3.8 Comments from Regional and Local Governments and Agencies and Responses

This section contains copies of comment letters (and any attachments) from the regional and local governments agencies listed in Table 3.8-1. As noted previously, each comment in the comment letters was assigned a number, in sequential order (note that some letters may have more than one comment). The numbers were then combined with an abbreviation for the local agency (example: AEWSD-1). For some comments, letters were added alphabetically to further identify related comments (example: AEWSD-2a).

Responses to the comments follow the comment letters, and are also numbered, corresponding to the numbers assigned in the letters. The letters and associated responses are sorted alphabetically by abbreviation and appear in the section in that order.

Table 3.8-1.
Regional and Local Governments and Agencies Providing Comments on Draft Program Environmental Impact Statement/Report

Abbreviation	Agency
AEWSD	Arvin-Edison Water Storage District
CCWD	Contra Costa Water District
EBMUD	East Bay Municipal Utility District
EC1	San Joaquin River Exchange Contractors Water Authority and the San Joaquin River Resource Management Coalition
EC2	San Joaquin River Exchange Contractors Water Authority and the San Joaquin River Resource Management Coalition
EC3	Duane Morris LLC
EC4	Lower San Joaquin Levee District, San Joaquin River Exchange Contractors Water Authority, San Luis and Delta-Mendota Water Authority
FMFCD	Fresno Metropolitan Flood Control District
FRES	Fresno County Board of Supervisors
FWA	Friant Water Authority

**Table 3.8-1.
Regional and Local Governments and Agencies Providing Comments on Draft Program Environmental Impact Statement/Report (contd.)**

Abbreviation	Agency
KCWA	Kern County Water Agency
KRFMP	Kings River Fisheries Management Program
KRWA	Kings River Water Association
LSJLD	Lower San Joaquin Levee District (Reggie Hill)
LSJLD2	Lower San Joaquin Levee District (Thomas Keene)
MADE	Madera County Department of Engineering and General Services
SEMI	Semitropic water Storage District
SEWD	Stockton East Water District
SJRA	San Joaquin River Association
SJTA	San Joaquin Tributaries Association
SLCC	San Luis Canal Company/Henry Miller Reclamation District #2131
SLDMWA	San Luis and Delta-Mendota Water Authority
STAN	Stanislaus County Environmental Review Committee
SWC	State Water Contractors
SWID	Shafter-Wasco Irrigation District

3.8.1 Arvin-Edison Water Storage District

AEWSD

ARVIN-EDISON WATER STORAGE DISTRICT

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September 21, 2011

VIA ELECTRONIC MAIL

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Re: Comments to Draft Program Environmental Impact Statement/Environmental Impact Report (Draft PEIS/R) For the San Joaquin River Restoration Program (SJRRP)

Dear Ms. Banonis and Ms. Schulte:

The Arvin-Edison Water Storage District (District) has reviewed the DPEIS/R for the SJRRP and is submitting the following comments:

AEWSD-1 **Surface Water Impacts:** The District has significant concerns regarding the analysis of impacts from reduced surface water supplies to Friant long-term contractors (LTC), notwithstanding the conclusions that various impacts caused by reduced deliveries are significant and unavoidable. The primary problem with the analysis of reduced water supplies is that the use of CalSIM and some of the assumptions derived from Dan Steiner's model related to availability and use of Class 2, Section 215 and "other" water results in a significant understatement of the reduced deliveries to Friant LTC. The conclusion that the long-term average reduction Class 2 deliveries is only 72 TAF is understated by at least a factor of two. Since this information is foundational for subsequent analysis of groundwater and economic impacts in the Friant service area, all of the subsequent analyses that rely on this information become suspect.

Page 1 of 2

AEWSD-2a **Groundwater Impacts:** We are also concerned that the determination of impacts to groundwater is based on two different types of analysis with no correlation between the two. More importantly, the assumption that groundwater is always available to make up for reduced surface water supplies and the only impact becomes the economic cost of pumping from deeper depths is both incorrect and flawed. The District does not have adequate groundwater to make up supplies. In addition, in an over drafted groundwater basin, any increase in the overdraft should be considered a long-term loss of water with the value of that water being the replacement cost to obtain that water from other sources. Because

AEWSD-2b much of the economic and socio-economic analysis depends on the conclusions regarding availability and cost of water supplies to maintain agricultural production, we believe that the socio-economic impacts are similarly understated.

AEWSD-3 **Water Quality Impacts:** We do not understand how the PEIS/R can reach the conclusion that water quality impacts from recirculation and introduction of more Delta water into the lower end of the Friant-Kern Canal will not be significant. The PEIS/R does not evaluate the recirculation at a Project level and we see no water quality impact analysis that would support such a conclusion. Our own records indicate, for example, that Delta water includes salts levels that are nearly 10 times higher than Friant Division water supplies that Reclamation refers to as "pristine." We find no discussion of the water quality degradation sure to ensue from direct recirculation of Delta water into the Friant-Kern Canal

AEWSD-4 **Friant Water Authority Comments:** Please include the comments of Friant Water Authority as comments submitted by Arvin-Edison Water Storage District.

AEWSD-5 We look forward to working with Reclamation and the other Settling Parties to ensure that the environmental documentation for the SJRRP is complete and legally defensible, and that it will adequately inform those who must make the final determinations about the documents have properly disclosed all potential impacts of the project.

Sincerely,

Steve Collup
Engineer-Manager

cc: Ron Jacobsma, FWA
Jeevan Muhar, Staff Engineer

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Responses to Comments from Arvin-Edison Water Storage District

AEWSD-1: CalSim-II was used in the Draft PEIS/R for modeling changes in CVP/SWP water supply operations because it is the best available tool for this purpose. As a publicly available tool, CalSim-II has a broad and knowledgeable user community, and is widely accepted as the standard for systemwide analysis of surface water operations in the California Central Valley. CalSim-II assigns a classification to surface water supplies delivered via the Friant-Kern and Madera canals (including Class 1, Class 2, Section 215, and Paragraph 16(b) water). The process used to determine classification of these supplies historically is based on highly variable, real-time decisions that are difficult to capture within an operational model such as CalSim-II. Because of this uncertainty, the CalSim-II model is designed to simulate the total delivery as accurately as possible, with the classification of these supplies as a secondary priority. Therefore, the CalSim-II simulated quantities of Class 1, Class 2, Section 215, and Paragraph 16(b) may not be a true representation of the classification that would have occurred in any given year. The results were post-processed (as described in Appendix H, "Modeling," of the Draft PEIS/R) to maintain the total CalSim-II simulated deliveries and provide a reasonable distribution of the total deliveries into water allocation categories. The post-processed results were presented in Chapter 13.0 and Appendix H, "Modeling," Appendix I, "Supplemental Hydrologic and Water Operations Analysis," and Appendix J, "Surface Water Supplies and Facilities Operations," of the Draft PEIS/R.

In recognition of the uncertainty associated with modeling allocations among these categories, subsequent groundwater and economic impact analyses were performed by first allocating the total CalSim-II volumes to the various water management areas using a procedure jointly developed with the Friant Division long-term contractors to produce a more representative analysis. This process is documented in Appendix H, "Modeling," of the Draft PEIS/R.

The comment refers to 72 TAF as the "long-term average reduction" in Class 2 deliveries, and contends that this is an understatement in long-term Class 2 deliveries "by at least a factor of two." It is unclear to what information the comment is referring. Table ES-7 of the Draft PEIS/R shows 72 TAF as the maximum long-term average annual water supply (not reduction in supply) that would be available for recirculation to Friant Division long-term contractors as a result of program-level recapture under Paragraph 16(a), including diversions along the San Joaquin River between the Merced River confluence and in the Delta. Table ES-7 is revised in response to this and other comments to clarify that this number represents the maximum long-term average annual water supply that would be available for recirculation to Friant Division long-term contractors as a result of program-level recapture under Paragraph 16(a), and is shown as the total increase in diversions at existing or new facilities in the San Joaquin River with implementation of program-level actions, in addition to the increase in CVP/SWP exports at existing Delta facilities with implementation of the project-level actions. See Chapter 4.0, "Errata," of this Final PEIS/R.

The revisions to Table ES-7 presented in Chapter 4.0, "Errata," further clarify that the range of potential long-term annual average water supply reduction is calculated as the difference between the long-term average annual water supply deliveries under the action alternatives as compared with the No-Action Alternative. The term "minimal potential reduction" is based on the recirculation pursuant to Paragraph 16(a) of all recaptured water to Friant Division long-term contractors using values shown in the table for program-level evaluation; the term "maximum potential reduction" assumes no recirculation under Paragraph 16(a).

AEWSD-2a: As described in Chapter 12.0, "Hydrology – Groundwater," of the Draft PEIS/R, a process was conducted to select the best available tools for the technical analysis of groundwater in the Friant Division. This tool selection process involved evaluating the following numerical groundwater simulation models for understanding potential regional effects of Settlement implementation: CVGSM, WESTSIM, KingIGSM, CVHM, C2VSIM, and HydroGeoSphere. CVGSM was considered outdated and too coarse to complete the analysis. WESTSIM and KingIGSM were found geographically incomplete in the Friant Division, while HydroGeoSphere was still in early stages of development. Although CVHM and C2VSIM were identified as the best candidates for the regional focus of the groundwater analyses presented in the Draft PEIS/R, neither was ready or available for application when the groundwater analysis was initiated.

In light of these limitations, an existing numerical tool (Schmidt Tool) was selected and supplemented with the Mass Balance Tool to evaluate regional groundwater conditions in the Friant Division. The Schmidt Tool is a numerical tool developed by Schmidt (2005) during San Joaquin River litigation that estimates changes in groundwater levels on an annual basis at a district scale in the Friant Division. Because the Schmidt Tool does not have input data available for all of the Friant Division long-term contractors, only a subset of Friant Division long-term contractors is represented using the Schmidt Tool analysis. In response to comments received from Friant Water Authority during development of the Draft PEIS/R that the groundwater conditions in the remaining Friant Division long-term contractor areas needed to be evaluated similarly, the Mass Balance Tool was developed and applied for the remaining Friant Division long-term contractors not represented by the Schmidt Tool. It is recognized that these two methods were developed independent of each other and do not directly correlate. However, the Schmidt Tool was selected as the best available tool for analyzing groundwater conditions within the areas to which it applies, and the Mass Balance Tool was developed as the best available approach for the remaining areas. Together, these tools are the most recently developed and available tools for evaluating groundwater levels specifically in the Friant Division. This approach is sufficient because it applies the best tools available at the time the analysis was conducted for analyzing groundwater conditions within the Friant Division.

The heterogeneous hydrogeology in the Friant Division is influenced by both local and regional conditions that affect aquifer response. Local and regional conditions have combined over the last several decades, leading to drawdown and even overdraft in many areas, as defined by DWR Bulletin 118-03. The Friant Division overlies several groundwater basins, and the boundaries of these groundwater basins do not directly coincide with the boundaries of overlying water districts. For these reasons, the Schmidt Tool and Mass Balance Tool are designed to reflect conditions at a regional resolution (though output from both tools is provided at the district level). Both tools include relationships that provide estimated annual changes in groundwater level in response to estimated changes in groundwater pumping.

The Schmidt Tool uses a relationship that correlates historical changes in groundwater pumping with changes in groundwater levels, effectively accounting for complex characteristics of the aquifer. The Mass Balance Tool incorporates assumptions regarding aquifer characteristics such as specific yield (or drainable porosity), to estimate changes in groundwater levels in response to changes in groundwater pumping. The aquifer parameters used in the Mass Balance Tool for each of the Friant Division long-term contractor areas are based on available information provided in DWR Bulletin 118-03 subbasin descriptions for each of the underlying groundwater subbasins. DWR Bulletin 118-03 groundwater subbasin descriptions referenced for this analysis include Chowchilla, Delta-Mendota, Kings, Madera, Merced, Tulare Lake, Westside, Tule, Kaweah, Kern County, and Pleasant Valley. The groundwater level for each of the Friant Division long-term contractor areas for the existing condition is based upon values presented by Schmidt for the existing condition or when unavailable, the groundwater level is estimated as the average of all measurements from wells collected in 2005 from within the respective groundwater subbasin reported on the DWR Water Data Library. Many of these subbasins are in a state of overdraft, as defined in DWR Bulletin 118-03. Under the No-Action Alternative, the groundwater basins are anticipated to continue to experience a decline in regional groundwater levels.

If all Friant Division long-term contractor areas were evaluated using the Mass Balance Tool, results of the analysis would indicate changes in groundwater levels less than those predicted by the Schmidt Tool in some areas, and greater than those predicted by the Schmidt Tool in other areas. This is a result of assuming a homogeneous system across the areas of investigation and using a single value to represent specific yield across an area. Regardless of the selection of analytical tools, the results would still result in a finding of potentially significant and unavoidable impacts to groundwater levels. Without the availability of a full numerical groundwater model, it is difficult to estimate the influence of pumping spatially across the entire project area. However, for the purposes of evaluating changes in groundwater conditions for each Friant District, these analytical tools provide a sufficient means for making a significance determination for the PEIS/R by incorporating information about historical groundwater conditions in the region to estimate future conditions in response to Settlement implementation. Historical practice indicates that groundwater use in the region has been limited only by economic considerations and that no evident actions are reasonably foreseeable that would limit groundwater use through regulatory or legal actions. Therefore, the assumed continuation of this practice is reasonable for NEPA and CEQA purposes.

As described in Chapter 16.0, “Land Use Planning and Agricultural Resources,” of the Draft PEIS/R, the analysis of Impact LUP-8, Substantial Diminishment of Agricultural Land Resource Quality and Importance Because of Altered Water Deliveries, does not assume that groundwater pumping will be used to make up for all of the water reductions. Rather, it concludes that even with additional groundwater pumping, reduced water deliveries would cause a substantial effect on agricultural land resource quality and importance. This conclusion is based in part on the integrated modeling of changes in deliveries of surface water, change in groundwater levels, agricultural production, and regional socioeconomics described in Appendix H, "Modeling," of the Draft PEIS/R. As part of this integrated modeling, simulations using the Central Valley Production Model (CVPM) were conducted to assess the effects of the program alternatives on agricultural crop production. In these simulations, if the cost of accessing groundwater is too large to generate positive net returns to crop production, even after considering changes in irrigation technology and crop types, then agricultural land would be assumed to be idled (see Appendix H, "Modeling," of the Draft PEIS/R, pages 6-2 to 6-15). Thus, simulated agricultural production could be impacted by reduced deliveries of surface water, despite the potential availability of additional groundwater. Furthermore, Impact LUP-8 notes that these CVPM simulations do not address all issues affecting the replacement of some water deliveries with additional groundwater pumping, including limited access to adequate quality groundwater. It also notes that these issues could affect agricultural productivity, and that irrigated acreages could be reduced by more than 1,000 acres. In part for this reason, the Draft PEIS/R concludes that this impact would be significant and unavoidable.

For the reasons set forth above, no changes to the PEIS/R are necessary.

AEWSD-2b: As described in Chapter 12.0, "Hydrology – Groundwater," of the Draft PEIS/R, it is recognized that aquifer drawdown projected by applying the Schmidt Tool may not be sustainable in some contractor areas within the Friant Division. As presented in Chapter 16.0, "Land Use Planning and Agricultural Resources," of the Draft PEIS/R, an analysis using the CVPM was conducted to assess the effects on agricultural crop production resulting from reduced water deliveries. CVPM evaluates grower response to reduced surface water deliveries by attempting to change cropping patterns or other agricultural practices, additional groundwater pumping, or idling of cropland, through economic analysis. CVPM does not consider infrastructure modifications such as modifying existing wells or drilling new wells to increase groundwater pumping.

CVPM analyses (which were based on existing irrigated acreage and crop mix) indicate that implementing any of the action alternatives would, on average, reduce irrigated acreages by less than 1,000 acres. This finding is based solely on assumptions and inputs to CVPM regarding surface water availability and cost. Those assumptions include future changes in land and water management practices in the Friant Division, such as higher efficiency water application, sowing different crops, land fallowing, and a reduction in irrigated acreage. CVPM assumptions and inputs did not include issues resulting from replacing some water deliveries with additional groundwater pumping that could affect agricultural productivity. These issues could include the need to install or modify wells at some sites, and limited access to adequate quality groundwater at other sites. Thus, some reduction in irrigated acreage in addition to CVPM estimates could occur. An increase in groundwater pumping for a prolonged period, such as would occur under the No-Action Alternative or the action alternatives, would not only decrease groundwater levels but in some areas could potentially result in upwelling of poorer quality groundwater. Therefore, in the case that additional groundwater pumping is required, irrigated acreages could be reduced by more than 1,000 acres.

These potential impacts related to groundwater availability and pumping costs are recognized and evaluated as part of the socioeconomic analysis presented in Chapter 22.0, “Socioeconomics,” of the Draft PEIS/R. Conversely, changes in land and water management practices in the Friant Division, as well as water purchases and transfers, could potentially reduce demand for water supply.

For the reasons set forth above, no changes to the PEIS/R are necessary.

AEWSD-3: The PEIS/R provides a program-level evaluation of the potential impacts to water quality associated with the recirculation of recaptured Interim and Restoration flows through a regional evaluation of the potential water quality impacts within the Friant Division. As such, the Draft PEIS/R does not explicitly evaluate potential effects of introducing more Delta water into the lower end of the Friant-Kern Canal. Introducing recirculation water into the Friant-Kern Canal would require a site-specific, project-level analysis once additional information is known. During subsequent site-specific analyses of recirculation, the project proponent would work with Friant Division long-term water contractors to formulate alternatives that would avoid, minimize, or reduce adverse impacts to environmental resources, including water quality. Reclamation understands that AEWSD is concerned that the introduction of Delta water into the Friant-Kern Canal would degrade water quality due to the high salinity of Delta water and that the buildup of such salts and other constituents of concern in AEWSD’s groundwater basin could result in substantial water quality changes that could adversely affect beneficial uses.

