APPENDIX H

SACRAMENTO DIVERSION PROJECT CUMULATIVE ANALYSIS

Introduction

The Sacramento River diversion would encompass constructing a joint diversion from the Sacramento River and treatment facilities to serve Placer County Water Agency (PCWA), the City of Sacramento, SSWD, and the City of Roseville. Connection of a new Sacramento River diversion to the PCWA service area would require new pipeline. The proposed alignment extends along Baseline Road, south to Pleasant Grove Road, west along Elverta Road, and finally connects to the Sacramento River. Upon completion of the Sacramento Diversion project, water supplies from this source would serve the Placer Vineyards Specific Plan Area and, ultimately, the proposed Regional University Specific Plan (RUSP) Area. Connection the Sacramento River, however, is not required specifically to serve the proposed RUSP, but would be needed to serve the anticipated growth in western Placer County.

The Revised Draft Environmental Impact Report for the Placer Vineyards Specific Plan states that surface water supply of 11,500 AFA will be required to meet the needs of the Placer Vineyards Specific Plan buildout. The long term water supply for Placer Vineyards was assumed to be the new Sacramento River diversion. The entire 35,000 AFA of the PCWA CVP contract water was used for Placer Vineyards' incremental contribution analysis. The Revised Draft Environmental Impact Report for the Placer Vineyards Specific Plan evaluated the full CVP contract amount of 35,000 AFA, which was evaluated based on the premise that this higher diversion amount provides a conservative representation of potential impacts associated with increased diversions from the Sacramento River to meet the proposed project needs. If no impacts were identified under this long-term option (i.e., diverting the full 35,000 AFA PCWA CVP contract from the Sacramento River), then it is reasoned that similarly, no impacts could be attributed to the full 11,500 AFA assigned to the proposed Placer Vineyards Specific Plan (i.e., the 11,500 AFA is part of the 35,000 AFA).

As stated above, the RUSP, while not dependent on water supplied by the Sacramento Diversion, may ultimately rely on Sacramento River water as its source through PCWA, as would Placer Vineyards. Because the proposed RUSP could rely on the same water supply as Placer Vineyards at buildout, the cumulative analysis prepared for the Placer Vineyards Specific Plan is used as the basis for the RUSP's potential contribution to cumulative effects from Sacramento diversion.

As described in Section 6.11, Public Utilities, of this Draft EIR, a water supply of 2,440 AFA will be required to meet the needs of the RUSP buildout. This represents approximately 7 percent of the 35,000 AFA, which is equivalent to 21 percent of the demand from Placer Vineyards.

Format

The following is an analysis of the potential impacts of the potential surface water supply from the proposed Placer Vineyards Specific Plan based on the March 2006 Revised Draft Environmental Impact Report for the Placer Vineyards Specific Plan (PVSP DEIR) cumulative analysis of PCWA's Sacramento Diversion project. Following the quoted text from the PVSP DEIR, which is indented and in Garamond font, is a comparative analysis of the RUSP's potential to contribute to the cumulative impacts of the Sacramento Diversion project.

PVSP DEIR p. 4.3-56 – 4.3-60

Description of the Sacramento Facilities

The Sacramento River diversion would encompass constructing a joint diversion from the Sacramento River and treatment facilities to serve not only PCWA but also the City of Sacramento, SSWD, and the City of Roseville. An EIR/EIS for this project is currently in preparation with the Reclamation acting as lead federal agency under NEPA and PCWA acting as lead agency under CEQA. The diversion facility would consist of expanding the existing Elkhorn Diversion owned by the Natomas Mutual Water Company on the east bank of the Sacramento River, upstream of the mouth of the American River at approximately river mile 73.3, or constructing a new diversion near the existing Elkhorn Diversion. Water treatment, storage, and pumping facilities would connect to the west end of the existing Cooperative Transmission Pipeline/Northridge Transmission Pipeline in Antelope Road to serve SSWD, and an extension of that line would be built north to the service areas of the City of Roseville and PCWA. A separate transmission line would extend south to connect to Sacramento's existing distribution system. Figure 3-5 in Chapter Three of this Revised Draft EIR describes the general alignment of the portion of the transmission line from the Sacramento River needed to serve the Specific Plan area, including a northern extension along Pleasant Grove Road to the project area.

To meet projected water supply demands, the participating local agencies would reallocate available surface water and groundwater resources between municipal and industrial (M&I) and agricultural uses (PCWA only), and among different wholesale and retail areas. Changes in entitlements implementing a Sacramento River diversion for the local partners would require a change in the point of diversion for PCWA'S CVP contract and for the City of Sacramento's Sacramento River water right permit, and an exchange agreement between PCWA and Reclamation for Roseville and SSWD diversions under their contract entitlements from PCWA's MFP.

The additional water supplies considered for each local partner include: (1) Additional water supply of up to 35,000 AF for PCWA's M&I demand with treatment capacity of 65 MGD; (2) additional water supply of up to 29,000 AF in Water Forum average, drier, and driest years for SSWD's M&I demand and groundwater stabilization program with a treatment capacity of 15 MGD; (3) additional water supply of up to 7,100 AF for Roseville's M&I demand with a treatment capacity of 10 MGD; and (4) additional water supply of up to 58,000 AF with a water treatment capacity of 165 MGD for Sacramento's M&I demand.

If no impacts are identified under this long-term option (i.e., diverting the full 35,000 AFA PCWA CVP contract from the Sacramento River), then it is reasoned that similarly, no impacts could be attributed to the full 11,500 AFA assigned to the proposed Specific Plan (i.e., the 11,500 AFA is part of the 35,000 AFA). The diversion would occur well into the future and, accordingly, was applicable under future condition hydrological conditions. As a result, it was modeled as a future simulation. Since this diversion would occur into the future, when other anticipated diversions and operational practices existent across the CVP/SWP would be in place, it in effect represented a future cumulative analysis, and is evaluated as a cumulative impact.

A surface water supply of 11,500 AFA will be required to meet the needs of the Specific Plan buildout. The entire 35,000 AFA of the PCWA CVP contract water was used for the project's incremental contribution analysis. The full CVP contract amount of 35,000 AFA (long-term water supply) was evaluated based on the premise that this higher diversion amount provides a conservative representation of potential impacts associated with increased diversions from the Sacramento River to meet the proposed project needs.

The following analysis consists of two parts: (1) an analysis to determine the effect of the proposed Specific Plan surface water supply project in combination with all past, present,

and reasonably foreseeable future projects (cumulative analysis) (this is the same as the *American River Basin Cumulative Report* [Cumulative Report] analysis that was prepared by Reclamation in September, 2002 as part of the PCWA Pump Station Project EIS/EIR.); and (2) if a significant cumulative impact was found, an analysis to determine the incremental contribution of the long-term water supply to the cumulative impact. If the modeling results indicated that potentially significant or significant impacts would occur under the full (35,000 AFA) long-term water supply, then further evaluation was performed to evaluate more closely the proposed Specific Plan long-term water supply project's 11,500 AFA diversion potential to affect environmental resources.

The Cumulative Report evaluated the potential for increased future diversions and CVP operations to affect annual water deliveries to contractors within the SWP and CVP, and non-CVP purveyors that divert water from Folsom Reservoir and the lower American River. Under the cumulative condition assumptions, non-CVP American River water users would receive the same deliveries under both the existing and cumulative conditions. Therefore, no cumulative impact to non-CVP American River water users would result under the cumulative condition. SWP customers receive deliveries from the Feather River and the Delta. The cumulative modeling results indicated that reductions in delivery allocations to Feather River service area customers would not occur, relative to the existing condition. Thus, there would be no future impacts to SWP customers in the Feather River service area. For CVP settlement and exchange contractors, the cumulative modeling results indicated that there would be no reduction in delivery allocations, relative to the existing condition, and thus, no impact to CVP settlement and exchange contractors. Implementation of the Reclamation actions evaluated in the Cumulative Report, however, would result in potentially-significant or significant-cumulative impacts to SWP Delta service area customers and CVP water service contractors. These impacts are summarized below and described fully in the Cumulative Report.

PVSP DEIR p. 4.3-5

A water supply of approximately 11,500 AFA will be required long-term to meet the needs of the Specific Plan buildout (see Section 3.4.1 in Chapter Three of this Revised Draft EIR). This 11,500 AFA is a portion of PCWA's pending amendatory Central Valley Project (CVP) contract with the U.S. Bureau of Reclamation (Reclamation) for 35,000 AFA. This water would be diverted from the Sacramento River, which has an annual runoff of approximately 18 million AFA (PCWA 2001). The entire 35,000 AFA of the PCWA CVP contract water was assumed in the analysis of the project's incremental contribution to cumulative demand for water (for a further description of the cumulative analysis, see Section 4.3.4). The full CVP contract amount of 35,000 AFA (long-term surface water supply) was evaluated based on the premise that this higher diversion amount provides a conservative representation of potential impacts associated with increased diversions from the Sacramento River to meet the proposed project needs.

PVSP DEIR p. 4.3-42

Sacramento River Watershed

The Sacramento River begins in the northern portion of the state and flows southerly past the city of Sacramento and into the Delta. The drainage area upstream of Sacramento is 23,502 square miles. The average rainfall over the Sacramento River basin is 18 inches, normally occurring from October through May. The flows at the city of Sacramento are greatly affected by the large facilities located in the upper regions of the watershed, particularly Shasta Reservoir; Keswick Reservoir; Whiskeytown Reservoir (which regulates imported water from the Trinity River system); and diversions such as the Corning, Tehama-Colusa, and Glenn-Colusa canals. The historical average annual flow for the Sacramento River at Freeport is 16,677,000 AF. The Feather and American rivers are the two largest contributors to the Sacramento River. Two other inflows that contribute to the Sacramento

River are the Cross Canal and the Colusa Basin Drain, which drains the agricultural land in the Glenn-Colusa Irrigation District. The lower Sacramento River begins downstream of its confluence with the lower American River.

Sacramento River flows are largely determined by the operation of upstream reservoirs (e.g., Shasta, Trinity, and Keswick) as well as the timing and rates of diversions from the Sacramento River and tributary streams. Upstream reservoirs are operated to fulfill a variety of functions, including flood control, water supply, fisheries and wildlife benefits and hydropower generation, and to meet water quality and flow requirements in the Delta. Diversions from the Sacramento River and tributary streams also influence seasonal flow levels by reducing overall flow volumes in the river. Shasta Reservoir is the largest CVP reservoir, storing up to 4,500,000 AF of water.

The natural flow pattern of the Sacramento River has been altered by a variety of river flow control facilities. Flows have been reduced during the wetter months by upstream storage and diversions, but are typically higher during the drier months due to the requirements to set flows at levels capable of meeting water quality objectives and water delivery obligations. The flow of the Sacramento River can vary significantly from year to year and within a year. Flow in the Sacramento River is generally controlled by operations of the CVP and SWP; at other times, such as during significant uncontrolled runoff during storms, flows are not controlled.

The overflows that spill over the series of weirs upstream of Wilkins Slough all flow into Butte Sink. These flows are then carried by the Sutter Bypass back into the Sacramento River at Verona. Flood flows can also bypass the Sacramento River at Verona by spilling over the Fremont Weir and into the Yolo Bypass. Overflows occur at this point when the Sacramento River flows exceed 55,000 cfs. Sacramento River overflows also can enter the Yolo Bypass just north of Sacramento by spilling over the Sacramento Weir.

PVSP DEIR p. 4.3-73

Sacramento River Diversion

This simulation represents future conditions with the proposed project's long-term water supply demand of 11,500 AFA being supplied from PCWA's proposed Sacramento River diversion (north of the confluence with the American River) of 35,000 AFA CVP contract water. This scenario represents the cumulative condition (i.e., includes all reasonably foreseeable future actions plus the proposed project), and is consistent with the WFA and the *American River Basin Cumulative Report* assessments where it was assumed that PCWA would obtain its 35,000 AFA CVP water contract supply from the Sacramento River. This simulation includes all future buildout demands by all purveyors, subject to delivery restrictions defined through known agreements, such as the Water Forum Agreement, as well as any reasonably foreseeable system operational changes or environmental obligations. Consistent with the Water Forum Agreement, dry year restrictions defined in the purveyor-specific agreements of the Water Forum Action Plan (Water Forum 2000) are included in the modeling assumptions.

Placer Vineyards Specific Plan RDEIR Hydrology Discussion

PVSP DEIR p. 4.3-33

4.3.2-12 There could be a cumulative effect on reservoir flood control diagrams, altered floodplain characteristics, lower American river levee stress, and river hydraulic processes.

A water supply of 11,500 AFA is a portion of the PCWA's pending amendatory CVP contract with the Reclamation for 35,000 AFA. This water would be diverted from the

Sacramento River, which has an annual runoff of approximately 18 million AF (PCWA 2001). The entire 35,000 AFA of the PCWA CVP contract water was used for the project's incremental contribution analysis (for a further description of the cumulative analysis, see Section 4.3.4). The full CVP contract amount of 35,000 AFA (long-term surface water supply) was evaluated based on the premise that this higher diversion amount provides a conservative representation of potential impacts associated with increased diversions from the Sacramento River to meet the proposed project needs.

Increased diversions from the CVP system that would occur under the cumulative condition would result in increased reservoir water storage capacity and hence, would provide positive benefits to flood control, relative to the existing condition. Thus, implementation of future actions would result in no significant future impacts to reservoir flood control diagrams, lower American River levee stress, floodplain characteristics, and river hydraulic processes; all key flood control parameters. As there would be no significant impact to flood control under the cumulative condition, relative to the existing condition, the proposed Specific Plan long-term surface water supply would not incrementally contribute to potential future impacts to flood control. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. This impact is therefore considered ***less than significant***.

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan Contribution to Cumulative Effects

Impact: There could be a cumulative effect on reservoir flood control diagrams, altered floodplain characteristics, lower American river levee stress, and river hydraulic processes.

A water supply of approximately 3,000 AFA is a portion of the PCWA's pending amendatory CVP contract with the Reclamation for 35,000 AFA. Increased diversions from the CVP system that would occur under the cumulative condition would result in increased reservoir water storage capacity and hence, would provide positive benefits to flood control, relative to the existing condition. Thus, implementation of future actions would result in no significant future impacts to reservoir flood control diagrams, lower American River levee stress, floodplain characteristics, and river hydraulic processes; all key flood control parameters. As there would be no significant impact to flood control under the cumulative condition, relative to the existing condition, the RUSP long-term surface water supply would not incrementally contribute to potential future impacts to flood control. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. This impact is therefore considered ***less than significant.***

4.3.3-11 The Specific Plan surface water supply would contribute to a cumulative effect on CVP gross hydropower generation and gross capacity.

Changes in the future operations of CVP facilities would result in an estimated annual reduction in gross annual CVP hydropower generation of 357 GWh, or 7%, relative to the existing condition. For nearly every month of the 840 months modeled under the 70-year period of hydrologic record, the cumulative condition would result in reductions in gross CVP hydropower generation, relative to the existing condition, with maximum reductions of up to 319 GWh in individual months. While such decreases would not be expected to result in significant direct environmental impacts, they would be expected to result in significant economic impacts that would be passed on to CVP customers.

There would be significant reductions in gross CVP capacity under the future cumulative condition, relative to the existing condition. Gross CVP capacity would be reduced in nearly every month of the 840 months included in the analysis, with average monthly reductions ranging from 1% to 10% of existing capacity, and maximum reductions of up to 569 MW, relative to the existing condition. While such decreases in capacity, like hydropower generation, would not result in direct environmental impacts, they would result in direct economic impacts that would be passed on to CVP customers. Any environmental impacts that would result from decreases in capacity could be the product of the need to acquire power from another facility that is less environmentally sound.

Incremental Contribution of the Long-Term Surface Water Supply

The proposed long-term surface water supply would not contribute substantially to either monthly or annual reductions in CVP hydropower generation; the greatest monthly reduction (of the 840 months included in the analysis) would be 63 GWh (Technical Appendix H-505 to H-517). Average CVP hydropower generation would not decrease more than 2 GWh during any given month over the 70-year simulation under the proposed long-term water supply relative to the cumulative condition (Template Output H-10). However, any decrease in generation that could occur in individual months would result in increased costs that would be passed on to CVP customers. Thus, while the proposed long-term water supply would not result in significant reductions in long-term average gross CVP hydropower generation, decreases in individual months could result in significant cost impacts to CVP customers.

The proposed long-term surface water supply would result in a minor contribution to the economic impacts that would occur under the future cumulative condition. The long-term water supply would result in mean monthly increases in capacity of up to 64 MW in August and mean monthly decreases up to 92 MW in October (5.9% and 6.8%, respectively), relative to the cumulative condition (Technical Appendix G-493 to G-504). Therefore, the proposed long-term water supply would have minor contributions to any decreases in capacity that would occur under the cumulative condition. Though the proposed long-term water supply would still result in direct cost impacts passed on to CVP customers, any impacts would not be of sufficient magnitude to be considered potentially significant. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively-considerable contribution to the impacts that occur under the cumulative condition. Thus, this environmental impact would be considered ***less than significant***.

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan Contribution to Cumulative Effects

Impact: The RUSP surface water supply would contribute to a cumulative effect on CVP gross hydropower generation and gross capacity.

Water diversion to the RUSP could reduce water in the CVP and could reduce the amount of water available for CVP hydropower generation and impact the CVP's capacity. However, the amount of water used by the RUSP would not contribute substantially to either monthly or annual reductions in CVP hydropower generation. In addition, the RUSP long-term water supply would have minor contributions to any decreases in capacity that would occur under the cumulative condition. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively-considerable contribution to the impacts that occur under the cumulative condition. Thus, this environmental impact would be considered ***less than significant.***

4.3.3-12 The Specific Plan could contribute to a cumulative effect on Folsom and EID pumping energy requirements.

Increased diversions under the cumulative condition would result in lower water surface elevations in Folsom Reservoir. Consequently, more energy would be required to lift water up to the Folsom and EID pumping plants that divert from Folsom Reservoir. Increases in pumping energy requirements under the cumulative condition also result from the fact that far more water will be delivered by water purveyors through these pumps as compared to the amount delivered under the existing condition. The energy requirement under the cumulative condition would be more than doubled at the Folsom Pumping Plant and six times greater at the EID Pumping Plant (more than 8,000 MWh and 18,000 MWh annual increases, respectively), relative to the existing condition. This significant-cumulative economic impact would be passed on to water users who rely on pumping at Folsom Reservoir, but would not result in direct environmental impacts.

The future average energy requirement, under the proposed Specific Plan long-term surface water supply, would decrease by 15 MWh at the Folsom Pumping Plant and 1 MWh at the EID Pumping Plant, relative to the cumulative condition (Template Output H-12 to H13). This constitutes a long-term average benefit to the energy requirements at these two pumping plants. The water diversion would shift to another location, so the pumping at these two facilities would be reduced. Therefore, the proposed Specific Plan long-term water supply would not contribute to the total increase in pumping requirements that would occur under the cumulative condition. In individual months, however, there would be both increases and decreases in pumping energy requirements, under the cumulative condition. At Folsom Pumping Plant, the largest decrease under the proposed long-term water supply would be 172 MWh during July and the largest increase would be 204 MWh during September (Technical Appendix G-518 to G-529). At EID Pumping Plant, the largest decrease would be 13 MWh during July and the largest increase would be 16 MWh during September (Technical Appendix G-518 to G-541). Such infrequent increases could result in a slight contribution to cost impacts under the cumulative condition, though any effects would not be of sufficient frequency or magnitude to create a significant impact (Technical Appendix G-518 to G-541). These changes would not result in specific adverse environmental effects, because the use of thermal generation resources for replacement energy would be minimal due to the small magnitude of change in pumping energy requirements associated with the proposed Specific Plan initial surface water supply. It would be speculative, moreover, to predict where any such environmental effects (e.g., air pollution) would occur, as it would also be speculative to predict what energy sources might be employed to replace lost CVP hydropower generation. Therefore, the environmental impact is considered ***less than significant***.

Mitigation Measures

No mitigation measures are required.

Impact: The RUSP could contribute to a cumulative effect on Folsom and EID pumping energy requirements.

As discussed above, although there would be both increases and decreases in pumping energy requirements under the cumulative condition, the proposed Placer Vineyards Specific Plan long-term water supply would not contribute to the total increase in pumping requirements that would occur under the cumulative condition. The proposed project's potable water demand would be approximately 20 percent of that of the Placer Vineyards Specific Plan and, similarly, would not have a substantial effect on the pumping requirements under the cumulative condition. Thus, the proposed project's incremental contribution would be less than considerable and this would be a less than significant impact.

4.3.3-13 The Specific Plan long-term surface water supply could contribute to cumulative effects on deliveries to SWP customers.

Under the cumulative condition, reductions in deliveries to SWP customers would range from 5% to 45%, relative to the existing condition, in 45 of the 70 years modeled. Such reductions under the cumulative condition would occur with sufficient frequency and magnitude to constitute ***potentially significant cumulative impacts*** to water supply deliveries to SWP customers.

Incremental Contribution of the Long-Term Surface Water Supply

The proposed Specific Plan long-term water supply would not contribute, in either frequency or magnitude, to any anticipated future long-term SWP customer delivery reductions, as shown in Table 4.3-11 (Template Output H-42). In fact, in all 70 years simulated, SWP deliveries would be essentially equivalent under the proposed long-term water supply compared to the cumulative condition (Technical Appendix G-579).

Table 4.3-11
Percent Water Supply Allocation to SWP Contractors Under Future No Project and Cumulative Conditions[1]

	Cumulative No Project	Cumulative (with PVSP)	Difference
Average	74	74	0
Minimum	20	20	0
Maximum	100	100	0

[1] Based on the 70 years modeled

The SWP has only one reservoir north of the Delta, Lake Oroville, which is located on the Feather River. SWP has five other reservoirs, all located south of the Delta. The SWP has a combined total of approximately 5.3 MAF of the total. North of the Delta, the only SWP demands are those within the Feather River Service Area (FRSA). FRSA users are entitled to approximately 1.0 MAFA diversion from the Feather River. These deliveries can be reduced due to drought by no more than 50% in any one year, and no more than 100% in any series of seven consecutive years. DWR balances SWP's many competing objectives in making water supply allocation decisions. When DWR makes water supply allocation decisions, only SWP water demands and system operations are evaluated. Even though the CVP and SWP is an integrated system, the CVP is not evaluated for SWP water supply allocation. The CVP is operated by Reclamation; therefore, CVP water supply allocation decisions are made by Reclamation and do not include the SWP.

The proposed long-term surface water supply would not contribute, in either frequency or magnitude, to any anticipated future long-term SWP customer delivery reductions, and therefore, would have no cumulatively-considerable contribution to significant-cumulative impacts to deliveries to SWP customers. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it also would have no cumulatively-considerable contribution to the impacts that occur under the cumulative condition. The impact therefore would be considered ***less than significant.***

<u>Mitigation Measures</u>

No mitigation measures are required.

Impact: The Specific Plan long-term surface water supply could contribute to cumulative effects on deliveries to SWP customers.

As discussed above, water delivery reductions to SVP customers would occur frequently over the 70 year period studied. The use of surface water for the RUSP, in and of itself, would not result in the long-term reduction of water supply allocation to SWP contractors. Therefore, the RUSP would have no cumulatively-considerable contribution to significant-cumulative impacts to deliveries to SWP customers. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it also would have no cumulatively-considerable contribution to the impacts that occur under the cumulative condition. The impact therefore would be considered ***less than significant.***

4.3.3-14 The Specific Plan long-term surface water supply could contribute to a cumulative effect on deliveries to CVP customers.

Under the cumulative condition, CVP water service contractors would experience significant reductions in deliveries, relative to the existing condition. CVP M&I contractors both north and south of the Delta would experience delivery reductions of 5% to 20%, relative to the existing condition, in 24 of the 70 years modeled. CVP agricultural contractors north of the Delta would experience reductions in deliveries of 5% to 25%, relative to the existing condition, in 42 of the 70 years modeled, and agricultural contractors south of the Delta would experience reductions of 5% to 20% in 35 of the 70 years modeled. Reductions to CVP customers both north and south of the Delta would occur with sufficient frequency and magnitude to be considered ***cumulatively significant impacts***.

Incremental Contribution of the Long-Term Surface Water Supply

The proposed long-term water supply would not contribute, in either frequency or magnitude, to any reduction in delivery to any CVP contractor, either north or south of the Delta, as shown in Tables 4.3-12 through 4.3-15 (Template Output H-18, H-21, H-30, and H-33). In fact, in all 70 years simulated, CVP deliveries to M&I and agricultural contractors would be essentially equivalent under the cumulative condition without the project compared, to the proposed long-term water supply (Technical Appendix G-571 to G-572 and G-575 to G-576).

Table 4.3-12
Percent Water Supply Allocation to CVP M&I Contractors North of Delta Under Future No Project and Cumulative Conditions[1]

	Cumulative No Project	Cumulative (with PVSP)	Difference
Average	87	87	0
Minimum	50	50	0
Maximum	100	100	0

1 Based on the 70 years modeled

Table 4.3-13 Percent Water Supply Allocation to CVP Agriculture Contractors North of Delta Under Future No Project and Cumulative Conditions[1]			
	Cumulative No Project	**Cumulative (with PVSP)**	**nce**
Average	67	67	
Minimum	0	0	
Maximum	100	100	
1 Based on the 70 years modeled			

Table 4.3-14 Percent Water Supply Allocation to CVP M&I Contractors South of Delta Under Future No Project and Cumulative Conditions[1]			
	Cumulative No Project	**Cumulative (with PVSP)**	**Difference**
Average	85	85	0
Minimum	50	50	0
Maximum	100	100	0
1 Based on the 70 years modeled			

Table 4.3-15 Percent Water Supply Allocation to CVP Agricultural Contractors South of Delta Under Future No Project and Cumulative Conditions[1]			
	Cumulative No Project	**Cumulative (with Project)**	**Difference**
Average	60	60	0
Minimum	0	0	0
Maximum	100	100	0
1 Based on the 70 years modeled			

CVP Water Service Contractors (agricultural and M&I Water Service Contractors both north and south of the Delta) entered into agreements with Reclamation for delivery of CVP water as a supplemental supply. Water availability for delivery to CVP Water Service Contractors during periods of insufficient supply is determined based on a combination of operational objectives, hydrologic conditions, and reservoir storage conditions. The water availability curtailments and the CVP system operations are further discussed in Impact 4.3.3-2.

The proposed long-term surface water supply would not contribute, in either frequency or magnitude, to any reduction in delivery to any CVP contractor, either north or south of the Delta; therefore, the Specific Plan would not have a cumulatively-considerable contribution to the significant impacts to CVP deliveries that would occur under the cumulative condition. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it would have no cumulatively-considerable contribution to the impacts that occur under the cumulative condition. This impact therefore would be considered ***less than significant.***

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan Contribution to Cumulative Effects

Impact: The Specific Plan long-term surface water supply could contribute to a cumulative effect on deliveries to CVP customers.

As described above, while deliveries to CVP customers would be reduced in the long-term, delivery of water to the *PVSP* would not affect the overall supply. Similarly, the proposed long-term surface water supply to the RUSP would not contribute, in either frequency or magnitude, to any reduction in delivery to any CVP contractor, either north or south of the Delta; therefore, the RUSP would not have a cumulatively-considerable contribution to the significant impacts to CVP deliveries that would occur under the cumulative condition. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it would have no cumulatively-considerable contribution to the impacts that occur under the cumulative condition. This impact therefore would be considered ***less than significant.***

PVSP DEIR p. 4.3-138 – 4.3-141

4.3.4-11 The Specific Plan could contribute to cumulative effects resulting from increased diversions and changes in CVP operations that could result in reduced river flows and reservoir storage.

Changes in the operation of the CVP and SWP under the cumulative condition could be expected to substantially reduce water storage levels in Folsom, Shasta, and Trinity reservoirs, and substantially reduce flows in the lower American and Sacramento rivers, relative to existing conditions. Under the cumulative condition, long-term average Folsom Reservoir water storage would be reduced by up to 11% during September, relative to the existing condition. Similarly, Shasta Reservoir long-term average water storage would be reduced by up to 7% in September under the cumulative condition, and Trinity Reservoir long-term average water storage would be reduced by up to 5% during June, relative to the existing condition. For the lower American River at Nimbus Dam, long-term average flows under the cumulative condition would be reduced by up to 15%, relative to the existing condition. Long-term average upper Sacramento River flows under the cumulative condition would be reduced by up to 9%, and long-term average lower Sacramento River flows would be reduced by up to 5%, relative to the existing condition. The greatest reductions in storage and flows would be from September through November, when existing flows are already low. Such reductions in storage and flow rates would result in increased concentrations of contaminants of concern. Increases in constituent concentrations that may occur under the cumulative condition could be sufficiently large to cause state or federal water quality criteria or standards to be exceeded, while such standards are not exceeded under the existing condition. Therefore, impacts to water quality under the cumulative condition would be ***potentially significant***.

