for the Study Area, as reviewed in Table 6-1, would result in less than significant impacts associated with recreation. Therefore, implementation of the ICU Program **would *not* result in a considerable contribution to the cumulative impact** to recreation.

6.2.10 Aesthetics

As urban areas grow and convert a large amount of existing open and vacant space into residential, commercial and industrial land uses, visual resources within the area may be impacted. Consequently, as shown in Table 6-1, three of the identified General Plans would result in significant and unavoidable effects associated with aesthetic resources. Additionally, as discussed in **Section 4.11, Aesthetics**, implementation of the ICU Program would result in significant and unavoidable impacts associated with short-term reduction in visual resource values, as well as permanent degradation of the existing visual quality/character of the Study Area. These impacts would result primarily from installing major water storage facilities associated with the ICU Program, and in particular, with installing a surface water reservoir. Because these impacts would be significant and unavoidable, and because no additional mitigation is available to avoid or further reduce the intensity of these impacts, implementation of the ICU Program ***would* result in a considerable contribution to the cumulative impact** to aesthetic resources.

6.2.11 Air Quality

As shown in Table 6-1, most of the General Plans reviewed would result in significant and unavoidable impacts associated with air quality. As discussed in greater detail in **Section 4.12, Air Quality**, implementation of the ICU Program is anticipated to result in significant and unavoidable impacts due to violation of air quality standards during the construction phase. Emissions during operation of the ICU Program would be mitigable to less than significant levels, as discussed in Section 4.12. However, although these emissions could be reduced to less than significant levels in terms of implementing only the ICU Program, some level of air quality emissions would result, even with implementation of the prescribed mitigation. These air emissions, when considered alongside air emissions identified in the General Plans discussed above, would be anticipated to contribute to the overall degradation of air quality within the Study Area. Therefore, and because no additional mitigation is available to avoid or further reduce the intensity of these impacts, implementation of the ICU Program ***would* result in a considerable contribution to the cumulative impact** to air quality.

6.2.12 Hazards, Hazardous Materials, and Public Safety

As shown in Table 6-1, all of the relevant General Plans would result in less than significant impacts associated with hazards, hazardous materials, and public safety. Additionally, as discussed in **Section 4.13, Hazards, Hazardous Materials, and Public Safety**, implementation of the ICU Program could potentially result in impacts associated with the transport and potential release of hazardous materials, the location of facilities on a hazardous materials site, location of facilities in the vicinity of an airport, exposure to wildland fires, or interference with emergency response. Each of these potential impacts would be reduced to less than significant levels with implementation of the mitigation prescribed in **Section 4.13**. Therefore, implementation of the ICU Program **would *not* result in a considerable contribution to the cumulative impact** to hazards, hazardous materials, or public safety.

6.2.13 Noise

Of the General Plans shown in Table 6-1, only the City of Ripon General Plan would result in significant unavoidable impacts associated with noise. As discussed in **Section 4.14, Noise**, potential noise impacts associated with implementation of the ICU Program would be associated with construction activities, and exposure of excessive noise levels in the vicinity of airports. However, these potential impacts would be reduced to less than significant levels with implementation of the mitigation prescribed in Section 4.14. Additionally, the ICU Program would not be anticipated to result in the installation of facilities that would generate noise in or in the vicinity of the City of Ripon. Therefore, implementation of the ICU Program **would *not* result in a considerable contribution to the cumulative impact** associated with noise.

6.2.14 Transportation and Traffic

As indicated in Table 6-1, the reviewed General Plans would result in significant and unavoidable impacts to traffic only for the City of Escalon. As discussed in **Section 4.15, Transportation and Traffic**, construction of the ICU Program projects would temporarily add construction traffic to local roadways, but that these increases would be mitigable to less than significant levels with implementation of the mitigation prescribed in Section 4.15. Additionally, the ICU Program is not anticipated to result in the installation of facilities that would generate additional traffic within the City of Escalon. Therefore, implementation of the ICU Program would not be anticipated to contribute to regional degradation of transportation and traffic. Implementation of the ICU Program **would *not* result in a considerable contribution to the cumulative impact** associated with transportation and traffic.

6.3 Significant Unavoidable and Potentially Significant Impacts

Chapter 4.0, Environmental Analysis provides analysis of significant unavoidable and potentially significant impacts that could result from implementation of the ICU Program. As summarized in

Table ES-1, significant unavoidable and potentially significant impacts could result from construction of facilities, facility siting, and operations. Operational impacts are primarily associated with surface water withdrawals, loss of fisheries resources, and loss of aesthetic value. Construction impacts result primarily from exceedance of regional air quality thresholds and loss of agricultural resources. However, it is expected that all other project construction and facility siting impacts could be reduced to less than significant levels with incorporation of identified mitigation measures identified in Chapter 4.0.