Recirculation of recaptured Interim and Restoration flows either at existing facilities or at new infrastructure on the San Joaquin River between the Merced River and the Delta, and associated impacts to water quality, are addressed at a program level in the Draft PEIS/R. The specific locations for delivery of recaptured water in the Friant Division are not known at this time, and the Implementing Agencies acknowledge that additional analysis pursuant to NEPA and/or CEQA will be required in the future for activities addressed at a program level in the Draft PEIS/R, after specific project details are identified. At that time, the Implementing Agencies would require compliance with the applicable mitigation measures set forth in the PEIS/R, as well as any new project-level mitigation measures and conditions for approval of subsequent actions.

Based on the significance criteria in the Draft PEIS/R for surface water and/or groundwater quality and anticipated continuation of water exchanges within the Friant Division of the CVP, program-level recapture of Interim and Restoration flows either at existing facilities or at new infrastructure on the San Joaquin River between the Merced River and the Delta are expected to have a less-than-significant impact on water quality.

Reclamation is in the process of developing a Recapture and Recirculation Plan, pursuant to Paragraph 16 of the Settlement, in consultation with the Settling Parties, Third Parties, and the State, and will conduct a subsequent site-specific evaluation of implementation of the Recapture and Recirculation Plan, in compliance with NEPA and CEQA, as appropriate. Because sufficient details to support project-level evaluation were not available at the time the Draft PEIS/R was prepared, the Draft PEIS/R presents a program-level evaluation of recirculation. Any action to introduce recirculation water into the Friant-Kern Canal as a component of the Recapture and Recirculation Plan would require additional analysis at a project level of detail.

In response to this comment, text on page 2-36, line 16, of the Draft PEIS/R has been revised to clarify that the Draft PEIS/R does not evaluate the direct discharge of water from south-of-Delta facilities into the Friant-Kern Canal at a project level of detail. If discharge of water from south-of-Delta facilities into the Friant-Kern Canal is proposed as part of the Recapture and Recirculation Plan, it would require further review pursuant to NEPA and/or CEQA.

AEWSD-4: Comment noted. Please see responses to comments submitted by Friant Water Authority in this chapter.

AEWSD-5: Reclamation acknowledges and appreciates the continued cooperation and support of Arvin-Edison WSD in the SJRRP. The text has not been revised.

3.8.2 Contra Costa Water District

CCWD

CONTRA COSTA
WATER DISTRICT

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September 21, 2011

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Subject: San Joaquin River Restoration Program Draft Program EIS/EIR

Dear Ms Banonis and Ms Schulte:

Contra Costa Water District (CCWD) appreciates this opportunity to comment on the San Joaquin River Restoration Program (SJRRP) Draft Program Environmental Impact Statement / Environmental Impact Report (Draft EIS/EIR) dated April 2011. CCWD supports restoration of the San Joaquin River and looks forward to reviewing more analyses of the SJRRP.

CCWD-1

CCWD's comments on the Draft EIS/EIR are organized into two categories: (1) adequacy of the modeling assumptions; and (2) adequacy of the impacts analysis.

Modeling Assumptions

The impacts analysis for the Draft EIS/EIR relies on comparisons of a model simulation of a no action baseline to simulations of the SJRRP alternatives. Thus, assumptions made within the modeling tools will affect the results and may alter conclusions of the impacts analysis.

Biological Opinions (BOs) for the Operations Criteria and Plan (OCAP)
The Draft EIS/EIR assumes operational criteria for the baseline and SJRRP alternatives based on the 2004 OCAP and subsequent BOs. However, the BOs were challenged in court in 2006, and the system has been operated in a modified manner since 2007. New BOs imposed new operational criteria in 2008 (U.S. Fish and Wildlife Service) and 2009 (National Marine Fisheries Service). The Draft EIS/EIR recognizes that the new BOs will alter operations and the ability to recapture the Restoration Flows within the Delta, but the Draft EIS/EIR assumes impacts will not change with the modified operations. This assumption must be verified; potential impacts of the SJRRP must be reanalyzed with updated modeling assumptions to

Ms Banonis and Ms Schulte
San Joaquin River Restoration Program Programmatic EIS/EIR
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CCWD-1 cont'd

incorporate modified operational criteria.

Although the legal and technical modifications of the OCAP requirements may continue, other planning efforts have implemented modified operational criteria within the modeling tools. CCWD has experience with implementation and review of these efforts and would be happy to review the new analysis prior to release of the Final EIS/EIR.

CCWD-2

Augmented water demands to reflect recirculation and recapture
The Draft EIR/EIS indicates that flow returns to the Friant Division are not modeled directly within CalSim. It is unclear from the description whether demands have been augmented within CalSim to facilitate the recapture of Restoration flows. If demands have not been augmented, the model may underestimate the amount of recapture, thus underestimating the potential impacts associated with the additional diversions. Any adjustment to demands within CalSim should be fully disclosed and analyzed.

CCWD-3

Impacts Analysis
The impacts analysis must be strengthened to fully capture and disclose potential impacts and benefits to water quality and water supply.

Water Quality
Impact SWQ-9 addresses Delta water quality at CCWD's Contra Costa Canal Pumping Plant No. 1, CCWD's Old River Intake, CCWD's intake on Victoria Canal, and the City of Stockton's proposed Delta intake. However, the analysis of this impact is incomplete and should incorporate the following:

- Additional Locations. The Draft EIS/EIR should evaluate potential impacts to water quality at CCWD's intake on Mallard Slough and the City of Antioch's water intake on the San Joaquin River.

CCWD-4

- Discussion of Results. While the Draft EIS/EIR indicates that some modeling results are attached in a "DSM2 Attachment," the attachment was not available on the project website. The full modeling results should be provided to CCWD and other reviewers. There should also be a summary and discussion of the implications of these results in the main body of the Draft EIS/EIR.

CCWD-5a

- Significance Determination. The criteria for whether the project results in "significant water quality changes that adversely affect beneficial uses" are not clear from the discussion. Only percent change in salinity is reported in the Draft EIS/EIS, with both increases and decreases in salinity caused by each alternative. Although the Draft EIS/EIR concludes that the changes are less than significant and beneficial, the Draft EIS/EIR does not contain sufficient information to make that determination.

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CCWD-5b CCWD would be happy to work with the SJRRP project team to evaluate the potential impacts. To determine if water quality changes affect beneficial uses, CCWD requires results from the water quality modeling, expressed in units of EC (not percent change). Additionally, the timing of increases and decreases in salinity affects the potential impacts (or benefits). CCWD needs the water quality modeling results to evaluate the expected change in our operations and the change in quality of water delivered to our customers due to the SJRRP.

Water Supply

Impact SWS-5 addresses the change in recurrence of Delta excess conditions. This evaluation is intended to determine if the SJRRP will adversely affect CCWD's ability to fill Los Vaqueros Reservoir. CCWD appreciates the inclusion of this potential impact within the Draft EIS/EIR. However, analysis of this impact is incomplete and should incorporate the following:

CCWD-6

- Significance Determination. As with potential water quality impacts, the threshold for significance is unclear from the discussion. The Draft EIS/EIR indicates that CCWD's ability to fill Los Vaqueros Reservoir may be impacted in a number of months, but determines that the impact is less than significant because the months are "scattered throughout the simulation record." However, the ability to fill Los Vaqueros Reservoir also affects the quality of water delivered to CCWD customers. CCWD requests more information on the timing of these changes to Delta excess conditions to determine the net effect on our water supply and water quality.

CCWD-7

- Additional metric. With implementation of the new BOs discussed above in "Modeling Assumptions," CCWD's ability to fill Los Vaqueros Reservoir may also be constrained by requirements for flows on Old and Middle Rivers. The Draft EIS/EIR should evaluate changes to the flows in Old and Middle River and the frequency that the Delta exports are limited by this requirement in the new BOs.

If you have any questions regarding CCWD's comments, please call me at (925) 688-8083, or call Deanna Sereno at (925) 688-8079.

Sincerely,

Leah Orloff
Water Resources Manager

Responses to Comments from Contra Costa Water District

CCWD-1: The analyses and impact assessment presented in the Draft PEIS/R were completed using the best available modeling tools and information. The modeling tools used in the Draft PEIS/R analyses were selected because they are publicly available, have a knowledgeable user community, and are widely accepted for use in similar systemwide analysis of resources in California's Central Valley. The modeling assumptions, modeling analyses and results, and baseline conditions used to support the environmental analysis in the Draft PEIS/R were based on the best available information and modeling tools at the time the Draft PEIS/R was prepared. The sensitivity analyses contained in Appendix C to this Final PEIS/R were completed using the same set of tools and information, as modified only to reflect an interim representation of the RPAs set forth in the 2008 USFWS CVP/SWP Operations BO and 2009 NMFS CVP/SWP Operations BO (2009a).

The analyses presented in the Draft PEIS/R were based, in part, on a water supply operations modeling tool, CalSim-II. The CalSim-II model is widely accepted as the standard for simulating the long-term effects of operational changes to CVP and SWP facilities. At the time evaluations were completed in support of the Draft PEIS/R, there was no representation of the full set of RPAs set forth in the 2008 USFWS CVP/SWP Operations BO and 2009 NMFS CVP/SWP available for use in the CalSim-II model. Therefore, the baseline for analyses presented in the Draft PEIS/R was developed using the best available information, remains the most defensible baseline, and is not revised in this Final PEIS/R. At the time the sensitivity analyses were completed in support of this Final PEIS/R, Reclamation and NMFS continued to discuss and work toward the representation of the 2008 and 2009 RPAs into a singular CalSim-II baseline. However, a representation that sufficiently captures the range of potential RPA implementation scenarios was available at the time the sensitivity analyses were developed, allowing for an evaluation of the potential for the 2008 and 2009 RPAs to change the anticipated effects of the program alternatives from those presented in the Draft PEIS/R.

The sensitivity analyses presented in Appendix C of this Final PEIS/R were performed to represent a comprehensive range of RPA implementation scenarios and evaluate the potential for the 2008 and 2009 RPAs to change the anticipated effects of the program alternatives from those presented in the Draft PEIS/R, which are based on the conditions evaluated in the 2005 USFWS and 2004 NMFS BOs. The CalSim-II simulations for the sensitivity analyses presented in Appendix C to this Final PEIS/R were developed to identify the range of potential operational changes that could occur under any RPA implementation scenario. CalSim-II output from these simulations was then used in analyzing the potential for the RPAs to change the anticipated effects to related resources using the same set of tools and information used in the Draft PEIS/R, including Delta hydrodynamics (using DSM2), groundwater (using the Schmidt Tool and mass balance method), agricultural economics (using CVPM), regional economics (using IMPLAN), and long-term power system power generation to reflect the updated surface water model. The sensitivity analyses results demonstrate that the overall impact mechanisms and significance determinations presented in the Draft PEIS/R would not change under a baseline that includes the RPAs set forth in the 2008 USFWS CVP/SWP Operations BO and 2009 NMFS CVP/SWP Operations BO.

In comparison to the results presented in the Draft PEIS/R, the results of the sensitivity analyses presented in Appendix C to this Final PEIS/R do not identify new significant environmental impacts or a substantial increase in the severity of an environmental impact, and do not create a feasible project alternative or mitigation measure that would clearly lessen environmental impacts of the action alternatives (including the proposed project). Therefore, inclusion of the sensitivity analyses in this Final PEIS/R does not trigger a need to recirculate a revised Draft PEIS/R under either NEPA or CEQA. Rather, the sensitivity analyses demonstrate that the overall impact mechanisms and significance determinations presented in the Draft PEIS/R would not change under a baseline that includes the RPAs set forth in the 2008 USFWS CVP/SWP Operations BO and 2009 NMFS CVP/SWP Operations BO, confirming that the analyses and conclusions presented in the Draft PEIS/R are thorough, accurate, and unlikely to change in light of the RPAs.

For the reasons set forth above, Reclamation and DWR believe that the PEIS/R provides a thorough, appropriate analysis of all relevant impacts of the action alternatives (including the proposed project) and the alternatives as required by NEPA and CEQA.

CCWD-2: Demands were not modified within CalSim-II for simulating the potential to recapture Interim and Restoration flows. Diversions at Jones and Banks pumping plants are limited by physical and regulatory constraints during most years. As described in Appendix H, "Modeling," of the Draft PEIS/R, CalSim-II attempts to maximize exports within all applicable physical and regulatory constraints, treating the Interim and Restoration flows that increase Delta inflows the same as any other Delta inflow. Recapture of a small quantity of Interim and Restoration flows is likely not reflected in the modeling during periods when diversions are demand-limited and not limited by physical or regulatory constraints. However, it is expected that any additional amount recaptured with increased demands would be minimal and not sufficient to change the analyses of potential impacts related to Delta recapture. For the reasons set forth above, no changes to the PEIS/R are necessary. The inclusion of this discussion does not change the analysis or conclusions of the Draft PEIS/R.

CCWD-3: The lead agencies consider Impact SWQ-9 complete as presented on pages 14-23, 14-28, 14-32, and 14-36 in the Draft PEIS/R. DSM2 was used with CalSim-II results to describe Delta water quality for each program alternative, as described in Chapter 14.0, "Hydrology – Surface Water Quality," of the Draft PEIS/R. DSM2 output was provided in the Delta Simulation Modeling Output – DSM2 Attachment to Appendix H, "Modeling," of the Draft PEIS/R. The DSM2 Attachment presents simulated historical monthly average salinity (expressed as electrical conductivity (EC)) and chloride at multiple locations, both by water year type and as a long-term historical average). The locations at which results are reported in the DSM2 attachment and discussed in Chapter 14.0 of the Draft PEIS/R were selected to capture the potential for water quality impacts, and included consideration of existing and reasonably foreseeable diversion points (such as Contra Costa Canal Pumping Plant No. 1) and commonly used water quality reporting locations (such as the San Joaquin River at Vernalis). The reporting locations requested in the comment, Mallard Slough and the City of Antioch, are modeled in DSM2 but were not selected for inclusion in the discussion presented in Chapter 14.0 of the Draft PEIS/R, as the locations discussed in Chapter 14.0 sufficiently capture the potential for water quality impacts to occur.

However for informational purposes, DSM2 output at the two sites requested, Mallard Slough and City of Antioch, are presented below in Tables 3.8-2 through 3.8-7 (EC at Mallard Slough), Tables 3.8-8 through 3.8-13 (EC at Antioch), Tables 3.8-14 through 3.8-19 (chloride at Mallard Slough), and Tables 3.8-20 through 3.8-25 (chloride at Antioch). These results were extracted from output files of simulations presented in the Draft PEIS/R, and do not reflect additional evaluations, new information of substantial importance, or result in new significant impacts or substantially more severe impacts than shown in the Draft PEIS/R. The results suggest that simulated historical monthly average salinity concentrations at these locations would decrease under all action alternatives as compared to the No-Action Alternative during most months and water year types. This information further supports the finding in the Draft PEIS/R that implementation of all action alternatives would not result in additional violations of existing water quality standards or substantial water quality changes that would adversely affect beneficial uses, or have substantive impacts on public health, and would therefore have less-than-significant impacts on Delta water quality conditions. The inclusion of this discussion does not change the analysis or conclusions of the Draft PEIS/R. Text has not been revised.

Table 3.8-2.
Monthly Averages of Simulated Electrical Conductivity at Sacramento River at Mallard Slough (µmhos/cm) – All Years

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	4300.1	4269.1 (-0.9%)	4272.0 (-0.7%)	4283.5 (-0.8%)	4281.5 (0.3%)	4275.9 (-0.2%)	4276.6 (-0.3%)	4287.5 (-0.2%)
November	1971.8	2030.4 (2.1%)	2030.6 (2.1%)	2034.1 (2.2%)	1906.3 (0.2%)	2025.6 (3.3%)	2026.3 (3.3%)	2028.9 (3.4%)
December	1389.3	1376.9 (1.0%)	1377.9 (1.1%)	1377.3 (1.0%)	1370.0 (1.7%)	1392.3 (-0.1%)	1393.3 (-0.1%)	1393.7 (-0.1%)
January	1836.5	1775.9 (-3.3%)	1779.0 (-3.2%)	1775.8 (-3.3%)	1842.3 (-0.2%)	1790.7 (-3.2%)	1793.8 (-3.1%)	1789.9 (-3.2%)
February	2652.9	2618.2 (-1.8%)	2621.0 (-1.7%)	2630.3 (-1.4%)	2641.2 (0.4%)	2613.9 (-1.7%)	2617.2 (-1.6%)	2629.9 (-1.1%)
March	4116.7	4088.0 (-1.4%)	4091.2 (-1.3%)	4096.3 (-1.2%)	4112.4 (1.1%)	4077.0 (-1.5%)	4079.4 (-1.5%)	4083.2 (-1.4%)
April	5281.0	5274.8 (0.0%)	5269.1 (-0.1%)	5276.8 (0.0%)	5200.3 (-1.3%)	5210.4 (0.3%)	5218.8 (0.5%)	5220.7 (0.5%)
May	7926.7	7971.5 (0.6%)	7967.9 (0.5%)	7967.2 (0.5%)	7692.1 (-2.3%)	7726.1 (0.5%)	7724.4 (0.5%)	7719.9 (0.4%)
June	9747.6	9768.6 (0.1%)	9775.4 (0.2%)	9772.2 (0.2%)	9475.0 (-0.9%)	9458.1 (-0.2%)	9455.9 (-0.3%)	9439.2 (-0.4%)
July	10623.7	10592.7 (-0.4%)	10601.4 (-0.3%)	10591.8 (-0.4%)	10515.1 (0.5%)	10492.9 (-0.3%)	10484.5 (-0.4%)	10471.0 (-0.5%)
August	9914.0	9865.3 (-0.6%)	9874.6 (-0.5%)	9867.9 (-0.5%)	10002.0 (2.4%)	9950.9 (-0.7%)	9949.8 (-0.7%)	9943.7 (-0.7%)
September	7015.1	6952.4 (-1.2%)	6959.1 (-1.1%)	6967.9 (-1.0%)	7097.9 (3.4%)	7042.4 (-0.8%)	7041.1 (-0.9%)	7054.3 (-0.7%)

Source: DSM2 Simulations (Node RSAC075)

Notes:

Simulation Period: October 1921 – September 2003

[1] (%) indicates percent change from Existing Conditions

[2] (%) indicates percent change from No-Action Alternative

Key:

µmhos/cm = micromhos per centimeter

Alt = Alternative

Table 3.8-3.
Monthly Averages of Simulated Electrical Conductivity at Sacramento River at Mallard Slough (µmhos/cm) – Wet Years

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	2659.5	2650.9 (-1.0%)	2650.9 (-1.0%)	2650.4 (-1.0%)	2687.9 (1.6%)	2699.9 (0.3%)	2700.7 (0.2%)	2700.8 (0.4%)
November	978.4	971.2 (-0.3%)	971.7 (-0.2%)	970.9 (-0.3%)	954.9 (-0.9%)	953.7 (0.6%)	954.6 (0.6%)	954.5 (0.6%)
December	949.6	933.6 (-0.4%)	934.2 (-0.3%)	933.8 (-0.4%)	958.1 (0.0%)	930.8 (-1.4%)	933.7 (-1.2%)	933.3 (-1.3%)
January	1370.9	1299.2 (-2.2%)	1301.5 (-2.1%)	1302.3 (-2.1%)	1347.3 (-1.3%)	1298.9 (-2.1%)	1302.0 (-2.1%)	1303.1 (-2.1%)
February	1859.2	1808.0 (-2.6%)	1813.5 (-2.5%)	1829.8 (-2.0%)	1816.8 (-0.8%)	1777.6 (-2.1%)	1782.0 (-2.0%)	1801.2 (-1.5%)
March	3220.3	3210.3 (-0.6%)	3214.4 (-0.5%)	3225.7 (-0.3%)	3248.6 (0.7%)	3214.6 (-0.9%)	3217.3 (-0.9%)	3226.7 (-0.7%)
April	4213.4	4221.4 (0.6%)	4205.0 (0.4%)	4226.9 (0.7%)	4136.2 (-0.8%)	4156.6 (0.8%)	4158.1 (0.8%)	4161.9 (0.9%)
May	6879.4	6980.1 (1.3%)	6978.5 (1.2%)	6980.1 (1.3%)	6806.5 (0.2%)	6861.3 (0.8%)	6864.1 (0.8%)	6863.8 (0.8%)
June	8287.3	8416.4 (1.2%)	8430.8 (1.3%)	8413.7 (1.1%)	8124.7 (1.5%)	8128.3 (0.0%)	8137.0 (0.1%)	8134.2 (0.0%)
July	8619.7	8659.5 (0.3%)	8679.1 (0.5%)	8656.9 (0.3%)	8615.1 (2.8%)	8621.1 (-0.1%)	8609.8 (-0.2%)	8614.4 (-0.1%)
August	7524.5	7520.8 (-0.3%)	7536.3 (0.0%)	7522.9 (-0.2%)	7704.1 (4.7%)	7648.4 (-0.9%)	7653.3 (-0.8%)	7648.5 (-0.8%)
September	2474.5	2424.9 (-1.4%)	2428.2 (-1.4%)	2432.8 (-1.4%)	2491.1 (3.0%)	2481.2 (-0.4%)	2472.3 (-0.7%)	2476.7 (-0.6%)

Source: DSM2 Simulations (Node RSAC075)

Notes:
Simulation Period: October 1921 – September 2003
[1] (%) indicates percent change from Existing Conditions
[2] (%) indicates percent change from No-Action Alternative

Key:
µmhos/cm = micromhos per centimeter
Alt = Alternative

Table 3.8-4.
Monthly Averages of Simulated Electrical Conductivity at Sacramento River at Mallard Slough (µmhos/cm) – Above Normal Years

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	4838.1	4807.2 (-1.3%)	4815.4 (0.1%)	4827.6 (-1.0%)	4840.7 (-1.2%)	4824.2 (-0.1%)	4816.2 (-1.2%)	4823.2 (-0.9%)
November	2233.5	2230.5 (0.1%)	2225.2 (-0.5%)	2231.7 (0.4%)	1555.4 (-8.8%)	2202.8 (18.7%)	2198.4 (18.6%)	2200.1 (18.7%)
December	1631.4	1603.5 (-1.9%)	1604.5 (-1.8%)	1603.1 (-2.0%)	1336.4 (-5.3%)	1642.5 (6.5%)	1642.7 (6.5%)	1642.6 (6.4%)
January	2152.0	2066.7 (-5.0%)	2067.5 (-5.1%)	2065.4 (-5.2%)	2131.8 (0.2%)	2097.1 (-4.4%)	2100.0 (-4.2%)	2099.6 (-4.2%)
February	2876.7	2848.3 (-1.9%)	2849.5 (-1.9%)	2858.0 (-1.5%)	2870.4 (1.3%)	2855.3 (-1.6%)	2858.7 (-1.5%)	2876.3 (-0.8%)
March	4196.8	4161.2 (-2.3%)	4165.8 (-2.2%)	4164.8 (-2.2%)	4167.5 (2.1%)	4141.4 (-2.0%)	4142.2 (-2.0%)	4144.0 (-1.9%)
April	5544.8	5546.4 (-0.2%)	5543.6 (-0.3%)	5544.8 (-0.2%)	5351.4 (-2.8%)	5384.7 (0.5%)	5399.4 (0.8%)	5402.2 (0.8%)
May	8388.5	8386.4 (0.0%)	8384.1 (0.0%)	8381.5 (-0.1%)	7978.6 (-4.6%)	8001.6 (0.3%)	8001.9 (0.3%)	7991.0 (0.1%)
June	10311.7	10236.1 (-1.0%)	10243.1 (-0.9%)	10251.3 (-0.8%)	9824.8 (-3.9%)	9814.1 (-0.1%)	9813.9 (-0.1%)	9784.0 (-0.5%)
July	11105.5	10951.3 (-2.0%)	10959.7 (-1.9%)	10967.0 (-1.8%)	10924.6 (-1.0%)	10811.6 (-1.5%)	10814.7 (-1.5%)	10791.9 (-1.7%)
August	9390.0	9218.3 (-2.3%)	9226.5 (-2.1%)	9228.7 (-2.1%)	9763.7 (4.3%)	9597.5 (-2.0%)	9586.9 (-2.2%)	9600.4 (-2.1%)
September	7256.6	7158.5 (-1.6%)	7158.0 (-1.5%)	7159.0 (-1.5%)	7540.6 (10.5%)	7447.9 (-1.4%)	7446.4 (-1.4%)	7469.4 (-1.2%)

Source: DSM2 Simulations (Node RSAC075)

Notes:

Simulation Period: October 1921 – September 2003

[1] (%) indicates percent change from Existing Conditions

[2] (%) indicates percent change from No-Action Alternative

Key:

µmhos/cm = micromhos per centimeter

Alt = Alternative

Table 3.8-5.
Monthly Averages of Simulated Electrical Conductivity at Sacramento River at Mallard Slough (µmhos/cm) – Below Normal Years

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	4535.6	4468.1 (-0.7%)	4474.0 (-0.7%)	4482.4 (-0.6%)	4411.1 (-0.8%)	4409.4 (-0.1%)	4422.7 (0.1%)	4442.7 (0.4%)
November	1579.7	1931.2 (11.6%)	1934.7 (11.7%)	1936.1 (11.8%)	1903.1 (10.4%)	1993.2 (0.3%)	1997.3 (0.6%)	1989.7 (0.6%)
December	873.7	896.4 (10.7%)	896.9 (10.8%)	896.4 (10.7%)	933.7 (13.2%)	909.8 (-1.4%)	912.8 (-1.3%)	908.3 (-1.7%)
January	1311.7	1269.1 (-3.9%)	1273.7 (-3.7%)	1270.5 (-3.9%)	1337.2 (0.5%)	1275.3 (-4.3%)	1280.1 (-4.1%)	1280.3 (-4.1%)
February	2054.9	2036.5 (-0.9%)	2038.3 (-0.8%)	2050.5 (-0.5%)	2065.7 (0.9%)	2053.9 (-0.6%)	2054.6 (-0.6%)	2070.8 (-0.1%)
March	3364.9	3352.6 (-0.5%)	3356.0 (-0.4%)	3359.8 (-0.3%)	3387.4 (1.9%)	3373.4 (-0.4%)	3376.2 (-0.3%)	3379.2 (-0.3%)
April	4820.2	4817.6 (-0.1%)	4821.0 (0.0%)	4829.7 (0.1%)	4767.3 (-0.6%)	4779.0 (0.4%)	4781.7 (0.5%)	4789.2 (0.6%)
May	7767.1	7773.1 (0.0%)	7754.0 (-0.2%)	7756.5 (-0.1%)	7512.2 (-2.9%)	7557.3 (0.8%)	7542.1 (0.6%)	7557.7 (0.8%)
June	9604.7	9579.7 (-0.3%)	9576.5 (-0.3%)	9569.6 (-0.4%)	9389.9 (0.0%)	9403.3 (0.1%)	9400.0 (0.1%)	9409.7 (0.2%)
July	10928.8	10910.1 (-0.2%)	10912.9 (-0.2%)	10904.5 (-0.3%)	10835.4 (0.4%)	10825.1 (-0.1%)	10831.7 (-0.1%)	10840.8 (0.0%)
August	11054.3	11004.8 (-0.3%)	11029.3 (0.0%)	11014.2 (-0.2%)	11080.5 (0.5%)	11033.1 (-0.4%)	11033.7 (-0.4%)	11020.6 (-0.5%)
September	8887.6	8904.4 (-1.4%)	8923.2 (-0.9%)	8926.6 (-0.9%)	9006.2 (1.8%)	8952.7 (-1.1%)	8951.8 (-1.2%)	8941.9 (-1.3%)

Source: DSM2 Simulations (Node RSAC075)

Notes:

Simulation Period: October 1921 – September 2003

[1] (%) indicates percent change from Existing Conditions

[2] (%) indicates percent change from No-Action Alternative

Key:

µmhos/cm = micromhos per centimeter

Alt = Alternative

Table 3.8-6.
Monthly Averages of Simulated Electrical Conductivity at Sacramento River at Mallard Slough (µmhos/cm) – Dry Years

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	4804.6	4768.0 (-1.0%)	4773.4 (-0.9%)	4808.2 (-0.5%)	4811.6 (0.7%)	4862.8 (0.3%)	4858.2 (0.3%)	4893.9 (0.7%)
November	1979.5	2004.6 (1.1%)	2006.3 (1.1%)	2020.3 (1.3%)	2002.4 (0.8%)	2094.6 (2.9%)	2098.1 (3.0%)	2113.1 (3.3%)
December	1734.8	1736.6 (-0.6%)	1738.1 (-0.5%)	1739.7 (-0.5%)	1753.6 (0.0%)	1754.5 (0.2%)	1753.7 (-0.1%)	1758.6 (0.2%)
January	2339.8	2295.3 (-3.2%)	2298.2 (-3.1%)	2297.0 (-3.1%)	2366.1 (0.3%)	2312.4 (-3.2%)	2308.8 (-3.4%)	2304.8 (-3.5%)
February	3300.0	3292.5 (-0.7%)	3295.6 (-0.6%)	3301.8 (-0.3%)	3351.4 (1.9%)	3318.5 (-1.9%)	3322.2 (-1.8%)	3336.0 (-1.3%)
March	4747.1	4685.6 (-2.4%)	4686.1 (-2.4%)	4690.6 (-2.3%)	4761.3 (1.3%)	4680.2 (-3.0%)	4679.6 (-3.0%)	4689.3 (-2.8%)
April	5808.4	5779.7 (-0.6%)	5778.3 (-0.6%)	5778.4 (-0.6%)	5743.6 (-1.5%)	5735.0 (-0.2%)	5754.5 (0.3%)	5754.8 (0.4%)
May	8343.3	8392.7 (0.7%)	8394.7 (0.7%)	8390.1 (0.6%)	8192.4 (-2.0%)	8214.2 (0.4%)	8210.1 (0.2%)	8196.2 (0.1%)
June	10669.7	10662.4 (-0.1%)	10668.4 (0.0%)	10663.9 (0.0%)	10559.1 (-0.5%)	10524.6 (-0.4%)	10501.9 (-0.7%)	10490.0 (-0.8%)
July	11942.8	11873.2 (-0.6%)	11874.2 (-0.6%)	11870.7 (-0.6%)	11748.8 (-0.8%)	11798.5 (0.4%)	11769.4 (0.1%)	11749.6 (-0.1%)
August	11262.6	11227.3 (-0.3%)	11223.6 (-0.4%)	11235.1 (-0.3%)	11208.2 (1.0%)	11221.1 (0.0%)	11214.7 (0.0%)	11214.7 (-0.1%)
September	8975.3	8915.4 (-0.4%)	8921.6 (-0.4%)	8934.7 (-0.2%)	9085.2 (2.9%)	9021.5 (-0.9%)	9029.8 (-0.6%)	9049.1 (-0.3%)

Source: DSM2 Simulations (Node RSAC075)

Notes:

Simulation Period: October 1921 – September 2003

[1](%) indicates percent change from Existing Conditions

[2](%) indicates percent change from No-Action Alternative

Key:

µmhos/cm = micromhos per centimeter

Alt = Alternative

Table 3.8-7.
Monthly Averages of Simulated Electrical Conductivity at Sacramento River at Mallard Slough (µmhos/cm) – Critical Years

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	6285.4	6256.4 (-0.7%)	6252.9 (-0.7%)	6258.7 (-0.6%)	6228.7 (-0.1%)	6106.2 (-2.3%)	6108.6 (-2.3%)	6098.8 (-2.6%)
November	4308.2	4279.5 (-0.4%)	4278.9 (-0.3%)	4275.5 (-0.5%)	4177.9 (-1.7%)	4105.2 (-2.5%)	4102.0 (-2.7%)	4105.3 (-2.4%)
December	2183.3	2131.6 (-2.2%)	2133.2 (-2.2%)	2129.7 (-2.3%)	2229.7 (1.8%)	2161.8 (-2.6%)	2159.5 (-2.7%)	2161.6 (-2.5%)
January	2387.1	2330.1 (-3.3%)	2335.8 (-3.1%)	2320.1 (-3.7%)	2428.8 (0.2%)	2368.9 (-3.0%)	2380.1 (-2.6%)	2356.9 (-3.1%)
February	3875.5	3810.7 (-2.7%)	3809.8 (-2.6%)	3806.1 (-2.7%)	3804.6 (-1.0%)	3781.0 (-1.6%)	3783.9 (-1.5%)	3772.2 (-1.6%)
March	5910.0	5877.8 (-1.8%)	5882.1 (-1.7%)	5881.5 (-1.7%)	5801.0 (-0.2%)	5797.6 (-1.5%)	5804.7 (-1.2%)	5790.6 (-1.6%)
April	7077.2	7061.6 (-0.4%)	7059.3 (-0.4%)	7052.5 (-0.5%)	7044.9 (-1.0%)	7036.0 (-0.3%)	7043.0 (-0.2%)	7035.4 (-0.3%)
May	9295.4	9304.7 (0.1%)	9305.0 (0.1%)	9303.4 (0.1%)	8783.8 (-5.3%)	8789.0 (0.0%)	8794.7 (0.1%)	8778.3 (-0.1%)
June	11131.0	11110.6 (-0.2%)	11113.6 (-0.2%)	11135.1 (0.0%)	10524.0 (-4.7%)	10447.1 (-0.9%)	10452.1 (-0.8%)	10379.8 (-1.6%)
July	12148.9	12131.8 (-0.2%)	12135.4 (-0.1%)	12125.7 (-0.2%)	11997.7 (-0.8%)	11883.5 (-1.1%)	11884.1 (-1.1%)	11823.4 (-1.6%)
August	12262.2	12219.8 (-0.5%)	12218.0 (-0.5%)	12199.9 (-0.7%)	12151.3 (-0.6%)	12125.2 (-0.3%)	12126.5 (-0.3%)	12097.2 (-0.5%)
September	11486.5	11334.2 (-1.5%)	11341.9 (-1.4%)	11367.2 (-1.2%)	11429.5 (-0.4%)	11322.4 (-0.9%)	11322.5 (-0.9%)	11362.7 (-0.5%)

Source: DSM2 Simulations (Node RSAC075)

Notes:

Simulation Period: October 1921 – September 2003

[1] (%) indicates percent change from Existing Conditions

[2] (%) indicates percent change from No-Action Alternative

Key:

µmhos/cm = micromhos per centimeter

Alt = Alternative

Table 3.8-8.
Monthly Averages of Simulated Electrical Conductivity at San Joaquin River at Antioch (µmhos/cm) – All Years

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	1635.3	1625.0 (-1.0%)	1626.8 (-0.9%)	1632.3 (-0.8%)	1621.1 (0.6%)	1631.2 (0.2%)	1631.8 (0.1%)	1637.9 (0.3%)
November	757.8	776.6 (2.1%)	776.7 (2.0%)	779.5 (2.2%)	729.7 (-0.6%)	767.6 (3.1%)	769.0 (3.2%)	770.3 (3.3%)
December	411.1	407.7 (1.1%)	408.0 (1.1%)	408.5 (1.1%)	406.8 (1.2%)	412.3 (0.9%)	412.8 (1.0%)	413.0 (1.0%)
January	407.7	390.8 (-2.8%)	391.6 (-2.6%)	389.9 (-3.1%)	412.0 (0.2%)	397.7 (-2.8%)	398.8 (-2.6%)	395.6 (-3.3%)
February	580.3	574.1 (-1.4%)	575.2 (-1.3%)	576.3 (-1.1%)	567.1 (-1.9%)	564.7 (-1.0%)	565.8 (-0.8%)	566.8 (-0.6%)
March	1014.2	1007.0 (-1.2%)	1011.6 (-0.9%)	1011.6 (-0.9%)	995.0 (-0.1%)	987.7 (-1.4%)	989.6 (-1.2%)	989.7 (-1.2%)
April	1456.4	1457.8 (0.1%)	1456.3 (0.0%)	1459.2 (0.2%)	1442.5 (-0.5%)	1447.8 (0.3%)	1445.5 (0.1%)	1446.1 (0.2%)
May	2489.3	2511.4 (0.8%)	2508.6 (0.7%)	2510.6 (0.8%)	2411.8 (-2.3%)	2428.9 (0.7%)	2425.1 (0.6%)	2424.0 (0.5%)
June	3772.5	3789.4 (0.3%)	3785.9 (0.2%)	3790.8 (0.3%)	3608.0 (-1.0%)	3598.8 (-0.4%)	3597.4 (-0.4%)	3586.6 (-0.7%)
July	4088.2	4066.6 (-0.8%)	4073.2 (-0.6%)	4063.0 (-0.8%)	3992.5 (0.8%)	3978.4 (-0.6%)	3983.6 (-0.5%)	3970.2 (-0.8%)
August	3841.1	3803.3 (-1.2%)	3805.5 (-1.0%)	3797.6 (-1.3%)	3867.3 (2.9%)	3823.4 (-1.2%)	3826.5 (-1.1%)	3816.0 (-1.4%)
September	2780.9	2745.2 (-1.8%)	2749.2 (-1.6%)	2752.3 (-1.6%)	2833.9 (4.9%)	2799.1 (-1.4%)	2799.3 (-1.5%)	2803.7 (-1.4%)