Incremental Contribution of the Long-Term Water Supply

The proposed long-term water supply would have no cumulatively considerable contribution to reductions in reservoir water storage or flow rates that would occur under the cumulative condition. In regards to Folsom Reservoir end-of-month water storage, the proposed long-term water supply would not contribute substantially to the reductions in long-term average storage that occur under the cumulative condition. Furthermore, the proposed long-term water supply would result only in increases in Folsom Reservoir end-of-month storage relative to the cumulative condition. The largest increase would be 0.2% during July and December (Template Output H-105). The proposed long-term water supply would contribute up to 1% of the cumulative reduction in long-term average water storage in Shasta Reservoir in any given month. During June and July, under the proposed long-term water supply, end-of-month storage would decrease by a maximum of 1,000 AF relative to the cumulative condition (Template Output H-106). At Trinity Reservoir, there would be no cumulatively considerable contribution to cumulative reductions in long-term average water storage at Trinity Reservoir. In fact, reductions in water storage at Trinity Reservoir would not occur and the greatest increase that would occur under the proposed long-term water

supply, relative to the cumulative condition, would be 0.1% during all months except January and April (Template Output H-107). Therefore, the proposed long-term water supply would have no cumulatively considerable contribution to water quality impacts to CVP reservoirs that could occur under the cumulative condition. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. Therefore, this impact is considered ***less than significant.***

The proposed long-term water supply would have no cumulatively considerable contribution to flow reductions under the cumulative condition in either the lower American or the Sacramento rivers. The proposed long-term water supply would contribute up to 8% of the total cumulative reduction in long-term average lower American River flows in any given month (Template Output H-108 to H-109). The greatest flow reduction that would occur in the lower American River below Nimbus Dam and at the mouth under the proposed long-term water supply would be 250 cfs compared to the cumulative condition. These flow reductions of up to 250 cfs occur as a step function in the model as a result of small changes in Folsom Reservoir storage (i.e., decreases in storage ranging from 4 to 12 TAF). These changes occur as a result of a modeling trigger (which releases water from Folsom Reservoir during dry year conditions, as defined in the model framework), and would not be experienced under real-time operations. Accordingly, the greatest reduction in flow that would occur under the proposed long-term water supply under real time operations in the lower American River below Nimbus Dam and at the mouth would be 196 cfs, respectively, compared to the cumulative condition (Technical Appendix G-313 to G-324 and G-361 to G-372). These reductions would be considered small because 196 cfs out of 4,821 cfs (monthly mean flow in the lower American River below Nimbus Dam) and 197 cfs out of 4,774 cfs (monthly mean flow in the lower American River at the mouth) would not be reductions of enough magnitude to constitute a significant effect to lower American River flows. In addition, the long-term average flow in the lower American River below Nimbus and at the mouth would not decrease more than 0.2% in all months simulated, under the proposed long-term water supply (Template Output H-108 to H-109).

For the upper Sacramento River below Keswick, the proposed long-term water supply would contribute up to 3% of the cumulative reduction in long-term average flow in any given month. The long-term average flow in the upper Sacramento River under the proposed long-term water supply, relative to the cumulative condition, would not reduce more than three cfs in any given month (Template Output H-110). In the lower Sacramento River at Freeport, the proposed long-term water supply would contribute up to 1% of the cumulative reduction in long-term average flow in any given month. Long-term average flow at Freeport would only decrease a maximum of 0.1% during October and August under the proposed long-term water supply (Template Output H-111).

The changes in monthly river flow under the proposed long-term water supply would not be of sufficient magnitude or frequency to result in a substantial increase in the concentration of contaminants in these water bodies. In addition, the greatest decreases in flow would not be experienced under real time operations. Consequently, the proposed long-term water supply would have no cumulatively considerable contribution to significant water quality impacts that could occur under the cumulative condition. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. This impact is therefore considered ***less than significant.***

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan Contribution to Cumulative Effects

Impact: The RUSP could contribute to cumulative effects resulting from increased diversions and changes in CVP operations that could result in reduced river flows and reservoir storage.

The RUSP would minimally contribute to potential increases and decreases in CVP reservoirs' storage. While the proposed long-term water supply would contribute less than 8% of the total cumulative (35,000 AFA) reduction in long-term average lower American River flows in any given month, the greatest reduction in flow that would occur under the proposed long-term water supply under real time operations in the lower American River below Nimbus Dam and at the mouth would be less than 196 cfs, compared to the cumulative condition. Reduced flows to the Sacramento River would be even smaller, as described above. The changes in monthly river flow under the proposed long-term water supply would not be of sufficient magnitude or frequency to result in a substantial increase in the concentration of contaminants in these water bodies. In addition, the greatest decreases in flow would not be experienced under real time operations. Consequently, the proposed long-term water supply would have no cumulatively considerable contribution to significant water quality impacts that could occur under the cumulative condition. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. This impact is therefore considered ***less than significant.***

4.3.4-12 The proposed Specific Plan could contribute to a cumulative effect on Delta water quality.

Reductions in long-term average Delta outflow of up to approximately 8% would occur during all months except April, July and August, when slight increases would occur under the cumulative condition, relative to the existing condition. Reductions in monthly mean flows of 5% or more (up to 42%), relative to the existing condition, would occur in 233 of the 840 months analyzed throughout the 70-year period of hydrologic record. Such reductions would occur with sufficient frequency and magnitude to result in ***potentially significant cumulative impacts*** to water quality.

The long-term average position of X2 would move upstream less than one kilometer during any given month under the cumulative condition, relative to the existing condition. However, there would be 31 occurrences, of the 840 months included in the analysis, in which the position of X2 would shift by one km or more, relative to the existing condition. Such shifts would be of sufficient magnitude to result in ***potentially significant cumulative impacts*** to water quality parameters that are influenced by the position of X2.

Incremental Contribution of the Long-Term Water Supply

The proposed long-term water supply would contribute to reductions in Delta outflow of 5% or more in 1 month to the 233 months under the cumulative condition (Technical Appendix H-1 to H-12). In 756 out of the 840 months simulated, monthly mean Delta outflow under the long-term water supply would be essentially equivalent to or greater than the cumulative condition. Furthermore, the proposed long-term water supply would result in maximum changes in the long-term average Delta outflow to be within 12 cfs, relative to the cumulative condition (Template Output H-413). Therefore, the proposed long-term water supply would not result in outflow reductions of sufficient frequency or magnitude to have a cumulatively considerable contribution to the potentially significant reductions in Delta outflow that would occur under the cumulative condition. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. This impact is therefore considered *less than significant*.

The proposed long-term water supply would not have a cumulatively considerable contribution to shifts in the position of X2. Specifically, the long-term average position of X2 would not shift during any given month under the proposed long-term water supply condition (Template Output 429). Moreover, in 806 of the 840 months simulated, the monthly mean position of X2 under the proposed long-term water supply would be essentially equivalent to the position under the cumulative condition. The greatest shift in the position of X2 under the proposed long-term water supply would be 0.3 km, representing a maximum change of 0.003%, relative to the cumulative condition (Technical Appendix H-13 to H-24). Therefore, the proposed long-term water supply would not have a cumulatively considerable contribution to future potentially significant water quality impacts in the Delta. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. This impact is therefore considered ***less than significant***.

Reductions in long-term average Delta outflow of up to approximately 8% would occur under the cumulative condition, relative to the existing condition. Monthly reductions of 5% or more (up to 42%), relative to the existing condition, would occur in 233 of the 840 months analyzed throughout the 70-year period of hydrologic record. Such reductions would occur with sufficient frequency and magnitude to result in ***potentially significant cumulative impacts*** to water quality. The proposed Specific Plan long-term water supply would contribute 1 month to the 233 months with outflow reductions under the cumulative condition (Technical Appendix G-1 to G-12). Therefore, the proposed long-term water supply would not result in outflow reductions of sufficient frequency or magnitude to contribute substantially to the potentially significant reductions in Delta outflow that would occur under the cumulative condition.

The long-term average position of X2 would move upstream less than one kilometer under the cumulative condition, relative to the existing condition. However, there would be 21 occurrences, of the 840 months included in the analysis, in which the position of X2 would shift by one km or more, relative to the existing condition. Such shifts would be of sufficient magnitude to result in ***potentially significant impacts*** to water quality parameters that are dependent upon the position of X2. The proposed Specific Plan long-term water supply, however, would not contribute considerably to shifts in the position of X2 (Technical Appendix G-13 to G-24). Therefore, the proposed long-term surface water supply's contribution to future significant water quality impacts in the Delta, would be ***less than cumulatively considerable (i.e., less than significant).***

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan Contribution to Cumulative Effects

Impact: The RUSP could contribute to a cumulative effect on Delta water quality.

As discussed above, the proposed long-term water supply would contribute to reductions in Delta outflow of 5% or more under the cumulative condition. In 90 percent of the months simulated, monthly mean Delta outflow under the long-term water supply would be essentially equivalent to or greater than the cumulative condition. Furthermore, the proposed long-term water supply would result in maximum changes in the long-term average Delta outflow to be within 12 cfs, relative to the cumulative condition. Therefore, the proposed long-term water supply would not result in outflow reductions of sufficient frequency or magnitude to have a cumulatively considerable contribution to the potentially significant reductions in Delta outflow that would occur

under the cumulative condition. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. This impact is therefore considered ***less than significant***.

The long-term average position of X2 would not shift during any given month under the proposed long-term water supply condition. Moreover, in 96 percent of the months simulated, the monthly mean position of X2 under the proposed long-term water supply would be essentially equivalent to the position under the cumulative condition. The RUSP long-term water supply, however, would not contribute considerably to shifts in the position of X2 Therefore, the proposed long-term water supply would not have a cumulatively considerable contribution to future potentially significant water quality impacts in the Delta. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. This impact is therefore considered ***less than significant***

Placer Vineyards Specific Plan RDEIR Biological Resources Discussion

PVSP DEIR p. 4.4-139 – 4.4-184

4.4-31 The Specific Plan could adversely affect vegetation associated with Folsom, Shasta, and Trinity reservoirs.

Folsom, Shasta, and Trinity reservoirs have water levels that fluctuate frequently on an annual basis, thus non-native, disturbance-adapted (or weedy) vegetation typically becomes established in areas below the high water line during the growing season. The drawdown zone at each of these reservoirs is vegetated primarily with weedy herbaceous plants and scattered willow shrubs that do not form a contiguous riparian community, and thus is not considered to have high habitat value for typically associated wildlife species. This type of plant community structure in the drawdown zone is due to changing water levels; a continuous band of riparian vegetation can establish over time if water levels were maintained at a more constant elevation. However, because maintenance of a consistent water elevation is counter to inflow patterns and common flood control and water supply practices, water levels constantly fluctuate, and quality nearshore vegetation and the habitat it would provide rarely establish or persist.

Under the proposed Specific Plan initial surface water supply, there would be little to no change (two feet msl on average) in the long-term 70-year average monthly water surface elevation of Folsom, Shasta, and Trinity reservoirs, relative to the existing condition (Technical Appendices A-193 to A-204, A-181 to A-192, A-169 to A-180). Quality wildlife habitat rarely establishes in the drawdown zone under the existing condition; therefore, there would be no further contribution under the proposed Specific Plan initial surface water supply to preventing the establishment of riparian vegetation. Thus, there would be no significant impact to the riparian and nearshore vegetation associated with Folsom, Shasta, or Trinity reservoirs under the proposed Specific Plan initial surface water supply, relative to the existing condition. Impacts to the vegetation communities associated with Folsom, Shasta, or Trinity reservoirs are therefore considered ***less than significant.***

Mitigation Measure

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could adversely affect vegetation associated with Folsom, Shasta, and Trinity reservoirs.

The RUSP would use surface water drawn from the Folsom, Shasta, and Trinity reservoirs, which could result in surface water fluctuations that could affect the associated vegetation. As discussed above, the vegetation located in the drawdown area is generally weedy, herbaceous plants and scattered willow shrubs that do not form a contiguous riparian community. Like the PVSP, the RUSP's surface water need would result in little or no change to the water surface elevation; thus, the impacts to vegetation communities associated with the reservoirs due to the RUSP would be less than significant. The RUSP would require approximately one-fifth of the water supply overall than the PVSP; therefore, the impact on vegetation communities associated with the reservoirs would be less than that of the PVSP and is also considered ***less than significant.***

4.4-32 The Specific Plan could adversely affect riparian vegetation of the upper Sacramento River.

The peak growing season for riparian vegetation is typically March through July, with the remainder of the growing season spanning from August through October. The analysis of effects on riparian vegetation of the upper Sacramento River is based on changes in monthly mean river flows below Keswick Dam resulting from the implementation of the proposed Specific Plan initial surface water supply, relative to flows under the existing condition.

Under the proposed Specific Plan initial surface water supply, monthly mean flows would be reduced negligibly (i.e., by up to four cfs in April, up to three cfs in July, and would increase by one cfs to eight cfs throughout the other months of the growing season, with no detectable change to monthly mean flows in September), relative to the existing condition (Template Output B-110). In the context of riparian vegetation effects, such changes in monthly mean flows ranging from increases of eight cfs to reductions of four cfs would be small and imperceptible, considering modeled monthly flows of 6,387 cfs to 13,255 cfs during the months of the growing season. Such small differences are not of sufficient frequency or magnitude to adversely affect riparian vegetation along the river. Therefore, impacts would be considered ***less than significant.***

Mitigation Measure

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could adversely affect riparian vegetation of the upper Sacramento River.

As discussed above, the monthly mean flows of the upper Sacramento River would only be reduced by a negligible amount as a result of the PVSP with some months predicted to have no perceptible change. These small differences are not of sufficient frequency or magnitude to adversely affect the riparian vegetation of the upper Sacramento River and the impacts resulting from the PVSP were determined to be less than significant. The RUSP would require approximately one-fifth of the water supply overall than the PVSP; therefore, the impact on riparian vegetation of the upper Sacramento River would be less than that of the PVSP and is also considered ***less than significant.***

4.4-33 The Specific Plan could adversely affect the lower Sacramento River and the Delta.

The analysis of potential effects on riparian vegetation of the lower Sacramento River and the Delta is based on changes in river flows below Freeport caused by the implementation of the proposed Specific Plan initial surface water supply, relative to flows under the existing condition. As discussed in Impact 4.4-32, the growing season for riparian vegetation is typically from March though October, with peak growing periods associated with the months of March through July. In addition to lower Sacramento River flows, the Delta wetlands are very sensitive to fluctuations in water salinity, which are determined by water flows into the Delta (San Francisco Estuary Project, 1993). The long-term position of X2 is also examined to assess any changes in salinity that could adversely affect Delta vegetation.

Vegetation Associated with the Lower Sacramento River and Delta. Under the proposed Specific Plan initial surface water supply, reductions in monthly mean flows at Freeport during the peak growing season would be negligible, ranging from one cfs to four cfs in June through July, with an increase of four cfs in May, relative to the existing condition (Template Output B-147). For the remainder of the growing season, monthly mean flows would not decrease and would experience similar negligible increases (i.e., up to five cfs), with the greatest increase in October relative to the existing condition (Template Output B-147). In the context of riparian vegetation effects, such changes in monthly mean flows would be small and imperceptible, considering modeled monthly flows of 12,046 cfs to 33,466 cfs during the months of the growing season, as well as the tidal influence at this stage of the river. These small differences in flows are not of sufficient frequency or magnitude to adversely affect riparian vegetation along the river or Delta, so impacts will be ***less than significant.***

Delta Wetland and the Position of X2. Under the proposed Specific Plan initial surface water supply, there would be no shift in the position of X2 relative to the existing condition over the entire 70-year period of record (Template Output B-429). Changes in Sacramento River flows due to the implementation of the proposed Specific Plan initial surface water supply would not occur, thus there would be no shift in the long-term average X2 position. Implementation of the proposed Specific Plan initial surface water supply would not result in adverse effects to riparian vegetation of the Delta, and impacts will be ***less than significant.***

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could adversely affect the lower Sacramento River and the Delta.

As discussed above, the monthly mean flows of the lower Sacramento River and Delta would be reduced by a negligible amount as a result of the PVSP and there would be no long-term shift in X2. The small differences in flows are not of sufficient frequency or magnitude to adversely affect the riparian vegetation of the lower Sacramento River and Delta; therefore, the impacts resulting from the PVSP were determined to be less than significant. The RUSP would require approximately one-fifth of the water supply overall compared to the PVSP; therefore, the impact on the lower Sacramento River and the Delta would be less than that of the PVSP and the impact due to the RUSP would also be considered ***less than significant.***

4.4-34 The Specific Plan could have effects on Delta habitats of special-status species.

A number of special-status species included in Table 4.4-4 are known to occur in a range of Delta habitats. As discussed in Impact 4.4-33, there would be small, albeit immeasurable, changes in monthly mean flows in the lower Sacramento River during certain times of the

year resulting from the implementation of the proposed Specific Plan initial surface water supply. These flows would not be expected to be reduced by any sufficient magnitude or frequency. Accordingly, they would not be expected to significantly alter habitats of special-status species dependent on the Delta. Furthermore, there would be no shift in the position of X2 under the proposed Specific Plan initial surface water supply, and hence no impacts anticipated due to changes in salinity (Template Output B-429). Thus, overall, there would be no impact to special-status species of the Delta resulting from reductions in flow of the lower Sacramento River or the position of X2 under the proposed Specific Plan initial surface water supply, relative to the existing condition. This impact is therefore considered ***less than significant.***

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could have effects on Delta habitats of special-status species.

As discussed above, the monthly mean flows of the Delta would only be reduced by a negligible amount and the salinity would not be affected because the X2 would not change position. Therefore the PVSP would not be expected to significantly alter the habitats of special-status species dependent on the Delta and was determined to be a less-than-significant impact. The RUSPwould require approximately one-fifth of the water supply overall than the PVSP; therefore, the impact to mean flows and Delta habitats would be less than that of the PVSP and would also be ***less than significant.***

4.4-35 The Specific Plan could have effects on riparian vegetation of the lower American River.

Flows to Support Mature Cottonwood Radial Growth Maintenance - 1,765 cfs Index (March through October). Under the proposed Specific Plan initial surface water supply, monthly mean flows during the growing season months of March through October would not be significantly reduced below the 1,765 cfs index, the long-term flow value required for the maintenance of radial growth of mature cottonwoods relative to the existing condition. Under the existing condition, monthly mean flows below Nimbus Dam fall below 1,765 cfs in 128 months out of the 560 months included in the analysis. Under the proposed Specific Plan initial surface water supply, monthly mean flows below Nimbus Dam would fall below the 1,765 cfs index in an additional two months (Technical Appendix A-313 and A-318 to A-324). Lower American River flows simulated below the H Street Bridge under the existing condition fall below 1,765 cfs in 138 months of the 560 months included in the analysis. Under the proposed Specific Plan initial surface water supply, lower American River flows would fall below the 1,765 cfs index in an additional three months (Technical Appendix A-337 and A-342 to A-348). Overall, there would be no significant increase in the frequency with which monthly mean flows under the proposed Specific Plan initial surface water supply would be below the 1,765 cfs index, relative to the existing condition. Therefore, impacts to the maintenance of mature cottonwoods, relative to the existing condition, will be ***less than significant.***

Flows to Support Some Cottonwood Growth - 2,000 cfs Index (March through October). Under the existing condition, flows below Nimbus Dam would be below 2,000 cfs, the long-term flow value required to support some growth of cottonwoods, in 140 of the 560 months included in the analysis. Under the proposed Specific Plan initial surface water supply, monthly mean flows below Nimbus Dam would fall below the 2,000 cfs index in three additional months (Technical Appendix A-313 and A-318 to A-324). The proposed Specific Plan initial surface water supply would, therefore, result in monthly mean flows below Nimbus Dam that would be below the maintenance index approximately 1.4% more

often than under the existing condition. Monthly mean flows for the existing condition below the H Street Bridge would fall below the 2,000 cfs index in 176 of the 560 months included in the analysis. Under the proposed Specific Plan initial surface water supply, lower American River flows would fall below the 2,000 cfs index in one additional month (Technical Appendix A-337 and A-342 to A-348). The proposed Specific Plan initial surface water supply would, therefore, result in monthly mean flows below H Street Bridge that would be below the maintenance index approximately 0.6% more often than under the existing condition. Thus, overall, under the proposed Specific Plan initial surface water supply, the increase in the frequency with which monthly mean flows would fall below the 2,000 cfs index will be ***less than significant***. Accordingly, no significant impact would be expected to occur to flows considered necessary to support some cottonwood growth, relative to the existing condition.

Flows to Support Reasonable to Maximum Cottonwood Growth Rates - 3,000 cfs Index (March through October). Under the proposed Specific Plan initial surface water supply, monthly mean flows would not be significantly reduced below the 3,000 cfs index, the long-term flow value required to support some growth of cottonwoods during the growing season months of March through October. Under the existing condition, monthly mean flows below Nimbus Dam would fall below the 3,000 cfs index 302 months out of the 560 months modeled for this period. The proposed Specific Plan initial surface water supply would result in no increase relative to the existing condition (Technical Appendix A-313 and A-318 to A-324). For flows below the H Street Bridge, monthly mean flows under the existing condition would fall below the 3,000 cfs index in 320 months of the 560 months modeled. The proposed Specific Plan initial surface water supply would result in one additional month relative to the existing condition (Technical Appendix A-337 and A- 342 to A-348). Thus, under the proposed Specific Plan initial surface water supply, there would be no significant increase in the frequency with which monthly mean flows would fall below the 3,000 cfs index. Therefore, the effect on flows considered necessary to support reasonable to maximum cottonwood growth will be ***less than significant***.

Flows to Support Terrace Inundation for Cottonwood Germination - 5,000 cfs Index. Implementation of the proposed Specific Plan initial surface water supply would result in a negligible reduction in the number of occurrences below Nimbus Dam or the H Street Bridge in which monthly mean peak flows would be above 5,000 cfs, the minimum flow considered appropriate for inundation of terraces essential for cottonwood germination during the seed release period of April through July (CCOMWP 1999). There would be no difference in the number of months above the 5,000 cfs index below Nimbus Dam under the proposed Specific Plan initial surface water supply, relative to the existing condition (Template Output B-87). At the H Street Bridge, lower American River flows are above the 5,000 cfs index 105 out of 840 months modeled, under the existing condition. The proposed Specific Plan initial surface water supply would result in 104 months above this index, equivalent to a decrease of less than 1%, relative to the existing condition (Template Output B-91). Thus, under the proposed Specific Plan initial surface water supply, there would be no significant decrease in the frequency of monthly mean flows above the 5,000 cfs index, therefore the effect on cottonwood germination relative to the existing condition will be ***less than significant***.

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could have effects on riparian vegetation of the lower American River.

Demand for surface water could reduce monthly mean flows in the lower American River which could affect the germination, growth, and maintenance of cottonwood trees. As discussed above, the demand from the PVSP would not affect monthly mean flows of the Delta to the point that would significantly affect cottonwood trees. . The RUSP would require approximately one-fifth of the water supply overall compared to the PVSP; therefore, the impact would be less than that of the PVSP and is also considered ***less than significant.***

4.4-36 The Specific Plan could have effects on backwater recharge in the lower American River.

Flows to Support Adequate Recharge of the Ponds Closest to the Lower American River - 2,700 cfs Index. Vegetation around backwater ponds closest to the river is typical of the riparian associations in the area and is composed of mixed-age willow, alder, and cottonwood. The water is slower moving and the ponds are isolated from human disturbances. These areas, as a result, tend to be of higher value to wildlife (Sands et al., 1985). Wildlife species that have been recorded in these areas include pied-billed grebe, American bittern, green heron, common merganser, white-tailed kite, wood duck, yellow warbler, warbling vireo, dusky-footed woodrat, western gray squirrel, Pacific tree frog, and western toad.

Under the proposed Specific Plan initial surface water supply, monthly mean flows would not be substantially reduced below the 2,700 cfs index. Under existing conditions, monthly mean flows below Nimbus Dam would fall below the 2,700 cfs threshold in 469 months out of the 840 months modeled. Under the proposed Specific Plan initial surface water supply, monthly mean flows would fall below this threshold 470 months, representing a 0.2% increase in frequency relative to the existing condition (Technical Appendix A-313 to A-324). For flows below the H Street Bridge, the long-term monthly mean flows below 2,700 cfs under the existing condition would occur in 492 months, with flows falling below this threshold in two additional months under the proposed Specific Plan initial surface water supply (Technical Appendix A-337 to A-348). This constitutes a 0.4% decrease in frequency relative to the existing condition. There would be no significant increase in the number of monthly occurrences below the 2,700 cfs threshold, consequently the impact to backwater recharge for ponds closest to the lower American River under the proposed Specific Plan initial surface water supply will be ***less than significant***.

Flows to Support Continued Recharge of Off-River Ponds - 4,000 cfs Index. Vegetation associated with off-river ponds would be similar to vegetation for ponds closest to the river (discussed above). Under the proposed Specific Plan initial surface water supply, monthly mean flows would not be substantially reduced below the 4,000 cfs index, the reported long-term flow value required to provide continued recharge of off-river ponds relative to the existing condition. Under the existing condition, monthly mean flows below Nimbus Dam below 4,000 cfs would occur in 609 of the 840 months included in the analysis. Under the proposed Specific Plan initial surface water supply, monthly mean flows would fall below this threshold in two additional months, representing a 0.5% increase in frequency relative to the existing condition (Technical Appendix A-313 to A-324). For the lower American River at the H Street Bridge, monthly flows would fall below the 4,000 cfs index in 643 months out of 840 months modeled under the existing condition, with flows falling below this threshold in 627 months under the proposed Specific Plan initial surface water supply (Technical Appendix A-337 to A-348). This would represent a 2.5% decrease in frequency relative to the existing condition. As there would be no significant increase in the number of monthly occurrences below the 4,000 cfs threshold, the impact to backwater recharge for American River off-river ponds under the proposed Specific Plan initial surface water supply will be ***less than significant.***

<u>Mitigation Measures</u>

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could have effects on backwater recharge in the lower American River.

The PVSP's need for surface water could affect backwater recharge in the lower American River by reducing monthly mean flows. The vegetation around the backwater ponds tends to have higher value to wildlife. The reduction of monthly mean flows could reduce the backwater recharge and therefore impact the associated vegetation and wildlife. As discussed in the PVSP DEIR, the monthly mean flows of the lower American River would not be reduced to the point as to significantly decrease backwater recharge. The impact on backwater recharge due to the PVSP was determined to be less than significant. The RUSP would require approximately one-fifth of the water supply of the PVSP; therefore, the RUSP would have a smaller impact on the monthly mean flows and consequently on backwater recharge. The impact of the RUSP would be less than that of the PVSP and is, therefore, also considered ***less than significant.***

4.4-37 The Specific Plan could have affects on special-status species dependent on lower American River riparian and open water habitats.

Bald eagle, bank swallow, yellow warbler, yellow-breasted chat, river otter, and several other species are special status species known to occur, nest, or periodically forage in open water and cottonwood forest habitats along the lower American River. Thus, potential impacts to cottonwood forests are typically used to determine whether special-status species dependent on this habitat would be affected by the proposed Specific Plan initial surface water supply.

As discussed in Impact 4.4-36, there would be no significant impact to the maintenance, growth, and establishment of cottonwood forests along the lower American River under the proposed Specific Plan initial surface water supply relative to the existing condition. The impacts to cottonwood radial growth maintenance, maximum growth, and establishment would be ***less than significant*** under the proposed Specific Plan initial surface water supply; therefore, impacts to special-status species associated with riparian and open water habitats would also be ***less than significant***.

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could have affects on special-status species dependent on lower American River riparian and open water habitats.

As discussed above, several special status species are known to occur, nest, or forage in open water and cottonwood forest habitats along the lower American River. The impacts on cottonwood forests are used to determine impacts on special status species that are dependant on this habitat. As discussed in Impact 4.4-36, the PVSP would not have a significant impact on the maintenance, growth, and establishment of cottonwood forests along the lower American River. Consequently, the PVSP was determined to have a less-than-significant impact on special status species that depend on the lower American River habitats. The RUSP would require approximately one-fifth of the water supply of the PVSP. Therefore, the impact of the RUSP would be less than that of the PVSP and is also considered ***less than significant.***

4.4-38 The Specific Plan could have affects on special-status species dependent on lower American River backwater pond/marsh habitats.

Sanford's arrowhead, western pond turtle, valley elderberry shrubs, the VELB, and tricolored blackbirds are special-status species known to occur in backwater pond areas along the lower American River. Thus, potential impacts to backwater ponds are used to determine whether special-status species dependent on this habitat would be affected by the proposed Specific Plan initial surface water supply.

As discussed in Impact 4.4-36, there would be no significant impact to the recharge of backwater ponds along the lower American River under the proposed Specific Plan initial surface water supply relative to the existing condition. As the impacts to adjacent and off-river ponds would be ***less than significant***, impacts to special-status species associated with backwater pond/marsh habitats would also be ***less than significant.***

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could have affects on special-status species dependent on lower American River backwater pond/marsh habitats.

The PVSP's need for surface water could affect backwater recharge in the lower American River by reducing monthly mean flows. Special status species are known to occur in backwater pond areas along the lower American River; therefore, impacts on this type of habitat are used to determine impacts on the special status species. As discussed in Impact 4.4-36, the impact on backwater recharge due to the PVSP was determined to be less than significant. The impact on backwater recharge due to the RUSP would be less than that of the PVSP and would also be less than significant; therefore, the RUSP's impacts on special status species that depend on the backwater pond/marsh habitats would also be ***less than significant.***

4.4-39 The Specific Plan could have effects on elderberry shrubs and VELB along the lower American River.

The USFWS has designated the American River Parkway as Critical Habitat for VELB, and this species has been recorded in elderberry shrubs near backwater ponds along the lower American River. Thus, potential impacts to backwater ponds are typically used to determine whether VELB would be affected by the proposed Specific Plan initial surface water supply.

As discussed in Impact 4.4-36, there would be no significant impact to the recharge of backwater ponds along the lower American River under the proposed Specific Plan initial surface water supply relative to the existing condition. As the impacts to adjacent and off-river ponds would be ***less than significant***, impacts to elderberry shrubs and VELB would also be ***less than significant.***

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could have effects on elderberry shrubs and VELB along the lower American River.

The PVSP's need for surface water could affect backwater recharge in the lower American River by reducing monthly mean flows. VELB have been recorded in elderberry shrubs near backwater

ponds along the lower American River. Impacts to backwater pond areas along the lower American River are used to determine impacts to VELB. As discussed in Impact 4.4-36, the impact on backwater recharge due to the PVSP was determined to be less than significant. The impact on backwater recharge due to the RUSP would also be less than significant; therefore, potential impacts on VELB that depend on the elderberry shrubs that grow near the backwater ponds would also be ***less than significant*** for the RUSP.

4.4-40 The Specific Plan could cause impacts to Shasta and Trinity reservoirs' warmwater fisheries.

Shasta Reservoir. Hydrologic conditions under the proposed Specific Plan initial surface water supply would result in no change in the long-term average end-of-month water surface elevation in Shasta Reservoir during the March through September period, when warmwater fish spawning and initial rearing may be expected (Template Output B-487). End-of-month elevation at Shasta Reservoir would be essentially equivalent to the existing condition in 486 of the 490 months included in the analysis (Technical Appendices A-186 to A-192). Reductions in average end-of-month elevation of up to two feet msl would, however, occur 0.8% of the time during the March through September period.