In addition to the cumulative impacts identified in the preceding portions of this chapter, the following impacts associated with construction and operation of the ICU Program have been determined to be significant and unavoidable or potentially significant:

Surface Water Resources

- Surface water diversions under the ICU Program would result in substantial withdrawals of water. Diversions would potentially occur along the Mokelumne, Stanislaus, and Sacramento rivers, as well as Littlejohns Creek, and directly from the Delta. Withdrawals along the Mokelumne River, in particular, would be of substantial volume and, even though most withdrawals would occur during periods of high river flow, these changes would be considered potentially significant.

Flooding and Drainage

- Operation of the ICU Program would result in conveyance of additional surface water flows through natural and agricultural drainages within the Study Area. Because these activities would result in flows above normal baseline conditions, increased in-channel erosion and sedimentation could result. Even with implementation of the mitigation prescribed in **Section 4.4, Flooding and Drainage**, these changes are anticipated to be potentially significant.
- Construction of the ICU Program would result in installation of intake structures, impoundments, pipelines, and other structures in or very close to existing waterways. These changes could alter the course of existing waterways in a manner that could require additional mitigation during implementation of individual projects under the ICU Program to prevent localized or downstream flooding. Therefore, this impact is considered potentially significant.

Biological Resources

- Implementation of the ICU Program Alternatives A and B would result in the construction of the Duck Creek Reservoir. A substantial portion of this reservoir would be located on land that is currently under California Department of Fish and Game conservation easement. Installation of the proposed reservoir would be inconsistent with these easements, and would therefore result in a significant and unavoidable impact for Alternatives A and B.

Land Use and Agriculture

- Implementation of the ICU Program would result in the permanent conversion of designated farmlands. Conversion would result primarily from installation of groundwater recharge facilities, which would result in the removal of agricultural lands from production. Due to the large number of acres that would be converted under each alternative, this impact is considered significant and unavoidable.

- Implementation of the ICU Program would also result in the conversion of lands that are currently under Williamson Act/Farm Security Zone contracts to non-agricultural use. Both the proposed Duck Creek Reservoir and the proposed South Gulch Reservoir are located in such areas, and would result in a significant and unavoidable conflict for Alternatives A, B, and D. Implementation of Alternative C would not obligatorily result in such a conflict, as no facilities have been specified that would necessarily be located on Williamson Act/Farm Security Zone lands. However, due to the large area of groundwater recharge basins that would be implemented, Alternative C would result in a potentially significant impact.

Aesthetics

- Implementation of the ICU Program Alternatives A, B, and D would involve construction of either the Duck Creek Reservoir or the South Gulch Reservoir. Construction activities associated with these reservoirs would be anticipated to result in short-term reductions in visual resource values in construction areas. Due to the scale of construction and visual change that would occur as a result of installing these reservoirs, this impact would be significant and unavoidable for Alternatives A, B, and D.
- Implementation of the ICU Program Alternatives A, B, and D would include installation and use of either the Duck Creek Reservoir or the South Gulch Reservoir. These large facilities would be anticipated to result in a degradation of existing visual quality within the Study Area, in the vicinity of these facilities. This impact would be significant and unavoidable for Alternatives A, B, and D.

Air Quality

- Construction of the ICU Program facilities would result in emission of ozone precursors. Even with implementation of mitigation prescribed in **Section 4.12, Air Quality**, these emissions would still be anticipated to result in a significant and unavoidable effect on air quality in the San Joaquin Valley Air Basin.

Growth Inducing Effects

- Implementation of the ICU Program would support planned growth within the Study Area, which would in turn result in significant and unavoidable impacts associated with the following resource areas, as identified during environmental review of the General Plans of relevant Study Area Cities and San Joaquin County: aesthetic resources, agricultural resources, air quality, biological resources, geology and soils, noise, population and housing, public services, and transportation and traffic.

6.4 Significant Irreversible Environmental Changes which would Result from the Proposed Action should it be Implemented

Introduction

CEQA section 21100(b) (2) and CEQA Guidelines section 15126.2(b) require that any significant effect on the environment that would be irreversible if the project is implemented must be identified. A project would generally result in a significant irreversible impact if:

- Primary and secondary impacts would commit future generations to similar uses;
- The project would involve a large commitment of nonrenewable resources; and/or
- The project would involve uses in which irreversible damage could result from any potential environmental accidents associated with the project.

Within this framework, significant and irreversible environmental changes associated with the ICU Program include:

Commitment to Future Uses

Implementation of the ICU Program would result in the conversion of agricultural and open space lands to groundwater recharge basins and, for Alternatives A, B, and D, a surface water reservoir. Conversion to groundwater recharge basins would be anticipated to involve substantial disturbance to or removal of soils required for agriculture, while conversion to a reservoir would be result in submerging the affected areas under water. Additionally, some individual projects implemented under the ICU Program would involve the construction of several above-ground facilities, including wastewater treatment expansion facilities, support structures, and other facilities. Installation of these facilities would represent a commitment of existing land areas to these uses.