Source: DSM2 Simulations (Node SJR_ANT)

Notes:
Simulation Period: October 1921 – September 2003
[1] (%) indicates percent change from Existing Conditions
[2] (%) indicates percent change from No-Action Alternative

Key:
µmhos/cm = micromhos per centimeter
Alt = Alternative

Table 3.8-9.
Monthly Averages of Simulated Electrical Conductivity at San Joaquin River at Antioch (µmhos/cm) – Wet Years

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	1089.1	1094.4 (-0.9%)	1094.5 (-0.9%)	1094.0 (-0.9%)	1097.3 (1.9%)	1115.9 (1.1%)	1116.7 (1.1%)	1116.7 (1.2%)
November	461.7	467.0 (0.7%)	467.8 (0.8%)	466.6 (0.6%)	455.8 (-0.9%)	458.5 (0.7%)	460.6 (1.0%)	460.5 (1.0%)
December	324.1	313.6 (-1.4%)	313.2 (-1.5%)	313.7 (-1.3%)	328.1 (-0.1%)	313.9 (-1.7%)	314.9 (-1.5%)	314.9 (-1.5%)
January	342.9	317.0 (-3.5%)	317.3 (-3.5%)	315.4 (-3.9%)	340.3 (-1.2%)	325.0 (-2.7%)	326.0 (-2.6%)	322.8 (-3.1%)
February	383.9	378.0 (-1.9%)	379.6 (-1.6%)	381.5 (-1.3%)	366.4 (-3.2%)	363.5 (-1.4%)	364.3 (-1.3%)	366.3 (-0.9%)
March	756.0	758.4 (-0.8%)	764.9 (-0.3%)	765.2 (-0.3%)	769.6 (0.4%)	759.8 (-1.6%)	760.2 (-1.6%)	763.1 (-1.3%)
April	1110.5	1116.6 (0.9%)	1113.3 (0.8%)	1118.6 (1.1%)	1094.7 (-0.7%)	1100.0 (0.7%)	1098.2 (0.6%)	1100.2 (0.8%)
May	2149.2	2203.7 (2.0%)	2198.7 (1.8%)	2204.1 (2.0%)	2135.2 (0.3%)	2160.6 (1.0%)	2161.0 (1.0%)	2160.9 (1.0%)
June	3190.5	3259.6 (1.6%)	3245.7 (1.3%)	3261.4 (1.6%)	3100.4 (2.4%)	3091.6 (-0.3%)	3100.0 (-0.1%)	3096.8 (-0.2%)
July	3279.3	3299.6 (0.4%)	3313.6 (0.7%)	3298.4 (0.4%)	3213.1 (2.9%)	3227.4 (0.2%)	3237.3 (0.4%)	3237.8 (0.4%)
August	2929.1	2935.0 (-0.2%)	2945.1 (0.2%)	2927.7 (-0.4%)	3079.1 (8.9%)	3031.1 (-1.4%)	3040.1 (-1.0%)	3033.6 (-1.1%)
September	1145.6	1111.4 (-2.3%)	1112.1 (-2.2%)	1112.6 (-2.3%)	1170.4 (5.2%)	1160.5 (-1.0%)	1159.9 (-1.4%)	1160.2 (-1.5%)

Source: DSM2 Simulations (Node SJR_ANT)

Notes:

Simulation Period: October 1921 – September 2003

[1](%) indicates percent change from Existing Conditions

[2](%) indicates percent change from No-Action Alternative

Key:

µmhos/cm = micromhos per centimeter

Alt = Alternative

Table 3.8-10.
Monthly Averages of Simulated Electrical Conductivity at San Joaquin River at Antioch (µmhos/cm) – Above Normal Years

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	1709.3	1694.1 (-1.8%)	1700.0 (-1.1%)	1707.9 (-1.2%)	1711.5 (-0.9%)	1733.8 (0.6%)	1729.9 (-0.7%)	1731.5 (-0.6%)
November	859.4	850.8 (-0.7%)	849.0 (-1.1%)	851.5 (-0.5%)	614.3 (-9.6%)	846.7 (21.0%)	845.6 (21.0%)	846.5 (21.1%)
December	450.9	443.0 (-1.1%)	443.1 (-1.1%)	443.0 (-1.1%)	350.7 (-7.7%)	448.8 (12.8%)	448.5 (12.7%)	448.6 (12.7%)
January	442.9	426.1 (-4.5%)	426.7 (-4.3%)	425.3 (-4.8%)	442.0 (1.4%)	437.7 (-4.0%)	438.4 (-3.8%)	436.2 (-4.5%)
February	647.3	641.8 (-1.4%)	644.0 (-1.2%)	644.3 (-1.1%)	633.9 (-1.9%)	635.0 (-1.1%)	636.8 (-0.9%)	637.6 (-0.7%)
March	1083.9	1072.6 (-1.1%)	1078.8 (-0.8%)	1076.5 (-0.9%)	1016.9 (-0.6%)	1011.9 (-0.6%)	1014.1 (-0.4%)	1011.1 (-0.5%)
April	1511.1	1509.3 (-0.5%)	1509.8 (-0.5%)	1510.1 (-0.5%)	1439.2 (-3.2%)	1453.4 (0.7%)	1456.3 (0.9%)	1457.5 (0.9%)
May	2711.2	2685.8 (-1.1%)	2685.6 (-1.0%)	2688.2 (-0.9%)	2484.9 (-7.1%)	2483.2 (-0.2%)	2482.3 (-0.3%)	2478.4 (-0.4%)
June	4028.8	3979.5 (-1.9%)	3983.0 (-1.8%)	3987.2 (-1.6%)	3753.2 (-5.4%)	3741.7 (-0.5%)	3740.2 (-0.5%)	3722.5 (-1.1%)
July	4383.1	4305.0 (-3.3%)	4310.1 (-3.1%)	4313.4 (-3.0%)	4248.9 (-1.5%)	4194.6 (-2.4%)	4198.2 (-2.3%)	4178.6 (-2.8%)
August	3631.3	3491.1 (-4.3%)	3496.0 (-4.1%)	3497.0 (-4.1%)	3766.3 (4.3%)	3641.9 (-3.7%)	3635.0 (-3.9%)	3640.3 (-3.9%)
September	2823.9	2761.0 (-2.8%)	2759.8 (-2.8%)	2760.3 (-2.7%)	2945.5 (12.1%)	2920.2 (-1.5%)	2918.7 (-1.6%)	2927.8 (-1.3%)

Source: DSM2 Simulations (Node SJR_ANT)

Notes:

Simulation Period: October 1921 – September 2003

[1] (%) indicates percent change from Existing Conditions

[2] (%) indicates percent change from No-Action Alternative

Key:

µmhos/cm = micromhos per centimeter

Alt = Alternative

Table 3.8-11.
Monthly Averages of Simulated Electrical Conductivity at San Joaquin River at Antioch (µmhos/cm) – Below Normal Years

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	1745.4	1727.1 (-0.2%)	1730.7 (-0.3%)	1734.3 (-0.1%)	1679.7 (-1.4%)	1693.1 (0.2%)	1703.3 (0.6%)	1715.2 (1.0%)
November	683.3	816.7 (12.4%)	818.5 (12.6%)	818.9 (12.7%)	773.8 (8.3%)	829.6 (1.6%)	832.2 (1.9%)	831.0 (2.0%)
December	296.3	324.0 (11.7%)	324.3 (11.8%)	324.3 (11.8%)	328.6 (12.2%)	332.9 (0.0%)	333.4 (0.1%)	332.3 (-0.1%)
January	293.2	289.0 (-0.9%)	290.1 (-0.7%)	288.2 (-1.2%)	297.3 (0.8%)	287.1 (-2.2%)	288.3 (-2.0%)	286.9 (-2.3%)
February	442.3	436.5 (-1.5%)	437.1 (-1.4%)	439.1 (-1.1%)	434.8 (-1.4%)	434.0 (-0.4%)	434.4 (-0.4%)	435.9 (-0.1%)
March	762.7	759.1 (-0.6%)	762.6 (-0.2%)	762.8 (-0.3%)	753.3 (-0.4%)	749.9 (-0.1%)	752.3 (0.0%)	752.0 (0.0%)
April	1266.4	1268.1 (0.2%)	1267.6 (0.1%)	1270.8 (0.3%)	1254.2 (-0.2%)	1257.9 (0.4%)	1257.3 (0.4%)	1260.0 (0.5%)
May	2419.5	2419.4 (-0.1%)	2412.6 (-0.3%)	2412.8 (-0.3%)	2309.4 (-3.8%)	2336.4 (1.4%)	2324.3 (1.1%)	2334.9 (1.4%)
June	3702.8	3709.5 (0.0%)	3704.6 (-0.1%)	3698.7 (-0.2%)	3552.4 (0.6%)	3561.7 (0.2%)	3554.6 (0.0%)	3566.3 (0.4%)
July	4143.5	4127.4 (-0.5%)	4130.3 (-0.5%)	4120.0 (-0.7%)	4048.3 (0.9%)	4045.7 (-0.2%)	4050.9 (-0.1%)	4055.1 (0.0%)
August	4327.5	4232.4 (-1.7%)	4230.9 (-1.7%)	4231.9 (-1.7%)	4306.0 (0.1%)	4237.1 (-1.5%)	4239.1 (-1.5%)	4218.0 (-1.9%)
September	3429.4	3459.6 (-1.0%)	3473.0 (-0.3%)	3473.4 (-0.3%)	3528.0 (4.1%)	3494.5 (-1.6%)	3494.1 (-1.8%)	3477.2 (-2.1%)

Source: DSM2 Simulations (Node SJR_ANT)

Notes:
Simulation Period: October 1921 – September 2003
[1] (%) indicates percent change from Existing Conditions
[2] (%) indicates percent change from No-Action Alternative

Key:
µmhos/cm = micromhos per centimeter
Alt = Alternative

Table 3.8-12.
Monthly Averages of Simulated Electrical Conductivity at San Joaquin River at Antioch (µmhos/cm) – Dry Years

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	1939.8	1920.4 (-1.2%)	1924.5 (-1.1%)	1941.0 (-0.7%)	1919.8 (0.8%)	1958.5 (1.0%)	1953.6 (0.9%)	1976.2 (1.5%)
November	827.7	816.0 (-0.4%)	816.5 (-0.4%)	829.1 (0.1%)	837.8 (0.2%)	830.1 (-0.1%)	831.4 (0.0%)	840.2 (0.4%)
December	448.0	448.2 (0.2%)	449.7 (0.4%)	451.7 (0.5%)	458.5 (0.8%)	456.2 (0.3%)	456.4 (0.3%)	458.9 (0.6%)
January	525.8	514.7 (-2.0%)	515.3 (-1.9%)	514.8 (-2.1%)	533.8 (0.3%)	517.7 (-2.4%)	517.2 (-2.6%)	514.6 (-3.2%)
February	748.7	747.2 (-0.5%)	748.1 (-0.4%)	748.8 (-0.3%)	754.5 (0.6%)	749.9 (-1.2%)	751.3 (-1.0%)	753.2 (-0.7%)
March	1113.0	1100.2 (-2.5%)	1102.0 (-2.3%)	1103.2 (-2.2%)	1103.2 (1.0%)	1088.1 (-3.4%)	1090.4 (-3.1%)	1092.2 (-3.0%)
April	1586.5	1583.6 (-0.3%)	1582.4 (-0.4%)	1582.3 (-0.4%)	1572.6 (0.4%)	1583.6 (0.3%)	1573.8 (-0.6%)	1571.5 (-0.7%)
May	2522.4	2555.5 (1.3%)	2555.1 (1.3%)	2555.4 (1.3%)	2534.2 (0.3%)	2542.7 (0.5%)	2534.7 (0.0%)	2532.6 (-0.1%)
June	4103.5	4116.4 (0.3%)	4120.1 (0.5%)	4117.5 (0.4%)	4084.0 (0.8%)	4067.2 (-0.6%)	4053.3 (-1.0%)	4041.2 (-1.3%)
July	4633.5	4579.0 (-1.2%)	4581.6 (-1.2%)	4575.4 (-1.3%)	4530.9 (0.3%)	4539.2 (0.0%)	4540.8 (0.0%)	4518.9 (-0.4%)
August	4432.9	4404.1 (-0.9%)	4398.4 (-1.0%)	4402.1 (-0.9%)	4314.2 (-2.2%)	4334.8 (0.5%)	4338.8 (0.6%)	4331.4 (0.4%)
September	3551.3	3514.5 (-0.9%)	3516.8 (-0.9%)	3522.2 (-0.7%)	3586.0 (2.8%)	3548.0 (-1.2%)	3550.2 (-0.9%)	3557.3 (-0.7%)

Source: DSM2 Simulations (Node SJR_ANT)
Notes:
Simulation Period: October 1921 – September 2003
[1] (%) indicates percent change from Existing Conditions
[2] (%) indicates percent change from No-Action Alternative
Key:
µmhos/cm = micromhos per centimeter
Alt = Alternative

Table 3.8-13.
Monthly Averages of Simulated Electrical Conductivity at San Joaquin River at Antioch (µmhos/cm) – Critical Years

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	2159.8	2142.9 (-0.8%)	2139.1 (-1.0%)	2140.6 (-0.9%)	2149.0 (1.3%)	2081.9 (-3.1%)	2083.7 (-3.0%)	2076.0 (-3.6%)
November	1280.0	1267.5 (-0.6%)	1264.9 (-0.6%)	1265.3 (-0.6%)	1225.1 (-2.7%)	1192.5 (-3.2%)	1193.0 (-3.3%)	1189.4 (-3.5%)
December	638.6	613.5 (-2.6%)	613.5 (-2.6%)	613.1 (-2.7%)	646.9 (0.7%)	616.1 (-3.2%)	616.1 (-3.3%)	615.4 (-3.1%)
January	469.1	448.3 (-2.8%)	450.3 (-2.5%)	447.3 (-3.2%)	488.8 (1.6%)	464.1 (-2.9%)	468.3 (-2.1%)	460.8 (-3.6%)
February	847.4	832.3 (-1.7%)	832.2 (-1.7%)	831.8 (-1.7%)	808.5 (-3.4%)	805.3 (-0.2%)	806.7 (0.0%)	803.3 (-0.6%)
March	1649.3	1629.1 (-1.0%)	1633.4 (-0.7%)	1633.4 (-0.7%)	1581.1 (-2.3%)	1583.9 (-0.1%)	1588.0 (0.1%)	1582.8 (-0.3%)
April	2177.6	2178.2 (-0.7%)	2176.8 (-0.7%)	2181.3 (-0.5%)	2223.8 (0.8%)	2213.3 (-1.1%)	2214.4 (-1.0%)	2213.2 (-1.1%)
May	3036.1	3044.6 (0.3%)	3044.9 (0.3%)	3043.9 (0.3%)	2873.6 (-5.0%)	2893.6 (0.6%)	2893.5 (0.6%)	2881.0 (0.2%)
June	4362.3	4349.6 (-0.3%)	4352.7 (-0.2%)	4358.8 (-0.1%)	3913.1 (-8.5%)	3895.6 (-0.8%)	3898.8 (-0.7%)	3854.2 (-1.9%)
July	4663.6	4650.4 (-0.3%)	4652.7 (-0.2%)	4634.2 (-0.7%)	4551.8 (-0.6%)	4469.3 (-2.1%)	4471.9 (-2.0%)	4426.6 (-3.1%)
August	4572.1	4595.3 (0.2%)	4593.4 (0.1%)	4569.2 (-0.4%)	4494.1 (-0.4%)	4472.1 (-0.8%)	4472.0 (-0.8%)	4444.8 (-1.3%)
September	4369.0	4282.1 (-2.2%)	4289.7 (-2.0%)	4300.6 (-1.8%)	4388.5 (0.9%)	4293.6 (-2.0%)	4295.1 (-2.0%)	4324.1 (-1.3%)

Source: DSM2 Simulations (Node SJR_ANT)

Notes:

Simulation Period: October 1921 – September 2003

[1] (%) indicates percent change from Existing Conditions

[2] (%) indicates percent change from No-Action Alternative

Key:

µmhos/cm = micromhos per centimeter

Alt = Alternative

**Table 3.8-14.
Monthly Averages of Simulated Chloride at Sacramento River at Mallard Slough (mg/L) – All Years**

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	1126.0	1117.6 (-1.7%)	1118.3 (-1.5%)	1121.5 (-1.5%)	1120.9 (1.4%)	1119.4 (-0.8%)	1119.6 (-0.9%)	1122.6 (-0.7%)
November	490.4	506.4 (1.4%)	506.5 (1.4%)	507.4 (1.6%)	472.5 (-0.2%)	505.1 (2.9%)	505.3 (3.0%)	506.0 (3.1%)
December	331.4	328.0 (2.7%)	328.3 (2.8%)	328.1 (2.6%)	326.1 (3.5%)	332.2 (-1.2%)	332.5 (-1.2%)	332.6 (-1.2%)
January	453.5	436.9 (-4.6%)	437.8 (-4.5%)	436.9 (-4.6%)	455.0 (-1.9%)	441.0 (-4.4%)	441.8 (-4.3%)	440.7 (-4.4%)
February	676.3	666.9 (-2.8%)	667.6 (-2.6%)	670.2 (-2.3%)	673.2 (-0.5%)	665.7 (-2.6%)	666.6 (-2.5%)	670.1 (-2.0%)
March	1076.0	1068.1 (-1.4%)	1069.0 (-1.3%)	1070.4 (-1.2%)	1074.8 (1.0%)	1065.1 (-1.5%)	1065.8 (-1.4%)	1066.8 (-1.3%)
April	1393.8	1392.1 (0.1%)	1390.6 (0.0%)	1392.7 (0.1%)	1371.8 (-1.2%)	1374.5 (0.4%)	1376.8 (0.6%)	1377.3 (0.6%)
May	2116.1	2128.3 (0.6%)	2127.3 (0.5%)	2127.2 (0.5%)	2052.0 (-2.3%)	2061.3 (0.5%)	2060.9 (0.5%)	2059.6 (0.4%)
June	2613.2	2618.9 (0.1%)	2620.8 (0.2%)	2619.9 (0.2%)	2538.8 (-0.8%)	2534.2 (-0.2%)	2533.6 (-0.3%)	2529.0 (-0.4%)
July	2852.4	2843.9 (-0.4%)	2846.3 (-0.3%)	2843.7 (-0.4%)	2822.7 (0.6%)	2816.7 (-0.4%)	2814.4 (-0.4%)	2810.7 (-0.5%)
August	2658.6	2645.3 (-0.6%)	2647.9 (-0.5%)	2646.0 (-0.6%)	2682.6 (2.5%)	2668.7 (-0.7%)	2668.4 (-0.7%)	2666.7 (-0.8%)
September	1867.2	1850.1 (-1.7%)	1851.9 (-1.5%)	1854.3 (-1.4%)	1889.8 (4.7%)	1874.7 (-1.1%)	1874.3 (-1.1%)	1877.9 (-0.9%)

Source: DSM2 Simulations (Node RSAC075)

Notes:

Simulation Period: October 1921 – September 2003

[1] (%) indicates percent change from Existing Conditions

[2] (%) indicates percent change from No-Action Alternative

Key:

Alt = Alternative

mg/L = milligram per liter

Table 3.8-15. Monthly Averages of Simulated Chloride at Sacramento River at Mallard Slough (mg/L) – Wet Years

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	678.1	675.8 (-2.1%)	675.8 (-2.1%)	675.7 (-2.0%)	685.9 (4.2%)	689.2 (-0.5%)	689.4 (-0.5%)	689.4 (-0.3%)
November	219.2	217.2 (-2.3%)	217.4 (-2.2%)	217.2 (-2.3%)	212.8 (-2.2%)	212.5 (-0.6%)	212.7 (-0.6%)	212.7 (-0.6%)
December	211.3	207.0 (-1.0%)	207.1 (-1.0%)	207.0 (-1.1%)	213.7 (-1.7%)	206.2 (-2.9%)	207.0 (-2.6%)	206.9 (-2.6%)
January	326.4	306.8 (-1.9%)	307.4 (-1.8%)	307.6 (-1.8%)	319.9 (-4.1%)	306.7 (-2.0%)	307.5 (-2.1%)	307.8 (-2.0%)
February	459.7	445.7 (-4.0%)	447.2 (-3.8%)	451.6 (-3.3%)	448.1 (-3.3%)	437.4 (-3.2%)	438.6 (-3.2%)	443.8 (-2.5%)
March	831.2	828.5 (-0.1%)	829.6 (0.0%)	832.7 (0.2%)	839.0 (0.0%)	829.7 (-0.3%)	830.4 (-0.2%)	833.0 (0.0%)
April	1102.4	1104.5 (0.9%)	1100.1 (0.7%)	1106.1 (1.0%)	1081.3 (-0.4%)	1086.8 (1.1%)	1087.3 (1.1%)	1088.3 (1.1%)
May	1830.2	1857.7 (1.3%)	1857.2 (1.3%)	1857.7 (1.3%)	1810.3 (0.3%)	1825.2 (0.8%)	1826.0 (0.8%)	1825.9 (0.8%)
June	2214.5	2249.8 (1.2%)	2253.7 (1.3%)	2249.0 (1.2%)	2170.1 (1.9%)	2171.1 (0.0%)	2173.5 (0.1%)	2172.7 (0.0%)
July	2305.3	2316.1 (0.3%)	2321.5 (0.5%)	2315.4 (0.3%)	2304.0 (3.0%)	2305.7 (-0.1%)	2302.6 (-0.2%)	2303.8 (-0.1%)
August	2006.3	2005.3 (-0.3%)	2009.5 (0.0%)	2005.9 (-0.2%)	2055.3 (5.2%)	2040.1 (-0.9%)	2041.4 (-0.8%)	2040.1 (-0.8%)
September	627.6	614.1 (-2.0%)	615.0 (-1.9%)	616.3 (-2.0%)	632.2 (5.6%)	629.5 (-0.4%)	627.0 (-0.6%)	628.3 (-0.6%)

Source: DSM2 Simulations (Node RSAC075)

Notes:

Simulation Period: October 1921 – September 2003

[1] (%) indicates percent change from Existing Conditions

[2] (%) indicates percent change from No-Action Alternative

Key:

Alt = Alternative

mg/L = milligram per liter

Table 3.8-16.
Monthly Averages of Simulated Chloride at Sacramento River at Mallard Slough (mg/L) – Above Normal Years

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	1272.9	1264.5 (-2.3%)	1266.7 (-0.6%)	1270.0 (-2.0%)	1273.6 (-1.5%)	1269.1 (-0.6%)	1266.9 (-1.6%)	1268.8 (-1.0%)
November	561.8	561.0 (0.0%)	559.6 (-0.6%)	561.4 (0.3%)	376.7 (-8.4%)	553.5 (20.0%)	552.3 (20.2%)	552.7 (20.3%)
December	397.5	389.9 (-2.4%)	390.1 (-2.3%)	389.8 (-2.5%)	316.9 (-6.1%)	400.5 (6.2%)	400.6 (6.2%)	400.5 (6.2%)
January	539.6	516.3 (-6.7%)	516.5 (-6.7%)	515.9 (-6.9%)	534.1 (-0.1%)	524.6 (-6.0%)	525.4 (-5.8%)	525.3 (-5.8%)
February	737.4	729.7 (-2.7%)	730.0 (-2.8%)	732.3 (-2.3%)	735.7 (1.1%)	731.6 (-2.3%)	732.5 (-2.3%)	737.3 (-1.4%)
March	1097.8	1088.1 (-2.9%)	1089.4 (-2.8%)	1089.1 (-2.8%)	1089.8 (2.4%)	1082.7 (-2.6%)	1082.9 (-2.6%)	1083.4 (-2.5%)
April	1465.8	1466.3 (-0.2%)	1465.5 (-0.3%)	1465.8 (-0.3%)	1413.0 (-2.9%)	1422.1 (0.5%)	1426.1 (0.8%)	1426.9 (0.8%)
May	2242.2	2241.6 (0.0%)	2241.0 (0.0%)	2240.3 (-0.1%)	2130.2 (-4.7%)	2136.5 (0.3%)	2136.6 (0.3%)	2133.6 (0.2%)
June	2767.2	2746.5 (-1.0%)	2748.5 (-0.9%)	2750.7 (-0.8%)	2634.3 (-4.0%)	2631.4 (-0.1%)	2631.3 (-0.1%)	2623.1 (-0.5%)
July	2983.9	2941.8 (-2.0%)	2944.1 (-1.9%)	2946.1 (-1.8%)	2934.5 (-1.0%)	2903.7 (-1.5%)	2904.5 (-1.5%)	2898.3 (-1.7%)
August	2515.6	2468.7 (-2.4%)	2470.9 (-2.2%)	2471.5 (-2.2%)	2617.6 (4.5%)	2572.2 (-2.1%)	2569.3 (-2.3%)	2573.0 (-2.2%)
September	1933.2	1906.4 (-2.7%)	1906.2 (-2.7%)	1906.5 (-2.7%)	2010.7 (12.9%)	1985.4 (-2.7%)	1985.0 (-2.9%)	1991.2 (-2.5%)

Source: DSM2 Simulations (Node RSAC075)

Notes:

Simulation Period: October 1921 – September 2003

[1] (%) indicates percent change from Existing Conditions

[2] (%) indicates percent change from No-Action Alternative

Key:

Alt = Alternative

mg/L = milligram per liter

Table 3.8-17.
Monthly Averages of Simulated Chloride at Sacramento River at Mallard Slough (mg/L) – Below Normal Years

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	1190.3	1171.9 (-1.1%)	1173.5 (-1.2%)	1175.8 (-1.0%)	1156.3 (0.1%)	1155.9 (-0.6%)	1159.5 (-0.5%)	1164.9 (-0.1%)
November	383.4	479.3 (12.3%)	480.3 (12.4%)	480.6 (12.5%)	471.6 (10.2%)	496.2 (0.1%)	497.4 (0.4%)	495.3 (0.4%)
December	190.6	196.8 (24.6%)	197.0 (24.7%)	196.8 (24.5%)	207.0 (29.1%)	200.5 (-3.3%)	201.3 (-3.4%)	200.1 (-3.9%)
January	310.2	298.6 (-6.4%)	299.8 (-6.3%)	298.9 (-6.5%)	317.2 (-1.5%)	300.3 (-6.6%)	301.6 (-6.4%)	301.6 (-6.3%)
February	513.1	508.1 (-1.9%)	508.6 (-1.7%)	511.9 (-1.4%)	516.0 (0.9%)	512.8 (-1.6%)	513.0 (-1.5%)	517.4 (-1.1%)
March	870.7	867.3 (-0.4%)	868.3 (-0.3%)	869.3 (-0.3%)	876.9 (2.3%)	873.0 (-0.3%)	873.8 (-0.3%)	874.6 (-0.3%)
April	1268.0	1267.3 (-0.1%)	1268.2 (0.0%)	1270.6 (0.1%)	1253.6 (-0.6%)	1256.8 (0.4%)	1257.5 (0.6%)	1259.6 (0.7%)
May	2072.5	2074.1 (0.0%)	2068.9 (-0.2%)	2069.6 (-0.2%)	2002.9 (-3.0%)	2015.2 (0.8%)	2011.1 (0.6%)	2015.4 (0.8%)
June	2574.2	2567.4 (-0.3%)	2566.5 (-0.3%)	2564.6 (-0.4%)	2515.5 (0.0%)	2519.2 (0.1%)	2518.3 (0.1%)	2521.0 (0.2%)
July	2935.7	2930.5 (-0.2%)	2931.3 (-0.2%)	2929.0 (-0.3%)	2910.2 (0.4%)	2907.3 (-0.1%)	2909.1 (-0.1%)	2911.6 (0.0%)
August	2969.9	2956.4 (-0.3%)	2963.1 (0.0%)	2959.0 (-0.2%)	2977.1 (0.5%)	2964.1 (-0.4%)	2964.3 (-0.4%)	2960.7 (-0.5%)
September	2378.4	2383.0 (-1.8%)	2388.1 (-1.3%)	2389.1 (-1.2%)	2410.8 (2.1%)	2396.2 (-1.2%)	2395.9 (-1.3%)	2393.2 (-1.4%)

Source: DSM2 Simulations (Node RSAC075)

Notes:
Simulation Period: October 1921 – September 2003
[1] (%) indicates percent change from Existing Conditions
[2] (%) indicates percent change from No-Action Alternative

Key:
Alt = Alternative
mg/L = milligram per liter

Table 3.8-18.
Monthly Averages of Simulated Chloride at Sacramento River at Mallard Slough (mg/L) – Dry Years

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	1263.8	1253.8 (-1.8%)	1255.2 (-1.8%)	1264.7 (-1.3%)	1265.7 (1.0%)	1279.7 (-0.2%)	1278.4 (-0.2%)	1288.1 (0.2%)
November	492.5	499.4 (0.5%)	499.8 (0.5%)	503.6 (0.8%)	498.8 (0.5%)	523.9 (2.6%)	524.9 (2.6%)	529.0 (3.0%)
December	425.7	426.2 (-1.8%)	426.6 (-1.6%)	427.0 (-1.8%)	430.8 (-1.3%)	431.1 (-0.4%)	430.8 (-0.8%)	432.2 (-0.5%)
January	590.9	578.7 (-5.2%)	579.5 (-5.0%)	579.2 (-5.0%)	598.0 (-0.8%)	583.4 (-5.0%)	582.4 (-5.2%)	581.3 (-5.2%)
February	853.0	850.9 (-0.9%)	851.8 (-0.9%)	853.5 (-0.5%)	867.0 (1.9%)	858.0 (-2.3%)	859.1 (-2.1%)	862.8 (-1.7%)
March	1248.1	1231.3 (-2.5%)	1231.4 (-2.4%)	1232.6 (-2.3%)	1251.9 (1.2%)	1229.8 (-3.0%)	1229.6 (-3.0%)	1232.3 (-2.7%)
April	1537.8	1530.0 (-0.6%)	1529.6 (-0.6%)	1529.6 (-0.6%)	1520.1 (-1.6%)	1517.8 (-0.2%)	1523.1 (0.4%)	1523.2 (0.4%)
May	2229.8	2243.3 (0.7%)	2243.8 (0.7%)	2242.6 (0.6%)	2188.6 (-2.0%)	2194.6 (0.4%)	2193.5 (0.3%)	2189.7 (0.1%)
June	2864.9	2862.9 (-0.1%)	2864.6 (0.0%)	2863.4 (0.0%)	2834.7 (-0.5%)	2825.3 (-0.4%)	2819.1 (-0.7%)	2815.9 (-0.8%)
July	3212.5	3193.5 (-0.6%)	3193.8 (-0.6%)	3192.8 (-0.6%)	3159.5 (-0.8%)	3173.1 (0.4%)	3165.1 (0.1%)	3159.7 (-0.1%)
August	3026.8	3017.2 (-0.3%)	3016.1 (-0.4%)	3019.3 (-0.3%)	3011.9 (1.1%)	3015.5 (0.0%)	3013.7 (0.0%)	3013.7 (-0.1%)
September	2402.3	2386.0 (-0.4%)	2387.7 (-0.4%)	2391.3 (-0.2%)	2432.3 (3.1%)	2415.0 (-0.9%)	2417.2 (-0.6%)	2422.5 (-0.3%)

Source: DSM2 Simulations (Node RSAC075)

Notes:
Simulation Period: October 1921 – September 2003
[1] (%) indicates percent change from Existing Conditions
[2] (%) indicates percent change from No-Action Alternative

Key:
Alt = Alternative
mg/L = milligram per liter

Table 3.8-19.
Monthly Averages of Simulated Chloride at Sacramento River at Mallard Slough (mg/L) – Critical Years

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	1668.0	1660.1 (-0.8%)	1659.2 (-0.9%)	1660.7 (-0.8%)	1652.5 (0.0%)	1619.1 (-2.7%)	1619.7 (-2.7%)	1617.1 (-3.0%)
November	1128.2	1120.4 (-0.2%)	1120.2 (-0.1%)	1119.3 (-0.4%)	1092.7 (-1.0%)	1072.8 (-2.9%)	1071.9 (-3.1%)	1072.8 (-2.8%)
December	548.2	534.0 (-3.1%)	534.5 (-3.0%)	533.5 (-3.1%)	560.8 (1.8%)	542.3 (-3.6%)	541.6 (-3.8%)	542.2 (-3.5%)
January	603.8	588.2 (-5.4%)	589.8 (-5.1%)	585.5 (-5.7%)	615.2 (-1.0%)	598.8 (-4.6%)	601.9 (-4.1%)	595.5 (-4.6%)
February	1010.1	992.4 (-4.0%)	992.2 (-3.8%)	991.2 (-3.9%)	990.8 (-1.0%)	984.3 (-3.1%)	985.1 (-2.8%)	981.9 (-3.0%)
March	1565.5	1556.7 (-2.4%)	1557.9 (-2.1%)	1557.7 (-2.2%)	1535.8 (0.1%)	1534.8 (-2.0%)	1536.8 (-1.7%)	1532.9 (-2.1%)
April	1884.2	1879.9 (-0.4%)	1879.3 (-0.4%)	1877.4 (-0.5%)	1875.4 (-1.1%)	1872.9 (-0.3%)	1874.8 (-0.2%)	1872.8 (-0.4%)
May	2489.7	2492.3 (0.1%)	2492.4 (0.1%)	2491.9 (0.1%)	2350.1 (-5.4%)	2351.5 (0.0%)	2353.1 (0.1%)	2348.6 (-0.1%)
June	2990.9	2985.3 (-0.2%)	2986.1 (-0.2%)	2992.0 (0.0%)	2825.1 (-4.8%)	2804.2 (-0.9%)	2805.5 (-0.9%)	2785.8 (-1.6%)
July	3268.7	3264.1 (-0.2%)	3265.1 (-0.1%)	3262.4 (-0.2%)	3227.5 (-0.8%)	3196.3 (-1.1%)	3196.5 (-1.1%)	3179.9 (-1.6%)
August	3299.7	3288.1 (-0.5%)	3287.6 (-0.5%)	3282.7 (-0.7%)	3269.4 (-0.6%)	3262.3 (-0.3%)	3262.6 (-0.3%)	3254.6 (-0.5%)
September	3087.9	3046.3 (-1.5%)	3048.4 (-1.5%)	3055.3 (-1.2%)	3072.4 (-0.4%)	3043.1 (-0.9%)	3043.1 (-0.9%)	3054.1 (-0.5%)

Source: DSM2 Simulations (Node RSAC075)

Notes:
Simulation Period: October 1921 – September 2003
[1] (%) indicates percent change from Existing Conditions
[2] (%) indicates percent change from No-Action Alternative

Key:
Alt = Alternative
mg/L = milligram per liter

Table 3.8-20.
Monthly Averages of Simulated Chloride at San Joaquin River at Antioch (mg/L) – All Years