Such changes in water surface elevation in Shasta Reservoir during the March through September period would result in minimal changes in the availability of reservoir littoral habitat. The amount of littoral habitat potentially available to warmwater fish for spawning and/or rearing in Shasta Reservoir would remain, for the most part, unchanged. The greatest decrease in the long-term average number of acres of littoral habitat under the proposed Specific Plan initial surface water supply would be two acres during April, relative to the existing condition (Template Output B-494). With the small changes in the availability of littoral habitat under the proposed Specific Plan initial surface water supply, the long-term average initial year-class strength of warmwater fish populations would also remain unaffected. As littoral habitat availability would not change as a result of potentially changing water surface elevations, this would constitute a ***less than significant impact*** to Shasta Reservoir's warmwater fisheries under the proposed Specific Plan initial surface water supply, relative to the existing condition.

In addition, implementation of the proposed Specific Plan initial surface water supply could alter the rates by which water surface elevation in Shasta Reservoir change during each month of the primary warmwater fish-spawning period (March through July). The frequency with which potential nest-dewatering events would occur in Shasta Reservoir during the spawning period would not change relative to the existing condition, as shown in Table 4.4-13. Therefore, impacts to Shasta Reservoir's warmwater fisheries resulting from increases in nest-dewatering events, under the proposed Specific Plan initial surface water supply, would be ***less than significant.***

Table 4.4-13
Long-term Average Surface Elevation and Number of Years with Elevation Decrease Greater than 9 feet msl in Shasta Reservoir Under Existing and Project Conditions

Month	Average Reservoir Surface Elevation[1] (feet msl)			No. Years[1] w/Monthly Elevation Decrease During Month > 9 ft	
	Existing	Project	Difference	Existing	Project
Mar	1,030	1,030	0	1	1
Apr	1,040	1,040	0	3	3
May	1,042	1,042	0	5	5
Jun	1,032	1,032	0	32	32
Jul	1,014	1,014	0	70	70

[1] Based on 70 years modeled.

Source: SWRI, 2002.

Trinity Reservoir. Hydrologic conditions under the proposed Specific Plan initial surface water supply would not result in substantial changes in the long-term average end-of-month water surface elevation in Trinity Reservoir during the March through September period (Template Output B-489). End-of-month elevation at Trinity Reservoir under the proposed Specific Plan initial surface water supply would be equivalent to the existing condition in all of the 490 months included in the analysis (Technical Appendices A-174 to A-180). Reductions in the long-term average amount of littoral habitat potentially available to warmwater fish for spawning and/or rearing in Trinity Reservoir under the proposed Specific Plan initial surface water supply would be within two acres from the existing condition during all months of the March through September period (Template Output B-495). The long-term average initial year-class strength of warmwater fish populations, relative to the existing condition, would not substantially change. Consequently, seasonal reductions in littoral habitat availability resulting from potential changes in reservoir water surface elevation would not be of sufficient frequency to adversely affect long-term population levels of warmwater fish and would constitute a ***less than significant impact*** to Trinity Reservoir's warmwater fisheries.

In addition, the frequency with which potential nest-dewatering events could occur in Trinity Reservoir would not be increased under the proposed Specific Plan initial surface water supply, relative to the existing condition, during any month of the March through July spawning period (Technical Appendices A-174 to A-178). Overall, impacts to Trinity Reservoir's warmwater fish populations would be ***less than significant.***

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could cause impacts to Shasta and Trinity reservoirs' warmwater fisheries.

The PVSP could affect the surface elevation of Shasta and Trinity reservoirs resulting in impacts to warmwater fisheries. Significant changes in surface water elevation could reduce the availability of littoral habitat and could increase the instances of nest-dewatering events. As described above, the PVSP would not result in a change in the long-term average end-of-month water surface elevation in Shasta Reservoir from March through September and would not result in a substantial change to these conditions in Trinity Reservoir. It was determined that the PVSP would not affect littoral habitat availability or cause a significant increase in the potential for nest dewatering events at the Shasta or Trinity Reservoirs; thus, impacts resulting from the PVSP on warmwater fisheries were determined to be less than significant. The RUSP is of a smaller scale than the PVSP; therefore impacts of the RUSP on warmwater fisheries would be less than that of the PVSP; therefore, impacts due to RUSP would also be ***less than significant.***

4.4-41 The Specific Plan could cause impacts to Shasta and Trinity reservoirs' coldwater fisheries.

Shasta Reservoir. Hydrologic conditions under the proposed Specific Plan initial surface water supply would not result in substantial changes in long-term average Shasta Reservoir storage during any month of the April through November period, relative to the existing condition. The greatest reduction in storage under the proposed Specific Plan initial surface water supply would be one TAF, relative to the existing condition (Template Output B-481). Shasta Reservoir end-of-month storage under the proposed Specific Plan initial surface water supply would be essentially equivalent to the existing condition in 558 of the 560 months

included in the analysis. In individual years during the April through November period (when Shasta Reservoir thermally stratifies), reductions in Shasta Reservoir end-of-month storage of more than 3% would not occur in any of the individual months (out of the 560 months included in the analysis) under the proposed Specific Plan initial surface water supply, relative to the existing condition (Technical Appendices A-103 to A-108 and A-97 to A-98). The largest individual storage reduction for any given month under the proposed Specific Plan initial surface water supply over the 70-year period of record for the April through November period would be 1.1%. Physical habitat availability, however, is not believed to be among the primary factors limiting coldwater fish populations within the reservoir, and anticipated changes in seasonal storage would not be expected to result in substantial adverse effects on the primary prey base used by the reservoir's coldwater fish populations; therefore, the infrequent and minimal seasonal reductions in storage that could occur under the proposed Specific Plan initial surface water supply would not be of sufficient magnitude to adversely affect long-term population levels of coldwater fish and would have ***less than significant impacts*** to Shasta Reservoir's coldwater fisheries.

Trinity Reservoir. Under the proposed Specific Plan initial surface water supply, the long-term average monthly storage in Trinity Reservoir would be essentially unchanged during all months of the April through November period (when Trinity Reservoir thermally stratifies). The greatest decrease in storage under the proposed Specific Plan initial surface water supply would be one TAF (0.1%) relative to the existing condition (Template Output B-482). For the proposed Specific Plan initial surface water supply, Trinity Reservoir storage would be essentially equivalent to the existing condition all months of the 560 months included in the analysis. Consequently, reductions of greater than 3% would not occur in any of the individual months (out of the 560 months included in the analysis). The maximum reduction in storage for any month out of the entire 70-year period of record would be 1.0%, relative to the existing condition (Technical Appendices A-85 to A-86 and A-91 to A-96). Similar to Shasta Reservoir, physical habitat availability is not believed to be among the primary factors limiting coldwater fish populations within the reservoir, and anticipated changes in seasonal storage would not be expected to result in substantial adverse effects on the primary prey base used by the reservoir's coldwater fish populations. Therefore, the infrequent and minimal seasonal reductions in storage that could occur under the proposed Specific Plan initial surface water supply would not be of sufficient magnitude to adversely affect long-term population levels of coldwater fish and would have ***less than significant impacts*** to Trinity Reservoir's coldwater fisheries.

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could cause impacts to Shasta and Trinity reservoirs' coldwater fisheries.

The hydrologic conditions under the PVSP could result in a change to the long-term average storage of Trinity and Shasta Reservoirs during April to November. If these changes were substantial they could affect the habitat available for coldwater fish. It was determined that the PVSP would not significantly reduce storage in either of the reservoirs to the extent that coldwater fist habitat, and therefore population, would be significantly adversely affected. Impacts resulting from the PVSP to coldwater fisheries were determined to be less than significant. The proposed RUSP is of a smaller scale than the PVSP; therefore impact of the RUSP on coldwater fisheries would be less than the PVSP, which would also be ***less than significant.***

SACRAMENTO RIVER FISHERIES IMPACTS

Flow- and temperature-related impacts are discussed separately below by species and life stage. Organizationally, flow- and temperature-related impacts to winter-run, spring-run, fall-run, and late fall-run Chinook salmon and steelhead are discussed together, followed by impact discussions for splittail, American shad, and striped bass.

4.4-42 The Specific Plan could cause impacts to winter-run Chinook salmon in the Sacramento River.

Flow-Related Impacts to Winter-Run Chinook Salmon Adult Immigration (December through July). The long-term average flow in the Sacramento River below Keswick Dam differs by less than 0.2% under the Specific Plan initial surface water supply, compared to the existing condition, during all months of the adult immigration period (December through July). In fact, long-term average Sacramento River flow below Keswick Dam under the Specific Plan initial surface water supply would not differ by more than five cfs less than flows under the existing condition, during the December through July period (Template Output B-141). Further, in 554 out of 560 months simulated in this period, Sacramento River flow below Keswick Dam under the Specific Plan initial surface water supply would be essentially equivalent to flows under the existing condition (Technical Appendix A-351 to A-358).

The long-term average flow at Freeport in the Sacramento River differs by less than 0.1% between the Specific Plan initial surface water supply and existing condition, during December through July. The greatest decrease in flows simulated under the Specific Plan initial surface water supply would be eight cfs (in February) and would be approximately four cfs greater under the proposed Specific Plan initial surface water supply from March through May (Template Output B-147). Monthly mean flows in the Sacramento River at Freeport under the Specific Plan initial surface water supply would be essentially equivalent to or greater than flows under the existing condition in 557 out of 560 months simulated for the December through July period (Technical Appendix A-387 to A-394). The Specific Plan initial surface water supply would not result in any substantial reductions in long-term average flows in any month of the winter-run Chinook salmon adult immigration period, relative to the existing condition.

The minimum flow objective for Keswick Dam releases stipulated in the NOAA Biological Opinion (1993, as revised in 1995) for the protection of winter-run Chinook salmon rearing and downstream passage is 3,250 cfs between October 1 and March 31. The minimum flow objective is applicable from December through March of the adult immigration period. Modeling output shows that the Specific Plan initial surface water supply would not result in additional reductions below 3,250 cfs, relative to the existing condition, throughout the December through March period (Technical Appendix A-351 to A-354).

Overall, the increases in flow that would be expected to occur in the Sacramento River below Keswick Dam and at Freeport under the Specific Plan initial surface water supply would not be of sufficient frequency or magnitude to adversely affect attraction or passage of adults immigrating into the Sacramento River. Therefore, the Specific Plan initial surface water supply is not likely to adversely affect immigration of winter-run Chinook salmon in the Sacramento River and the impact would be ***less than significant***, relative to the existing condition.

Temperature-Related Impacts to Winter-Run Chinook Salmon Adult Immigration (December through July). Long-term average water temperature in the Sacramento River at Bend Bridge would not differ by more than 0.1°F during any month of the December through July period, relative to the existing condition (Template Output B-307). Similarly, long-term average water temperature in the Sacramento River at Jelly's Ferry and Freeport

would not differ during any month of the December through July period (Template Output B-314 and B-321).

The NOAA Biological Opinion (1993, as revised in 1995) for winter-run Chinook salmon provides temperature requirements for Bend Bridge and Jelly's Ferry in the Sacramento River from April through October. The temperature criteria are applicable from April through July of the winter-run Chinook salmon adult immigration period (the most rigorous are maximum temperatures of 56°F from April through September and 60°F during October at Bend Bridge). As described above, the long-term average water temperatures in the Sacramento River modeled for the Specific Plan initial surface water supply would not differ from those under the existing condition at Jelly's Ferry during all months of the April through July period. Monthly mean water temperatures in the Sacramento River at Bend Bridge under the Specific Plan initial surface water supply would remain essentially equivalent to or less than those under the existing condition in 276 out of 276 months included in the analysis (Technical Appendix A-47 to A-478). Similarly, water temperatures at Jelly's Ferry during April though July under the Specific Plan initial surface water supply also would remain essentially equivalent to the existing condition in 276 of the 276 months included in the analysis (Technical Appendix A-463 to A-466). Further, temperatures at Bend Bridge would exceed 56°F in 30 out of 276 months modeled for the April through July period under the existing condition, and the Specific Plan initial surface water supply would not result in additional occurrences in which Sacramento River water temperatures at Bend Bridge would exceed 56°F (Technical Appendix A-471 to A-478).

Overall, changes in Sacramento River water temperatures throughout the December through July period under the Specific Plan initial surface water supply would not be of sufficient frequency or magnitude to result in substantial temperature-related impacts to winter-run Chinook salmon adult immigration. Therefore, the Specific Plan initial surface water supply is not likely to adversely affect winter-run Chinook salmon adult immigration. Consequently, potential temperature-related impacts to winter-run Chinook salmon adult immigration under the Specific Plan initial surface water supply would be ***less than significant***, relative to the existing condition.

Flow-Related Impacts to Winter-Run Chinook Salmon Spawning and Incubation (April through August). The long-term average flow in the Sacramento River below Keswick Dam under the Specific Plan initial surface water supply would be within 0.1% of the flow under the existing condition during all months of the April through August period (Template Output B-141). In 348 of the 350 months simulated during this period, flow in the Sacramento River below Keswick Dam would be either essentially equivalent to or greater than flows under the existing condition (Technical Appendix A-355 to A-359).

The exceedance curves for the Sacramento River below Keswick Dam for the April through August period demonstrate that flows under the Specific Plan initial surface water supply during April through August would be nearly identical to those under the existing condition. Differences in flows in the lower flow ranges are more crucial for salmon survival. Reductions in flows in the lower flow ranges could reduce the amount of available Chinook salmon spawning habitat, which could result in increased redd superimposition during years when adult returns are high enough for spawning habitat to be limiting. However, there would be no detectable reduction in simulated flows in any month of the April through August period, relative to the existing condition (Template Output B-139 to B-140).

The long-term average flow in the Sacramento River at Freeport under the Specific Plan initial surface water supply would not decrease more than four cfs relative to Sacramento River flows under the existing condition (Template Output B-147). In 350 of the 350 months simulated during the April through August period, flows at Freeport under the Specific Plan initial surface water supply would be essentially equivalent to or greater than flows under the existing condition (Technical Appendix A-391 to A-395). The exceedance curves for the Sacramento River at Freeport for the April through August period

demonstrate that flows under the Specific Plan initial surface water supply would be nearly identical to those under the existing condition in the April through August period (Template Output B-145 to B-146).

Overall, changes in Sacramento River flows under the Specific Plan initial surface water supply would not be of sufficient frequency or magnitude to result in a reduction in winter-run Chinook salmon spawning habitat. Such changes are not likely to have an adverse impact on long-term initial year-class strength of Sacramento River winter-run Chinook salmon. Therefore, potential flow-related impacts to winter-run Chinook salmon spawning and initial rearing under the Specific Plan initial surface water supply would be ***less than significant***, relative to the existing condition.

Temperature-Related Impacts to Winter-Run Chinook Salmon Spawning and Incubation (April through August). Under the Specific Plan initial surface water supply, the long-term average water temperatures would not differ by more than 0.1°F from those under the existing condition during the April through August period at Bend Bridge and at Jelly's Ferry (Template Output B-307 and B-314). In fact, in 345 out of the 345 months included in the analysis, the water temperatures under the Specific Plan initial surface water supply at these locations would be essentially equivalent to water temperatures under the existing condition (Technical Appendix A-463 to A-467 and A-475 to A-479).

Throughout the April through August period, Sacramento River water temperatures would not exceed NOAA temperature criteria more frequently under the Specific Plan initial surface water supply than under the existing condition. Under the Specific Plan initial surface water supply, there would not be any additional occurrences in which water temperatures at Bend Bridge in the Sacramento River under the Specific Plan initial surface water supply would exceed 56°F, relative to the existing condition (Technical Appendix A-475 to A-479).

The long-term average annual early lifestage survival for winter-run Chinook salmon in the Sacramento River would be 96.0% under the existing condition and 95.9% under the Specific Plan initial surface water supply (Template Output B-469). Substantial increases or decreases in survival would not occur in any individual year of the 69-year simulation. In five years under the Specific Plan initial surface water supply, there would be slight reductions (less than 1.8%) in annual early lifestage survival for winter-run Chinook salmon in the Sacramento River. However, the maximum relative reduction in annual early lifestage survival would be 2.4%, relative to the existing condition (Technical Appendix A-568).

Based on modeling results, small temperature changes in the Sacramento River resulting from the Specific Plan initial surface water supply during the April through August period are not of sufficient frequency or magnitude to result in adverse effects to spawning and incubation success of winter-run Chinook salmon, relative to the existing condition. Therefore, potential water temperature impacts to winter-run Chinook salmon spawning and incubation in the Sacramento River resulting from the implementation of the Specific Plan initial surface water supply would be ***less than significant***, relative to the existing condition.

Flow-Related Impacts to Winter-Run Chinook Salmon Juvenile Rearing and Emigration (August through December). Under the Specific Plan initial surface water supply, the simulated long-term average flow below Keswick Dam would increase slightly, relative to the existing condition (Template Output B-141). Long-term average flows in the Sacramento River would increase by 0.1% (i.e., eight cfs) in August. In 348 out of the 350 months simulated for the Specific Plan initial surface water supply, Sacramento River flow below Keswick Dam would be essentially equivalent to flows simulated under the existing condition (Technical Appendix A-349 to A-360). In addition, flows would not be reduced below the 3,250 cfs flow criterion specified by the NOAA winter-run Chinook salmon Biological Opinion more frequently under the Specific Plan initial surface water supply compared to the existing condition during the October through December period in which

flow requirements must be maintained (Technical Appendix A-349 to A-360). Although small flow reductions in Sacramento River flows below Keswick Dam would occur under the Specific Plan initial surface water supply in a few years during the August through December period, such changes would not be likely to result in measurable changes to winter-run Chinook salmon juvenile emigration.

Long-term average flows in the Sacramento River at Freeport under the Specific Plan initial surface water supply would be increased (i.e., up to 7 cfs) from August through November, and would not differ substantially during December, relative to flows under the existing condition (Template Output B-147). In August through November, long-term average flows would increase by approximately one cfs to seven cfs. In 349 out of 350 months modeled, monthly mean flows in the Sacramento River at Freeport under the Specific Plan initial surface water supply would be essentially equivalent to or greater than flows simulated under the existing condition (Technical Appendix A-385 to A-396).

Overall, changes in Sacramento River flows would not be of sufficient frequency or magnitude to adversely affect the success of juvenile salmonid emigration. Therefore, impacts to juvenile winter-run Chinook salmon emigration under the Specific Plan initial surface water supply would be ***less than significant***, relative to the existing condition.

Temperature-Related Impacts to Winter-Run Chinook Salmon Juvenile Rearing and Emigration (August through December). The long-term average water temperature in the Sacramento River at Bend Bridge and at Jelly's Ferry during August through December under the Specific Plan initial surface water supply would not change substantially, relative to temperatures under the existing condition (Template Output B-307 and B-314). In the 69-year simulation, monthly mean water temperature at Bend Bridge would increase more than 0.3°F in one year during September, and would not increase by more than 0.1°F in any year modeled for the remainder of the August through December period (Technical Appendix A-469 to A-480). At Jelly's Ferry, monthly mean water temperature would increase more than 0.3°F in one year during September, and would not increase by more than 0.1°F (i.e., would remain essentially equivalent to the existing condition) in any year modeled for the remainder of the August through December period (Technical Appendix A-457 to A-468).

NOAA temperature criteria for winter-run Chinook salmon are applicable during August through October of the juvenile emigration period. Under the Specific Plan initial surface water supply, there would not be any additional occurrences during August, September, October and November in which simulated water temperatures in the Sacramento River at Bend Bridge would be above 56°F, relative to the existing condition (Technical Appendix A-469 to A-480). Similarly, at Jelly's Ferry on the Sacramento River, there would not be any additional occurrences during October when water temperatures would be greater than 60°F (i.e., the temperature criterion for Jelly's Ferry in October), relative to the existing condition (Technical Appendix A-457 to A-468). Further, water temperatures under the Specific Plan initial surface water supply throughout the August through December period would not exceed 65°F, the upper end of the suitable range of water temperatures for juvenile Chinook salmon, more frequently than under the existing condition at Bend Bridge or Jelly's Ferry (Technical Appendix A-457 to A-468 and A-469 to A-480). In fact, water temperatures under the existing condition and Specific Plan initial surface water supply would remain below 65°F at Bend Bridge and Jelly's Ferry in 342 and 343 of the 345 months modeled, respectively, for the August through December period (Technical Appendix A-457 to A-468 and A-469 to A-480).

Long-term average water temperatures in the Sacramento River at Freeport under the Specific Plan initial surface water supply would not differ from water temperatures under the existing condition throughout the August through December period (Template Output B-321). Monthly mean water temperatures in the Sacramento River at Freeport would be essentially equivalent to or less than water temperatures under the existing condition in 345 out of 345 months modeled for the August through December period (Technical Appendix

A-481 to A-492). Further, water temperatures under the Specific Plan initial surface water supply at this location would not exceed 65°F more frequently than under the existing condition (Technical Appendix A-481 to A-492).

Based on the results discussed above, potential water temperature changes resulting from the Specific Plan initial surface water supply are not of sufficient frequency or magnitude to adversely affect juvenile winter-run Chinook salmon emigration. Therefore, potential water temperature-related impacts to winter-run Chinook salmon emigration under the Specific Plan initial surface water supply would be ***less than significant***, relative to the existing condition.

Mitigation Measure

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could cause impacts to winter-run Chinook salmon in the Sacramento River.

The PVSP EIR evaluated the potential impact on winter-run Chinook salmon in relation to flow-related and temperature-related change during both adult immigration and spawning and incubation and determined that significant changes in these conditions could result in a decrease in the Chinook salmon population. It was determined that the PVSP would not significantly alter either the temperature or the flow of the Sacramento River enough to affect either the adult immigration or the spawning and initial rearing of the winter-run Chinook salmon. Thus, impacts resulting from the PVSP on winter-run Chinook salmon were determined to be less than significant. The RUSP would demand less water than the PVSP, approximately one-fifth the size in terms of water demand; therefore, the impact of the RUSP on winter-run Chinook salmon would also be ***less than significant.***

4.4-43 The Specific Plan could cause impacts to spring-run Chinook salmon in the Sacramento River.

Flow-Related Impacts to Spring-Run Chinook Salmon Adult Immigration and Holding (March through September). The long-term average flow in the Sacramento River below Keswick Dam under the Specific Plan initial surface water supply would be within 0.1% of flows under the existing condition, during all months of the adult immigration period (March through September) (Template Output B-141). In 487 out of 490 months simulated in this period, the flow in the Sacramento River below Keswick Dam would be essentially equivalent to or greater than flows under the existing condition (Technical Appendix A-349 to A-360).

Long-term average flow in the Sacramento River at Freeport under the Specific Plan initial surface water supply would decrease by approximately one cfs to four cfs from March through September, relative to the existing condition (Template Output B-147). Monthly mean flow in the Sacramento River at Freeport under the Specific Plan initial surface water supply would be essentially equivalent to or greater than flows under the existing condition in 490 out of 490 months modeled for the March through September period (Technical Appendix A-390 to A-396).

The difference in Sacramento River flow below Keswick Dam and at Freeport that would occur under the Specific Plan initial surface water supply would not be of sufficient frequency or magnitude to result in adverse effects to attraction of adult spring-run Chinook salmon immigrating into the Sacramento River. Therefore, potential changes in flows under the Specific Plan initial surface water supply would result in a ***less than significant*** impact to immigration of spring-run Chinook salmon immigration and holding.

Temperature-Related Impacts to Spring-Run Chinook Salmon Adult Immigration and Holding (March through September). The long-term average water temperatures in the Sacramento River modeled for the Specific Plan initial surface water supply would not differ by more than 0.1°F from those under the existing condition at the Bend Bridge and Jelly's Ferry during all months of the March through September adult immigration period (Template Output B-307 and B-314). Moreover, under the Specific Plan initial surface water supply, water temperatures in the Sacramento River at Bend Bridge would remain essentially equivalent to those under the existing condition in 482 out of 483 months included in the analysis (Technical Appendix A-474 to A-480). Water temperatures at Jelly's Ferry under the Specific Plan initial surface water supply would remain essentially equivalent to those simulated under the existing condition in 482 of the 483 months included in the analysis (Technical Appendix A-462 to A-468).

March through September long-term average water temperatures in the Sacramento River at Freeport under the Specific Plan initial surface water supply would not differ from water temperatures under the existing condition (Template Output B-321). Further, water temperatures in the Sacramento River at Freeport under the Specific Plan initial surface water supply would be essentially equivalent to water temperatures under the existing condition in 483 of the 483 months modeled for the March through September period (Technical Appendix A-486 to A-492).

Overall, changes in water temperatures in the Sacramento River under the Specific Plan initial surface water supply would not be of sufficient frequency or magnitude to result in adverse effects to spring-run Chinook salmon adult immigration and holding. Therefore, impacts to spring-run Chinook salmon adult immigration and holding under the Specific Plan initial surface water supply would be ***less than significant***, relative to the existing condition.

Flow-Related Impacts to Spring-Run Chinook Salmon Spawning and Incubation (August through January). The long-term average flow in the Sacramento River below Keswick Dam under the Specific Plan initial surface water supply would be within 0.1% of the flow under the existing condition during all months of the August through January period (Template Output B-141). In 417 of the 420 months simulated during this period, Sacramento River flow below Keswick Dam would be essentially equivalent to flows under the existing condition (Technical Appendix A-349 to A-360).

The exceedance curves for the Sacramento River below Keswick Dam for the August through January period demonstrate that flows under the Specific Plan initial surface water supply would be similar to those under the existing condition at all flow ranges. Differences in flows in lower flow ranges would be more crucial for salmon survival. Reductions in flows in lower flow ranges could potentially reduce the amount of available spring-run Chinook salmon spawning habitat, which could result in increased redd superimposition during years when adult returns are high enough for spawning habitat to be limiting. However, the Specific Plan initial surface water supply would not result in any change in flows, relative to the existing condition (Template Output B-144 and B-146).

Long-term average flows in the Sacramento River at Freeport under the Specific Plan initial surface water supply would be essentially equivalent to flows under the existing condition of the August through January spring-run Chinook salmon spawning and incubation period (Template Output B-147). In October and November, long-term average flows would increase by five cfs and seven cfs, respectively, relative to the existing condition (Template Output B-147). Throughout the August through January period, monthly mean flows in the Sacramento River at Freeport under the Specific Plan initial surface water supply would be essentially equivalent to or greater than flows under the existing condition in 418 out of 420 months modeled (Technical Appendix A-385 to A-396).

Overall, changes in flow in the Sacramento River would not be of sufficient frequency or magnitude to result in adverse impacts to long-term initial year-class strength of Sacramento River spring-run Chinook salmon. Thus, potential impacts to spring-run Chinook salmon in the Sacramento River under the Specific Plan initial surface water supply would be ***less than significant***, relative to the existing condition.

Temperature-Related Impacts to Spring-Run Chinook Salmon Spawning and Incubation (August through January). Under the Specific Plan initial surface water supply, long-term average water temperatures would not differ from those modeled under the existing condition during the August through January period at Bend Bridge and Jelly's Ferry (Template Output B-307 and B-314). In fact, in 413 months out of the 414 months included in the analysis, the water temperatures at Bend Bridge and Jelly's Ferry would be essentially equivalent to or less than water temperatures under the existing condition (Technical Appendix A-469 to A-480 and A-457 to A-468). Further, there would not be any additional occurrences of water temperatures in the Sacramento River above 56°F under the Specific Plan initial surface water supply, relative to the existing condition, at either Bend Bridge or Jelly's Ferry (Technical Appendix A-469 to A-480 and A-457 to A-468).

For spring-run Chinook salmon, the long-term average annual early lifestage survival in the Sacramento River would be 87.5% under the existing condition and 87.4% under the Specific Plan initial surface water supply (Template Output B-469). There would not be substantial decreases in absolute annual early-lifestage survival of spring-run Chinook salmon in any individual year of the 69-year period of record. The mean long-term average relative percent change in early-lifestage survival would only decrease by 0.6%, relative to early-lifestage survival under the existing condition. The long-term average relative percent change in early lifestage survival is primarily due to one individual year of the 69-year period of record included in the simulation. For the year 1933, the estimated absolute survival under the existing condition is 1.8% and under the proposed Specific Plan initial surface water supply is 1.1%. Therefore, the absolute difference between the proposed Specific Plan initial surface water supply and the existing condition is only 0.7%. However, because early-lifestage survival would be low under the existing condition for this particular year, the relatively small absolute change in early lifestage survival translates into a large (i.e., 38.9%) relative change in early lifestage survival. Excluding this year, there would be no change in mean long-term average relative percent change for the remaining 68 years included in the simulation.

Based on these modeling results, potential water temperature changes in the Sacramento River resulting from the implementation of the Specific Plan initial surface water supply are not of sufficient frequency or magnitude to adversely affect spring-run Chinook salmon spawning and incubation. Therefore, changes in Sacramento River water temperatures during August through January under the Specific Plan initial surface water supply would result in a ***less than significant*** impact to spawning and incubation success of spring-run Chinook salmon, relative to the existing condition.

Flow-Related Impacts to Spring-Run Chinook Salmon Juvenile Rearing and Emigration (December through April). Under the Specific Plan initial surface water supply, the long-term average flow in the Sacramento River below Keswick Dam would be within 0.1% of flows modeled under the existing condition during the December through April period (Template Output B-141). In 345 out of 350 months simulated, the flow below Keswick Dam under the Specific Plan initial surface water supply would be essentially equivalent to flows under the existing condition (Technical Appendix A-351 to A-355). Flow exceedance curves during the December through April period for the Sacramento River below Keswick Dam indicate that flows below Keswick Dam under the Specific Plan initial surface water supply would be nearly identical to flows under the existing condition. Therefore, flows modeled under the Specific Plan initial surface water supply would not be likely to result in adverse effects to long-term juvenile spring-run Chinook salmon rearing and emigration (Template Output B-138 to B-139).