Commitment of Resources

Implementation of the ICU Program would directly and indirectly result in the commitment of nonrenewable natural resources used in the construction process. These may include sand, gravel, dirt, petroleum products, steel, copper, and other materials. Increased fossil fuel and energy demands would be used for construction, lighting, pumping of water during operations, water and wastewater treatment processes, transportation, and other uses. Implementation of the ICU Program would also indirectly result in the commitment of these resources because the ICU Program would support planned growth within the Study Area, and that growth would result in additional commitment of these resources.

CHAPTER 7
Acronyms and Abbreviations

ABAG	Association of Bay Area Governments
AF	acre-feet
AF/yr	acre-feet per year
AIA	Air Impact Assessment
ALS	Advanced Life Support
ALUC	Airport Land Use Commission
AQCMM	Air Quality Construction Mitigation Manager
ARPA	Archaeological Resources Protection Act
ASR	aquifer storage and recovery
BART	Bay Area Rapid Transit
Basin	Eastern San Joaquin Groundwater Basin
BDCP	Bay Delta Conservation Plan
BMO	Basin Management Objective
BMP	Best Management Practice
CA	California
California ESA	California Endangered Species Act
Caltrans	California Department of Transportation
CalWater	California Water Service Company
CARB	California Air Resources Board
CBC	California Building Code
CCAA	California Clean Air Act
CCR	California Code of Regulations
CCWD	Contra Costa Water District
CDM	Camp Dresser McKee Engineering
CDFG	California Department of Fish and Game

CDWA	Central Delta Water Agency
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFCs	Chlorofluorocarbons
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGS	California Geological Survey
CH_4	methane
CHP	California Highway Patrol
CIWMB	California Integrated Waste Management Board
CMP	Congestion Management Program
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO_2	carbon dioxide
CO_2E	CO_2 equivalents
COSMA	City of Stockton Metropolitan Area
CPUC	California Public Utilities Commission
CRCV	Coast Range-Central Valley
CRHR	California Register of Historical Resources
CSJ	Central San Joaquin
CSJWCD	Central San Joaquin Water Conservation District
CUPA	Certified Unified Program Agency
CVPIA	Central Valley Project Improvement Act
CVRWQCB	Central Valley Regional Water Quality Control Board
CVP	Central Valley Project
CWA	Clean Water Act
CWMP	Conjunctive Water Management Program
dB	decibels
dBA	A-weighted decibels

DHS	California Department of Health Services
DLA	Defense Logistics Agency
DMM	Demand Mitigation Measures
DOT	U.S. Department of Transportation (federal)
DPM	diesel particulate matter
DSOD	California Division of Safety of Dams
DTSC	Department of Toxic Substance Control
DWR	California Department of Water Resources
DWSAP	Drinking Water Source Assessment Program
DWSP	Delta Water Supply Project
DYNFLOW	DYNFLOW Groundwater Model
EBMUD	East Bay Municipal Utilities District
EC	electrical conductivity
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
FRWP	Freeport Regional Water Project
ESA	Environmental Science Associates
ESJPWA	Eastern San Joaquin Parties Water Authority
FAA	Federal Aviation Administration
FCAA	Federal Clean Air Act
Federal ESA	Federal Endangered Species Act
FEMA	Federal Emergency Management Agency
FFA	Federal Facility Agreement
FIP	Federal Implementation Plan
FIRM	Flood Insurance Rate Map
FMMP	Farmland Mapping and Monitoring Program (CA Department of Conservation)
ft	feet
FTA	Federal Transit Administration's
GAMAQI	*Guide for Assessing and Mitigating Air Quality Impacts*
GBA	Groundwater Banking Authority

GIS	geographic information system
GMA	Groundwater Management Area
gpm	gallons per minute
GW	Gigawatt
GWh	Gigawatthour
GWMP	Groundwater Basin Groundwater Management Plan
H_2O	water (vapor)
HCP	Habitat Conservation Plan
HMMP	Hazardous Materials Management Plan
HPTP	Historic Property Treatment Plans
HFCs	hydrofluorocarbons
HWMP	Hazardous Waste Management Plan
Hz	hertz
I	Interstate
ICU	Integrated Conjunctive Use
IPCC	Intergovernmental Panel on Climate Change
IRWMP	Integrated Regional Water Management Plan
ISR	Indirect Source Review
JPA	Joint Powers Authority
JSA	Joint Settlement Agreement
LEA	Local Enforcement Agency
LUST	Leaking Underground Storage Tanks
M&I	municipal and industrial
MEI	Maximally Exposed Individual
mg/L	milligrams per liter
MGD	million gallons per day
mi	miles
MRWPA	Mokelumne River Water and Power Authority
MRZ	Mineral Resource Zones
MSDS	Materials Safety Data Sheet