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	398.5	395.7 (-1.8%)	396.2 (-1.7%)	397.7 (-1.6%)	394.7 (1.6%)	397.4 (-0.2%)	397.6 (-0.5%)	399.2 (-0.3%)
November	159.0	164.1 (2.2%)	164.1 (2.1%)	164.9 (2.4%)	151.3 (-1.1%)	161.7 (3.6%)	162.0 (3.9%)	162.4 (4.0%)
December	64.3	63.4 (6.0%)	63.5 (6.0%)	63.6 (6.1%)	63.1 (4.4%)	64.7 (1.4%)	64.8 (1.5%)	64.9 (1.6%)
January	63.4	58.8 (-3.1%)	59.0 (-3.0%)	58.5 (-3.7%)	64.6 (-2.1%)	60.7 (-3.4%)	61.0 (-3.2%)	60.1 (-4.3%)
February	110.5	108.8 (-3.9%)	109.1 (-3.7%)	109.4 (-3.4%)	106.9 (-6.3%)	106.3 (-3.2%)	106.6 (-3.0%)	106.8 (-2.6%)
March	229.0	227.0 (-2.2%)	228.3 (-1.7%)	228.3 (-1.7%)	223.7 (-0.9%)	221.7 (-2.6%)	222.3 (-2.4%)	222.3 (-2.3%)
April	349.7	350.1 (0.1%)	349.7 (0.1%)	350.5 (0.2%)	345.9 (-0.9%)	347.3 (0.4%)	346.7 (0.2%)	346.9 (0.2%)
May	631.7	637.7 (0.8%)	636.9 (0.8%)	637.5 (0.8%)	610.5 (-2.1%)	615.2 (0.8%)	614.2 (0.6%)	613.9 (0.5%)
June	982.0	986.6 (0.3%)	985.6 (0.2%)	987.0 (0.3%)	937.1 (-0.1%)	934.6 (-0.4%)	934.2 (-0.5%)	931.3 (-0.8%)
July	1068.2	1062.3 (-0.9%)	1064.1 (-0.7%)	1061.3 (-1.0%)	1042.0 (1.8%)	1038.2 (-0.7%)	1039.6 (-0.6%)	1036.0 (-0.9%)
August	1000.7	990.4 (-1.3%)	991.0 (-1.2%)	988.8 (-1.5%)	1007.9 (3.4%)	995.9 (-1.4%)	996.7 (-1.3%)	993.9 (-1.5%)
September	711.3	701.5 (-2.3%)	702.6 (-2.1%)	703.5 (-2.1%)	725.7 (7.2%)	716.3 (-1.7%)	716.3 (-1.8%)	717.5 (-1.7%)

Source: DSM2 Simulations (Node SJR_ANT)

Notes:

Simulation Period: October 1921 – September 2003

[1] (%) indicates percent change from Existing Conditions

[2] (%) indicates percent change from No-Action Alternative

Key:

Alt = Alternative

mg/L = milligram per liter

Table 3.8-21.
Monthly Averages of Simulated Chloride at San Joaquin River at Antioch (mg/L) – Wet Years

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	249.4	250.9 (-2.1%)	250.9 (-2.1%)	250.8 (-2.0%)	251.7 (3.9%)	256.7 (0.7%)	257.0 (0.7%)	257.0 (0.9%)
November	78.1	79.6 (-0.4%)	79.8 (-0.2%)	79.5 (-0.4%)	76.5 (-1.9%)	77.3 (0.1%)	77.8 (0.5%)	77.8 (0.5%)
December	40.6	37.7 (-1.6%)	37.6 (-1.8%)	37.7 (-1.6%)	41.7 (-2.8%)	37.8 (-2.2%)	38.1 (-1.8%)	38.1 (-1.8%)
January	45.7	38.6 (-2.5%)	38.7 (-2.6%)	38.2 (-3.3%)	45.0 (-5.6%)	40.8 (-2.8%)	41.1 (-2.7%)	40.2 (-3.6%)
February	56.9	55.3 (-6.0%)	55.7 (-5.6%)	56.3 (-5.1%)	52.1 (-9.3%)	51.3 (-4.9%)	51.5 (-4.8%)	52.1 (-4.2%)
March	158.5	159.2 (-1.4%)	160.9 (-0.8%)	161.0 (-0.7%)	162.2 (-1.9%)	159.5 (-2.3%)	159.6 (-2.3%)	160.4 (-2.0%)
April	255.3	256.9 (1.3%)	256.0 (1.2%)	257.5 (1.5%)	251.0 (-1.6%)	252.4 (1.1%)	251.9 (1.0%)	252.5 (1.1%)
May	538.8	553.7 (2.2%)	552.4 (2.0%)	553.8 (2.2%)	535.0 (1.1%)	541.9 (1.1%)	542.1 (1.1%)	542.0 (1.1%)
June	823.1	842.0 (1.6%)	838.2 (1.3%)	842.5 (1.7%)	798.5 (4.7%)	796.1 (-0.4%)	798.4 (-0.1%)	797.5 (-0.2%)
July	847.4	852.9 (0.2%)	856.7 (0.5%)	852.6 (0.2%)	829.3 (5.1%)	833.2 (0.0%)	835.9 (0.2%)	836.0 (0.2%)
August	751.7	753.3 (-0.6%)	756.1 (0.0%)	751.4 (-0.7%)	792.7 (10.2%)	779.6 (-1.7%)	782.0 (-1.3%)	780.3 (-1.5%)
September	264.9	255.5 (-3.3%)	255.7 (-3.1%)	255.8 (-3.4%)	271.6 (9.6%)	268.9 (-1.1%)	268.7 (-1.7%)	268.8 (-1.8%)

Source: DSM2 Simulations (Node SJR_ANT)

Notes:

Simulation Period: October 1921 – September 2003

[1] (%) indicates percent change from Existing Conditions

[2] (%) indicates percent change from No-Action Alternative

Key:

Alt = Alternative

mg/L = milligram per liter

Table 3.8-22.
Monthly Averages of Simulated Chloride at San Joaquin River at Antioch (mg/L) – Above Normal Years

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	418.7	414.6 (-3.0%)	416.2 (-1.9%)	418.4 (-2.4%)	419.3 (-1.3%)	425.4 (0.8%)	424.4 (-1.7%)	424.8 (-1.4%)
November	186.7	184.4 (-1.0%)	183.9 (-1.7%)	184.6 (-0.7%)	119.8 (-10.1%)	183.3 (25.4%)	183.0 (25.6%)	183.2 (25.7%)
December	75.2	73.0 (-1.4%)	73.1 (-1.3%)	73.0 (-1.4%)	47.8 (-9.9%)	74.6 (18.7%)	74.6 (18.5%)	74.6 (18.5%)
January	73.0	68.4 (-7.7%)	68.6 (-7.6%)	68.2 (-8.5%)	72.8 (-0.1%)	71.6 (-7.3%)	71.8 (-7.0%)	71.2 (-8.1%)
February	128.8	127.3 (-4.6%)	127.9 (-4.5%)	128.0 (-4.2%)	125.2 (-6.3%)	125.5 (-4.4%)	126.0 (-4.4%)	126.2 (-3.8%)
March	248.0	244.9 (-1.7%)	246.6 (-1.2%)	246.0 (-1.4%)	229.7 (-1.3%)	228.3 (-1.3%)	228.9 (-1.1%)	228.1 (-1.2%)
April	364.6	364.1 (-0.7%)	364.3 (-0.7%)	364.3 (-0.7%)	345.0 (-3.7%)	348.9 (0.7%)	349.7 (0.9%)	350.0 (0.9%)
May	692.3	685.3 (-1.1%)	685.3 (-1.1%)	686.0 (-1.0%)	630.5 (-7.6%)	630.0 (-0.3%)	629.8 (-0.3%)	628.7 (-0.5%)
June	1052.0	1038.5 (-2.0%)	1039.5 (-1.9%)	1040.6 (-1.8%)	976.7 (-5.6%)	973.6 (-0.5%)	973.2 (-0.6%)	968.3 (-1.1%)
July	1148.7	1127.4 (-3.5%)	1128.8 (-3.4%)	1129.6 (-3.2%)	1112.0 (-1.4%)	1097.2 (-2.6%)	1098.2 (-2.5%)	1092.9 (-3.1%)
August	943.4	905.2 (-4.6%)	906.5 (-4.4%)	906.8 (-4.4%)	980.3 (4.6%)	946.3 (-3.9%)	944.4 (-4.2%)	945.9 (-4.2%)
September	723.0	705.8 (-3.8%)	705.5 (-3.8%)	705.7 (-3.8%)	756.2 (16.5%)	749.3 (-2.6%)	748.9 (-2.7%)	751.4 (-2.5%)

Source: DSM2 Simulations (Node SJR_ANT)

Notes:
Simulation Period: October 1921 – September 2003
[1] (%) indicates percent change from Existing Conditions
[2] (%) indicates percent change from No-Action Alternative

Key:
Alt = Alternative
mg/L = milligram per liter

Table 3.8-23.
Monthly Averages of Simulated Chloride at San Joaquin River at Antioch (mg/L) – Below Normal Years

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	428.6	423.6 (-0.5%)	424.6 (-0.6%)	425.6 (-0.4%)	410.7 (-0.6%)	414.3 (-0.3%)	417.1 (0.0%)	420.3 (0.6%)
November	138.6	175.1 (15.4%)	175.6 (15.6%)	175.7 (15.7%)	163.4 (10.7%)	178.6 (1.6%)	179.3 (2.3%)	179.0 (2.5%)
December	33.0	40.6 (41.2%)	40.6 (41.5%)	40.6 (41.6%)	41.8 (40.1%)	43.0 (-1.1%)	43.1 (-0.9%)	42.8 (-1.3%)
January	32.1	31.0 (-0.7%)	31.3 (-0.4%)	30.8 (-1.2%)	33.3 (-1.0%)	30.5 (-2.0%)	30.8 (-1.8%)	30.4 (-2.3%)
February	72.8	71.3 (-4.8%)	71.4 (-4.6%)	72.0 (-4.3%)	70.8 (-5.3%)	70.6 (-3.3%)	70.7 (-3.2%)	71.1 (-2.8%)
March	160.3	159.3 (-0.9%)	160.3 (-0.2%)	160.4 (-0.4%)	157.8 (-1.6%)	156.8 (-0.2%)	157.5 (0.0%)	157.4 (-0.1%)
April	297.8	298.3 (0.2%)	298.1 (0.2%)	299.0 (0.3%)	294.5 (-0.6%)	295.5 (0.5%)	295.3 (0.5%)	296.1 (0.7%)
May	612.6	612.6 (-0.1%)	610.7 (-0.3%)	610.8 (-0.3%)	582.6 (-3.9%)	589.9 (1.6%)	586.6 (1.2%)	589.5 (1.5%)
June	963.0	964.8 (0.0%)	963.4 (-0.1%)	961.8 (-0.3%)	921.9 (1.4%)	924.4 (0.2%)	922.5 (0.0%)	925.7 (0.4%)
July	1083.3	1078.9 (-0.6%)	1079.7 (-0.6%)	1076.9 (-0.8%)	1057.3 (1.5%)	1056.6 (-0.2%)	1058.0 (-0.1%)	1059.1 (0.0%)
August	1133.5	1107.5 (-1.7%)	1107.1 (-1.7%)	1107.4 (-1.8%)	1127.6 (0.1%)	1108.8 (-1.6%)	1109.4 (-1.5%)	1103.6 (-2.0%)
September	888.3	896.6 (-1.4%)	900.2 (-0.6%)	900.3 (-0.6%)	915.3 (4.8%)	906.1 (-1.9%)	906.0 (-2.0%)	901.4 (-2.4%)

Source: DSM2 Simulations (Node SJR_ANT)

Notes:

Simulation Period: October 1921 – September 2003

[1] (%) indicates percent change from Existing Conditions

[2] (%) indicates percent change from No-Action Alternative

Key:

Alt = Alternative

mg/L = milligram per liter

Table 3.8-24.
Monthly Averages of Simulated Chloride at San Joaquin River at Antioch (mg/L) – Dry Years

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	481.7	476.4 (-2.2%)	477.5 (-2.1%)	482.0 (-1.7%)	476.2 (2.0%)	486.8 (0.3%)	485.4 (0.2%)	491.6 (0.8%)
November	178.1	174.9 (-0.4%)	175.0 (-0.5%)	178.5 (0.2%)	180.8 (-1.8%)	178.7 (0.9%)	179.1 (1.1%)	181.5 (1.8%)
December	74.4	74.5 (0.9%)	74.9 (1.2%)	75.4 (1.3%)	77.3 (-1.4%)	76.6 (1.3%)	76.7 (1.1%)	77.4 (1.7%)
January	95.6	92.6 (-2.6%)	92.8 (-2.4%)	92.6 (-2.7%)	97.8 (-1.9%)	93.4 (-2.5%)	93.3 (-2.9%)	92.6 (-4.1%)
February	156.5	156.1 (-1.5%)	156.3 (-1.4%)	156.5 (-1.1%)	158.1 (-1.7%)	156.8 (-2.8%)	157.2 (-2.6%)	157.7 (-2.0%)
March	255.9	252.5 (-4.7%)	253.0 (-4.5%)	253.3 (-4.3%)	253.3 (1.9%)	249.1 (-6.1%)	249.8 (-5.7%)	250.3 (-5.5%)
April	385.2	384.4 (-0.4%)	384.1 (-0.5%)	384.1 (-0.5%)	381.4 (0.7%)	384.4 (0.3%)	381.7 (-0.8%)	381.1 (-0.9%)
May	640.7	649.8 (1.4%)	649.6 (1.3%)	649.7 (1.4%)	643.9 (0.3%)	646.3 (0.5%)	644.1 (0.0%)	643.5 (-0.2%)
June	1072.3	1075.9 (0.4%)	1076.9 (0.5%)	1076.2 (0.4%)	1067.0 (1.0%)	1062.4 (-0.7%)	1058.6 (-1.1%)	1055.3 (-1.4%)
July	1217.0	1202.2 (-1.3%)	1202.9 (-1.2%)	1201.2 (-1.4%)	1189.0 (0.8%)	1191.3 (0.0%)	1191.7 (0.0%)	1185.8 (-0.5%)
August	1162.3	1154.4 (-0.9%)	1152.9 (-1.1%)	1153.9 (-1.0%)	1129.9 (-2.3%)	1135.5 (0.5%)	1136.6 (0.6%)	1134.6 (0.4%)
September	921.6	911.6 (-0.7%)	912.2 (-0.7%)	913.6 (-0.5%)	931.1 (3.6%)	920.7 (-1.3%)	921.3 (-0.9%)	923.2 (-0.7%)

Source: DSM2 Simulations (Node SJR_ANT)

Notes:

Simulation Period: October 1921 – September 2003

[1](%) indicates percent change from Existing Conditions

[2](%) indicates percent change from No-Action Alternative

Key:

Alt = Alternative

mg/L = milligram per liter

**Table 3.8-25.
Monthly Averages of Simulated Chloride at San Joaquin River at Antioch (mg/L) – Critical Years**

Months	Existing Level (2005)				Future Level (2030)			
	Existing Conditions	Alt A1 and A2[1]	Alt B1 and B2[1]	Alt C1 and C2[1]	No-Action Alt[1]	Alt A1 and A2[2]	Alt B1 and B2[2]	Alt C1 and C2[2]
October	541.7	537.1 (-1.1%)	536.1 (-1.3%)	536.5 (-1.2%)	538.8 (1.5%)	520.5 (-3.5%)	521.0 (-3.4%)	518.9 (-4.2%)
November	301.6	298.1 (-0.5%)	297.4 (-0.6%)	297.5 (-0.7%)	286.5 (-2.9%)	277.6 (-4.5%)	277.8 (-4.6%)	276.8 (-4.9%)
December	126.4	119.6 (-3.7%)	119.6 (-3.7%)	119.5 (-3.8%)	128.7 (1.1%)	120.3 (-5.1%)	120.3 (-5.2%)	120.1 (-4.8%)
January	80.2	74.5 (-3.5%)	75.0 (-3.2%)	74.2 (-4.4%)	85.5 (1.6%)	78.8 (-3.8%)	80.0 (-2.6%)	77.9 (-4.5%)
February	183.4	179.3 (-1.2%)	179.3 (-1.3%)	179.2 (-1.3%)	172.8 (-7.6%)	171.9 (1.6%)	172.3 (1.9%)	171.4 (1.1%)
March	402.4	396.8 (-2.4%)	398.0 (-2.0%)	398.0 (-2.1%)	383.7 (-2.0%)	384.5 (-2.0%)	385.6 (-1.5%)	384.2 (-2.1%)
April	546.6	546.8 (-0.9%)	546.4 (-0.9%)	547.6 (-0.7%)	559.2 (0.8%)	556.3 (-1.3%)	556.6 (-1.2%)	556.3 (-1.5%)
May	781.0	783.3 (0.3%)	783.4 (0.3%)	783.1 (0.3%)	736.6 (-5.3%)	742.1 (0.6%)	742.0 (0.6%)	738.6 (0.2%)
June	1143.0	1139.5 (-0.3%)	1140.4 (-0.2%)	1142.0 (-0.1%)	1020.4 (-8.7%)	1015.6 (-0.8%)	1016.5 (-0.7%)	1004.3 (-2.0%)
July	1225.3	1221.7 (-0.3%)	1222.3 (-0.3%)	1217.2 (-0.7%)	1194.7 (-0.4%)	1172.2 (-2.2%)	1172.9 (-2.1%)	1160.6 (-3.2%)
August	1200.3	1206.6 (0.2%)	1206.1 (0.1%)	1199.5 (-0.5%)	1179.0 (-0.3%)	1173.0 (-0.8%)	1172.9 (-0.8%)	1165.5 (-1.4%)
September	1144.8	1121.1 (-2.3%)	1123.2 (-2.1%)	1126.2 (-1.9%)	1150.2 (0.9%)	1124.2 (-2.1%)	1124.7 (-2.1%)	1132.6 (-1.3%)

Source: DSM2 Simulations (Node SJR_ANT)

Notes:
Simulation Period: October 1921 – September 2003
[1] (%) indicates percent change from Existing Conditions
[2] (%) indicates percent change from No-Action Alternative

Key:
Alt = Alternative
mg/L = milligram per liter

CCWD-4: Results from the water quality modeling are presented in the Delta Simulation Modeling Output – DSM2 Attachment to Appendix H, “Modeling,” of the Draft PEIS/R. A compact disc that included an electronic version of the DSM2 Attachment was provided with the Draft PEIS/R to CCWD and all reviewers listed in Section 28.3, “Distribution List,” of the Draft PEIS/R. Paper copies of the DSM2 Attachment were also made available for review at public libraries in Fresno, Los Banos, Sacramento, Visalia, Willows, and Woodland, and available upon request from Reclamation and DWR. The DSM2 Attachment presents simulated historical monthly average salinity (expressed as EC) and chloride at multiple locations, both by water year type and as a long-term historical average. These results are summarized and discussed in Chapter 14.0, “Hydrology – Surface Water Quality,” of the Draft PEIS/R under impacts SWQ-7 through SWQ-10, on pages 14-23, 14-28 through 14-31, 14-32 through 14-35, and 14-36 through 14-39. Text has not been revised.