Long-term average flows in the Sacramento River at Freeport under the Specific Plan initial surface water supply would not differ from flows modeled under the existing condition throughout the December through April period (Template Output B-147). Monthly mean flows in the Sacramento River at Freeport under the Specific Plan initial surface water supply would be essentially equivalent to or greater than flows under the existing condition in 347 out of 350 months modeled for the December through April period (Technical Appendix A-387 to A-391).

Overall, flows in the Sacramento River below Keswick Dam and at Freeport would not differ substantially under the Specific Plan initial surface water supply, relative to the existing condition. Potential flow decreases, which could result in a reduction in juvenile spring-run Chinook salmon spawning habitat, would not be greater than 0.1 percent during the December through April period under the Specific Plan initial surface water supply. Slight increases in simulated flows under the Specific Plan initial surface water supply would not be of sufficient frequency or magnitude to result in adverse effects to juvenile spring-run Chinook salmon emigration. Therefore, potential flow-related impacts to spring-run Chinook salmon juvenile rearing and emigration under the Specific Plan initial surface water supply would be ***less than significant***, relative to the existing condition.

Temperature-Related Impacts to Spring-Run Chinook Salmon Juvenile Rearing and Emigration (December through April). Modeling associated with the Specific Plan initial surface water supply indicates that the long-term average water temperature at Bend Bridge would not change during any month of the December through August period, compared to the existing condition (Template Output B-307). Monthly mean water temperature in the Sacramento River at Bend Bridge would not increase more than 0.1°F, relative to the existing condition, in any month of the December through April period (Technical Appendix A-471 to A-475). Further, the Specific Plan initial surface water supply would not result in an increase in the frequency in which monthly mean water temperatures would exceed 65°F for each month of the December through April period (Technical Appendix A-471 to A-475).

Long-term average water temperatures under the Specific Plan initial surface water supply at Jelly's Ferry in the Sacramento River would not differ from those modeled under the existing condition throughout the December through April period (Template Output B-314). Monthly mean water temperatures at this location under the Specific Plan initial surface water supply would be essentially equivalent to those under the existing condition in all 345 months modeled for the December through April period (Technical Appendix A-459 to A-463). Further, the Specific Plan initial surface water supply would not result in an increase in the frequency in which monthly mean water temperatures would exceed 65°F at Jelly's Ferry in the Sacramento River, relative to the existing condition, for any month modeled throughout the juvenile rearing and emigration period (Technical Appendix A-459 to A-463).

Similarly, long-term average water temperatures under the Specific Plan initial surface water supply at Freeport in the Sacramento River would not differ from those under the existing condition throughout the December through April period (Template Output B-321). Monthly mean water temperatures at this location under the Specific Plan initial surface water supply would be essentially equivalent to those under the existing condition in 345 out of 345 months modeled for the December through April period (Technical Appendix A-483 to A-487). Further, the Specific Plan initial surface water supply would not result in an increase in the frequency in which monthly mean water temperatures would exceed 65°F at Freeport in the Sacramento River, relative to the existing condition, for any month modeled throughout the juvenile rearing and emigration period (Technical Appendix A-483 to A-487).

Overall, the Specific Plan initial surface water supply would result in negligible changes in Sacramento River water temperatures at Bend Bridge, Jelly's Ferry, and Freeport throughout the December through April spring-run Chinook salmon juvenile rearing and emigration period. Changes in water temperatures under the Specific Plan initial surface water supply would not be of sufficient frequency or magnitude to adversely affect spring-run Chinook salmon juvenile rearing or emigration. In addition, there would be no increase in the frequency in which water temperatures at Bend Bridge, Jelly's Ferry, or Freeport would exceed the upper end of the suitable range of water temperatures for juvenile Chinook salmon rearing. Therefore, potential impacts to spring-run Chinook salmon juvenile rearing and emigration under the Specific Plan initial surface water supply would be ***less than significant***, relative to the existing condition.

Mitigation Measure

No mitigation measures are required.

Regional University Specific Plan

Impact:The Specific Plan could cause impacts to spring-run Chinook salmon in the Sacramento River.

The PVSP EIR evaluated the impact on spring-run Chinook salmon in relation to flow-related and temperature-related change during both adult immigration and spawning and incubation. It was determined that the PVSP would not significantly alter either the temperature or the flow of the Sacramento River enough to affect either the adult immigration or the spawning and initial rearing of the spring-run Chinook salmon. Impacts resulting from the PVSP on spring-run Chinook salmon were determined to be less than significant. The RUSP is of a smaller scale than the PVSP, approximately one-fifth the size in terms of water demand; therefore, the impact of the RUSP on spring-run Chinook salmon would also be ***less than significant.***

4.4-44 The Specific Plan could cause impacts to fall-run Chinook salmon and steelhead in the Sacramento River.

Flow-Related Impacts to Fall-Run Chinook Salmon/Steelhead Adult Immigration (September through November). The long-term average flow in the Sacramento River below Keswick Dam would increase by a maximum of 0.1% (i.e., 7 cfs) under the Specific Plan initial surface water supply, compared to the existing condition, during all months of the adult immigration period (September through November). Under the Specific Plan initial surface water supply, Sacramento River flows below Keswick Dam would be essentially equivalent to those under the existing condition in 209 out of 210 months simulated in this period (Technical Appendix A-349 to A-360).

Long-term average flow under the Specific Plan initial surface water supply in the Sacramento River at Freeport would not differ from flows modeled under the existing condition throughout the September through November period (Template Output B-147). Monthly mean flows under the Specific Plan initial surface water supply would be essentially equivalent to or greater than flows under the existing condition in 209 out of 210 months modeled for the September through November period (Technical Appendix A-385 to A-396).

Overall, potential changes in flows in the Sacramento River under the Specific Plan initial surface water supply would not be of sufficient frequency or magnitude to result in adverse effects to fall-run Chinook salmon and steelhead adult immigration. Therefore, potential impacts to fall-run Chinook salmon and steelhead adult immigration under the Specific Plan initial surface water supply would be ***less than significant***, relative to the existing condition.

Temperature-Related Impacts to Fall-Run Chinook Salmon/Steelhead Adult Immigration (September through November). The long-term average water temperatures modeled for the Specific Plan initial surface water supply would not differ from those under the existing condition at Bend Bridge in the Sacramento River during all months of the September through November adult immigration period (Template Output B-307). Similarly, at Jelly's Ferry, long-term average water temperatures in the Sacramento River would not differ between the Specific Plan initial surface water supply and existing condition during all months of the September through November period (Template Output B-314). Moreover, under the Specific Plan initial surface water supply, water temperatures in the Sacramento River at Bend Bridge would remain essentially equivalent to those under the existing condition in 206 out of 207 months included in the analysis (Technical Appendix A-469 to A-480). Monthly mean water temperatures at Jelly's Ferry under the Specific Plan initial surface water supply would remain essentially equivalent to the existing condition in 206 of the 207 months included in the analysis (Technical Appendix A-457 to A-468).

Long-term average water temperatures under the Specific Plan initial surface water supply at Freeport in the Sacramento River would not differ from those modeled under the existing condition throughout the September through November period (Template Output B-321). Monthly mean water temperatures at this location under the Specific Plan initial surface water supply would be essentially equivalent to those under the existing condition in 207 out of 207 months modeled for the September through November period (Technical Appendix A-481 to A-492). The Specific Plan initial surface water supply would not result in an increase in the frequency in which monthly mean water temperatures would exceed 65°F at Freeport in the Sacramento River, relative to the existing condition, for any month modeled throughout the fall-run Chinook salmon and steelhead adult immigration period (Technical Appendix A-481 to A-492).

Overall, changes in Sacramento River water temperatures throughout the September through November period under the Specific Plan initial surface water supply would not be of sufficient frequency or magnitude to result in adverse effects to fall-run Chinook salmon and steelhead adult immigration. Therefore, potential temperature-related impacts to fall-run Chinook salmon and steelhead adult immigration under the Specific Plan initial surface water supply would be ***less than significant***, relative to the existing condition.

Flow-Related Impacts to Fall-Run Chinook Salmon Spawning and Incubation (October through February). The long-term average flow in the Sacramento River below Keswick Dam under the Specific Plan initial surface water supply would differ by less than 0.1% from flows under the existing condition during all months of the October through February period (Template Output B-141). Monthly mean flows under the Specific Plan initial surface water supply would be essentially equivalent to flows under the existing condition in 346 of the 350 months simulated for the October through February period (Technical Appendix A-349 to A-353).

The exceedance curves demonstrate that flows under the Specific Plan initial surface water supply would be essentially identical to those under the existing condition (Template Output B-138 and B-139). Therefore, reductions in flow that could potentially reduce the amount of available Chinook salmon spawning habitat, which could result in increased redd superimposition during years when adult returns are high enough for spawning habitat to be limiting, would not be likely to occur under the Specific Plan initial surface water supply, relative to the existing condition.

The Specific Plan initial surface water supply would result in negligible changes in lower Sacramento River flows at Freeport during the October through February period. The greatest decrease in long-term average flow under the Specific Plan initial surface water supply in the Sacramento River at Freeport would be eight cfs, relative to flows under the existing condition from October through February (Template Output B-147). Monthly mean flows under the Specific Plan initial surface water supply would be essentially

equivalent to or greater than flows under the existing condition in 346 out of 350 months modeled for the October through February period (Technical Appendix A-385 to A-389).

Overall, changes in Sacramento River flows below Keswick Dam and at Freeport under the Specific Plan initial surface water supply would not be of sufficient frequency or magnitude to result in adverse flow-related effects to fall-run Chinook salmon spawning and incubation. Therefore, potential flow-related impacts to fall-run Chinook salmon spawning under the Specific Plan initial surface water supply would be ***less than significant***, relative to the existing condition.

Temperature-Related Impacts to Fall-Run Chinook Salmon Spawning and Incubation (October through February). Under the Specific Plan initial surface water supply, the long-term average water temperatures would not differ from those modeled under the existing condition during the October through February period at Bend Bridge and Jelly's Ferry (Template Output B-307 and B-314). In fact, in 345 out of the 345 months included in the analysis, the water temperatures at these locations under the Specific Plan initial surface water supply would be essentially equivalent to those under the existing condition (Technical Appendix A-457 to A-461 and A-469 to A-473). At Freeport in the lower Sacramento River, long-term average water temperatures under the Specific Plan initial surface water supply would not differ from those water temperatures under the existing condition (Template Output B-321). Monthly mean water temperatures under the Specific Plan initial surface water supply at this location would be essentially equivalent to those under the existing condition in 345 months out of the 345 months modeled for the October through February period (Technical Appendix A-481 to A-485).

Under the Specific Plan initial surface water supply, there would not be any additional occurrences of water temperatures in the Sacramento River at Bend Bridge or Jelly's Ferry above 56°F, relative to the existing condition, in any month of the October through February period (Technical Appendix A-457 to A-461 and A-469 to A-473*)*. Further, water temperatures at Bend Bridge and Jelly's Ferry during December, January, and February would be below 56°F in all 69 years modeled under both the Specific Plan initial surface water supply and existing condition (Technical Appendix A-457 to A-461 and A-469 to A-473). Similarly, at Freeport in the lower Sacramento River, monthly mean water temperatures under the Specific Plan initial surface water supply would not exceed 56°F more frequently than under the existing condition (Technical Appendix A-481 to A-485).

The long-term average annual early lifestage survival for fall-run Chinook salmon in the Sacramento River would be 89.6% under the existing condition and 89.6% under the Specific Plan initial surface water supply (Template Output B-469). The annual survival estimates for each year of the 69 years modeled indicates substantial increases or decreases in survival would not occur in any individual year of the 69-year simulation. Reductions in annual early lifestage survival of 0.1% to 0.9%, relative to the existing condition, would occur in 12 years of the 69-year simulation. In 9 of these years, relative reductions in survival would be 0.1%, relative to the existing condition (Technical Appendix A-566).

Based on these modeling results, small temperature changes in the Sacramento River resulting from the implementation of the Specific Plan initial surface water supply during the October through February period would not be of sufficient frequency or magnitude to result in adverse effects to fall-run Chinook salmon spawning, incubation, and annual early lifestage survival. Therefore, potential water temperature changes in the Sacramento River resulting from the implementation of the Specific Plan initial surface water supply would result in ***less than significant*** impacts to fall-run Chinook salmon spawning and incubation, relative to the existing condition.

Flow- and Temperature-related Impacts to Steelhead Adult Immigration, Spawning, and Incubation (December through March). Monthly mean flows below Keswick Dam and at Freeport in the Sacramento River under the Specific Plan initial surface water supply

would be essentially equivalent to flows under the existing condition for 276 and 277 months, respectively out of 280 months included in the analysis (Technical Appendix A-351 to A-354 and A-387 to A-390). Additionally, monthly mean water temperatures under the Specific Plan initial surface water supply at Bend Bridge and Jelly's Ferry would be essentially equivalent to flows under the existing condition for 276 of the 276 months included in the analysis (Technical Appendix A-471 to A-474 and A-459 to A-462). Similarly, monthly mean water temperatures at Freeport under the Specific Plan initial surface water supply would be essentially equivalent to flows under the existing condition in 276 of the 276 months included in the analysis (Technical Appendix A-483 to A-486).

Under the Specific Plan initial surface water supply, the frequency in which water temperatures at Bend Bridge or Jelly's Ferry in the Sacramento River would exceed 56°F would not increase, relative to the existing condition, throughout the December through March period (Technical Appendix A-471 to A-474 and A-459 to A-462). Similarly, at Freeport, the Specific Plan initial surface water supply would not result in additional exceedances of 56°F in any month modeled for the December through March period (Technical Appendix A-483 to A-486).

Steelhead survival cannot be estimated under the Specific Plan initial surface water supply or existing condition, because a steelhead mortality model has not been developed for the Sacramento River. For late fall-run Chinook salmon in the Sacramento River, the long-term average annual early lifestage survival would be 99.1% under both the existing condition and Specific Plan initial surface water supply (Template Output B-469). The annual survival estimates for late fall-run Chinook salmon in the Sacramento River for the 69 years modeled indicates substantial increases or decreases in survival would not occur in any individual year of the 69-year simulation, relative to the existing condition. In 67 out of the 69 years modeled, there would be no difference in annual early lifestage survival of late-fall-run Chinook salmon between the Specific Plan initial surface water supply and the existing condition. In 1 of the 69 years modeled, a relative decrease would occur in the Specific Plan initial surface water supply, relative to the existing condition, but would not be greater than 0.1% in any of the 69 years modeled. In 1 of the 69 years modeled, a relative increase would occur in the Specific Plan initial surface water supply, relative to the existing condition, but would not be greater than 0.1 percent in any of the 69 years modeled (Technical Appendix A-567). Thus, changes in late fall-run Chinook salmon survival under the Specific Plan initial surface water supply would be negligible, relative to the existing condition. Consequently, it is not anticipated that detectable decreases in average early lifestage steelhead survival would occur under the Specific Plan initial surface water supply.

Overall, there would be no detectable change to monthly mean flows or water temperatures in the upper or lower Sacramento River under the Specific Plan initial surface water supply, relative to the existing condition. Consequently, flow- and temperature-related changes under the Specific Plan initial surface water supply during the steelhead adult immigration, spawning, and incubation period represent a ***less than significant*** impact, relative to the existing condition.

Flow-Related Impacts to Fall-Run Chinook Salmon and Steelhead Juvenile Rearing and Emigration (February through June). Under the Specific Plan initial surface water supply, the long-term average flow below Keswick Dam would be within 0.1% of flows modeled under the existing condition during the February through June period (Template Output B-141). In 347 out of 350 months simulated, the monthly mean flow below Keswick Dam under the Specific Plan initial surface water supply would be essentially equivalent to flows under the existing condition (Technical Appendix A-353 to A-357). Flow exceedance curves for the Sacramento River below Keswick Dam during the February through June period indicate that flows in the Sacramento River below Keswick Dam under the Specific Plan initial surface water supply would be nearly identical to flows under the existing condition (Template Output B-139 and B-140).

Long-term average flow under the Specific Plan initial surface water supply in the Sacramento River at Freeport would not differ substantially from flows under the existing condition during the February through June period (Template Output B-139 to B-140). Monthly mean flows under the Specific Plan initial surface water supply would be essentially equivalent to or less than flows under the existing condition in 348 out of 350 months modeled for the February through June period (Technical Appendix A-389 to A-393). Exceedance curves for the Sacramento River flows at Freeport indicate that flows under the Specific Plan initial surface water supply would be nearly identical to those under the existing condition, throughout the February through June period (Template Output B-145 to B-146).

Overall, the slight decreases in flow that would occur under the Specific Plan initial surface water supply would not occur with sufficient frequency or magnitude to result in adverse effects to long-term juvenile fall-run Chinook salmon or steelhead rearing success, and are not likely to result in adverse effects to juvenile emigration, relative to the existing condition. Therefore, the Specific Plan initial surface water supply would result in ***less than significant*** impacts to juvenile rearing and emigration of fall-run Chinook salmon and steelhead in the Sacramento River.

Temperature-Related Impacts to Fall-Run Chinook Salmon and Steelhead Juvenile Rearing and Emigration (February through June). Modeling associated with the Specific Plan initial surface water supply indicates that simulated long-term average water temperature at Bend Bridge would not change during any month of the February through June period, compared to the existing condition (Template Output B-307). Monthly mean water temperatures in the Sacramento River at Bend Bridge under the Specific Plan initial surface water supply would not increase in any of the 345 months simulated for the February through June period (Technical Appendix A-473 to A-477). Further, there would not be any additional occurrences under the Specific Plan initial surface water supply in which water temperatures would be above 65°F at Bend Bridge, relative to the existing condition (Technical Appendix A-473 to A-477).

Long-term average water temperatures under the Specific Plan initial surface water supply at Jelly's Ferry in the Sacramento River would not differ from those under the existing condition throughout the February through June period (Template Output B-314). Monthly mean water temperatures at this location under the Specific Plan initial surface water supply would be essentially equivalent to those under the existing condition in 345 out of 345 months modeled for the February through June period (Technical Appendix A-461 to A-465). The Specific Plan initial surface water supply would not result in an increase in the frequency in which monthly mean water temperatures would exceed 65°F at Jelly's Ferry in the Sacramento River, relative to the existing condition, for any month modeled throughout the juvenile rearing and emigration period (Technical Appendix A-461 to A-465).

Long-term average water temperatures under the Specific Plan initial surface water supply at Freeport in the Sacramento River would be nearly identical to those under the existing condition throughout the February through June period (Template Output B-321). Monthly mean water temperatures at this location under the Specific Plan initial surface water supply would be essentially equivalent to those under the existing condition in 345 out of 345 months modeled for the February through June period (Technical Appendix A-485 to A-489). Further, the Specific Plan initial surface water supply would result in no additional months in which monthly mean water temperatures would exceed 65°F at Freeport in the Sacramento River, relative to the existing condition, for all months simulated throughout the juvenile rearing and emigration period (Technical Appendix A-485 to A-489).

Overall, changes in Sacramento River water temperatures at Bend Bridge, Jelly's Ferry, and Freeport under the Specific Plan initial surface water supply throughout the February through June period would be negligible, relative to the existing condition. Therefore, potential changes to water temperatures under the Specific Plan initial surface water supply would not be of sufficient frequency or magnitude to adversely affect rearing and emigration

and would result in ***less than significant*** impacts to fall-run Chinook salmon and steelhead juvenile rearing and emigration, relative to the existing condition.

Flow-Related Impacts to Steelhead Juvenile Over-Summer Rearing (July through September). Under the Specific Plan initial surface water supply, the long-term average flow in the Sacramento River below Keswick Dam would not decrease by more than three cfs for any month of the July through September period, relative to the existing condition (Template Output B-141). Monthly mean flows under the Specific Plan initial surface water supply would be essentially equivalent to or greater than flows under the existing condition in 209 out of 210 months simulated (Technical Appendix A-358 to A-360).

Long-term average flow under the Specific Plan initial surface water supply in the Sacramento River at Freeport would decrease by four cfs during July and increase by one to two cfs during the August and September period, relative to the existing condition (Template Output B-147). Monthly mean flows at Freeport under the Specific Plan initial surface water supply would be essentially equivalent to or greater than flows under the existing condition in 210 out of 210 months modeled for the March through September period (Technical Appendix A-394 to A-396). Any changes in flows at Freeport would not be of sufficient magnitude to result in adverse effects to juvenile steelhead over-summer rearing.

Overall, changes in flows under the Specific Plan initial surface water supply at Keswick or Freeport would not be of sufficient frequency or magnitude to result in adverse effects to long-term juvenile rearing success of over-summering steelhead. Therefore, flow-related impacts to juvenile rearing under the Specific Plan initial surface water supply would be ***less than significant***, relative to the existing condition.

Temperature-Related Impacts to Steelhead Over-Summer Rearing (July Through September). The long-term average water temperature under the Specific Plan initial surface water supply at Bend Bridge, Jelly's Ferry, and Freeport would be within 0.1°F of long-term average water temperatures under the existing condition during July, August, and September (Template Output B-307, B-314, and B-321, respectively). Water temperatures at Bend Bridge would be essentially equivalent to those under the existing condition in 206 out of the 207 months simulated in this three-month period (Technical Appendix A-478 to A-480). At Jelly's Ferry, Sacramento River water temperatures under the Specific Plan initial surface water supply would be essentially equivalent to those under the existing condition in 206 of the 207 months simulated for the July through September period (Technical Appendix A-466 to A-468). Monthly mean water temperatures at Freeport under the Specific Plan initial surface water supply would be essentially equivalent to those under the existing condition in 207 of 207 months simulated for the juvenile steelhead over-summer rearing period (Technical Appendix A-490 to A-492). The Specific Plan initial surface water supply would not result in additional occurrences of water temperatures exceeding 65°F during any month modeled for the July through September period at Bend Bridge, Jelly's Ferry, or Freeport in the Sacramento River, relative to the existing condition (Technical Appendix A-478 to A-480, A-466 to A-468, and A-490 to A-492).

Overall, potential changes in water temperature that may occur under the Specific Plan initial surface water supply would be negligible, relative to the existing condition. Therefore, potential changes in water temperatures would not be of sufficient frequency or magnitude to result in adverse effects to juvenile steelhead over-summer rearing. Consequently, potential impacts to juvenile steelhead over summer rearing under the Specific Plan initial surface water supply would be ***less than significant***, relative to the existing condition.

<u>Mitigation Measure</u>

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could cause impacts to fall-run Chinook salmon and steelhead in the Sacramento River.

The PVSP EIR evaluated the impacts on the flow and temperature of the Sacramento River and how that would affect the various lifestages of the fall-run Chinook salmon and steelhead. The various lifestages evaluated above include adult immigration, spawning, incubation, juvenile rearing and emigration, and juvenile over-summer rearing. It was determined that the PVSP would not significantly alter either the temperature or the flow of the Sacramento River enough to affect any of the above mentioned lifestages. Therefore, impacts resulting from the PVSP on fall-run Chinook salmon and steelhead were determined to be less than significant. The RUSP would require approximately one-fifth of the water supply that the PVSP would require; therefore, the impact of the RUSP on fall-run Chinook salmon and steelhead would also be ***less than significant.***

4.4-45 The Specific Plan could cause impacts to late fall-run Chinook salmon in the Sacramento River.

Flow-Related Impacts to Late Fall-Run Chinook Salmon Adult Immigration and Holding (October through April). The long-term average flow in the Sacramento River below Keswick Dam under the Specific Plan initial surface water supply would not differ by more than 0.1% from flows modeled under the existing condition, during all months of the adult immigration period (October through April) (Template Output B-141). In 484 of the 490 months simulated in this period, the flow in the Sacramento River below Keswick Dam would be essentially equivalent to flows under the existing condition (Technical Appendix A-349 to A-355).

Long-term average flow in the Sacramento River at Freeport under the Specific Plan initial surface water supply would not substantially differ from flows under the existing condition during October through April (Template Output B-147). Monthly mean flow in the Sacramento River at Freeport under the Specific Plan initial surface water supply would be essentially equivalent to or greater than flows under the existing condition in 486 out of 490 months modeled for the October through April period (Technical Appendix A-385 to A-391).

The difference in Sacramento River flow below Keswick Dam and at Freeport that would occur under the Specific Plan initial surface water supply would not be of sufficient frequency or magnitude to result in adverse effects to attraction of adult late fall-run Chinook salmon immigrating into the Sacramento River. Therefore, potential changes in flows under the Specific Plan initial surface water supply would result in a ***less than significant*** impact to immigration of late fall-run Chinook salmon immigration and holding.

Temperature-Related Impacts to Late Fall-Run Chinook Salmon Adult Immigration and Holding (October through April). The long-term average water temperatures in the Sacramento River modeled for the Specific Plan initial surface water supply would not differ from those under the existing condition at the Bend Bridge and Jelly's Ferry during all months of the October through April adult immigration period (Template Output B-307 and B-314). Moreover, under the Specific Plan initial surface water supply, water temperatures in the Sacramento River at Bend Bridge would remain essentially equivalent to those under the existing condition in all 483 months included in the analysis (Technical Appendix A-469 to A-475). Water temperatures at Jelly's Ferry under the Specific Plan initial surface water supply would remain essentially equivalent to those simulated under the existing condition in all 483 months included in the analysis (Technical Appendix A-457 to A-463).

October through April water temperatures in the Sacramento River at Freeport under the Specific Plan initial surface water supply would not differ from those water temperatures modeled under the existing condition (Template Output B-321). Further, water temperatures in the Sacramento River at Freeport under the Specific Plan initial surface water supply would be essentially equivalent to water temperatures under the existing condition in all of the 483 months modeled for the October through April period (Technical Appendix A-486 to A-492).

Overall, changes in water temperatures in the Sacramento River under the Specific Plan initial surface water supply would not be of sufficient frequency or magnitude to result in adverse effects to late-fall-run Chinook salmon adult immigration and holding. Therefore, impacts to late fall-run Chinook salmon adult immigration and holding under the Specific Plan initial surface water supply would be ***less than significant***, relative to the existing condition.

Flow-Related Impacts to Late Fall-Run Chinook Salmon Spawning and Incubation (December through April). The long-term average flow in the Sacramento River below Keswick Dam under the Specific Plan initial surface water supply would be not differ by more than 0.1% from the flows under the existing condition during all months of the December through April period (Template Output B-141). In 345 out of 360 months simulated during this period, Sacramento River flow below Keswick Dam would be essentially equivalent to flows under the existing condition (Technical Appendix A-351 to A-355).

Exceedance curves for the Sacramento River below Keswick Dam for the December through April period demonstrate that flows under the Specific Plan initial surface water supply would be similar to those under the existing condition at all flow ranges (Template Output B-138 to B-139). Differences in flows in lower flow ranges would be more crucial for salmon survival. Reductions in flows in lower flow ranges could potentially reduce the amount of available late-fall-run Chinook salmon spawning habitat, which could result in increased redd superimposition during years when adult returns are high enough for spawning habitat to be limiting. However, the Specific Plan initial surface water supply would not likely result in reductions in flows during the December through April spawning period, relative to the existing condition.

Long-term average flows in the Sacramento River at Freeport under the Specific Plan initial surface water supply would not substantially differ to flows under the existing condition from December through April. (Template Output B-147). Throughout the December through April period, monthly mean flows in the Sacramento River at Freeport under the Specific Plan initial surface water supply would be essentially equivalent to or greater than flows under the existing condition in 347 out of 350 months modeled (Technical Appendix A-387 to A-391).

Overall, changes in flow in the Sacramento River would not be of sufficient frequency or magnitude to result in adverse impacts to long-term initial year-class strength of Sacramento River late-fall-run Chinook salmon. Thus, potential impacts to late fall-run Chinook salmon in the Sacramento River under the Specific Plan initial surface water supply would be ***less than significant***, relative to the existing condition.

Temperature-Related Impacts to Late Fall-Run Chinook Salmon Spawning and Incubation (December through April). Under the Specific Plan initial surface water supply, long-term average water temperatures would not differ from those under the existing condition during the December through April period at Bend Bridge and Jelly's Ferry (Template Output B-307 and B-314). In fact, in 345 of the 345 months included in the analysis, the water temperatures at Bend Bridge and Jelly's Ferry, respectively, would be essentially equivalent to water temperatures under the existing condition (Technical Appendix A-471 to A-475 and A-459 to A-463). Further, there would not be any additional

occurrences of water temperatures in the Sacramento River above 56°F under the Specific Plan initial surface water supply, relative to the existing condition, at either Bend Bridge or Jelly's Ferry (Technical Appendix A-471 to A-475 and A-459 to A-463).

The long-term average annual early lifestage survival for late fall-run Chinook salmon in the Sacramento River would be 99.1% under both the existing condition and Specific Plan initial surface water supply (Template Output B-469). The annual survival estimates for late fall-run Chinook salmon in the Sacramento River for the 69 years modeled indicates that substantial increases or decreases in survival would not occur in any individual year of the 69-year simulation, relative to the existing condition (Technical Appendix A-567). In 67 out of the 69 years modeled, there would be no difference in annual early lifestage survival of late fall-run Chinook salmon between the Specific Plan initial surface water supply and the existing condition. In 1 of the 69 years modeled, a relative decrease would occur in the Specific Plan initial surface water supply, relative to the existing condition, but would not be greater than 0.1% in any of the 69 years modeled (Technical Appendix A-567). Thus, decreases in late fall run Chinook salmon survival under the Specific Plan initial surface water supply would be negligible, relative to the existing condition.

Based on these modeling results, potential water temperature changes in the Sacramento River resulting from the implementation of the Specific Plan initial surface water supply are not of sufficient frequency or magnitude to adversely affect late fall-run Chinook salmon spawning and incubation. Therefore, changes in Sacramento River water temperatures during December through April under the Specific Plan initial surface water supply would result in a ***less than significant*** impact to spawning and incubation success of late fall-run Chinook salmon, relative to the existing condition.