MSL	mean sea level
MW	Megawatt
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NCCP	Natural Communities Conservation Plan
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIH	National Institutes of Health
NMFS	National Marine Fisheries Service
NO_2	Nitrogen Dioxide
NOP	Notice of Preparation
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRC	Nuclear Regulatory Commission
NRHP	National Register of Historic Places
NSJWCD	North San Joaquin Water Conservation District
NSPS	New Source Performance Standards
O_3	ozone
OCAP	Operations Criteria and Plan
OES	Office of Emergency Services
OID	Oakdale Irrigation District
OPR	California Office of Planning and Research
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbons
PCE	perchloroethylene
PCP	pentachlorophenol
PEIR	Program Environmental Impact Report
PFCs	perfluorocarbons
PFFP	Public Facilities Financing Plan
PGA	peak ground acceleration
ppm	parts per million

ppv	peak particle velocity
RCRA	Resource Conservation and Recovery Act
Reclamation	U.S. Bureau of Reclamation
RMP	Risk Management Plan
RMS	root mean square
ROG	reactive organic gases
RWQCB	Regional Water Quality Control Board
SEWD	Stockton East Water District
SDWA	South Delta Water Agency
SF6	sulfur hexafluoride
SHPO	State Historic Preservation Office
SIP	California State Implementation Plan
SJAFCA	San Joaquin Area Flood Control Agency
SJC	San Joaquin County
SJCEHD	San Joaquin County Environmental Health Department
SJCFCWCD	San Joaquin County Flood Control and Water Conservation District
SJCOG	San Joaquin Council of Governments
SJFBF	San Joaquin Farm Bureau Federation
SJMSCP	San Joaquin Multi-Species Conservation Plan
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SLIC	List of Spill and Leak Sites
SMARA	California Surface Mining and Reclamation Act
SOI	Sphere of Influence
SPCCP	Spill Prevention Control and Countermeasures Plan
SR	State Route
SSJID	South San Joaquin Irrigation District
Stockton MUD	Stockton Municipal Utility District
SWP	State Water Project
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board

TAC	Toxic Air Contaminants
TAF	Thousand acre-feet
TCE	trichloroethylene
TCP	Traditional Cultural Property
TDS	total dissolved solids
TMDL	Total Maximum Daily Load
UBC	Uniform Building Code
UFC	Upper Farmington Canal
ug/L	micrograms per liter
UIC	Underground Injection Control
USACE	U.S. Army Corps of Engineers
USBR	U.S. Bureau of Reclamation
USGS	US Geological Survey
USNWS	U.S. National Weather Service
UST	Underground Storage Tank
UWMP	Urban Water Management Plan
VAMP	Vernalis Adaptive Management Program
Vdb	decibel notation
VOC	volatile organic carbons
WID	Woodbridge Irrigation District
yr	year
µmhos/cm	Micromhos per centimeter (units for conductivity of water)

CHAPTER 8.0
Preparers of the Draft PEIR

Northeastern San Joaquin County Groundwater Banking Authority

San Joaquin County

- Mel Lytle – Water Resources Coordinator
- Brandon Nakagawa, P.E. – Senior Civil Engineer

California Water Service Company – Stockton District

Central Delta Water Agency

Central San Joaquin Water Conservation District

City of Lodi

City of Stockton

North San Joaquin Water Conservation District

San Joaquin Farm Bureau Federation (Associate Member)

South Delta Water Agency

Stockton East Water District

Woodbridge Irrigation District

Consultants

Environmental Science Associates

Leslie Mouton	Project Director/Project Manager
Robert Eckard	Deputy Project Manager, Water Resources Specialist, EIR Preparation, Water Sections, Recreation
Jessica Mitchell	Aesthetics, Growth
Paul Miller	Air Quality and Greenhouse Gases
Matt Morales	Air Quality, Noise
Stephanie Parsons	Biological Resources

Kathy Anderson	Cultural Resources
Paul Garcia	Geology and Soils, Public Services and Utilities
Deborah Kruse	Growth
Aaron Hecock	Land Use
Todd Gordon	Public Services and Utilities, Hazards, EIR Preparation
Andrea Thorpe	Technical Editing
Tom Wyatt	Graphics
David Beecroft	GIS
Logan Sakai	Word Processing

Camp Dresser McKee

Brian Heywood	Groundwater Modeling

Peterson Brustad Incorporated

Dave Peterson	Principal – Surface Water Technical Memorandum
Patrick Luzuriaga	Surface Water Technical Memorandum

GEI Consultants, Bookman-Edmonston Division

Mark Williamson	Technical Review

CHAPTER 9.0
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