CCWD-5a: As described on page 14-17 of the Draft PEIS/R, the thresholds of significance for impacts are based on the environmental checklist in Appendix G of the State CEQA Guidelines, as amended. These thresholds include the potential for the project to result in substantial water quality changes that adversely affect beneficial uses. The comment states that the Draft PEIS/R refers only to percent changes in salinity. In addition to percent changes in salinity, expressed as EC, the impact referenced in the comment, Impact SWQ-9, also discusses percent changes in chloride concentrations beginning on page 14-29, line 28, of the Draft PEIS/R. Presenting the analysis in percent change rather than in concentration is appropriate and sufficient because this approach allows comparison of the relative changes in water quality conditions between the action alternatives and the No-Action Alternative. While this evaluation could also be presented with a discussion of changes in concentrations, a discussion presenting concentrations would also require detailed discussions of the complex spatial and temporal variability of water quality conditions in the Delta, which is beyond the purpose and scope of the PEIS/R.

In addition to the text descriptions of percent changes to Delta salinity and chloride concentrations presented in the Draft PEIS/R, simulated monthly average EC and chloride concentrations, changes in simulated monthly average EC and chloride concentrations, and percent change in simulated monthly average EC and chloride concentrations under the No-Action and action alternatives are presented in Appendix H, “Modeling,” of the Draft PEIS/R for all locations discussed in Chapter 14.0, “Hydrology – Surface Water Quality,” of the Draft PEIS/R.

For the reasons set forth above, no changes to the PEIS/R are necessary. See also response to comment CCWD-4 for additional information related to this comment.

CCWD-5b: Results from the water quality modeling are presented in the Delta Simulation Modeling Output – DSM2 Attachment to Appendix H, “Modeling,” of the Draft PEIS/R. A compact disc that included an electronic version of the DSM2 Attachment was provided with the Draft PEIS/R to Contra Costa Water District (CCWD) and all reviewers listed in Section 28.3, “Distribution List,” of the Draft PEIS/R. Paper copies of the DSM2 Attachment were also made available for review at public libraries in

Fresno, Los Banos, Sacramento, Visalia, Willows, and Woodland, and available upon request from Reclamation and DWR. The DSM2 Attachment presents simulated historical monthly average salinity (expressed as EC) and chloride concentration at multiple locations, both by water year type and as a long-term historical average. These results, along with supplemental information provided in response to comment CCWD-3 in Tables 1 through 24, are summarized and discussed in Chapter 14.0, "Hydrology – Surface Water Quality," of the Draft PEIS/R under impacts SWQ-7 through SWQ-10, on pages 14-23, 14-28 through 14-31, 14-32 through 14-35, and 14-36 through 14-39. See also response to comments CCWD-3 and CCWD-4.

CCWD-6: Please refer to the Water Operations Modeling Output – CalSim Attachment and the Delta Simulation Modeling Output – DSM2 Attachment to Appendix H, "Modeling," of the Draft PEIS/R for tables of simulated monthly average flows and salinity conditions at multiple locations for all program alternatives. The timing of the changes in Delta excess conditions are summarized in Table 13-58 on page 13-83, Table 13-59 on page 13-85, and Table 13-60 on page 13-86 of the Draft PEIS/R. These tables demonstrate the number of years within the 82-year simulation period (1922 through 2003) when the action alternatives would have changed Delta conditions from excess conditions to balanced conditions for each month from November through June (the period during which Los Vaqueros Reservoir is filled). The results demonstrate that the action alternatives would cause very few changes from excess to balanced conditions compared to the existing conditions and the No-Action Alternative during the critical months of November through June. The most impacted month would be February; however, the frequency of change in the simulation record is relatively small (between 1 and 7 percent of months during the 984 months (82 years) of simulated record, depending on the action alternative). Excess Delta conditions occur when Delta outflows exceed the outflow requirements in place during that same period. For informational purposes, Delta outflow in excess of outflow requirements, referred to as surplus Delta outflow, under the existing conditions and the action alternatives (at a 2005 level of development), is shown below for each month in the 82-year simulation period in Tables 3.8-26 through 3.8-37. Delta surplus flows under the No-Action and action alternatives (at a 2030 level of development) are shown below for each month in the 82-year simulation period in Tables 3.8-38 through 3.8-49. These results were extracted from output files of simulations presented in the Draft PEIS/R, and do not reflect additional evaluations, new information of substantial importance, or result in new significant impacts or substantially more severe impacts than shown in the Draft PEIS/R. The inclusion of this discussion does not change the analysis or conclusions of the Draft PEIS/R. The text has not been revised.

**Table 3.8-26.
Simulated Monthly Surplus Delta Outflows, Existing Conditions (2005), Sacramento Valley Index Year Type**

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0	0	3,607	0	13,030	4,729	10,672	41,270	15,757	0	0	0
1923	Above Normal	0	0	16,697	18,514	0	0	8,796	6,062	0	2,475	1,018	0
1924	Critical	0	0	0	2,940	5,603	0	1,377	0	532	0	2,570	0
1925	Below Normal	938	1,830	534	0	51,410	0	7,676	3,917	0	0	1,318	0
1926	Dry	1,438	0	0	2,794	24,598	0	9,520	0	0	0	1,935	0
1927	Above Normal	0	7,517	3,975	24,111	74,674	20,393	30,149	2,785	0	4,989	0	0
1928	Below Normal	0	3,885	1,200	8,291	0	74,116	2,452	0	0	2,866	0	0
1929	Critical	0	559	1,337	0	159	0	0	0	0	0	2,299	0
1930	Critical	1,205	1,454	3,411	6,036	0	14,220	2,506	1,443	0	1,569	1,055	0
1931	Critical	1,278	0	0	402	0	0	0	0	3,147	0	2,344	0
1932	Above Normal	1,120	1,958	5,959	5,961	0	0	0	3,246	0	0	0	0
1933	Dry	1,590	0	0	3,231	0	0	0	0	0	0	2,138	0
1934	Critical	1,049	1,661	2,201	5,724	0	0	0	0	0	0	1,878	0
1935	Above Normal	1,393	1,477	2,225	15,424	0	4,797	38,466	0	0	2,438	0	0
1936	Above Normal	0	0	1,788	26,988	54,737	5,659	7,909	0	0	2,962	0	0
1937	Wet	0	0	1,256	2,709	32,773	29,532	8,803	0	0	0	0	0
1938	Wet	0	11,729	56,759	24,698	74,124	74,552	57,577	51,501	25,949	0	0	5,735
1939	Dry	3,745	0	0	285	0	0	0	3,456	0	3,355	984	0
1940	Above Normal	0	0	1,101	18,751	29,355	73,932	48,187	0	0	5,588	0	0
1941	Wet	0	737	29,540	71,235	73,662	67,914	55,617	25,795	0	0	0	3,499
1942	Wet	0	0	49,665	66,063	74,337	4,977	33,488	15,251	8,085	0	0	4,801
1943	Wet	0	3,974	17,362	68,864	31,986	66,688	11,019	0	804	2,293	0	0
1944	Below Normal	0	797	1,105	233	6,364	0	1,500	2,948	0	1,822	1,689	0
1945	Above Normal	0	1,193	3,110	0	37,865	0	1,668	2,986	0	2,188	0	0
1946	Above Normal	0	1,079	59,907	35,103	0	0	4,710	2,485	0	2,694	0	0
1947	Dry	0	0	2,797	0	0	0	0	3,763	80	2,995	0	0
1948	Below Normal	937	0	1,720	1,451	7,021	0	12,172	10,498	0	0	2,599	0
1949	Below Normal	0	0	1,266	1,346	15,521	11,116	2,243	1,703	0	0	2,559	0
1950	Below Normal	0	0	1,327	4,883	11,688	1,153	6,951	3,010	0	0	0	0
1951	Above Normal	0	40,372	74,682	57,102	52,490	9,060	0	5,777	607	4,723	0	0
1952	Wet	0	332	30,599	65,872	47,852	43,334	51,339	50,450	21,096	3,483	2,155	9,991
1953	Below Normal	1,057	0	30,235	71,276	0	0	5,140	10,828	4,341	0	0	2,937
1954	Below Normal	0	951	0	18,764	31,191	21,148	17,596	0	0	4,864	0	0
1955	Dry	0	358	10,356	4,103	0	0	3,476	4,044	0	1,543	1,527	0
1956	Wet	0	0	74,100	75,038	64,578	21,114	2,852	28,591	3,201	0	0	4,959
1957	Below Normal	813	0	129	3,179	12,275	20,239	0	5,275	0	2,671	0	0
1958	Wet	5,451	1,357	9,661	23,879	74,346	73,802	73,529	32,599	13,761	0	2,176	8,477
1959	Dry	2,264	0	0	21,093	21,368	0	1,299	2,758	884	3,537	0	0
1960	Critical	0	0	2,610	0	8,089	0	0	2,971	945	3,189	0	0
1961	Critical	1,524	0	2,733	0	12,043	0	0	3,229	0	2,129	2,494	0
1962	Below Normal	0	0	2,310	0	30,044	0	2,628	0	411	4,952	0	0
1963	Above Normal	23,058	1,484	13,768	1,751	38,776	0	70,876	5,443	0	5,738	0	0
1964	Dry	0	13,609	0	8,693	0	0	4,377	5,406	409	2,206	2,172	0
1965	Wet	0	939	67,671	74,172	8,705	0	31,802	0	485	3,062	0	0
1966	Below Normal	0	9,086	2,507	18,368	0	2,709	1,619	0	322	4,224	0	0
1967	Wet	0	80	21,709	31,166	21,534	33,159	34,347	36,234	26,941	8,550	1,360	9,605
1968	Dry	3,020	162	606	17,433	36,236	4,424	0	3,436	0	3,896	0	0
1969	Wet	0	840	9,849	73,845	73,935	43,421	39,716	42,575	16,706	0	0	6,843
1970	Above Normal	2,471	406	46,792	76,488	59,447	19,325	0	6,444	1,681	4,487	0	0
1971	Below Normal	0	5,051	45,210	35,536	0	10,098	0	15,064	0	4,145	0	3,535
1972	Dry	0	0	2,631	1,137	199	9,767	0	1,842	731	2,611	1,422	0
1973	Above Normal	0	5,932	11,719	69,180	61,550	33,439	1,205	6,117	0	3,294	0	0
1974	Wet	0	44,858	56,449	74,625	13,527	73,697	45,784	2,353	5,356	2,014	937	7,372
1975	Wet	413	0	2,684	3,097	45,736	62,301	3,797	17,899	4,822	0	0	6,354
1976	Critical	2,734	1,866	785	0	0	0	0	0	0	1,999	1,200	0
1977	Critical	2,395	0	3,279	0	0	0	0	0	1,455	1,336	1,953	0
1978	Wet	1,249	1,071	3,430	50,501	22,328	43,341	21,032	1,785	4,466	0	0	0
1979	Above Normal	0	247	1,868	8,238	9,716	13,751	0	4,927	0	0	0	0
1980	Wet	0	696	5,935	74,182	74,174	42,762	2,218	4,072	4,687	0	0	0
1981	Dry	0	0	1,156	12,509	0	3,833	2,767	2,069	0	2,313	1,085	0
1982	Wet	897	19,563	73,974	60,573	73,996	62,548	74,620	26,023	6,190	0	1,008	13,768
1983	Wet	12,827	34,917	64,052	70,660	75,028	77,207	58,073	54,492	51,751	23,688	14,108	18,487
1984	Above Normal	7,085	64,098	75,284	47,575	19,037	16,471	0	5,639	2,044	4,127	0	0
1985	Dry	178	17,473	7,588	0	0	0	2,788	1,611	0	2,498	1,370	0
1986	Wet	0	597	2,549	6,451	78,796	74,533	7,357	1,351	3,754	1,453	0	0
1987	Critical	0	0	1,369	2,294	2,422	7,314	0	3,974	0	2,537	1,224	0
1988	Critical	0	0	1,877	12,062	0	0	2,573	0	0	0	2,284	0
1989	Critical	1,197	2,349	876	4,986	0	22,714	8,475	0	0	2,867	1,800	0
1990	Critical	0	0	2,858	3,256	0	0	0	1,381	0	2,254	1,921	0
1991	Critical	1,289	1,467	1,453	1,161	0	2,162	0	1,121	0	1,627	2,426	0
1992	Critical	0	2,371	0	3,172	8,677	0	0	0	0	0	1,254	0
1993	Wet	2,115	0	2,062	48,907	26,794	6,437	5,799	5,011	7,755	0	0	0
1994	Critical	0	0	1,357	1,144	0	0	2,570	3,023	0	1,278	4,046	0
1995	Wet	0	2,842	469	73,849	16,806	76,617	45,536	66,532	24,498	16,052	4,850	9,590
1996	Wet	1,118	0	12,471	33,511	74,604	53,589	23,647	29,362	0	0	1,053	3,938
1997	Wet	0	3,835	69,227	78,756	52,126	8,598	2,703	4,238	1,323	2,785	0	0
1998	Wet	0	0	5,375	49,055	74,767	67,831	42,306	36,579	60,256	21,073	9,031	15,563
1999	Above Normal	4,898	15,415	22,423	28,888	70,494	39,828	9,676	7,493	2,400	2,840	0	2,138
2000	Above Normal	0	268	0	17,946	72,405	40,613	0	0	0	4,075	0	0
2001	Dry	0	0	2,485	2,513	1,566	0	0	3,332	0	1,952	1,268	0
2002	Dry	0	1,272	17,525	35,120	0	0	4,424	1,840	0	2,475	2,483	0
2003	Below Normal	0	3,900	20,360	45,047	0	0	12,008	25,231	0	3,505	0	0

Table 3.8-27.
Simulated Monthly Surplus Delta Outflows, Alternative A (2005), Sacramento Valley Index Year Type