Flow-Related Impacts to Late Fall-Run Chinook Salmon Juvenile Rearing and Emigration (April through October). Under the Specific Plan initial surface water supply, the long-term average flow in the Sacramento River below Keswick Dam would not differ by greater than 0.1% from flows modeled under the existing condition during the April through October period (Template Output B-141). In 487 out of 490 months simulated, the flow below Keswick Dam under the Specific Plan initial surface water supply would be essentially equivalent to flows under the existing condition (Technical Appendix A-349 to A-360). Flow exceedance curves during the April through October period for the Sacramento River below Keswick Dam indicate that flows below Keswick Dam under the Specific Plan initial surface water supply would be nearly identical to flows under the existing condition (Template Output B-138 to B-140). Therefore, flows modeled under the Specific Plan initial surface water supply would not be likely to result in adverse effects to long-term juvenile late fall-run Chinook salmon rearing and emigration.

Long-term average flows in the Sacramento River at Freeport under the Specific Plan initial surface water supply would be essentially equivalent, relative to the existing condition. The greatest increase in flows under the Specific Plan initial surface water supply would be five cfs, relative to the existing condition during the April through October period (Template Output B-147). Monthly mean flows in the Sacramento River at Freeport under the Specific Plan initial surface water supply would be essentially equivalent to flows under the existing condition in 489 out of the 490 months modeled for the April through October period (Technical Appendix A-385 to A-396).

Overall, flows in the Sacramento River below Keswick Dam and at Freeport would not differ substantially under the Specific Plan initial surface water supply, relative to the existing condition. Potential flow decreases, which could result in a reduction in juvenile late-fall-run Chinook salmon spawning habitat, would not be greater than 0.1 percent during the April through October period under the Specific Plan initial surface water supply. Increases in simulated flows under the Specific Plan initial surface water supply would not be of sufficient frequency or magnitude to result in adverse effects to juvenile late fall-run

Chinook salmon emigration. Therefore, potential flow-related impacts to late fall-run Chinook salmon juvenile rearing and emigration under the Specific Plan initial surface water supply would be ***less than significant***, relative to the existing condition.

Temperature-Related Impacts to Late Fall-Run Chinook Salmon Juvenile Rearing and Emigration (April through October). Modeling associated with the Specific Plan initial surface water supply indicates that the long-term average water temperature at Bend Bridge would not change by greater than 0.1°F during any month of the April through October period, compared to the existing condition (Template Output B-307). Monthly mean water temperature in the Sacramento River at Bend Bridge would be essentially equivalent to those under to the existing condition in 482 of the 483 months of the April through October period (Technical Appendix A-469 to A-480). Further, the Specific Plan initial surface water supply would not result in an increase in the frequency in which monthly mean water temperatures would exceed 65°F for each month of the April through October period (Technical Appendix A-469 to A-480).

Long-term average water temperatures under the Specific Plan initial surface water supply at Jelly's Ferry in the Sacramento River would not change during any month, relative to the existing condition throughout the April through October period (Template Output B-314). Monthly mean water temperatures at this location under the Specific Plan initial surface water supply would be essentially equivalent to those under the existing condition in 482 out of 483 months modeled for the April through October period (Technical Appendix A-457 to A-468). Further, the Specific Plan initial surface water supply would not result in an increase in the frequency in which monthly mean water temperatures would exceed 65°F at Jelly's Ferry in the Sacramento River, relative to the existing condition, for any month modeled throughout the juvenile rearing and emigration period (Technical Appendix A-457 to A-468).

Similarly, long-term average water temperatures under the Specific Plan initial surface water supply at Freeport in the Sacramento River would not change during any month, relative to the existing condition throughout the April through October period (Template Output B-321). Monthly mean water temperatures at this location under the Specific Plan initial surface water supply would be essentially equivalent to those under the existing condition in all 483 months modeled for the April through October period (Technical Appendix A-481 to A-492). Further, the Specific Plan initial surface water supply would not result in any additional occurrence in which monthly mean water temperatures would exceed 65°F at Freeport in the Sacramento River, relative to the existing condition (Technical Appendix A-481 to A-492).

Overall, the Specific Plan initial surface water supply would result in negligible changes in Sacramento River water temperatures at Bend Bridge, Jelly's Ferry, and Freeport throughout the April through October late fall-run Chinook salmon juvenile rearing and emigration period. Changes in water temperatures under the Specific Plan initial surface water supply would not be of sufficient frequency or magnitude to adversely affect late fall-run Chinook salmon juvenile rearing or emigration. Therefore, potential impacts to late fall-run Chinook salmon juvenile rearing and emigration under the Specific Plan initial surface water supply would be ***less than significant***, relative to the existing condition.

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could cause impacts to late fall-run Chinook salmon in the Sacramento River.

The PVSP EIR evaluated the impacts on the flow and temperature of the Sacramento River and how that would affect the various lifestages of the fall-run Chinook salmon. The various lifestages evaluated above include adult immigration and holding, spawning, incubation, and juvenile rearing and emigration. It was determined that the PVSP would not significantly alter either the temperature or the flow of the Sacramento River enough to affect any of the above mentioned lifestages. Impacts resulting from the PVSP on late fall-run Chinook salmon were determined to be less than significant. The RUSP is approximately one-fifth the size of the PVSP in terms of water demand; therefore, the impact of the RUSP on late fall-run Chinook salmon would also be ***less than significant.***

4.4-46 The Specific Plan could cause impacts to splittail in the Sacramento River.

Under the Specific Plan initial surface water supply, the long-term average flow at Freeport during the period of February through May would be essentially equivalent to flows under the existing condition (Template Output B-147). In 278 of the 280 months simulated for this period, flows would be essentially equivalent to flows under the existing condition (Technical Appendix A-389 to A-392). Therefore, flow reductions that could potential reduce the availability of inundated habitat for splittail spawning would be unlikely to occur under the Specific Plan initial surface water supply.

During the February through May period, water temperatures at Freeport would not rise above 68°F, the upper end of the reported preferred range for splittail spawning, more frequently as a result of the Specific Plan initial surface water supply, relative to the existing condition (Technical Appendix A-485 to A-488). Overall, potential flow and water temperature changes resulting from the implementation of the Specific Plan initial surface water supply would not be of sufficient frequency or magnitude to result in adverse effects to splittail spawning. Therefore, impacts to splittail in the Sacramento River under the Specific Plan initial surface water supply would be ***less than significant***, relative to the existing condition.

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could cause impacts to splittail in the Sacramento River.

The PVSP EIR evaluated the PVSP's impacts on splittail in the Sacramento River, specifically how the species would be affected by changes in the long-term average flow and temperature of the river at Freeport. It was determined that the PVSP would not significantly alter either the temperature or the flow of the Sacramento River at Freeport enough to significantly affect the splittail population. Impacts resulting from the PVSP on splittail were determined to be less than significant. The RUSP is smaller scale than the PVSP, approximately one-fifth the size in terms of water supply required; therefore, the impact of the RUSP on splittail would be reduced compared to that of the PVSP and would also be ***less than significant.***

4.4-47 The Specific Plan could cause impacts to American shad in the Sacramento River.

The long-term average flow in the Sacramento River at Freeport would not differ substantially from long-term average flows under the existing condition in May and June (Template Output B-147). Similarly, monthly mean flows under the Specific Plan initial surface water supply during May and June would be essentially equivalent to those under the existing condition in all 140 months simulated for this period (Technical Appendix A-392 to A-393). While flow reductions could potentially reduce the number of adult shad attracted

into the river, the Specific Plan initial surface water supply would not result in detectable reductions in flows during May or June, relative to the existing condition.

The number of years that monthly mean water temperatures at Freeport in May and June would be within the reported preferred range for American shad spawning of 60°F to 70°F would not differ under the Specific Plan initial surface water supply, relative to the existing condition (Technical Appendix A-488 to A-489). Therefore, the frequency with which suitable temperatures for American shad spawning would occur would not change under the Specific Plan initial surface water supply, relative to the existing condition.

Overall, changes in flows and water temperatures at Freeport in the lower Sacramento River would not be of sufficient frequency or magnitude to result in adverse effects to American shad spawning. Therefore, impacts to American shad in the Sacramento River would be ***less than significant***, relative to the existing condition.

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could cause impacts to American shad in the Sacramento River.

The PVSP EIR evaluated the project's impacts on American shad in the Sacramento River, specifically how the species would be affected by changes in the long-term average flow and temperature of the river at Freeport. It was determined that the PVSP would not significantly alter either the temperature or the flow of the Sacramento River at Freeport enough to significantly affect the American shad population. Impacts resulting from the PVSP to American shad were determined to be less than significant. The RUSP is of a smaller scale than the PVSP, approximately one-fifth the size in terms of water demand; therefore, the impact of the RUSP on American shad would be reduced compared to that of the PVSP and would also be ***less than significant.***

4.4-48 The Specific Plan could cause impacts to striped bass in the Sacramento River.

The long-term average flow in the Sacramento River at Freeport would not differ substantially from long-term average flows under the existing condition in the March through June period (Template Output B-147). Similarly, monthly mean flows under the Specific Plan initial surface water supply during May through June would be essentially equivalent to those under the existing condition in all 140 months simulated for this period (Technical Appendix A-392 to A-393).

The frequency that monthly mean water temperatures would be within the reported preferred range for striped bass spawning and initial rearing of 59°F to 68°F would not differ under the Specific Plan initial surface water supply, relative to the existing condition, throughout the May through June period (Technical Appendix A-486 to A-489). Therefore, water temperatures in Sacramento River under the Specific Plan initial surface water supply would not adversely affect striped bass spawning and initial rearing, relative to the existing condition.

Overall, changes in flows and water temperatures at Freeport in the Sacramento River would not be of sufficient frequency or magnitude to result in adverse effects to striped bass spawning and initial rearing. Therefore, impacts to striped bass in the Sacramento River would be ***less than significant***, relative to the existing condition.

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could cause impacts to striped bass in the Sacramento River.

The PVSP EIR evaluated the impacts on striped bass in the Sacramento River, specifically how the species would be affected by changes in the long-term average flow and temperature of the river at Freeport. It was determined that the PVSP would not significantly alter either the temperature or the flow of the Sacramento River at Freeport enough to significantly affect the striped bass population, so impacts resulting from the PVSP on striped bass were determined to be less than significant. The RUSP is of a smaller scale than the PVSP, approximately one-fifth the size in terms of water demand; therefore, the impact of the RUSP on striped bass would be reduced compared to that of the PVSP and would also be ***less than significant.***

4.4-49 The Specific Plan could cause impacts to Oroville Reservoir's warmwater fisheries.

Hydrologic conditions under the Specific Plan initial surface water supply would result in a minimal difference in the long-term average end-of-month water surface elevation in Oroville Reservoir during the March through September period (when warmwater fish spawning and initial rearing occurs). The average end-of-month elevation would be the same in all months of the March through September period under the Specific Plan initial surface water supply and existing conditions (Technical Appendix A-585 to A-591). End-of-month water surface elevation at Oroville Reservoir would be essentially equivalent to the existing condition for 490 months of the 490 months included in the analysis (Technical Appendix A-585 to A-591).

Changes in water surface elevation in Oroville Reservoir during the March through September period would result in corresponding changes in the availability of reservoir littoral habitat containing inundated terrestrial vegetation (willows and button brush). Such shallow, nearshore waters containing physical structure are important to producing and maintaining strong year-classes of warmwater fish annually. However, the frequency of reductions in water surface elevation under the Specific Plan initial surface water supply would not be of sufficient frequency or magnitude to result in reductions in the long-term availability of littoral habitat. Further, the small and infrequent reduction in the water surface elevation that would occur under the Specific Plan initial surface water supply would not be of sufficient magnitude to substantially reduce the amount of available littoral habitat and long-term, average initial year-class strength of the warmwater fish populations. Consequently, reductions in water surface elevation would constitute a ***less than significant*** impact to Oroville Reservoir warmwater fish rearing.

In addition, the Specific Plan initial surface water supply could alter the extent to which water surface elevations in Oroville Reservoir change during each month of the primary warmwater fish-spawning period (March through July). Adverse effects to spawning from nest-dewatering are assumed to have the potential to occur when reservoir elevation decreases by more than nine feet within a given month. Modeling results indicate that the frequency with which potential nest-dewatering events could occur in Oroville Reservoir would not increase under the Specific Plan initial surface water supply, compared to the existing condition, during any month of the March through July spawning period (Technical Appendix A-585 to A-589). As the frequency with which potential nest-dewatering events could occur in Oroville Reservoir would not change during any month of the March through July warmwater fish-spawning period, effects to warmwater fish nesting success under the Specific Plan initial surface water supply would be considered ***less than significant***.

In summary, the Specific Plan initial surface water supply is not likely to result in changes in the availability of littoral habitat at Oroville Reservoir, and is not likely to result in an increase in the frequency of potential nest-dewatering events. Therefore, overall, impacts to Oroville Reservoir warmwater fisheries would be considered ***less than significant***, relative to the existing condition.

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could cause impacts to Oroville Reservoir's warmwater fisheries.

Changes to the hydrologic conditions could change the long-term average end-of-month water surface elevation of the Oroville Reservoir during March to September. If these changes were substantial they could affect the habitat available for warmwater fish. However, as discussed above, it was determined that the PVSP would not significantly reduce the water surface elevation in the reservoir to the extent that warmwater fish habitat and population would be significantly adversely affected. Thus, impacts resulting from the PVSP on warmwater fisheries were determined to be less than significant in the Oroville Reservoir. The RSUP would demand approximately one fifth of the water of the PVSP; therefore, the impact of the RUSP on warmwater fisheries in the Oroville Reservoir would be reduced compared to that of the PVSP and would also be ***less than significant.***

4.4-50 The Specific Plan could cause impacts to Oroville Reservoir's coldwater fisheries.

Long-term average end-of-month storage under the Specific Plan initial surface water supply would not decrease detectably, relative to the existing condition, during the April through November period, when the reservoir thermally stratifies (Technical Appendix A-121 to A-122 and A-127 to A-132). Oroville Reservoir monthly mean end-of-month storage under the Specific Plan initial surface water supply would be essentially equivalent to the existing condition for 560 of the 560 months for the April through November period (Technical Appendix A-121 to A-122 and A-127 to A-132). On a monthly mean basis, the largest difference between end-of-month storage out of the 560 months simulated would be 4 TAF, a less than 0.2% difference (Technical Appendix A-121 to A-122 and A-127 to A-132). Anticipated reductions in reservoir storage that would occur under the Specific Plan initial surface water supply would not be of sufficient magnitude to adversely affect the reservoir's coldwater fisheries because coldwater habitat would remain available within the reservoir during all months of all years, physical habitat availability is not believed to be among the primary factors limiting coldwater fish populations, and anticipated seasonal reductions in storage would not be expected to adversely affect the primary prey species used by coldwater fish. Therefore, potential impacts to Oroville Reservoir coldwater fisheries under the Specific Plan initial surface water supply would be ***less than significant***, relative to the existing condition.

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could cause impacts to Oroville Reservoir's coldwater fisheries.

The hydrologic conditions under the PVSP could result in a change to the long-term average end-of-month water surface elevation of the Oroville Reservoir during March to September. If these changes were substantial they could affect the habitat available for coldwater fish. It was determined that the PVSP would not significantly reduce the water surface elevation in the reservoir to the extent that coldwater fish habitat or primary prey species would be affected. Therefore, coldwater fish population would not be significantly adversely affected. Impacts resulting from the PVSP on coldwater fisheries were determined to be less than significant in the Oroville Reservoir. The RUSP is of a smaller scale than the PVSP; therefore, the impact of the RUSP on coldwater fisheries in the Oroville Reservoir would be reduced compared to that of the PVSP and would also be ***less than significant.***

4.4-51 The Specific Plan could cause impacts to Delta fish populations.

Delta outflow is considered to have a substantial effect on a number of fish species relying on Delta habitats for one or more of their lifestages. Reductions in the long-term average Delta outflow at a maximum of up to eight cfs for any given month could occur under the proposed Specific Plan initial surface water supply relative to the existing condition (Template Output B-413). Delta outflow during the period of February through June is believed to be of greatest concern for potential effects to spawning and rearing habitat and downstream transport flows for delta smelt, longfin smelt, splittail, striped bass, salmonids, and other aquatic species in the Delta. Throughout the entire 70-year period of record included in the analysis, Delta outflow reductions of more than 1.1% would not occur during any of the individual months (out of 350 months) under the proposed Specific Plan initial surface water supply, relative to the existing condition (Technical Appendices A-1 to A-12).

Under the proposed Specific Plan initial surface water supply, there would be no substantial shift in the long-term monthly average position of X2 in any given month, relative to the existing condition (Template Output B-429). Furthermore, during the February through June period, considered important for providing appropriate spawning and rearing conditions and downstream transport flows for various fish species, the maximum upstream shift for any individual month of any year in the position of X2 would be 0.1 km for the proposed Specific Plan initial surface water supply, relative to the existing condition (Technical Appendices A-13 to A-24).

The model simulations conducted for the proposed Specific Plan initial surface water supply included conformance with X2 requirements set forth in the SWRCB *Interim Water Quality Control Plan.* Also, the Delta export-to-inflow ratios under the proposed Specific Plan initial surface water supply would not exceed the maximum export ratio as set by the SWRCB *Interim Water Quality Control Plan*. In addition, the decreases in Delta outflow and the shifts in the position of X2 under the Specific Plan initial surface water supply would not be of sufficient frequency or magnitude to adversely affect Delta fish resources, relative to the existing condition. Overall, impacts to Delta fish populations would, therefore, be ***less than significant.***

<u>Mitigation Measures</u>

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could cause impacts to Delta fish populations.

The PVSP could affect Delta outflow, which in turn could have a substantial effect on fish species relying on Delta habitats. It was determined that the PVSP could reduce average Delta outflow; however, not to the extent that habitats and Delta fish populations would be significantly

impacted. Thus, the impact resulting from the PVSP on the Delta outflow was determined to be less than significant. The RUSP is of a smaller scale than the PVSP; therefore, the impact of the RUSP on the Delta outflow would be reduced compared to that of the PVSP and would also be ***less than significant.***

4.4-52 The Specific Plan could cause impacts to Folsom Reservoir's warmwater fisheries.

Hydrologic conditions under the proposed Specific Plan initial surface water supply would result in almost no difference in the long-term average end-of-month water surface elevation in Folsom Reservoir during the March through September period (when warmwater fish spawning and initial rearing occurs) (Template Output B-485). End-of-month water surface elevation at Folsom Reservoir would be essentially equivalent to the existing condition for all months of the 490 months included in the analysis (Technical Appendices A-198 to A-204). For the entire 70-year period of record, the largest single difference in end-of-month water surface elevation (out of 490 months) during the March through September season would be a one-foot decrease, relative to the existing condition (Technical Appendices A-198 to A-204).

Changes in water surface elevation in Folsom Reservoir during the March through September period could result in measurable corresponding changes in the availability of reservoir littoral habitat containing inundated terrestrial vegetation (willows and button brush). Such shallow, near shore waters containing physical structure are important to producing and maintaining strong year-classes of warmwater fish annually. However, the difference in the long-term monthly average amount of littoral habitat potentially available to warmwater fish for spawning and/or rearing in Folsom Reservoir during the March through September period attributable to the proposed Specific Plan initial surface water supply is estimated to be 0.6% or less, relative to the existing condition (Template Output B-493). Such reductions in littoral habitat availability would not be of sufficient magnitude to substantially reduce long-term, average initial year-class strength of the warmwater fish populations. Consequently, seasonal reductions in littoral habitat availability would constitute a ***less than significant impact*** to Folsom Reservoir's warmwater fisheries.

In addition, the proposed Specific Plan initial surface water supply could alter the extent to which water surface elevations in Folsom Reservoir change during each month of the primary warmwater fish-spawning period (March through July). As previously discussed, adverse impacts to spawning from nest-dewatering are assumed to have the potential to occur when reservoir elevation decreases by more than nine feet msl within a given month. Modeling results for the proposed Specific Plan initial surface water supply indicate that the frequency with which potential nest-dewatering events could occur in Folsom Reservoir would remain unchanged, relative to the existing condition, during the March through July spawning period (Template Output B-486). Consequently, impacts to Folsom Reservoir warm-water fisheries would be ***less than significant.***

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could cause impacts to Folsom Reservoir's warmwater fisheries.

The PVSP could impact the long-term average end-of-month water surface elevation in Folsom Reservoir, which could impact the warmwater fisheries through seasonal reductions in littoral habitat or nest dewatering during spawning. While it was determined that the PVSP could affect warmwater fisheries, changes in water surface elevation would not be to the extent that habitats and spawning conditions would be significantly impacted. Therefore,, impacts resulting from the

PVSP on the Folsom Reservoir's warmwater fisheries were determined to be less than significant. The RUSP would require one fifth of the water of the PVSP; therefore, the impact of the RUSP on Folsom Reservoir's warmwater fisheries would be reduced compared to that of the PVSP and would also be ***less than significant.***

4.4-53 The Specific Plan could cause impacts to Folsom Reservoir's coldwater fisheries.

Folsom Reservoir end-of-month storage under the proposed Specific Plan initial surface water supply would be essentially equivalent to the existing condition in 554 of the 560 months included in the analysis (i.e., April through November, when the reservoir stratifies) (Technical Appendices A-109 to A-120). The proposed Specific Plan initial surface water supply, relative to the existing condition, would result in small changes in Folsom Reservoir end-of-month storage during some years of the simulation for the April through November period. Long-term average end-of-month storage would remain unchanged under the proposed Specific Plan initial surface water supply, relative to the existing condition (Template Output B-480). For any given month, the largest difference between the proposed Specific Plan initial surface water supply and existing condition for long-term average end-of-month storage would be 13,000 TAF, a 4.0 difference. The largest reduction in Folsom Reservoir end-of-month storage would be 7,000 TAF, or 1.0 during April of the April through December period. Such anticipated reductions in reservoir storage would not be expected to adversely affect the reservoir's coldwater fisheries, since coldwater habitat would remain available within the reservoir during all months of all years. Physical habitat availability is not believed to be among the primary factors limiting coldwater fish populations, and anticipated seasonal reductions in storage would not be of sufficient magnitude to adversely affect the primary prey species used by coldwater fish. Therefore, changes in Folsom Reservoir storage under the proposed Specific Plan initial surface water supply represent a ***less than significant impact*** on coldwater fish resources.

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could cause impacts to Folsom Reservoir's coldwater fisheries.

The PVSP could impact the long-term average end-of-month water surface elevation in Folsom Reservoir, which could impact the coldwater fisheries through seasonal reductions in habitat availability. It was determined that the PVSP could impact coldwater fisheries; however, not to the extent that habitats would be significantly impacted. Therefore, impacts resulting from the PVSP on the Folsom Reservoir's coldwater fisheries were determined to be less than significant. The RUSP would demand less water than the PVSP; therefore, the impact of the RUSP on Folsom Reservoir's coldwater fisheries would be reduced compared to that of the PVSP and would also be ***less than significant.***

4.4-54 The Specific Plan could cause impacts to the Nimbus Fish Hatchery.

CVP operations of Folsom Dam and Reservoir associated with the proposed Specific Plan initial surface water supply would have very little effect on the temperature of water entering the Nimbus Fish Hatchery from Lake Natoma during the May through September period, relative to the existing condition. Under the proposed Specific Plan initial surface water supply, the long-term average temperature of water released from Nimbus Dam would not differ by more than a calculated 0.1°F, relative to the existing condition, during any month of the year , as shown in Table 4.4-14 (Template Output B-279). Furthermore, there would not be substantial differences in the frequency with which water temperatures exceed the water temperature indices of 60°F, 65°F and 68°F. Specifically, increases in the frequency of

exceedance occur in one additional month and decreases in the frequency of exceedance would occur in one additional month during the May through September period, relative to the existing condition (Template Output B-282). These small and infrequent differences in water temperature which could occur during the May through September period (when hatchery temperatures reach annual highs) would not be of sufficient frequency or magnitude to affect hatchery operations and resultant fish production. Therefore, implementation of the proposed Specific Plan initial surface water supply would result in a ***less than significant impact.***

Table 4.4-14
Long-term Average Water Temperature in the American River Below Nimbus Dam Under Existing and Project Conditions

Month	Water Temperature[1] (ºF)		
	Existing	Project	Difference (ºF)
Oct	59.6	59.5	-0.1
Nov	56.9	56.9	0.0
Dec	50.0	50.0	0.0
Jan	46.3	46.3	0.0
Feb	47.3	47.3	0.0
Mar	50.6	50.6	0.0
Apr	55.4	55.4	0.0
May	58.9	58.9	0.0
Jun	62.7	62.7	0.0
Jul	66.0	66.0	0.0
Aug	66.4	66.4	0.0
Sep	67.8	67.7	-0.1

[1] Based on 69 years modeled.

Source: SWRI, 2002.

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could cause impacts to the Nimbus Fish Hatchery.

CVP operations of Folsom Dam and Reservoir associated with the PVSP could impact the Nimbus Fish Hatchery by raising the temperature of water entering the hatchery from Lake Natoma from May through September. This could affect hatchery operations and, consequently, fish production. While it was determined that the PVSP could impact water temperatures; the changes would not be to the extent that the hatchery would be significantly impacted. Impacts resulting from the PVSP to the Nimbus Fish Hatchery were determined to be less than significant. The RUSP water demand is smaller than that of the PVSP; therefore, the impact of the RUSP on Nimbus Fish Hatchery would be reduced compared to that of the PVSP and would also be ***less than significant.***

LOWER AMERICAN RIVER FISHERIES IMPACTS

Flow- and temperature-related impacts are discussed separately below by species and lifestage. Organizationally, flow- and temperature-related impacts to fall-run Chinook salmon and steelhead are discussed together, followed by impact discussions for splittail, American shad, and striped bass.

4.4-55 The Specific Plan could cause impacts to fall-run Chinook salmon and steelhead in the lower American River.

Minimal potential differences in lower American River flows and water temperatures under the proposed Specific Plan initial surface water supply, relative to the existing condition, would not be expected to adversely affect fall-run Chinook salmon and steelhead immigration, spawning and incubation, or juvenile rearing and emigration.

Flow-Related Impacts to Fall-Run Chinook Salmon/Steelhead Adult Immigration (September through March). Even at current minimum flow requirements (i.e., 250 cfs under D-893), flow-related physical impediments to adult salmonid upstream passage are not known to occur. Therefore, flow-related impacts to Chinook salmon adult immigration would primarily be determined by flows at the mouth of the American River during the September through December period, when lower American River Chinook salmon adults immigrate through the Sacramento River in search of their natal stream to spawn. The same would be true for steelhead during the December through March period. Reduced flows at the mouth are of concern primarily due to the fact that less flow could result in insufficient olfactory cues for immigrating adult salmonids, thereby making it more difficult for them to "home" to the lower American River. Insufficient flow could result in higher rates of straying to other Central Valley rivers. Under the proposed Specific Plan initial surface water supply, the long-term average flow at the mouth differs by a maximum of 0.1% to 0.7% for all the months of the year, relative to the existing condition (Template Output B-135). These negligible differences in flows that could occur at the mouth, under the proposed Specific Plan initial surface water supply, would not be of sufficient magnitude to adversely affect the attraction of adults immigrating into the lower American River. Therefore, flow-related impacts to fall-run Chinook salmon/steelhead adult immigration are considered ***less than significant***.

Temperature-Related Impacts to Fall-Run Chinook Salmon/Steelhead Adult Immigration (September through March). Reclamation's lower American River Temperature Model does not account for the influence of Sacramento River water intrusion on water temperatures at the mouth. Therefore, the remaining temperature assessments are based on temperatures modeled at the lower American River mouth and at Freeport on the Sacramento River. The long-term average water temperatures modeled for the proposed Specific Plan initial surface water supply would be within 0.1° F to those under the existing condition at the American River mouth and at Freeport on the Sacramento River during all months of the September through March adult immigration period (Template Output B-325). Under the proposed Specific Plan initial surface water supply, monthly mean water temperatures at the American River mouth would be essentially equivalent to the existing condition in 480 of the 483 months included in the analysis (Technical Appendices A-433 to A-444). Monthly mean water temperatures at Freeport on the Sacramento River would be essentially equivalent to the existing condition for all months of the 483 months included in the analysis (Technical Appendices A-481 to A-492). Therefore, changes in water temperature under the proposed Specific Plan initial surface water supply would not be of sufficient frequency or magnitude to adversely affect the attraction of fall-run Chinook salmon/steelhead adults and represents a ***less than significant impact*** to fall-run Chinook salmon/steelhead adult immigration.

Flow-Related Impacts to Fall-Run Chinook Salmon Spawning and Incubation (October Through February). All flow-related impact assessments regarding fall-run Chinook salmon spawning and incubation were based on flows below Nimbus Dam and at Watt Avenue, with a greater emphasis placed on flows below Nimbus Dam. Aerial redd surveys conducted by CDFG in recent years have shown that 98% of all spawning occurs upstream of Watt Avenue, and 88% of spawning occurs upstream of RM 17 (located just upstream of Ancil Hoffman Park). Hence, the majority of spawning occurs upstream of RM 17.

Monthly mean flows below Nimbus Dam and at Watt Avenue under the proposed Specific Plan initial surface water supply would be essentially equivalent to the existing condition in 326 of the 350 months included in the analysis (Technical Appendices A-313 to A-324 and A-325 to A-336). The long-term average flow below Nimbus Dam and at Watt Avenue would be within 0.3% of the flow under the existing condition during all months of the October through February period (Template Output B-117 and B-123).

Exceedance curves for the American River release from Nimbus Dam for the October through February period for the proposed Specific Plan initial surface water supply demonstrate that flows under the proposed Specific Plan initial surface water supply would be similar to those under the existing condition (Template Output B-114 and B-115). Differences in flows in the lower flow ranges are more crucial for salmon survival. Throughout the October through February period, the proposed Specific Plan initial surface water supply would not substantially reduce flows compared to the existing condition. These slight reductions in flow would not be expected to be of sufficient magnitude or occur with the necessary frequency to have a significant adverse effect on long-term initial year-class strength of lower American River fall-run Chinook salmon. This impact is therefore considered ***less than significant.***

Temperature-Related Impacts to Fall-Run Chinook Salmon Spawning and Incubation (October Through February). Under the proposed Specific Plan initial surface water supply, the long-term average water temperatures would be equivalent to those under the existing condition during October at Watt Avenue, and during the November through February period below Nimbus Dam. Watt Avenue is the location of concern in October since air temperatures tend to warm the river as it moves downstream. Conversely, water temperatures below Nimbus Dam are usually warmer than water temperatures at Watt Avenue in the winter season (Template Output B-328).

The October water temperatures at Watt Avenue would be essentially equivalent to the existing condition in 68 of the 69 months included in the analysis (Technical Appendix A-421). The October water temperature at Watt Avenue would increase by more than 0.2°F in up to three months of the simulation, with the greatest increase of 0.7°F. The November through February monthly mean water temperatures below Nimbus Dam would be essentially equivalent to the existing condition in 274 of the 276 months included in the analysis (Technical Appendices A-409 to A-420). November water temperatures below Nimbus Dam would increase by more than 0.3°F in 2 years of the 69 years modeled. However, December, January and February water temperatures below Nimbus Dam would be below 56°F in all 69 years modeled under the proposed project. Under the proposed Specific Plan initial surface water supply there would be one additional occurrence where October water temperatures at Watt Avenue would be above 56°F, relative to the existing condition.

The long-term average annual early lifestage survival for fall-run Chinook salmon in the American River would be 84.9% under the existing condition and 85.0% under the proposed Specific Plan initial surface water supply. The largest relative decrease that would occur under the proposed initial surface water supply relative to the existing condition would be 1%, which would occur in only 1 year of the 69 years modeled. Substantial increases or decreases in survival would not occur in any individual year of the 69-year simulation (Template Output B-469).

Based on these modeling results, any small temperature changes in the lower American River resulting from the implementation of the proposed Specific Plan initial surface water supply during the October through February period would not be of sufficient frequency or magnitude to adversely affect spawning and incubation success of fall-run Chinook salmon. This impact is therefore considered ***less than significant.***

Flow- and Temperature-Related Impacts to Steelhead Spawning and Incubation (December through March). Monthly mean flows below Nimbus Dam and at Watt Avenue associated with the proposed Specific Plan initial surface water supply would be essentially equivalent to the existing condition in 261 of the 280 months included in the analysis (Technical Appendices A-315 to A-318 and A-327 to A-330). In addition, monthly mean water temperatures below Nimbus Dam and at Watt Avenue would be similar to the existing condition in 275 of the 276 months included in the analysis (Technical Appendices A-411 to A-414 and A-423 to A-426). Moreover, under the proposed Specific Plan initial surface water supply, water temperatures below Nimbus Dam would remain below 56°F for all months of the 69 years modeled for the spawning and incubation period for steelhead. December, January, and February water temperatures at Watt Avenue under the proposed Specific Plan initial surface water supply would be below 56°F in all 69 years modeled (Technical Appendices A-411 to A-414 and A-423 to A-426). There would be no additional occurrences under the proposed Specific Plan initial surface water supply in which water temperatures at Watt Avenue would be greater than 56°F, relative to the existing condition. Therefore, no significant flow- or temperature-related impacts to steelhead spawning or incubation would be expected to occur under the proposed Specific Plan initial surface water supply. This impact is therefore considered ***less than significant***.

Flow-Related Impacts to Fall-Run Chinook Salmon and Steelhead Juvenile Rearing (March Through June). The majority of juvenile salmonid rearing is believed to occur upstream of Watt Avenue. Moreover, depletions generally exceed tributary accretions to the river throughout the March through June period (generally resulting in lower flows at Watt Avenue than below Nimbus Dam). Accordingly, all flow-related impact assessments for fall-run Chinook salmon and steelhead rearing are based on flows at Watt Avenue.

Insignificant changes in monthly mean flows would be expected to occur at Watt Avenue under the proposed Specific Plan initial surface water supply, relative to the existing condition. Long-term average flows at Watt Avenue under the proposed Specific Plan initial surface water supply would be within 0.3% of the flow under the existing condition for any given month during the March through June period (Template Output B-123). Flow exceedance curves for March through June at Watt Avenue indicate that slight decreases in flow would occur under the proposed Specific Plan initial surface water supply during the March through June period, when flows under the existing condition are 2,000 cfs or less (Template Output B-121 to B-122). Such small differences in flow would not be of sufficient frequency or magnitude to adversely affect long-term juvenile fall-run Chinook salmon or steelhead rearing success. This impact is therefore considered ***less than significant***.

Temperature-Related Impacts to Fall-Run Chinook Salmon and Steelhead Juvenile Rearing (March Through June). Modeling of the proposed Specific Plan initial surface water supply indicates that the long-term average water temperature at Watt Avenue would not change during any month of the March through June period, relative to the existing condition (Template Output B-286). Monthly mean water temperatures at Watt Avenue would be essentially equivalent to the existing condition in 275 of the 276 months included in the analysis (Technical Appendices A-426 to A-429). Moreover, under the proposed Specific Plan initial surface water supply, there would not be any additional occurrences in which water temperatures would be above 65°F, relative to the existing condition, for the entire March through June period (Technical Appendices A-426 to A-429). Consequently, with no temperature increases at Watt Avenue during the March through June period, the proposed Specific Plan initial surface water supply would not be expected to result in significant adverse affects to the success of juvenile salmon rearing. This impact is therefore considered ***less than significant***.

Flow-Related Impacts to Fall-Run Chinook Salmon and Steelhead Juvenile Emigration (February through June). The primary period of fall-run Chinook salmon juvenile emigration occurs from February to June, with the majority of juvenile steelhead

emigration occurring during this same period. Generally little, if any, emigration occurs during July and August. Flow-related impacts to salmonid immigration discussed above addressed flow changes in February and March. As previously concluded for adult immigration, potential changes in flows under the proposed Specific Plan initial surface water supply during February through March would not adversely affect juvenile fall-run Chinook salmon or steelhead rearing and, therefore, also would not adversely affect emigration. Hence, this discussion focuses primarily on the April through June period.

Monthly mean flows expected to occur at the American River mouth associated with implementation of the proposed Specific Plan initial surface water supply would be essentially equivalent or greater than flows under the existing condition in 200 of the 210 months included in the analysis (Technical Appendix A-367 to A-369). Under the proposed Specific Plan initial surface water supply, the simulated long-term average flow at the mouth would decrease slightly (i.e., less than 0.5%) in the April through June period (Template Output B-135). Juvenile salmonid emigration surveys conducted by CDFG have shown no direct relationship between peak emigration of juvenile Chinook salmon and peak spring flows (Snider et al. 1997). Moreover, emigrating fish are more likely to be adversely affected by events when flows are high, then ramp down quickly (resulting in isolation and stranding). Adverse changes in flow ramping rates would not be expected to occur under the proposed Specific Plan initial surface water supply. Consequently, although small flow reductions at the mouth (i.e., less than 0.5 percent) would occur in a few years during the April through June period, these flow reductions would not occur with sufficient frequency or magnitude to adversely affect the success of juvenile salmonid emigration. In addition, the resultant flows would not be expected to adversely affect the success of juvenile salmonid emigration. This impact is therefore considered ***less than significant.***

Temperature-Related Impacts to Fall-Run Chinook Salmon and Steelhead Juvenile Emigration (February through June). With the possible exception of a small percentage of fish that may rear near the mouth of the lower American River, impacts due to elevated water temperatures at the mouth to fall-run Chinook salmon and steelhead would, at worst, be limited to the several days that it takes emigrants to pass through the lower portion of the river and into the Sacramento River en route to the Delta. Water temperatures near the mouth during the primary emigration period (February into June) are often largely affected by intrusion of Sacramento River water, which is not accounted for by Reclamation's lower American River Temperature Model. Consequently, actual temperatures near the mouth would likely be somewhere between temperatures modeled for the mouth and temperatures modeled for the Sacramento River at Freeport (RM 46), located 14 miles downstream of the lower American River's confluence. For this reason, the long-term average temperatures are discussed for both of these locations.

Monthly mean temperatures at the American River mouth under the proposed Specific Plan initial surface water supply would be essentially equivalent to, or less than, the existing condition in 342 of the 345 months included in the analysis (Technical Appendices A-437 to A-441). Monthly mean temperatures at Freeport on the Sacramento River would be essentially equivalent to the existing condition for all months of the 345 months included in the analysis (Technical Appendices A-485 to A-489). The long-term average water temperature at the American River mouth and on the Sacramento River at Freeport during February through June under the proposed Specific Plan initial surface water supply would be similar to temperatures under the existing condition (Template Output B-325). The largest difference in long-term average would be an increase of 0.1°F at the mouth during March. In the 69-year simulation under the proposed Specific Plan initial surface water supply, water temperature would increase 0.4°F or more at the mouth in only one year during March, May, and June. At Freeport on the Sacramento River, monthly mean temperature increases greater than 0.1°F in the months of February through June would not occur, relative to the existing condition (Technical Appendices A-485 to A-489). Moreover, under the proposed Specific Plan initial surface water supply, there would not be any additional occurrences throughout the February through June period in which temperatures

at the mouth of the lower American River would be above 65°F, relative to the existing condition. In addition, under the proposed Specific Plan initial surface water supply, there would not be any additional occurrences throughout the February through June period in which water temperatures would be above 65°F at Freeport relative to the existing condition.

Based on the results discussed above, changes in water temperatures under the proposed Specific Plan initial surface water supply would not be of sufficient frequency or magnitude to adversely affect emigration during the February through June period, relative to the existing condition. This impact is therefore considered ***less than significant.***

Flow-Related Impacts to Steelhead Rearing (July through September). Monthly mean flows below Nimbus Dam under the proposed Specific Plan initial surface water supply would be essentially equivalent to or greater than flows under the existing condition in 179 of the 210 months modeled (Technical Appendix A-322 to A-324). The long-term average flow below Nimbus Dam would decrease by less than 0.8% (17 cfs) compared to the existing condition for the July through September period. The difference in flow would be similar at Watt Avenue (Template Output B-117 and B-123).

Based on these findings, flow reductions under the proposed Specific Plan initial surface water supply are not expected to reduce juvenile steelhead rearing habitat. Further, steelhead populations in the lower American River are believed to be limited by instream temperature conditions during the July through September period, rather than by flows. Therefore, small and infrequent reductions in flow would not be of sufficient frequency or magnitude to adversely affect long-term rearing success of juvenile steelhead. This impact is therefore considered ***less than significant.***

Temperature-Related Impacts to Steelhead Rearing (July through September). The long-term average water temperatures below Nimbus Dam, Watt Avenue, and the mouth would not substantially differ during July, August and September between the proposed Specific Plan initial surface water supply compared to the existing condition (Template Output B-279, B-286, and B-293). Monthly mean water temperatures below Nimbus Dam under the proposed Specific Plan initial surface water supply would be essentially equivalent to the existing condition in 203 of the 207 months included in the analysis (Technical Appendices A-418 to A-420). Monthly mean water temperatures at Watt Avenue under the proposed Specific Plan initial surface water supply would be essentially equivalent to the existing condition in 204 of the 207 months included in the analysis (Technical Appendices A-430 to A-432). Moreover, under the proposed Specific Plan initial surface water supply, there would be no increase in the number of occurrences in which water temperatures would be above 65°F during the July through September period at Watt Avenue, relative to the existing condition (Technical Appendices A-430 to A-432). Monthly mean water temperatures at the mouth of the American River under the proposed Specific Plan initial surface water supply would be essentially equivalent to the existing condition in 205 of the 207 months included in the analysis (Technical Appendices A-442 to A-444). Therefore, such small and infrequent increases in water temperature that would occur under the proposed Specific Plan initial surface water supply would not be of sufficient frequency to adversely affect long-term rearing success of juvenile steelhead. This impact is therefore considered ***less than significant.***

<u>Mitigation Measures</u>

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could cause impacts to fall-run Chinook salmon and steelhead in the lower American River.

The PVSP EIR evaluated the potential impacts on the flow and temperature of the lower American River and how that would affect the various lifestages of the fall-run Chinook salmon and steelhead. The various lifestages evaluated above include adult immigration, spawning and incubation, juvenile rearing and emigration, and rearing. It was determined that the PVSP would not significantly alter either the temperature or the flow of the lower American River enough to affect any of the above mentioned lifestages. Impacts resulting from the PVSP on fall-run Chinook salmon and steelhead were determined to be less than significant. The RUSP's water demand is approximately one-fifth that of the PVSP; therefore, the impact of the RUSP on fall-run Chinook salmon and steelhead would be reduced compared to that of the PVSP and would also be ***less than significant.***

4.4-56 The Specific Plan could degrade habitat for splittail in the lower American River.

Monthly mean flows at Watt Avenue during February through May under the proposed Specific Plan initial surface water supply would be essentially equivalent to or greater than the existing condition in 270 of the 280 months included in the analysis (Technical Appendices A-329 to A-332). The long-term average flow at Watt Avenue during the period February through May would range between zero and 0.2% less than under the existing condition (Template Output B-123).

Using flows at Watt Avenue, the acreage of usable riparian vegetation inundated between RM 8 and RM 9 was used as an index of the relative amount of inundated riparian vegetation that would occur in the lower portion of the river for a given flow rate. The amount of riparian habitat inundated in this portion of the river under the proposed Specific Plan initial surface water supply would remain unchanged in 64 years of the 70 years modeled (91% of the time) during February, in 67 years (96% of the time) during March, in 64 years (91% of the time) during April, and in 65 years (93% of the time) during May (Template Output B-113). Therefore, sufficient change in the frequency of habitat reductions would not be expected to occur during February, March, April, or May of any year.

During the February through May splittail spawning period, the long-term average usable inundated riparian habitat between RM 8 and RM 9 under the proposed Specific Plan initial surface water supply would remain unchanged relative to the existing condition (Template Output B-113). In addition, flow changes under the proposed Specific Plan initial surface water supply would have little, if any, effect on the availability of in-channel spawning habitat availability, or the amount of potential spawning habitat available from the mouth up to RM 5, the reach of the river influenced by Sacramento River stage. Ultimately, these reductions in flow would not be expected to be of sufficient magnitude and/or to occur with enough frequency to have a significant adverse effect on the long-term population trends of lower American River splittail.

Monthly mean temperatures at Watt Avenue under the proposed Specific Plan initial surface water supply would be essentially equivalent to the existing condition in 275 of the 276 months included in the analysis (Technical Appendices A-425 to A-428). Over the 69-year period of simulation, February through April mean monthly water temperatures at Watt Avenue under the proposed Specific Plan initial surface water supply and existing condition would not exceed 68°F, the upper limit of the reported preferred range for splittail spawning, relative to the existing condition in any of the 69 years modeled (Technical Appendices A-425 to A-428). During May, there would be two occurrences under both the existing condition and proposed initial surface water supply that monthly mean water temperatures would exceed 68°F. Therefore, water temperature-related impacts to splittail spawning would be considered ***less than significant,*** since no sufficient change in the frequency of water temperature exceeding the reported preferred range for splittail spawning would occur under the proposed Specific Plan initial surface water supply and this condition would occur with or without the project.

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could degrade habitat for splittail in the lower American River.

The PVSP EIR evaluated the project's impacts on splittail habitat in the lower American River, specifically how habitat would be affected by a fluctuation in monthly mean flows and monthly mean temperatures. It was determined that the PVSP would not significantly alter either the temperature or the flow of the lower American River enough to significantly affect the splittail habitat. Impacts resulting from the PVSP on splittail in the lower American River were determined to be less than significant. The RUSP's water demand is approximately one-fifth that of the PVSP; therefore, the impact of the RUSP on splittail in the lower American River would be reduced compared to that of the PVSP and would also be ***less than significant.***

4.4-57 The Specific Plan could cause impacts to American shad in the lower American River.

The long-term average flow at the American River mouth would be reduced by 0.4% or less during May and June under the proposed Specific Plan initial surface water supply, relative to the existing condition (Template Output B-135). Flow reductions in May and June under the proposed Specific Plan initial surface water supply could potentially reduce the number of adult shad attracted into the river during a few years. However, American shad spawn opportunistically where suitable conditions are found, so that production of American shad within the Sacramento River system would likely remain unaffected. Any flow-related impacts to American shad are considered to be ***less than significant***. In addition, analysis was performed to determine the probability that lower American River flows at the mouth in May and June would be greater than 3,000 cfs, the flow level defined by CDFG as that which would be sufficient to maintain the sport fishery for American shad. The simulations showed no difference in the number of years that the flow at the mouth would be below 3,000 cfs in May and June (Technical Appendices A-368 to A-369).

The frequency with which monthly mean water temperatures in May and June below Nimbus Dam would be within the reported preferred range for American shad spawning of 60°F to 70°F would not change under the proposed Specific Plan initial surface water supply relative to the existing condition (Technical Appendices A-416 to A-417). Monthly mean water temperatures in May and June at the mouth of the lower American River would be within the reported preferred range for American shad spawning in one fewer year under the proposed Specific Plan initial surface water supply, relative to the existing condition (Technical Appendices A-440 to A-441). The frequency with which suitable temperatures for American shad spawning would not substantially differ infers that temperature-related impacts to American shad would be considered ***less than significant*** relative to the existing condition. Overall, the impacts associated with implementation of the proposed Specific Plan initial surface water supply would be ***less than significant.***

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could cause impacts to American shad in the lower American River.

The PVSP EIR evaluated the project's impacts on American shad in the lower American River, specifically reducing flows and altering the temperature which in turn could impact spawning. It was determined that the PVSP would not significantly alter the flow or the temperature of the lower American River enough to significantly affect the American shad. Impacts resulting from the PVSP on American shad in the lower American River were determined to be less than significant. The RUSP's water demand is approximately one-fifth that of the PVSP; therefore, the impact of the RUSP on American shad in the lower American River would be reduced compared to that of the PVSP and would also be ***less than significant.***

4.4-58 The Specific Plan could cause impacts to striped bass in the lower American River.

The flow-related impact assessment conducted for fall-run Chinook salmon and steelhead addresses potential flow-related impacts to striped bass juvenile rearing, which occurs during the months of May and June. In addition, an analysis was performed to determine the probability that lower American River flows at the mouth would be below 1,500 cfs, the flow level defined by CDFG as that which would be sufficient to maintain the sport fishery for striped bass. Under the proposed Specific Plan initial surface water supply, monthly mean flows in the lower American River would be below the 1,500 cfs attraction flow index during May and June in 17 of the 140 years modeled (Technical Appendices A-368 to A-369). Moreover, flows at the mouth that are believed to be sufficient to maintain the striped bass fishery would be met or exceeded in most years during both May and June. Substantial changes in the strength of the striped bass fishery would not be expected to occur when May and/or June monthly mean flows fall below 1,500 cfs, and therefore, flow-related impacts to the striped bass fishery that could potentially occur under the proposed Specific Plan initial surface water supply would be ***less than significant***.

The number of years that monthly mean water temperatures would be within the reported preferred range for striped bass spawning of 59°F to 68°F would not change during June below Nimbus Dam and at the mouth during May and June (Technical Appendices A-416 to A-417 and A-440 to A-441). Thus, the frequency of suitable temperatures for juvenile striped bass rearing in the lower American River would remain essentially unchanged, and therefore, temperature-related impacts to juvenile striped bass rearing are considered to be ***less than significant*** relative to the existing condition. Overall, potential impacts to striped bass under the proposed Specific Plan initial surface water supply would be ***less than significant***.

Mitigation Measures

No mitigation measures are required.

Regional University Specific Plan

Impact: The Specific Plan could cause impacts to striped bass in the lower American River.

The PVSP EIR evaluated the project's impacts on the flow and temperature of the lower American River as they relate to the juvenile rearing of striped bass. It was determined that the PVSP would not significantly alter the flow or the temperature of the lower American River enough to significantly affect the juvenile rearing of striped bass. Impacts resulting from the PVSP to juvenile rearing of striped bass in the lower American River were determined to be less than significant. The RUSP's water demand is approximately one-fifth that of the PVSP; therefore, the impact of the RUSP on juvenile rearing of striped bass in the lower American River would be reduced compared to that of the PVSP and would also be ***less than significant.***

Placer Vineyards Specific Plan RDEIR Biological Resources Discussion

PVSP DEIR p. 4.4-186 – 4.4-203

LONG-TERM SURFACE WATER SUPPLY

A water supply of 11,500 AFA will be required to meet the needs of the Specific Plan buildout. This 11,500 AFA is part of the PCWA's pending amendatory CVP contract with the Reclamation for 35,000 AFA. This water would be diverted from the Sacramento River, which has an annual runoff of approximately 18 million AF (PCWA 2001). The entire 35,000 AFA of the PCWA CVP contract water was used for the project's incremental contribution analysis (for further description of the cumulative analysis, see Section 4.3.4 in this Revised Draft EIR). The full CVP contract amount of 35,000 AFA (long-term surface water supply) was evaluated based on the premise that this higher diversion amount provides a conservative representation of potential impacts associated with increased diversions from the Sacramento River to meet the proposed Specific Plan.
The following consists of two parts: (1) an analysis to determine the effect of the proposed Specific Plan long-term surface water supply project in combination with all past, present, and reasonably foreseeable future projects (cumulative analysis); and (2) if a significant cumulative impact was found, an analysis to determine the incremental contribution of the long-term surface water supply to the cumulative impact. If the modeling results indicated that potentially significant or significant impacts would occur under the full (35,000 AFA) long-term surface water supply, then further evaluation was performed to evaluate more closely the future Specific Plan long-term surface water supply project's 11,500 AFA diversion potential to affect environmental resources.

Terrestrial Resources

4.4-61 The Specific Plan could contribute to cumulative effects on lower American River riparian vegetation and Special-Status Species dependent upon riparian and open water habitats.

Changes in lower American River flows would result in more frequent reductions of flows below the indices for cottonwood growth and terrace inundation. Flows would be below that considered necessary for radial growth maintenance up to 7% more frequently and below the index required for some growth by up to approximately 6% more frequently than under the existing condition. Reduced flows under the cumulative condition would result in six to seven more occurrences of two or more consecutive months in which flows would be below the radial growth maintenance index at both Nimbus Dam and the H Street Bridge, respectively, and four to five additional occurrences of two or more consecutive months below the same growth index required for some growth at the H Street Bridge and Nimbus Dam, respectively. However, none of the consecutive flow reductions would occur during the critical growing period of April through July. Because these consecutive flow reductions would not occur during the critical growing period of April through July, and the minimal percent of time that the mean monthly flows fall below the growth thresholds, such flow reductions are not considered to be of sufficient magnitude and/or frequency to have long-term effects on the population and growth of cottonwoods/riparian vegetation, relative to the existing condition. Furthermore, given that flow reductions would not result in long-term adverse effects on cottonwoods or riparian vegetation, future impacts to special-status species that depend on lower American River riparian vegetation would also be ***less than significant***, relative to the existing condition.

Mitigation Measures

No mitigation measures are required.

Impact : The RUSP could contribute to cumulative effects on lower American River riparian vegetation and Special-Status Species dependent upon riparian and open water habitats.

A potable water supply of approximately 2,440 AFA will be required to meet the needs of the RUSP buildout. This 2,440 AFA is part of the PCWA's pending amendatory CVP contract with the Reclamation for 35,000 AFA and would be diverted from the Sacramento River, which has an annual runoff of approximately 18 million AF (PCWA 2001).

Under cumulative conditions, changes in lower American River flows would result in more frequent reductions of flows below the indices for cottonwood growth and terrace inundation. However, these reductions would likely not occur during the critical growing period of April through July. Because these reductions would not occur during the critical growing period, such flow reductions are not considered to be of sufficient magnitude and/or frequency to have long-term effects on the population and growth of cottonwoods/riparian vegetation, relative to the existing condition. Furthermore, given that flow reductions would not result in long-term adverse effects on cottonwoods or riparian vegetation, future impacts to special-status species that depend on lower American River riparian vegetation would also be ***less than significant***, relative to the existing condition.

4.4-62 The Specific Plan could contribute to cumulative effects on lower American River backwater ponds and Special-Status Species dependent on backwater pond/marsh habitats (including elderberry shrubs and VELB).

Modeling results indicate that recharge of lower American River backwater ponds would not be significantly altered under the cumulative condition, relative to the existing condition. Monthly long-term average reductions in the frequency of flows above 2,700 cfs, the minimum flow required for recharge of ponds closest to the river, would range from 1% to 14%. Reductions in long-term average flows above 4,000 cfs, the flow value required for recharge of off-river ponds, would range from 1% to 20%, relative to the existing condition. Adequate recharge of both adjacent and off-river ponds would still occur under the cumulative condition given the magnitude of future changes in flows. Consequently, such reductions were considered *less than significant*, relative to the existing condition. Furthermore, special-status species dependent upon recharge of backwater pond/marsh habitats, including elderberry shrubs and VELB, would not be adversely affected by future reductions in flow that would occur under the cumulative condition, and consequently, impacts to these special-status species would be *less than significant*.

Mitigation Measures

No mitigation measures are required.

Impact: The RUSP could contribute to cumulative effects on lower American River backwater ponds and Special-Status Species dependent on backwater pond/marsh habitats (including elderberry shrubs and VELB).

Because adequate recharge of both adjacent and off-river ponds would still occur under the cumulative condition given the magnitude of future changes in flow, the RUSP's contribution to the cumulative recharge effects on lower American River backwater ponds would not be substantial. Minor reductions in flows would be considered ***less than significant***, relative to the existing condition. Furthermore, special-status species dependent upon recharge of backwater pond/marsh habitats, including elderberry shrubs and VELB, would not be adversely affected by future reductions in flow that would occur under the cumulative condition, and consequently, impacts to these special-status species would be ***less than significant.***

4.4-63 The Specific Plan could contribute to cumulative effects on Folsom, Trinity, and Shasta Reservoir vegetation.

Long-term average end-of-month water surface elevations for Folsom, Trinity, and Shasta reservoirs would be reduced, relative to the existing condition, with reductions ranging from 2 to 11 feet msl during growing season months of March through September. Weedy vegetation, rather than vegetation that would provide quality wildlife habitat, establishes in the drawdown zone under existing conditions, due to constant changes in reservoir elevation that result from reservoir drawdown patterns. Consequently, reductions in reservoir elevations that would occur under the cumulative condition would not affect areas of high and consistent habitat value that are available for species associated with the reservoir under the existing condition, and impacts would be *less than significant*.

Mitigation Measures

No mitigation measures are required.

Impact: The RUSP could contribute to cumulative effects on Folsom, Trinity, and Shasta Reservoir vegetation.

Under cumulative conditions, water surface elevations for Folsom, Trinity, and Shasta reservoirs would be reduced. However, under current conditions, weedy, not quality habitat, is exposed in the drawdown zones. The RUSP long-term water supply would not exacerbate existing conditions, and the impact would be ***less than significant***.

4.4-64 The Specific Plan could contribute to cumulative effects on upper Sacramento River riparian vegetation.

Under the cumulative condition, upper Sacramento River long-term average flows during the March through October growing season would be reduced, relative to the existing condition. Such decreases would range from approximately 80 to 825 cfs, relative to the existing condition. However, such decreases would be small, considering the monthly mean flow range under the existing condition of over 5,000 to over 13,000 cfs. Thus, anticipated flow reductions that would occur under the cumulative condition would not be of sufficient magnitude and/or frequency to significantly alter upper Sacramento River riparian vegetation and related species, relative to the existing condition, and impacts would be *less than significant*.

Mitigation Measures

No mitigation measures are required.

Impact: The RUSP could contribute to cumulative effects on upper Sacramento River riparian vegetation.

Any decrease to Sacramento River flows would be relatively small compared to existing conditions. Thus, anticipated flow reductions that would occur under the cumulative condition would not be of sufficient magnitude and/or frequency to significantly alter upper Sacramento River riparian vegetation and related species, relative to the existing condition, and impacts would be ***less than significant***.

4.4-65 The Specific Plan could contribute to cumulative effects on lower Sacramento River riparian vegetation.

Modeled reductions in long-term average flows of the lower Sacramento River under the cumulative condition would range from 399 to 828 cfs during most months, with increases ranging from 36 to 466 cfs in early spring and mid-summer months, relative to the existing

condition. However, the greatest reduction in long-term average flow under the cumulative condition would be less than 5% of existing flows for any month of the growing season, relative to the existing condition. Furthermore, the frequency and magnitude of flow reductions that would occur under the cumulative condition would be small, considering the existing monthly mean flow range of over 11,000 to over 33,000 cfs during the growing season months. Because the flow reductions that occur under the cumulative condition would not be of sufficient frequency or magnitude to significantly alter existing riparian habitats along the river, adverse effects to riparian habitats of the lower Sacramento River would not be expected under the cumulative condition, relative to the existing condition, and impacts would be ***less than significant***.

Mitigation Measures

No mitigation measures are required.

Impact: The RUSP could contribute to cumulative effects on lower Sacramento River riparian vegetation.

Any decrease to Sacramento River flows would be relatively small compared to existing conditions and anticipated flow reductions that would occur under the cumulative condition would not be of sufficient magnitude and/or frequency to substantially alter upper Sacramento River riparian vegetation and related species, relative to the existing condition. Thus, impacts would be ***less than significant***.

4.4-66 The Specific Plan could contribute to a cumulative effect on Delta riparian vegetation and special-status species.

Long-term average reductions in lower Sacramento River flow would not be expected to alter the riparian habitat of the Delta. Potential shifts in the long-term average position of X2 of up to 0.7 km would occur under the cumulative condition, relative to the existing condition. Such shifts would be considered minor in the context of Delta riparian vegetation and would not adversely affect Delta vegetation (which is adapted to changes in salinity) or special-status species dependent upon Delta habitats.

In summary, there would be no potentially significant impact to terrestrial resources and vegetation associated with the implementation of future actions, including the proposed long-term surface water supply, under the cumulative condition relative to the existing condition. As no significant impacts are anticipated to terrestrial resources under the cumulative condition, the proposed Specific Plan long-term surface water supply would have no cumulatively considerable incremental contribution to future impacts to riparian resources that occur under the cumulative condition, and therefore the impacts would be ***less than significant***.

Mitigation Measures

No mitigation measures are required.

Impact: The RUSP could contribute to a cumulative effect on Delta riparian vegetation and special-status species.

Long-term average reductions in lower Sacramento River flow would not be expected to alter the riparian habitat of the Delta. Shifts in the position of X2 would be considered minor. Such changes would not drastically affect salinity; therefore, Delta riparian vegetation would not be adversely affected. There would be no potentially significant impact to terrestrial resources and vegetation associated with the implementation of future actions, including the proposed long-term surface water supply, under the cumulative condition relative to the existing condition. As no

significant impacts are anticipated to terrestrial resources under the cumulative condition, the proposed RUSP long-term surface water supply would have no cumulatively considerable incremental contribution to future impacts to riparian resources that occur under the cumulative condition, and therefore the impacts would be ***less than significant.***

Fisheries and Aquatic Habitat

The Cumulative Report evaluated the potential for future impacts to fisheries and aquatic habitat associated with the lower American River, Sacramento River, and Sacramento-San Joaquin Delta, as well as the fisheries resources of Folsom, Shasta and Trinity reservoirs. The results of this analysis indicated there would be no significant adverse cumulative effects to the following resources (for additional descriptions of these resources please refer to the *PCWA American River Pump Station Project Final EIS/EIR* [PCWA and Reclamation 2001]):

- Folsom Reservoir Coldwater Fisheries
- Nimbus Fish Hatchery Operations and Fish Production
- Lower American River American Shad
- Lower American River Striped Bass
- Lower American River Splittail (temperature-related)
- Shasta Reservoir Coldwater Fisheries
- Trinity Reservoir Coldwater Fisheries
- Trinity Reservoir Warmwater Fisheries
- Upper Sacramento River Fisheries (flow-related)
- Lower Sacramento River Fisheries (flow-related)

The Cumulative Report, however, identified potentially significant cumulative impacts on the fisheries and aquatic habitat resources listed below:

- Folsom Reservoir Warmwater Fisheries
- Lower American River Fall-Run Chinook Salmon and Steelhead
- Lower American River Splittail (flow-related)
- Shasta Reservoir Warmwater Fisheries
- Upper Sacramento River Fisheries (temperature-related)
- Lower Sacramento River Fisheries (temperature-related)
- Delta Fish Populations

These potentially significant cumulative impacts identified in the Cumulative Report are summarized below. Each discussion is followed by an evaluation of the potential for the proposed Specific Plan long-term surface water supply to result in a significant contribution to the identified cumulative impact.

4.4-67 The Specific Plan could contribute to cumulative effects on Folsom Reservoir warmwater fisheries.

Under the cumulative condition, long-term average end-of-month water surface elevation would be reduced in Folsom Reservoir by up to eight feet msl, relative to the existing condition, during the March through September period, when warmwater fish spawning and initial rearing occur. On a monthly basis, reservoir elevations would be reduced by 2 to 36 ft msl in 272 months of the 490 months included throughout the March through September period. Future changes in water surface elevation would result in a reduction in the long-term average amount of available littoral habitat of 5% to 31% (59 to 323 acres) during March through September, with reductions in individual months of up to 1,897 acres, relative to the existing condition. Such reductions in habitat availability could, in turn, lead to increased predation on young-of the year warmwater fish, thereby reducing the long-term initial year-class strength of the population. Unless willows and other near-shore vegetation,

in response to seasonal reductions in water levels, become established at lower reservoir elevations in the future, long-term year-class production of warmwater fisheries could be reduced. Consequently, seasonal reductions in littoral habitat availability represent a ***potentially significant cumulative impact*** to Folsom Reservoir warmwater fisheries.

Increases in the frequency of potential nest-dewatering events could occur in Folsom Reservoir under the cumulative condition, relative to the existing condition. Modeling results indicate that the greatest increase would occur in June, with 10 more nest-dewatering events, relative to the existing condition. The frequency with which potential nest-dewatering events could occur in Folsom Reservoir would increase in the months of the March through July warmwater fish-spawning period, and consequently, may be a ***potentially significant cumulative impact*** to warmwater fish nesting success.

Incremental Contribution of the Long-Term Surface Water Supply. The proposed Specific Plan long-term surface water supply would not contribute substantially to reductions in reservoir end of month elevation and acres of littoral habitat under the cumulative condition. The proposed long-term surface water supply would contribute 2 months of the 272 months with reductions in Folsom Reservoir elevation, or 0.7% of the total cumulative impact (Technical Appendix G-193 to G-204). Furthermore, the proposed long-term surface water supply would have no cumulatively considerable contributions to reductions in the amount of Folsom Reservoir littoral habitat. During April through September, the proposed long-term surface water supply would contribute a minor benefit to the long-term average amount of littoral habitat, with increases of up to four acres (Template Output H-493). In individual months, the proposed long-term surface water supply would result in both increases and decreases in the amount of littoral habitat, with reductions up to 108 acres (Technical Appendix G-277 to G-288). Such reductions would not occur with sufficient frequency or magnitude to contribute to significant reductions in littoral habitat availability that would occur under the cumulative condition.

The proposed long-term surface water supply also would not contribute substantially to increases in the frequency of potential nest-dewatering events in any month during March through July (Template Output H-486). During May, there would be one additional occurrence under the proposed long-term surface water supply, that monthly elevation would decrease more than nine feet. However, this additional occurrence would not be of sufficient magnitude or frequency to adversely affect the availability of warmwater fish nests. Therefore, the proposed long-term surface water supply would have no cumulatively considerable contribution to future adverse effects to warmwater fish nests that occur under the cumulative condition. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. Impacts would therefore be considered ***less than significant***.

Mitigation Measures

No mitigation measures are required.

Impact: The RUSP could contribute to cumulative effects on Folsom Reservoir warmwater fisheries.

As discussed above, long-term year-class production of warmwater fisheries could be reduced and the frequency with which potential nest-dewatering events could occur in Folsom Reservoir would increase in the months of the March through July warmwater fish-spawning period under the cumulative condition. Consequently, seasonal reductions in littoral habitat availability represent a ***potentially significant cumulative impact*** to Folsom Reservoir warmwater fisheries.

However, the proposed RUSP long-term surface water supply would not contribute substantially to reductions in reservoir end of month elevation and amount of littoral habitat or contribute substantially to increases in the frequency of potential nest-dewatering events in any month during March through July under the cumulative condition. Changes to Folsom Reservoir elevations would not occur with sufficient frequency or magnitude to contribute to significant reductions in littoral habitat availability or adversely affect the availability of warmwater fish nests. Therefore, the proposed long-term surface water supply would have no cumulatively considerable contribution to future adverse effects to littoral habitat availability or warmwater fish nests that occur under the cumulative condition. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. Impacts would therefore be considered ***less than significant***.

4.4-68 The Specific Plan would contribute to cumulative effects on lower American River fall-run Chinook salmon and steelhead.

Flow-Related Impacts to Fall-Run Chinook Salmon Spawning and Incubation (October Through February). All flow-related impact assessments regarding fall-run Chinook salmon spawning and incubation were based on flows below Nimbus Dam and at Watt Avenue, with a greater emphasis placed on flows below Nimbus Dam, as 98% of all spawning occurs upstream of Watt Avenue.

The modeled long-term average flow below Nimbus Dam under the cumulative condition would be up to 13.6% less (292 cfs, October) than the flow under the existing condition during all months of the October through February fall-run Chinook salmon spawning and incubation period. Similarly, modeled changes in long-term average flows at Watt Avenue would be up to 14.3% less (300 cfs, October) during the October through February period (See Tables C-3.419 and –20 in the Cumulative Report for additional information). Differences in flows in the lower flow ranges are of particular concern. In October, November and December, when the existing condition flow would be 2,500 cfs or less, the cumulative condition would result in flow reductions of up to 750 cfs nearly 50% of the time, while effects on flow during January and February would be minor.

Such reductions in flows would reduce the amount of available Chinook salmon spawning habitat, which could result in increased redd superimposition during years when adult returns are high enough for spawning habitat to be limiting. These reductions in flow are of sufficient magnitude and occur with enough frequency to represent a ***potentially significant cumulative impact*** to long-term initial year-class strength of lower American River fall-run Chinook salmon.

Incremental Contribution of the Long-Term Surface Water Supply. The proposed Specific Plan long-term surface water supply would have no cumulatively considerable contribution to future lower American River flow reductions at either Nimbus Dam or Watt Avenue during October through February. The maximum simulated reduction in long-term average flow would be four cfs at either of the locations, or 1.3% to 1.4% of the total cumulative reduction in flows (Template Output H-117 and H-123). Furthermore, the proposed long-term surface water supply would contribute 6 months to the 185 and 186 months in which flows would reduce 1% or more under the cumulative condition below Nimbus and at Watt Avenue, respectively. Thus, the proposed long-term surface water supply would not provide a substantial contribution to reductions in lower American River flows that would occur under the cumulative condition. Consequently, the proposed long-term surface water supply would have no cumulatively considerable contribution to significant impacts to fall-run Chinook salmon and steelhead spawning and incubation under the cumulative condition. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively

considerable contribution to the impact hat occur under the cumulative condition. Impacts would therefore be considered ***less than significant.***

Flow-Related Impacts to Fall-Run Chinook Salmon and Steelhead Juvenile Rearing (March through June). The majority of juvenile salmonid rearing is believed to occur upstream of Watt Avenue. Furthermore, diversions generally exceed tributary accretions to the river throughout the March through June period, resulting in lower flows at Watt Avenue than below Nimbus Dam. Therefore, all flow-related impact assessments for fall-run Chinook salmon and steelhead rearing are based on flows at Watt Avenue.

Relatively small differences in long-term average flows would occur between the cumulative condition and the existing condition during the March through June juvenile fall-run Chinook salmon and steelhead rearing period, with the largest reduction at Watt Avenue of 6.3%, relative to the existing condition (247 cfs, May). However, flows in individual months would be reduced from 3% to 71%, relative to the existing condition, in 174 of the 280 months included in the analyses throughout the March through June rearing period. These differences in flow may adversely affect long-term juvenile fall-run Chinook salmon or steelhead rearing habitat availability, and therefore represent a ***potentially significant cumulative impact.***

Incremental Contribution of the Long-Term Surface Water Supply. The proposed Specific Plan long-term surface water supply would have no cumulatively considerable contribution to cumulative lower American River flow reductions that would occur during the March through June rearing period. This long-term surface water supply would contribute up to four cfs (April), or 7%, to reductions in the long-term average flow at Watt Avenue, with no contribution to flow reductions in May, the month in which cumulative flow reductions would be greatest (Template Output H-123). Furthermore, the proposed long-term surface water supply would contribute six months, or 3%, to the 174 months in which flows would be reduced under the cumulative condition (Technical Appendix G-330 to G-333). Therefore, the proposed long-term surface water supply would not provide a significant contribution to the substantial reductions in lower American River flows that would occur under the cumulative condition, and consequently, would have no cumulatively considerable contribution to future potentially significant flow-related impacts to fall-run Chinook salmon and steelhead rearing on the lower American River. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. Impacts would therefore be considered ***less than significant.***

Temperature-Related Impacts to Fall-Run Chinook Salmon and Steelhead Juvenile Rearing (March through June). Under the cumulative condition, there would be two more occurrences during the March through June period in which water temperatures at Watt Avenue would be above 65°F, relative to the existing condition, although long-term average water temperature at Watt Avenue would not change by more than 0.3°F during any month of the March through June period, relative to the existing condition. Under the cumulative condition, water temperature increases of greater than 0.3°F, relative to the existing condition, would occur during the March through June period in 50 of the 276 months modeled. Such frequent increases in water temperature represent a ***potentially significant cumulative impact*** to fall-run Chinook salmon and steelhead juvenile rearing.

Incremental Contribution of the Long-Term Surface Water Supply. The proposed Specific Plan long-term surface water supply would have no cumulatively considerable contribution to potentially significant impacts to fall-run Chinook salmon and steelhead juvenile rearing. This long-term surface water supply would not contribute to the 50 occurrences of temperature increases of 0.3°F or more at Watt Avenue that would occur under the cumulative condition (Technical Appendix G-426 to G-429). Furthermore, the

proposed long-term surface water supply would not contribute to the frequency in which temperatures would be above 65°F under the cumulative condition (Template Output H-289), and would not contribute to increases in the long-term average temperatures at Watt Avenue (Template Output H-286). Thus, the proposed long-term surface water supply would not contribute significantly to increases in lower American River water temperatures at Watt Avenue that occur under the cumulative condition, and consequently, would have no cumulatively considerable contribution to potentially significant impacts to fall-run Chinook salmon and steelhead juvenile rearing. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. Impacts would therefore be ***less than significant***.

Flow-Related Impacts to Steelhead Rearing (July through September). Under the cumulative condition, the long-term average monthly flow below Nimbus Dam would decrease by approximately 7% to 15% (up to 370 cfs) throughout the July through September period, relative to the existing condition. At Watt Avenue, the long-term average monthly flow would decrease by approximately 8% to 16% (up to 383 cfs), relative to the existing condition. In addition, flows below Nimbus Dam under the cumulative condition would be reduced by 1% to 73% in 142 months of the 210 individual months included in the analysis. For Watt Avenue, flows under the cumulative condition would be reduced by 1% to 79% in 147 months of the 210 individual months included in the analysis. The flow reductions that would occur under the cumulative condition are of sufficient magnitude and frequency to reduce juvenile steelhead summer rearing habitat, relative to the amount available under the existing condition. Consequently, reductions in flow associated with the cumulative condition may adversely affect long-term rearing success of juvenile steelhead, and therefore represent a ***potentially significant cumulative impact***.

Incremental Contribution of the Long-Term Surface Water Supply. The proposed Specific Plan long-term surface water supply would have no cumulatively considerable contribution to the substantial flow reductions that would occur under the cumulative condition. For flows below Nimbus Dam, the proposed long-term surface water supply would contribute four months, or 3 percent of the total 142 months where reductions occur under the cumulative condition (Technical Appendix G-322 to G-324). Similarly, the proposed long-term surface water supply would contribute four months of reductions at Watt Avenue, or three percent of the total 147 months where reductions occur under the cumulative condition (Technical Appendix G-334 to G-336). The greatest flow reductions that the proposed long-term surface water supply would contribute to the cumulative condition during these four months at Nimbus Dam and Watt Avenue would be 5.7 percent and 7.5 percent, respectively. These flow reductions would occur during a critical water year, when existing flows would be relatively low. Flow reductions would not occur with sufficient magnitude or frequency to result in a significant contribution to changes in long-term average flows at either Nimbus Dam or Watt Avenue under the cumulative condition. Therefore, the proposed long-term surface water supply would have no cumulatively considerable contribution to potential impacts to steelhead rearing that would occur under the cumulative condition. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. Impacts would therefore be ***less than significant***.

Temperature-Related Impacts to Steelhead Rearing (July through September). Temperature modeling indicates that the long-term average water temperature at Watt Avenue would increase slightly each month during July through September under the cumulative condition, relative to the existing condition, with no increases (but several decreases) in the frequency in which water temperatures at Watt Avenue would be above 65°F.

During the July through September steelhead rearing period, water temperatures under the cumulative condition would be higher than those under the existing condition when water temperatures would already by relatively warm. In 41 months of the 207 months included in the analysis, water temperatures would increase by more than 0.3°F, relative to the existing condition, with increases up to 4.1°F when water temperatures under the existing condition are at 70°F or greater. Such water temperature increases represent a ***potentially significant cumulative impact*** to juvenile steelhead summer rearing.

Incremental Contribution of the Long-Term Surface Water Supply. The proposed Specific Plan long-term surface water supply would have no cumulatively considerable contribution to substantial water temperature increases that would occur under the cumulative condition. This long-term surface water supply would not result in any substantial increases in the frequency in which water temperatures at Watt Avenue would be above 65°F in any month of the July through September period (i.e., one additional occurrence in September) (Template Output H-289). Furthermore, the proposed long-term surface water supply would not contribute to the long-term average water temperature increases that would occur under the cumulative condition, and would only contribute one month, or 2%, to the number of months in which water temperatures under the cumulative condition would increase by greater than 0.3°F (Template Output H-286 and Technical Appendix G-430 to G-432). Thus, the proposed long-term surface water supply would not result in substantial increases in lower American River water temperatures at Watt Avenue during July through September, and consequently, would have no cumulatively considerable contribution to the potentially significant temperature-related impacts to steelhead rearing that would occur under the cumulative condition. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. This impact would therefore be ***less than significant.***

Mitigation Measures

No mitigation measures are required.

Impact: The RSUP would contribute to cumulative effects on lower American River fall-run Chinook salmon and steelhead.

As described above, average flows below Nimbus Dam under the cumulative condition would be reduced, resulting in a ***potentially significant cumulative impact***. Flow- and temperature-related impacts could occur to fall-run Chinook salmon and steelhead as a result.

Flow-Related Impacts to Fall-Run Chinook Salmon Spawning and Incubation (October Through February). The proposed RUSP long-term surface water supply would not have a cumulatively considerable contribution to future lower American River flow reductions at either Nimbus Dam or Watt Avenue during October through February. The maximum simulated reduction in long-term average flow would likely be less than 1 percent of the total cumulative reduction in flows. Thus, the proposed long-term surface water supply would not provide a substantial contribution to reductions in lower American River flows that would occur under the cumulative condition. Consequently, the proposed long-term surface water supply would have no cumulatively considerable contribution to significant impacts to fall-run Chinook salmon and steelhead spawning and incubation under the cumulative condition. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impact hat occur under the cumulative condition. Impacts would therefore be considered ***less than significant.***

Flow-Related Impacts to Fall-Run Chinook Salmon and Steelhead Juvenile Rearing (March through June). As discussed above, the greatest reductions to flows at Watt Avenue would occur during May under the cumulative condition. The proposed RUSP long-term surface water supply would have no cumulatively considerable contribution to cumulative lower American River

flow reductions that would occur during the March through June rearing period. This long-term surface water supply would contribute to minor reductions in the long-term average flow at Watt Avenue, with no contribution to flow reductions in May, the month in which cumulative flow reductions would be greatest. Therefore, the proposed long-term surface water supply would not provide a significant contribution to the substantial reductions in lower American River flows that would occur under the cumulative condition, and consequently, would have no cumulatively considerable contribution to future potentially significant flow-related impacts to fall-run Chinook salmon and steelhead rearing on the lower American River. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. Impacts would therefore be considered ***less than significant.***

Temperature-Related Impacts to Fall-Run Chinook Salmon and Steelhead Juvenile Rearing (March through June). As discussed above, there would be relatively frequent changes in water temperature under cumulative conditions, resulting in a potentially significant impact. However, the proposed RUSP long-term surface water supply would have no cumulatively considerable contribution to potentially significant impacts to fall-run Chinook salmon and steelhead juvenile rearing. This long-term surface water supply would not contribute to long- or short-term temperature increases at Watt Avenue that would occur under the cumulative condition. Thus, the proposed long-term surface water supply would not contribute significantly to increases in lower American River water temperatures at Watt Avenue that occur under the cumulative condition, and consequently, would have no cumulatively considerable contribution to potentially significant impacts to fall-run Chinook salmon and steelhead juvenile rearing. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. Impacts would therefore be ***less than significant.***

Flow-Related Impacts to Steelhead Rearing (July through September). As discussed above, reduced flows below Nimbus Dam and at Watt Avenue may adversely affect long-term rearing success of juvenile steelhead, resulting in a potentially significant impact. However, for flows below Nimbus Dam and at Watt Avenue, the proposed long-term surface water supply would contribute less than 3 percent of the total 142 months where reductions occur under the cumulative condition. Flow reductions would not occur with sufficient magnitude or frequency to result in a significant contribution to changes in long-term average flows at either Nimbus Dam or Watt Avenue under the cumulative condition. Therefore, the proposed long-term surface water supply would have no cumulatively considerable contribution to potential impacts to steelhead rearing that would occur under the cumulative condition. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. Impacts would therefore be ***less than significant.***

Temperature-Related Impacts to Steelhead Rearing (July through September). As discussed above, the long-term average water temperature at Watt Avenue would increase slightly each month during July through September under the cumulative condition, relative to the existing condition. This temperature fluctuation would occur with enough intensity and frequency to be considered a potentially significant impact. However, the proposed RUSP long-term surface water supply would have no cumulatively considerable contribution to substantial water temperature increases that would occur under the cumulative condition. This long-term surface water supply would not result in any substantial increases in the frequency in which water temperatures at Watt Avenue would be above 65°F in any month of the July through September period. Furthermore, the proposed long-term surface water supply would not contribute to the long-term average water temperature increases that would occur under the cumulative condition. Thus, the proposed long-term surface water supply would not result in substantial increases in lower American River water temperatures at Watt Avenue during July through September, and consequently, would have no cumulatively considerable contribution to the potentially significant temperature-related impacts to steelhead rearing that would occur under the cumulative condition. As the long-term surface water supply would not contribute to the impacts that occur

under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. This impact would therefore be ***less than significant.***

4.4-69 The Specific Plan could contribute to cumulative effects on lower American River splittail.

Under the cumulative condition, the modeled long-term average flow at Watt Avenue during February through May would decrease by 1.6% to 6.3%, relative to the existing condition. These flow reductions correspond to reductions in usable habitat of up to 3.9 acres, and in one year a 100% reduction, of the habitat available in individual years under the existing condition. While in many years, riparian vegetation would not be inundated throughout this period under either the cumulative or existing condition, reductions in inundated riparian habitat would occur virtually every month during the February through May period in those years when habitat would be inundated under the existing condition. However, relatively little splittail habitat is available under either the cumulative or existing condition. Given the uncertainty regarding the magnitude and extent of splittail spawning habitat in the lower American River, and the actual amount of potential spawning habitat available at specific flow rates throughout the river, the effects of flow reductions during the February through May period are also uncertain, and therefore, represent a ***potentially significant cumulative impact*** to this federally threatened species.

Incremental Contribution of the Long-Term Surface Water Supply. The proposed Specific Plan long-term surface water supply would have no cumulatively considerable contribution to potential cumulative impacts to lower American River splittail. The proposed long-term surface water supply would not result in changes in the long-term average amount of habitat available under the existing condition. Specifically, the proposed long-term surface water supply would result in changes (one increase of 0.2 acres, one decrease of 0.3 acres) in the amount of habitat in 2 months of the 280 months included in the analysis throughout the February through May period (Technical Appendix G-558 to G-561). Thus, the proposed long-term surface water supply would not contribute significantly to reductions in splittail habitat under the cumulative condition, and therefore, would have no cumulatively considerable contribution to future potential impacts to lower American River splittail. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. This impact is therefore considered ***less than significant***.

Mitigation Measures

No mitigation measures are required.

Impact: The RUSP could contribute to cumulative effects on lower American River splittail.

As discussed above, reduction of flows under cumulative conditions could result in the reduction of suitable habitat for lower American River splittail. However, the proposed long-term surface water supply would not result in changes in the long-term average amount of habitat available under the existing condition. The long-term surface water supply would only slightly alter the amount of habitat a small percentage of the time. Thus, the proposed long-term surface water supply would not contribute significantly to reductions in splittail habitat under the cumulative condition, and therefore, would have no cumulatively considerable contribution to future potential impacts to lower American River splittail. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. This impact is therefore considered ***less than significant.***

4.4-70 The Specific Plan could contribute to cumulative effects on Shasta Reservoir warmwater fisheries.

Hydrologic conditions under the cumulative condition would result in a decline in the long-term average end-of-month water surface elevation in Shasta Reservoir during the March through September period when warmwater fish spawning and initial rearing may be expected. In 275 months of the 490 months included in the analysis, the water surface elevation of Shasta Reservoir during the spawning and rearing period would be reduced by 2 to 54 feet msl, relative to the existing condition. Long-term average water surface elevation levels would be reduced up to 11 feet msl, relative to the existing condition. In addition, the long-term average amount of littoral habitat potentially available to warmwater fish for spawning and/or rearing under the cumulative condition would decrease by approximately 6% to 23% over the March through September period, relative to the existing condition. Reductions in the availability of littoral habitat under the cumulative condition may be of sufficient magnitude to substantially reduce long-term average initial year-class strength of warmwater fish populations. While the relative frequency of potential nest dewatering events under the cumulative condition would not change substantially, relative to the existing condition, overall potential impacts to Shasta Reservoir warmwater fisheries due to reductions in reservoir water surface elevation and decreases in littoral habitat under the cumulative condition represent a ***potentially significant cumulative impact.***

Incremental Contribution of the Long-Term Surface Water Supply. The proposed Specific Plan long-term surface water supply would have no cumulatively considerable contribution to future impacts to Shasta Reservoir warmwater fisheries. This long-term surface water supply would not contribute to reductions in long-term average water surface reservoir elevation, and would only contribute to elevation decreases in four months of the 490 months included in the analysis (Template Output H-487 and Technical Appendix G-186 to G-192). Furthermore, the proposed long-term surface water supply would not result in future increases in the frequency of potential nest-dewatering events, and would result in reductions in littoral habitat of up to three acres, or up to 1.6% of the total cumulative reduction in habitat (Template Output H-488 and H-494). Thus, the proposed long-term surface water supply would not contribute to significant reductions in reservoir water surface elevation or available littoral habitat, or increases in potential nest-dewatering events under the cumulative condition. Consequently, the proposed long-term surface water supply would have no cumulatively considerable contribution to future significant impacts to Shasta Reservoir warmwater fisheries under the cumulative condition. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. Impacts would therefore be considered ***less than significant.***

Mitigation Measures
No mitigation measures are required.

Impact: The RUSP could contribute to cumulative effects on Shasta Reservoir warmwater fisheries.

As discussed above, hydrologic conditions under the cumulative condition would result in a decline in the long-term average end-of-month water surface elevation in Shasta Reservoir during the March through September period when warmwater fish spawning and initial rearing may be expected, resulting in a potentially significant impact. However, RUSP's long-term surface water supply would not contribute to reductions in long-term average water surface reservoir elevation, and would likely only contribute to elevation decreases in no more than four months of the 490 months included in the analysis. This would not increase the frequency of potential nest-dewatering events, and could result in only minor reductions in littoral habitat. Thus, the proposed long-term surface water supply would not contribute to significant reductions in

reservoir water surface elevation or available littoral habitat, or increases in potential nest-dewatering events under the cumulative condition. Consequently, the proposed long-term surface water supply would have no cumulatively considerable contribution to future significant impacts to Shasta Reservoir warmwater fisheries under the cumulative condition. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. Impacts would therefore be considered ***less than significant.***

4.4-71 The Specific Plan could contribute to cumulative effects on upper Sacramento River fisheries (temperature-related).

The cumulative condition would result in changes in long-term average water temperature (both increases and decreases) at Keswick Dam and Bend Bridge, relative to the existing condition. There would also be several additional months in the simulation in which water temperatures would exceed 56°F or 60°F at either Keswick Dam or Bend Bridge. For example, there would be 22 additional occurrences where the 56°F index would be exceeded, and eight more occurrences where the 60°F index would be exceeded at Keswick Dam, relative to the existing condition. At Bend Bridge, there would be 31 additional occurrences where the 56°F index would be exceeded and seven more occurrences where the 60°F index would be exceeded, relative to the existing condition. Thus, the cumulative condition would result in a significant increase in the frequency of exceedance of temperature criteria identified in the NOAA Biological Opinion for winter-run Chinook salmon.

Early lifestage survival also was examined for winter-run, spring-run, fall-run and late fall-run Chinook salmon in the Sacramento River. Winter-run Chinook salmon long-term average early-lifestage survival would be 93.4% under the cumulative condition compared to 96% under the existing condition. Winter-run Chinook salmon, absolute long-term average early-lifestage survival would decrease more than 10% in 4 of the 69 years studied relative to the existing condition. Winter-run Chinook salmon relative long-term average early lifestage survival would decrease more than 10% in 5 of the 69 years studied. For fall-run Chinook salmon, long-term average early-lifestage survival would be 86.2% under the cumulative condition compared to 89.6% under the existing condition. Absolute and relative long-term average early lifestage survival of fall-run Chinook salmon would decrease more than 10% in 11 of the 69 years studied compared to the existing conditions. Spring-run Chinook salmon long-term average early-lifestage survival would be 81.7% under the cumulative condition compared to 87.5% under the existing condition. Absolute long-term average early-lifestage survival for spring-run Chinook salmon would decrease more than 10% in 8 of the 69 years studied. The long-term average relative percent change in early lifestage survival for spring-run Chinook salmon would decrease by approximately 6.2% compared to the existing condition. Relative long-term average early-lifestage survival would decrease more than 10% in 10 of the 69 years studied. The long-term average early-lifestage survival for late fall-run Chinook salmon would be 98.7% under the cumulative condition compared to 99.1% under the existing conditions. No decreases of more than 10% in absolute or relative long-term average early-lifestage survival are expected for late fall-run Chinook salmon.

Based on the increased number of exceedances of the temperature criteria identified in the NOAA Biological Opinion for winter-run Chinook salmon, and decreases in absolute and relative long-term early lifestage survival of fall-run, winter-run and spring-run Chinook salmon, water temperature-related impacts to upper Sacramento River fisheries under the cumulative condition would represent a ***potentially significant cumulative impact***.

Incremental Contribution of the Long-Term Surface Water Supply. The proposed Specific Plan long-term surface water supply would have no cumulatively considerable contribution to significant upper Sacramento River water temperature-related fisheries impacts that would occur under the cumulative condition. For water temperatures below Keswick Dam and Bend Bridge, the proposed long-term surface water supply would have

no cumulatively considerable contribution to increases in long-term average water temperatures under the cumulative condition as shown in Tables 4.4-15 and 4.4-16 (Template Output H-300 and H-307). Similarly, there would be no cumulatively considerable contribution to the increase in the frequency of exceedance of the 56°F and 60°F temperature criteria at either Keswick Dam or Bend Bridge (Template Output H-303 and H-310).

Table 4.4-15 Long-Term Average Water Temperature in the Sacramento River Below Keswick Dam Under Future NP and Cumulative Conditions			
Month	Water Temperature[1] (°F)		
	Future NP	Cumulative	Difference (°F)
Oct	53.6	53.6	0.0
Nov	53.0	53.0	0.0
Dec	48.9	48.9	0.0
Jan	45.3	45.3	0.0
Feb	47.3	47.3	0.0
Mar	51.0	51.0	0.0
Apr	51.1	51.1	0.0
May	48.0	48.0	0.0
Jun	47.5	47.5	0.0
Jul	48.8	48.8	-0.1
Aug	51.2	51.2	0.0
Sep	51.5	51.5	0.0
[1] Based on 69 Years Modeled			
Source: SWRI, 2002.			

Table 4.4-16 Long-Term Average Water Temperature in the Sacramento River at Bend Bridge Under Future NP and Cumulative Conditions			
Month	Water Temperature[1] (°F)		
	Future NP	Cumulative	Difference (°F)
Oct	55.7	55.7	0.0
Nov	52.2	52.2	0.0
Dec	47.2	47.2	0.0
Jan	44.9	44.9	0.0
Feb	48.0	48.0	0.0
Mar	52.0	52.0	0.0
Apr	54.7	54.7	0.0
May	54.8	54.8	0.0
Jun	54.5	54.5	0.0
Jul	54.7	54.7	0.0
Aug	56.1	56.1	0.0
Sep	56.8	56.8	0.0
[1] Based on 69 Years Modeled			
Source: SWRI, 2002.			

In addition, there would not be substantial decreases in absolute or relative annual early-lifestage survival of fall-run and late fall-run Chinook salmon in any individual year under the proposed long-term surface water supply relative to the cumulative condition (Technical Appendices H-566 to H-569). For winter-run Chinook salmon, the long-term average early-lifestage survival would be 93.4% for both the proposed long-term surface water supply and the cumulative conditions. There would not be substantial decreases in absolute annual early-lifestage survival of winter-run Chinook salmon in any individual year of the 69-year period of record. The long-term surface water supply would not result in a change in mean long-term average relative percent in early-lifestage survival, relative to early-lifestage survival

under the cumulative condition. In 2 of the 69 years modeled, early-lifestage survival would decrease relative to the cumulative condition. In these two years, winter-run Chinook salmon absolute and relative long-term average early lifestage survival would not decrease by more than 10%. The largest relative decrease that would occur would be 5.7%, though this individual year's reduction in early lifestage winter-run Chinook salmon survival would not change the mean long-term average survival.

For spring-run Chinook salmon, the long-term average early-lifestage survival would be 81.7% under the proposed long-term surface water supply and 81.7% under the cumulative condition. There would be no substantial decreases in absolute annual early-lifestage survival of spring-run Chinook salmon in any individual year of the 69-year period of record. There would not be a change in mean long-term average relative percent in early-lifestage survival, relative to early-lifestage survival under the cumulative condition. In 4 of the 69 years modeled, early-lifestage survival would decrease relative to the cumulative condition. In these four years, spring-run Chinook salmon absolute and relative long-term early-lifestage survival would not decrease by more than 10%. The largest relative decrease that would occur would be 5.9%, though this individual year's reduction in early-lifestage spring-run Chinook salmon survival would not change the mean long-term average survival.

Therefore, the proposed long-term surface water supply would have no cumulatively considerable contribution to the potentially significant temperature-related impacts to fisheries of the upper Sacramento River that would occur under the cumulative condition. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. Impacts would therefore be considered ***less than significant.***

Mitigation Measures

No mitigation measures are required.

Impact: The RUSP could contribute to cumulative effects on upper Sacramento River fisheries (temperature-related).

As discussed above, the cumulative condition would result in adverse changes in long-term average water temperature (both increases and decreases) at Keswick Dam and Bend Bridge, relative to the existing condition, resulting in a potentially significant impact. However, the RUSP would not exacerbate the cumulative conditions. For water temperatures below Keswick Dam and Bend Bridge, the proposed long-term surface water supply would have no cumulatively considerable contribution to increases in long-term average water temperatures under the cumulative condition. In addition, there would not be substantial decreases in absolute or relative annual early-lifestage survival of fall-run and late fall-run or spring-run Chinook salmon. Therefore, the proposed long-term surface water supply would have no cumulatively considerable contribution to the potentially significant temperature-related impacts to fisheries of the upper Sacramento River that would occur under the cumulative condition. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. Impacts would therefore be considered ***less than significant.***

4.4-72 The Specific Plan could contribute to cumulative effects on lower Sacramento River fisheries (temperature related).

Under the cumulative condition, the long-term average water temperature at Freeport on the lower Sacramento River would not change more than 0.3°F during any month of the year, relative to the existing condition. However, the number of years that water temperatures at this location would exceed 56°F, 60°F, and 70°F would be greater (i.e., 2 more occurrences

for the 56°F index, 11 more occurrences for the 60°F index, and 9 more occurrences for the 70°F index), relative to the existing condition, during the March through November period. In addition, water temperature at Freeport would increase by 0.3°F or more, relative to the existing condition, in 178 of the 828 months included in the analysis. Based on these findings, potential temperature-related impacts to fish species within the lower Sacramento River represent a ***potentially significant cumulative impact.***

Incremental Contribution of the Long-Term Surface Water Supply. The proposed Specific Plan long-term surface water supply would have no cumulatively considerable contribution to the frequent water temperature increases that would occur under the cumulative condition. This long-term surface water supply would not contribute to increases in long-term average water temperatures at Freeport on the lower Sacramento River, and would not contribute to increases in the frequency of water temperature criteria exceedance that would occur under the cumulative condition, as shown in Tables 4.4-17 and 4.4-18 (Template Output H-321 and H-324). Furthermore, the proposed long-term surface water supply would not contribute to increases in water temperature of 0.3°F or more in any month of the 828 months included in the analysis (Technical Appendix G-481 to G-492). Therefore, the proposed long-term surface water supply would not contribute to future significant water temperature increases on the lower Sacramento River, and consequently, would have no cumulatively considerable contribution to temperature-related impacts to lower Sacramento River fisheries that occur under the cumulative condition. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. This impact is therefore considered ***less than significant.***

Table 4.4-17
Long-Term Average Water Temperature in the Sacramento River at Freeport Under Future NP and Cumulative Conditions

Month	Water Temperature[1] (°F)		
	Future NP	Cumulative	Difference (°F)
Oct	60.8	60.8	0.0
Nov	52.6	52.6	0.0
Dec	45.9	45.9	0.0
Jan	44.8	44.8	0.0
Feb	49.1	49.1	0.0
Mar	53.9	53.9	0.0
Apr	59.9	59.9	0.0
May	65.4	65.4	0.0
Jun	69.8	69.8	0.0
Jul	72.8	72.8	0.0
Aug	72.0	72.0	0.0
Sep	68.6	68.6	0.0

[1] Based on 69 Years Modeled

Source: SWRI, 2002.

Table 4.4-18 Water Temperature Exceeding Index Temperatures in the Sacramento River at Freeport Under Future NP and Cumulative Conditions Number of years[1] exceeding index and, in parentheses, average temperature in years when index is exceeded										
Index:	**56°F**		**60°F**		**65°F**		**68°F**		**70°F**	
Month	**Future NP**	**Cum.**	**Future NP**	**Cum.**	**Future NP**	**Cum.**	**Future NP**	**Cum.**	**Future NP**	**Cum.**
Oct	69(60.8°)	69(60.8°)	45(61.7°)	45(61.7°)	1(65.1°)	1(65.1°)	0	0	0	0
Nov	1(56.4°)	1(56.4°)	0	0	0	0	0	0	0	0
Dec	0	0	0	0	0	0	0	0	0	0
Jan	0	0	0	0	0	0	0	0	0	0
Feb	0	0	0	0	0	0	0	0	0	0
Mar	9(57.2°)	9(57.2°)	0	0	0	0	0	0	0	0
Apr	66(60.1°)	66(60.1°)	35(61.8°)	35(61.8°)	1(65.1°)	1(65.1°)	0	0	0	0
May	69(65.4°)	69(65.4°)	69(65.4°)	69(65.4°)	39(66.8°)	39(66.8°)	7(69.3°)	7(69.3°)	1(70.6°)	1(70.6°)
Jun	69(69.8°)	69(69.8°)	69(69.8°)	69(69.8°)	69(69.8°)	69(69.8°)	57(70.3°)	57(70.3°)	30(71.3°)	30(71.3°)
Jul	69(72.8°)	69(72.8°)	69(72.8°)	69(72.8°)	69(72.8°)	69(72.8°)	69(72.8°)	69(72.8°)	69(72.8°)	69(72.8°)
Aug	69(72°)	69(72°)	69(72°)	69(72°)	69(72°)	69(72°)	69(72°)	69(72°)	69(72.3°)	69(72.3°)
Sep	69(68.6°)	69(68.6°)	69(68.6°)	69(68.6°)	69(68.7°)	69(68.7°)	46(69.5°)	46(69.5°)	10(70.9°)	10(70.9°)
[1] Based on 69 Years Modeled										
Source: SWRI, 2002.										

Mitigation Measures
No mitigation measures are required.

Impact: The RUSP could contribute to cumulative effects on lower Sacramento River fisheries (temperature related).

As discussed above, water temperatures in the lower Sacramento River could exceed temperature thresholds under cumulative conditions, potentially resulting in a potentially significant impact on fish species. However, the proposed RUSP long-term surface water supply would have no cumulatively considerable contribution to the frequent water temperature increases that would occur under the cumulative condition. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. This impact is therefore considered ***less than significant.***

4.4-73 The Specific Plan could contribute to cumulative effects on Delta fish populations.

Delta outflow during the period of February through June is believed to be of greatest concern for potential effects to spawning and rearing habitat and downstream transport flows for delta smelt, longfin smelt, splittail, striped bass, salmonids, and other aquatic species in the Delta. In 38 of the 350 months modeled throughout the February through June period, Delta outflow would decrease by 10% or more, relative to the existing condition, with the greatest long-term reduction in long-term average Delta outflow at 4.5% (June).

Under the cumulative condition, the long-term average position of X2 would move upstream less than one km, relative to the existing condition, in any given month of the year. However, during the February through June period considered important for providing appropriate spawning and rearing conditions and downstream transport flows for various fish species, the upstream shift in the position of X2 under the cumulative condition would change 12% of the time (for 42 of the 350 months included in the analysis), relative to the existing condition.

The model simulations conducted for the cumulative condition included conformance with X2 requirements set forth in the SWRCB *Interim Water Quality Control Plan*. Furthermore, Delta export-to-inflow ratios under the cumulative condition would not exceed the maximum export ratio as set by the SWRCB *Interim Water Quality Control Plan*. Although the cumulative condition would not cause X2 or Delta outflow standards to be violated, there would be a decrease in long-term average outflow and an upstream shift in the position of X2, relative to the existing condition. Such changes to the Delta system would be considered to result in ***potentially significant cumulative impacts*** to Delta fisheries.

Incremental Contribution of the Long-Term Surface Water Supply. The proposed Specific Plan long-term surface water supply would not result in a significant contribution to Delta fisheries impacts under the cumulative condition. The proposed long-term surface water supply would not contribute to increases of Delta outflow of 10% or more; in fact, the greatest single reduction, at 357 cfs (May 1937), which would result in only a 1.9% decrease relative to the cumulative condition (Technical Appendix G-5 to G-9).

Furthermore, the proposed long-term surface water supply would not contribute to future shifts in the long-term average position of X2 (Template Output H-429). Based on the 350 months modeled throughout the February though June period, the proposed long-term surface water supply would result in shifts in the position of X2 of up to 0.2 km in 13 months (Technical Appendix G-17 to G-21). Thus, the proposed long-term surface water supply would not contribute significantly to future reductions in Delta outflow or shifts in the position of X2 that would occur under the cumulative condition, and consequently, would have no cumulatively considerable contribution to potentially significant impacts to Delta fish species that occur under the cumulative condition. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. This impact is therefore considered ***less than significant.***

<u>Mitigation Measures</u>

No mitigation measures are required.

Impact: The RUSP could contribute to cumulative effects on Delta fish populations.

As discussed above, there would be a decrease in long-term average outflow and an upstream shift in the position of X2, relative to the existing condition. Such changes to the Delta system would be considered to result in potentially significant cumulative impacts to Delta fisheries. However, the proposed long-term surface water supply would not contribute to increases of Delta outflow of 10% or more. The long-term average position of X2 would not shift more than 1 km. Thus, the proposed long-term surface water supply would not contribute significantly to future reductions in Delta outflow or shifts in the position of X2 that would occur under the cumulative condition, and consequently, would have no cumulatively considerable contribution to potentially significant impacts to Delta fish species that occur under the cumulative condition. As the long-term surface water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. This impact is therefore considered ***less than significant.***

Placer Vineyards Specific Plan RDEIR Cultural Resources Discussion

p. 4.6-85 – 4.6-87

As stated in Section 3.4 in Chapter Three of this Revised Draft EIR, it is recognized that a water supply of 11,500 AFA will be required to meet the needs of the Specific Plan buildout. This 13,000 AFA is part of the PCWA's pending amendatory CVP contract with the USBR for 35,000 AFA. This water would be diverted from the Sacramento River, which has an annual runoff of approximately 18 million AF (PCWA 2001). The entire 35,000 AFA of the PCWA CVP contract water was used for the project's incremental contribution analysis (for further description of the cumulative analysis, see Section 4.3.4 of this Revised Draft EIR). The full CVP contract amount of 35,000 AFA (long-term water supply) was evaluated based on the premise that this higher diversion amount provides a conservative representation of potential impacts associated with increased diversions from the Sacramento River to meet the proposed Specific Plan long-term water supply needs.

The analysis below consists of two parts: first, an analysis to determine the effect of the proposed Specific Plan water supply in combination with all past, present, and reasonably foreseeable future projects (cumulative analysis); and second, if a significant cumulative impact is found, an analysis to determine the incremental contribution of the long-tem water supply to the cumulative impact. If the modeling results indicated that potentially significant or significant impacts would occur under the full (35,000 AFA) long-term water supply, then further evaluation would be performed to look more closely at the future Specific Plan long-term water supply project's 11,500 AFA diversion potential to affect environmental resources.

4.6-20 The off-site infrastructure areas could be affected by changes in flows in the lower American River, Sacramento River, and Sacramento-San Joaquin Delta and changes in water surface elevation at Shasta, Trinity and Folsom Reservoirs.

The *American River Basin Cumulative Report* evaluated the potential for future impacts to cultural resources associated with the lower American River, Sacramento River, Sacramento-San Joaquin Delta, and Folsom, Shasta and Trinity reservoirs. The results of this analysis indicated there would be ***no potentially significant cumulative impacts*** on lower American River flows, Folsom Reservoir elevation, Trinity Reservoir elevation, the upper and lower Sacramento River, and the Delta.

The Cumulative Report, did, however, identify potentially significant cumulative impacts to cultural resources associated with Shasta Reservoir elevation. Under the cumulative condition, there would not be significant increases in maximum monthly water surface reservoir elevation, relative to the existing condition, throughout the 70-year period of simulation. However, with regard to maximum drawdown, a comparison of the minimum end-of-month water surface elevations between the cumulative and existing conditions

indicates that the minimum water surface elevation for each month would be from 8 to 45 feet msl lower, relative to the existing condition. This could result in increased exposure of cultural resources and represents a ***potentially significant cumulative impact*** to cultural resources at Shasta Reservoir.

Incremental Contribution of the Long-Term Water Supply. The proposed Specific Plan long-term water supply would not contribute to the reductions in minimum water surface reservoir elevation that would occur under the cumulative condition in any month of the year. In fact, under the proposed long-term water supply, there would be increases of up to one foot msl in the minimum and average end of the month elevation at Shasta Reservoir, relative to the cumulative condition (Template Output H-66). In 836 of the 840 months modeled, Shasta Reservoir end of the month elevation would remain equivalent to or greater than those elevations under the cumulative condition (Technical Appendix G-181 to G-192). Therefore, the proposed long-term water supply would not contribute significantly to increases in the exposure of cultural resources at Shasta Reservoir, and hence, would have no cumulatively considerable contribution to future significant impacts to Shasta Reservoir cultural resources. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. This impact is therefore considered ***less than significant***.

Mitigation Measure

No mitigation measures are required.

Impact: The off-site infrastructure areas could be affected by changes in flows in the lower American River, Sacramento River, and Sacramento-San Joaquin Delta and changes in water surface elevation at Shasta, Trinity and Folsom Reservoirs.

As discussed above, there would be potentially significant cumulative impacts to cultural resources associated with Shasta Reservoir elevation resulting in increased exposure of cultural resources under cumulative conditions. However, the proposed RUSP long-term water supply would not contribute to the reductions in minimum water surface reservoir elevation that would occur under the cumulative condition. Therefore, the proposed long-term water supply would not contribute significantly to increases in the exposure of cultural resources at Shasta Reservoir, and hence, would have no cumulatively considerable contribution to future significant impacts to Shasta Reservoir cultural resources. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. This impact is therefore considered ***less than significant***.

Placer Vineyards Specific Plan RDEIR Parks and Recreation Discussion

p. 4.11-128

Surface Water Supply Setting

Numerous recreational opportunities in the vicinity of the Specific Plan occur on or near natural water bodies such as the Sacramento and American Rivers and their reservoirs. This section describes the existing water-related recreational resources within the study area of the Specific Plan's water supply, including the regional and project settings. This section also presents an analysis of potential effects to these resources due to implementation of the proposed Specific Plan water supply.

The setting descriptions contained in the *PCWA American River Pump Station Project EIS/EIR* are incorporated by reference in their entirety (PCWA and Reclamation, 2001) and the *American River Basin Cumulative Report* prepared by Reclamation as part of the referenced

EIS/EIR (September 2002). The discussions of the various setting components contained in this section are, for the most part, taken directly from those documents.

The first impact analysis conducted is to evaluate the effects of the proposed Specific Plan initial surface water supply of 6,000 AFA to be provided by PCWA, compared to the existing condition. While the established buildup schedule of water use for the project predicts that approximately 6,000 AFA would be needed by the year 2012, the modeling assumed that the project supplies would be immediately required. For analytical purposes, this means that the results of the proposed initial surface water supply evaluation (using the 6,000 AFA) under existing conditions were conservative (i.e., tended to overemphasize any real present day effects).

The second impact analysis conducted is to evaluate any cumulative effects, as well as the incremental contribution of the proposed Specific Plan long-term water supply of 11,500 AFA required to meet the needs of the Specific Plan buildout (for a further description of the cumulative analysis, see Section 4.3.3 of this Revised Draft EIR). This 11,500 AFA water supply, which would be diverted from the Sacramento River, is part of the PCWA's pending amendatory CVP contract with Reclamation for 35,000 AFA. The entire 35,000 AFA of the PCWA CVP contract water was modeled to evaluate the project's incremental contribution to the cumulative condition.

The impact assessment focuses on water-dependent and water-enhanced recreation opportunities, excluding sport fishing. The Specific Plan water supply effects on fisheries resources, including those species of interest for sport fishing, are discussed in Section 4.4.4 of this Revised Draft EIR.

p. 4.11-171 – 4.11-175

SURFACE WATER SUPPLY

A surface water supply of 11,500 AFA will be required to meet the needs of the Specific Plan buildout. This 11,500 AFA is a portion of the PCWA's pending amendatory CVP contract with the Reclamation for 35,000 AFA. This water would be diverted from the Sacramento River, which has an annual runoff of approximately 18 million AF (PCWA 2001). The entire 35,000 AFA of the PCWA CVP contract water was used for the project's incremental contribution analysis (For a further description of the cumulative analysis, see Section 4.3.3 of this Revised Draft EIR). The full CVP contract amount of 35,000 AFA (long-term surface water supply) was evaluated based on the premise that this higher diversion amount provides a conservative representation of potential impacts associated with increased diversions from the Sacramento River to meet the proposed project needs.

The following consists of two parts: (1) an analysis to determine the effect of the proposed Specific Plan water supply project in combination with all past, present, and reasonably foreseeable future projects (cumulative analysis) (this is the same as the *American River Basin Cumulative Report (*Cumulative Report) analysis that was prepared by Reclamation in September 2002 as part of the PCWA Pump Station Project EIS/EIR); and (2) if a significant cumulative impact was found, an analysis to determine the incremental contribution of the long-term water supply to the cumulative impact. If the modeling results indicated that potentially significant or significant impacts would occur under the full (35,000 AFA) long-term surface water supply, then further evaluation was performed to evaluate more closely the future Specific Plan long-term surface water supply project's 11,500 AFA diversion potential to affect environmental resources.

The Cumulative Report evaluated the potential for future impacts to water-related recreational activities associated with the lower American River, Sacramento River, Sacramento-San Joaquin Delta, and Folsom, Shasta and Trinity reservoirs. The results of this analysis indicated there would be no significant adverse cumulative impacts on:

- Upper Sacramento River Recreation,
- Lower Sacramento River Recreation,
- Delta Recreation, or
- Trinity Reservoir Recreation.

The Cumulative Report, however, identified ***potentially significant cumulative impacts*** related to the following water-related recreational activities:

- Lower American River Recreation,
- Folsom Reservoir Boating,
- Folsom Reservoir Swimming, and
- Shasta Reservoir Recreation.

These potentially significant cumulative impacts identified in the Cumulative Report are identified below. Each impact includes an evaluation of the potential for the proposed Specific Plan long-term water supply to result in a cumulatively considerable contribution to the identified cumulative impact.

4.11.13-19 Development of the Specific Plan could result in a cumulative effect on lower American River recreation.

Under the cumulative condition, flows would be reduced by greater than 1%, relative to the existing condition, in 229 months of the 350 months modeled throughout the May through September recreational use period. This would be considered a significant reduction in recreational opportunities on the lower American River. For recreational flow ranges, the cumulative condition would result in 12 fewer months in which lower American River flows would be in the minimum to maximum flow range (1,750 to 6,000 cfs), relative to 255 months within this range under the existing condition, and 19 fewer months within the optimum flow range (3,000 to 6,000 cfs), relative to 165 months within this range under the existing condition.

Incremental Contribution of the Long-Term Surface Water Supply. The proposed long-term water supply long-term average results indicate no fewer months in which lower American River flows would be in the minimum to maximum flow range (1,750 to 6,000 cfs), and no fewer months within the optimum flow range (3,000 to 6,000 cfs), relative to the cumulative condition (Template Output H-44). Therefore, the proposed long-term water supply would have no cumulatively considerable contribution to the significant recreational impacts that would occur under the cumulative condition. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. The impacts would be considered ***less than significant.***

<u>Mitigation Measure</u>

No mitigation measures are required.

Impact: Development of the RUSP could result in a cumulative effect on lower American River recreation.

Under the cumulative condition, flows would be reduced by greater than 1%, relative to the existing condition 65 percent of the months modeled throughout the May through September recreational use period. This would be considered a significant reduction in recreational opportunities on the lower American River. However, the proposed long-term water supply would likely not reduce the number of months that the lower American River would be in the minimum to

maximum flow range or in the optimum flow range. Therefore, the proposed long-term water supply would have no cumulatively considerable contribution to the significant recreational impacts that would occur under the cumulative condition. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. The impacts would be considered ***less than significant.***

4.11.13-20 Development of the Specific Plan could result in a cumulative effect on Folsom Reservoir boating.

Under the cumulative condition, Folsom Reservoir elevation levels during the March through September recreational use period would be above the elevation required for use of all boat ramps (420 feet msl) in 37 fewer months, relative to 330 months available under the existing condition. Reservoir elevations would fall below 412 feet msl, the elevation required for the use of marina wet slips, in 37 additional months, relative to 368 months available under the existing condition. Such reductions in reservoir elevation would be considered to significantly reduce Folsom Reservoir boating opportunities under the cumulative condition, relative to the existing condition.

Incremental Contribution of the Long-Term Surface Water Supply. The proposed long-term water supply would be above the elevation required for use of all boat ramps (420 feet msl) in no fewer months, and reservoir elevations would fall below 412 feet msl in no additional months during the March through September period, relative to the cumulative condition (Template Output H-47). Consequently, the proposed long-term water supply would have no cumulatively considerable contribution to the significant Folsom Reservoir boating impacts that would occur under the cumulative condition. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. The impacts would be considered ***less than significant.***

Mitigation Measure

No mitigation measures are required.

Impact: Development of the RUSP could result in a cumulative effect on Folsom Reservoir boating.

As discussed above, Folsom Reservoir elevation levels during the March through September recreational use period would be frequently reduced under cumulative conditions. However, the proposed long-term water supply would be above the elevation required for use of all boat ramps and marina wet slips in no additional months during the March through September period, relative to the cumulative condition. Consequently, the proposed long-term water supply would have no cumulatively considerable contribution to the significant Folsom Reservoir boating impacts that would occur under the cumulative condition. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. The impacts would be considered ***less than significant.***

4.11.13-21 Development of the Specific Plan could result in a cumulative effect on Folsom Reservoir swimming.

Under the cumulative condition, Folsom Reservoir water levels would be within the usable swimming range (420 to 455 feet msl) during the peak May through September swimming

season in 26 fewer months, relative to 149 usable months under the existing condition. For the optimum use elevation range (435 to 455 feet msl), there would be 15 fewer usable months, under the cumulative condition, relative to 73 months within the range under the existing conditions. Such changes in reservoir water levels under the cumulative condition would significantly limit swimming opportunities at Folsom Reservoir, relative to the existing condition.

Incremental Contribution of the Long-Term Surface Water Supply. The proposed long-term water supply would not contribute to reductions in the frequency of usability for either the usable or optimum elevation ranges required for swimming activities at Folsom Reservoir in any month modeled for the May through September period (Template Output H-47). Therefore, the proposed long-term water supply would have no cumulatively considerable contribution to Folsom Reservoir swimming impacts under the future cumulative condition. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. The impacts would be considered ***less than significant.***

Mitigation Measure

No mitigation measures are required.

Impact: Development of the RUSP could result in a cumulative effect on Folsom Reservoir swimming.

As discussed above, Folsom Reservoir elevation levels during the May through September swimming use period would be frequently reduced under cumulative conditions. However, The proposed long-term water supply would not contribute to reductions in the frequency of usability for either the usable or optimum elevation ranges required for swimming activities at Folsom Reservoir in any month modeled for the May through September period. Therefore, the proposed long-term water supply would have no cumulatively considerable contribution to Folsom Reservoir swimming impacts under the future cumulative condition. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. The impacts would be considered ***less than significant.***

4.11.13-22 Development of the Specific Plan could result in a cumulative effect on Shasta Reservoir recreation.

Under the cumulative condition, long-term average water surface elevation at Shasta Reservoir would not be substantially reduced during the May through September period. However, reservoir water surface elevation levels would fall below individual recreational thresholds more frequently than under the existing condition. Under the cumulative condition, there would be 25 fewer months in which reservoir water surface elevations would be at or above the levels required for usability of all boat ramps (1,017 feet msl), relative to 206 usable months under the existing condition. Similarly, there would be 12 fewer months in which reservoir water surface elevations would be at or above the levels required for usability of at least one boat ramp (941 feet msl), relative to 329 usable months under the existing condition. Furthermore, there would be 27 fewer months in which water surface elevations would be suitable for shoreline uses (1,007 feet msl), and 17 fewer months in which boat-in camping would be sustained (967 feet msl), relative to 234 and 310 months, respectively, in which these uses would be sustained under the existing condition. Such reductions would occur with sufficient frequency to significantly limit future recreational opportunities at Shasta Reservoir, under the cumulative condition.

Incremental Contribution of the Long-Term Surface Water Supply. The proposed long-term water supply, however, would not contribute to reductions in the usability of any recreational activity at Shasta Reservoir in any month modeled for the May through September recreational use period, as shown in Table 4.11-28 (Template Output H-52). Therefore, the proposed long-term water supply would have no cumulatively considerable contribution to significant cumulative impacts to recreation at Shasta Reservoir that would occur under the cumulative condition. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no cumulatively considerable contribution to the impacts that occur under the cumulative condition. The impacts would be considered ***less than significant.***

Mitigation Measure

No mitigation measures are required.

Table 4.11-28

Recreation Facility Usability of Shasta Reservoir Under Future No Project (NP) and Cumulative Conditions

Month	Number of Years of the 70-Year Record at Specified Levels											
	Number of Years All Boat Ramps Usable			**Number of Years At Least One Boat Ramp Usable on Each Arm**			**Number of Years Shoreline Use Levels Sustained**			**Number of Years Boat-In Camping Use Levels Sustained**		
	(>=1,017 ft)			(>=941 ft)			(>=1,007 ft)			(>=967 ft)		
	Future NP	Cumulative	Diff	Future NP	Cumulative	Diff	Future NP	Cumulative	Diff	Future NP	Cumulative	Diff
May	57	57	0	68	68	0	60	60	0	64	64	0
June	50	50	0	65	65	0	54	54	0	63	63	0
July	33	33	0	63	63	0	42	42	0	61	61	0
Aug.	24	24	0	61	61	0	26	26	0	55	55	0
Sept.	17	17	0	60	60	0	25	25	0	50	50	0
Total			0			0			0			0

Impact: Development of the RUSP could result in a cumulative effect on Shasta Reservoir recreation.

As discussed above, under the cumulative condition, long-term average water surface elevation at Shasta Reservoir would not be substantially reduced during the May through September period. However, reservoir water surface elevation levels would fall below individual recreational thresholds more frequently than under the existing condition. Decreased water levels would affect the usability of boat ramps, shoreline uses and boat-in camping. Such reductions would occur with sufficient frequency to significantly limit future recreational opportunities at Shasta Reservoir, under the cumulative condition.

However, the proposed long-term water supply, however, would not contribute to reductions in the usability of any recreational activity at Shasta Reservoir during the May through September recreational use period. Therefore, the proposed long-term water supply would have no cumulatively considerable contribution to significant cumulative impacts to recreation at Shasta Reservoir that would occur under the cumulative condition. As the long-term water supply would not contribute to the impacts that occur under the cumulative condition, it would also have no

cumulatively considerable contribution to the impacts that occur under the cumulative condition. The impacts would be considered ***less than significant***.