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0	0	3,687	0	13,168	5,011	9,441	41,381	16,348	0	0	0
1923	Above Normal	0	0	17,564	18,491	0	0	6,994	5,470	0	2,341	1,212	0
1924	Critical	0	0	0	2,894	5,561	0	1,372	0	535	0	2,582	0
1925	Below Normal	932	1,864	462	0	51,411	0	7,351	3,770	0	0	1,247	0
1926	Dry	1,539	0	0	2,870	24,704	0	10,383	0	0	1,623	1,284	0
1927	Above Normal	1,397	7,762	4,664	22,860	74,700	21,171	31,003	2,917	0	4,907	0	0
1928	Below Normal	0	4,060	1,307	8,360	0	74,117	3,548	0	0	2,840	0	0
1929	Critical	223	25	2,145	0	0	0	0	0	0	0	2,294	0
1930	Critical	1,237	1,477	3,292	6,103	0	14,832	2,659	1,450	0	1,465	1,121	0
1931	Critical	1,267	0	0	284	0	0	0	0	3,180	0	2,335	0
1932	Above Normal	1,126	1,947	5,962	5,962	0	0	1,093	4,292	0	0	0	0
1933	Dry	1,124	0	0	3,866	0	0	0	0	0	0	2,146	0
1934	Critical	1,099	1,729	1,883	7,262	0	0	0	0	0	0	1,880	0
1935	Above Normal	1,424	1,877	838	15,492	0	6,484	38,154	0	976	2,388	0	0
1936	Above Normal	0	0	1,502	26,944	52,931	6,292	8,823	0	0	3,185	0	0
1937	Wet	0	0	0	1,199	30,943	32,533	9,895	0	0	0	0	0
1938	Wet	0	12,466	55,461	24,637	74,111	74,552	57,578	51,016	24,059	0	0	5,922
1939	Dry	3,813	0	0	54	0	0	0	3,445	0	3,213	988	0
1940	Above Normal	0	0	943	18,832	29,847	73,939	48,984	0	0	5,553	0	0
1941	Wet	0	0	28,034	70,354	73,667	67,052	53,598	26,777	0	0	0	3,519
1942	Wet	0	0	51,677	66,051	74,337	3,926	31,584	15,659	8,442	0	0	4,795
1943	Wet	0	4,205	17,436	68,863	30,392	66,686	11,658	0	868	2,092	0	0
1944	Below Normal	511	0	1,038	91	5,068	0	1,893	2,067	0	1,799	1,295	0
1945	Above Normal	0	1,394	3,180	0	37,017	0	686	3,089	0	1,893	1,128	0
1946	Above Normal	0	2,560	60,601	35,240	0	0	4,111	2,540	0	2,633	1,109	0
1947	Dry	0	282	2,950	0	0	0	922	3,721	60	2,892	0	0
1948	Below Normal	968	0	0	2,033	3,996	0	12,639	11,262	0	0	1,711	0
1949	Below Normal	0	0	2,216	0	0	13,443	2,473	1,775	0	0	2,969	0
1950	Below Normal	0	0	1,286	4,959	9,029	481	6,041	3,489	0	0	0	0
1951	Above Normal	0	42,016	74,702	56,855	52,132	9,739	0	5,969	842	4,447	0	0
1952	Wet	0	321	32,650	65,674	47,883	45,268	52,911	49,220	19,944	3,489	2,162	10,016
1953	Below Normal	1,130	0	30,316	71,488	0	0	6,339	11,829	4,316	0	0	3,496
1954	Below Normal	0	1,210	0	19,504	31,154	22,316	19,116	0	0	4,859	0	0
1955	Dry	0	408	10,341	4,173	0	0	3,900	3,594	0	980	1,096	0
1956	Wet	913	0	74,201	75,022	64,646	21,785	3,218	27,107	5,126	0	0	5,590
1957	Below Normal	2,124	0	0	2,320	13,346	17,758	0	6,933	0	2,759	0	0
1958	Wet	4,175	1,641	9,739	24,649	74,483	73,800	73,529	33,117	13,967	0	2,183	8,509
1959	Dry	2,337	0	0	21,221	21,437	0	1,607	2,835	838	3,650	0	0
1960	Critical	0	0	2,508	0	8,124	0	0	2,988	946	3,216	0	0
1961	Critical	1,533	0	2,661	0	12,282	0	0	3,292	0	2,336	2,290	0
1962	Below Normal	0	0	2,289	0	29,843	0	4,235	0	486	4,652	0	0
1963	Above Normal	23,522	1,702	13,847	1,815	41,121	0	68,842	5,496	0	5,718	0	0
1964	Dry	0	14,214	0	8,858	0	0	4,349	5,406	417	2,169	2,261	0
1965	Wet	0	1,162	67,976	74,172	7,585	0	29,957	0	417	2,951	0	0
1966	Below Normal	0	8,033	3,056	18,168	0	0	2,372	0	544	4,091	0	0
1967	Wet	0	358	21,842	31,366	21,944	31,751	34,380	36,101	25,527	8,657	1,368	9,630
1968	Dry	3,094	381	685	17,530	36,361	5,213	0	3,470	0	3,911	0	0
1969	Wet	0	769	9,929	73,854	73,934	43,422	39,717	43,164	14,234	0	0	6,700
1970	Above Normal	2,545	623	46,870	76,488	59,590	19,956	0	6,805	1,554	4,057	0	0
1971	Below Normal	0	5,272	46,350	35,588	0	14,131	1,552	15,099	0	4,157	0	3,636
1972	Dry	0	0	2,741	1,204	0	12,459	1,571	1,865	605	2,554	1,523	0
1973	Above Normal	0	6,155	11,823	69,422	61,618	34,337	0	7,485	0	3,195	0	0
1974	Wet	0	46,050	56,873	74,625	13,586	73,697	47,178	2,590	5,405	1,784	938	7,493
1975	Wet	748	0	2,805	2,375	46,009	61,911	4,378	18,003	5,358	0	0	6,368
1976	Critical	2,807	2,318	893	0	0	0	0	0	0	2,123	1,108	0
1977	Critical	2,448	0	3,118	0	0	0	0	0	1,446	1,343	1,963	0
1978	Wet	1,242	1,083	3,397	50,501	20,775	42,616	20,967	1,810	4,466	0	0	0
1979	Above Normal	0	121	1,570	8,287	10,062	10,988	1,226	5,019	0	0	0	0
1980	Wet	0	957	6,055	74,192	74,174	42,159	2,992	4,621	5,381	0	0	0
1981	Dry	0	0	1,153	13,239	0	834	3,406	2,066	0	2,208	1,183	0
1982	Wet	827	19,922	73,980	60,508	73,996	59,260	74,620	25,176	6,554	0	1,010	13,799
1983	Wet	12,900	34,095	64,051	70,660	75,028	77,207	58,073	54,491	51,750	23,687	14,114	18,511
1984	Above Normal	7,171	64,097	75,284	47,575	19,054	17,202	0	5,672	1,966	3,952	0	0
1985	Dry	460	16,629	7,015	0	0	0	3,555	1,572	0	2,409	1,519	0
1986	Wet	0	433	2,644	6,550	78,795	74,555	8,771	670	4,526	931	0	0
1987	Critical	0	0	1,322	2,137	2,925	8,270	0	4,073	0	2,617	1,085	0
1988	Critical	0	0	1,984	12,127	0	0	2,706	0	0	0	2,275	0
1989	Critical	1,234	2,332	832	4,912	0	23,291	8,868	0	0	3,040	1,647	0
1990	Critical	0	0	3,054	3,313	0	0	0	1,397	0	2,588	1,701	0
1991	Critical	1,414	1,373	1,557	988	0	2,559	0	1,598	0	1,154	2,770	0
1992	Critical	0	2,338	0	3,234	8,706	0	0	0	0	0	1,250	0
1993	Wet	2,168	0	1,948	49,332	26,884	7,138	7,579	7,762	8,527	0	0	269
1994	Critical	0	0	1,986	0	0	0	2,632	2,966	0	2,292	2,248	0
1995	Wet	1,557	1,442	2,882	73,675	19,906	76,616	49,206	66,098	24,157	16,064	4,864	9,624
1996	Wet	1,208	0	12,559	33,834	74,604	52,720	24,847	29,128	0	0	957	4,135
1997	Wet	0	3,064	69,239	78,756	51,524	5,442	2,117	4,888	2,135	2,298	0	0
1998	Wet	0	0	5,544	49,161	74,767	67,831	43,611	35,944	58,337	20,251	9,038	15,588
1999	Above Normal	4,971	15,634	22,502	28,984	70,448	40,569	10,332	7,532	2,416	2,777	0	2,223
2000	Above Normal	0	577	354	18,718	72,406	41,506	0	1,104	0	3,926	0	0
2001	Dry	0	0	1,904	2,572	1,581	0	0	3,355	0	1,934	0	0
2002	Dry	1,060	1,086	18,395	36,203	0	0	5,172	1,856	0	2,371	2,734	0
2003	Below Normal	0	4,113	20,106	45,014	0	0	11,574	25,225	0	3,481	0	0

Table 3.8-28.
Change in Simulated Monthly Surplus Delta Outflows, Alternative A (2005) – Existing Conditions (2005), Sacramento Valley Index Year Type

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0	0	79	0	139	282	-1,230	111	591	0	0	0
1923	Above Normal	0	0	868	-23	0	0	-1,802	-592	0	-134	194	0
1924	Critical	0	0	0	-46	-43	0	-5	0	3	0	12	0
1925	Below Normal	-7	35	-71	0	0	0	-324	-147	0	0	-71	0
1926	Dry	101	0	0	77	107	0	863	0	0	1,623	-651	0
1927	Above Normal	1,397	245	689	-1,250	26	778	854	132	0	-83	0	0
1928	Below Normal	0	175	107	69	0	1	1,096	0	0	-26	0	0
1929	Critical	223	-534	808	0	-159	0	0	0	0	0	-5	0
1930	Critical	32	23	-119	67	0	611	153	7	0	-104	66	0
1931	Critical	-11	0	0	-118	0	0	0	0	32	0	-9	0
1932	Above Normal	6	-11	3	0	0	0	1,093	1,046	0	0	0	0
1933	Dry	-466	0	0	635	0	0	0	0	0	0	8	0
1934	Critical	50	67	-318	1,538	0	0	0	0	0	0	2	0
1935	Above Normal	31	399	-1,387	68	0	1,687	-312	0	976	-49	0	0
1936	Above Normal	0	0	-286	-44	-1,807	633	914	0	0	223	0	0
1937	Wet	0	0	-1,256	-1,511	-1,830	3,001	1,092	0	0	0	0	0
1938	Wet	0	738	-1,298	-61	-13	0	1	-485	-1,889	0	0	186
1939	Dry	69	0	0	-231	0	0	0	-11	0	-143	4	0
1940	Above Normal	0	0	-158	81	492	8	798	0	0	-35	0	0
1941	Wet	0	-737	-1,506	-881	6	-863	-2,019	983	0	0	0	20
1942	Wet	0	0	2,012	-11	0	-1,051	-1,904	408	357	0	0	-6
1943	Wet	0	231	74	0	-1,595	-2	639	0	65	-201	0	0
1944	Below Normal	511	-797	-68	-142	-1,296	0	394	-881	0	-23	-394	0
1945	Above Normal	0	201	70	0	-848	0	-982	103	0	-295	1,128	0
1946	Above Normal	0	1,481	694	136	0	0	-599	55	0	-61	1,109	0
1947	Dry	0	282	153	0	0	0	922	-42	-20	-103	0	0
1948	Below Normal	31	0	-1,720	582	-3,025	0	466	764	0	0	-887	0
1949	Below Normal	0	0	949	-1,346	-15,521	2,328	230	72	0	0	409	0
1950	Below Normal	0	0	-41	75	-2,659	-672	-910	479	0	0	0	0
1951	Above Normal	0	1,644	21	-247	-358	679	0	192	236	-277	0	0
1952	Wet	0	-11	2,050	-198	30	1,934	1,572	-1,231	-1,152	7	7	25
1953	Below Normal	73	0	81	212	0	0	1,199	1,001	-25	0	0	559
1954	Below Normal	0	259	0	741	-38	1,169	1,521	0	0	-5	0	0
1955	Dry	0	50	-15	70	0	0	424	-450	0	-563	-432	0
1956	Wet	913	0	101	-17	68	672	366	-1,484	1,925	0	0	632
1957	Below Normal	1,311	0	-129	-859	1,071	-2,481	0	1,657	0	89	0	0
1958	Wet	-1,276	284	77	770	138	-1	0	519	205	0	6	32
1959	Dry	73	0	0	128	68	0	308	77	-46	113	0	0
1960	Critical	0	0	-102	0	35	0	0	17	1	26	0	0
1961	Critical	9	0	-72	0	239	0	0	63	0	207	-204	0
1962	Below Normal	0	0	-20	0	-201	0	1,607	0	76	-300	0	0
1963	Above Normal	464	218	80	65	2,345	0	-2,034	54	0	-20	0	0
1964	Dry	0	605	0	166	0	0	-28	0	8	-36	89	0
1965	Wet	0	223	306	0	-1,120	0	-1,845	0	-68	-111	0	0
1966	Below Normal	0	-1,053	549	-200	0	-2,709	753	0	223	-133	0	0
1967	Wet	0	278	133	200	410	-1,407	33	-133	-1,414	107	8	25
1968	Dry	74	220	80	97	125	789	0	34	0	16	0	0
1969	Wet	0	-71	80	9	0	1	1	589	-2,472	0	0	-143
1970	Above Normal	74	217	78	0	142	631	0	362	-127	-431	0	0
1971	Below Normal	0	221	1,140	52	0	4,033	1,552	35	0	13	0	100
1972	Dry	0	0	109	66	-199	2,692	1,571	23	-126	-57	101	0
1973	Above Normal	0	223	104	242	69	898	-1,205	1,368	0	-99	0	0
1974	Wet	0	1,193	424	0	59	0	1,394	237	49	-230	1	121
1975	Wet	335	0	121	-722	273	-389	581	104	536	0	0	14
1976	Critical	73	453	108	0	0	0	0	0	0	124	-92	0
1977	Critical	52	0	-161	0	0	0	0	0	-8	7	10	0
1978	Wet	-8	12	-33	0	-1,553	-725	-65	25	0	0	0	0
1979	Above Normal	0	-127	-297	49	346	-2,763	1,226	91	0	0	0	0
1980	Wet	0	261	120	9	0	-603	774	548	694	0	0	0
1981	Dry	0	0	-2	730	0	-2,999	639	-3	0	-105	98	0
1982	Wet	-70	359	7	-64	0	-3,288	0	-846	364	0	2	31
1983	Wet	72	-822	-1	0	0	0	-1	-1	-1	-1	6	24
1984	Above Normal	85	-1	0	-1	17	731	0	33	-78	-174	0	0
1985	Dry	282	-844	-572	0	0	0	767	-39	0	-89	150	0
1986	Wet	0	-164	95	98	0	22	1,414	-681	773	-522	0	0
1987	Critical	0	0	-47	-157	503	956	0	98	0	80	-139	0
1988	Critical	0	0	107	65	0	0	134	0	0	0	-8	0
1989	Critical	36	-17	-43	-74	0	578	393	0	0	174	-153	0
1990	Critical	0	0	196	57	0	0	0	16	0	334	-219	0
1991	Critical	125	-95	104	-172	0	397	0	476	0	-473	344	0
1992	Critical	0	-33	0	62	29	0	0	0	0	0	-3	0
1993	Wet	53	0	-114	425	90	700	1,780	2,752	772	0	0	269
1994	Critical	0	0	630	-1,144	0	0	62	-56	0	1,015	-1,798	0
1995	Wet	1,557	-1,400	2,414	-174	3,100	-1	3,670	-434	-340	12	15	35
1996	Wet	91	0	88	324	0	-869	1,199	-234	0	0	-97	197
1997	Wet	0	-771	12	0	-602	-3,156	-585	650	813	-488	0	0
1998	Wet	0	0	169	106	0	0	1,305	-635	-1,920	-822	7	25
1999	Above Normal	73	219	79	97	-46	741	656	39	17	-62	0	85
2000	Above Normal	0	309	354	773	0	893	0	1,104	0	-149	0	0
2001	Dry	0	0	-582	58	15	0	0	23	0	-18	-1,268	0
2002	Dry	1,060	-186	870	1,082	0	0	748	15	0	-104	252	0
2003	Below Normal	0	213	-254	-33	0	0	-434	-6	0	-24	0	0

Table 3.8-29.
Percent Change in Simulated Monthly Surplus Delta Outflows from Existing Conditions (2005), Alternative A (2005), Sacramento Valley Index Year Type

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0%	0%	2%	0%	1%	6%	-12%	0%	4%	0%	0%	0%
1923	Above Normal	0%	0%	5%	0%	0%	0%	-20%	-10%	0%	-5%	19%	0%
1924	Critical	0%	0%	0%	-2%	-1%	0%	0%	0%	1%	0%	0%	0%
1925	Below Normal	-1%	2%	-13%	0%	0%	0%	-4%	-4%	0%	0%	-5%	0%
1926	Dry	7%	0%	0%	3%	0%	0%	9%	0%	0%	0%	-34%	0%
1927	Above Normal	0%	3%	17%	-5%	0%	4%	3%	5%	0%	-2%	0%	0%
1928	Below Normal	0%	5%	9%	1%	0%	0%	45%	0%	0%	-1%	0%	0%
1929	Critical	0%	-95%	60%	0%	-100%	0%	0%	0%	0%	0%	0%	0%
1930	Critical	3%	2%	-3%	1%	0%	4%	6%	0%	0%	-7%	6%	0%
1931	Critical	-1%	0%	0%	-29%	0%	0%	0%	0%	1%	0%	0%	0%
1932	Above Normal	1%	-1%	0%	0%	0%	0%	0%	32%	0%	0%	0%	0%
1933	Dry	-29%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	0%
1934	Critical	5%	4%	-14%	27%	0%	0%	0%	0%	0%	0%	0%	0%
1935	Above Normal	2%	27%	-62%	0%	0%	35%	-1%	0%	0%	-2%	0%	0%
1936	Above Normal	0%	0%	-16%	0%	-3%	11%	12%	0%	0%	8%	0%	0%
1937	Wet	0%	0%	-100%	-56%	-6%	10%	12%	0%	0%	0%	0%	0%
1938	Wet	0%	6%	-2%	0%	0%	0%	0%	-1%	-7%	0%	0%	3%
1939	Dry	2%	0%	0%	-81%	0%	0%	0%	0%	0%	-4%	0%	0%
1940	Above Normal	0%	0%	-14%	0%	2%	0%	2%	0%	0%	-1%	0%	0%
1941	Wet	0%	-100%	-5%	-1%	0%	-1%	-4%	4%	0%	0%	0%	1%
1942	Wet	0%	0%	4%	0%	0%	-21%	-6%	3%	4%	0%	0%	0%
1943	Wet	0%	6%	0%	0%	-5%	0%	6%	0%	8%	-9%	0%	0%
1944	Below Normal	0%	-100%	-6%	-61%	-20%	0%	26%	-30%	0%	-1%	-23%	0%
1945	Above Normal	0%	17%	2%	0%	-2%	0%	-59%	3%	0%	-13%	0%	0%
1946	Above Normal	0%	137%	1%	0%	0%	0%	-13%	2%	0%	-2%	0%	0%
1947	Dry	0%	0%	5%	0%	0%	0%	0%	-1%	-25%	-3%	0%	0%
1948	Below Normal	3%	0%	-100%	40%	-43%	0%	4%	7%	0%	0%	-34%	0%
1949	Below Normal	0%	0%	75%	-100%	-100%	21%	10%	4%	0%	0%	16%	0%
1950	Below Normal	0%	0%	-3%	2%	-23%	-58%	-13%	16%	0%	0%	0%	0%
1951	Above Normal	0%	4%	0%	0%	-1%	7%	0%	3%	39%	-6%	0%	0%
1952	Wet	0%	-3%	7%	0%	0%	4%	3%	-2%	-5%	0%	0%	0%
1953	Below Normal	7%	0%	0%	0%	0%	0%	23%	9%	-1%	0%	0%	19%
1954	Below Normal	0%	27%	0%	4%	0%	6%	9%	0%	0%	0%	0%	0%
1955	Dry	0%	14%	0%	2%	0%	0%	12%	-11%	0%	-36%	-28%	0%
1956	Wet	0%	0%	0%	0%	0%	3%	13%	-5%	60%	0%	0%	13%
1957	Below Normal	161%	0%	-100%	-27%	9%	-12%	0%	31%	0%	3%	0%	0%
1958	Wet	-23%	21%	1%	3%	0%	0%	0%	2%	1%	0%	0%	0%
1959	Dry	3%	0%	0%	1%	0%	0%	24%	3%	-5%	3%	0%	0%
1960	Critical	0%	0%	-4%	0%	0%	0%	0%	1%	0%	1%	0%	0%
1961	Critical	1%	0%	-3%	0%	2%	0%	0%	2%	0%	10%	-8%	0%
1962	Below Normal	0%	0%	-1%	0%	-1%	0%	61%	0%	18%	-6%	0%	0%
1963	Above Normal	2%	15%	1%	4%	6%	0%	-3%	1%	0%	0%	0%	0%
1964	Dry	0%	4%	0%	2%	0%	0%	-1%	0%	2%	-2%	4%	0%
1965	Wet	0%	24%	0%	0%	-13%	0%	-6%	0%	-14%	-4%	0%	0%
1966	Below Normal	0%	-12%	22%	-1%	0%	-100%	47%	0%	69%	-3%	0%	0%
1967	Wet	0%	346%	1%	1%	2%	-4%	0%	0%	-5%	1%	1%	0%
1968	Dry	2%	136%	13%	1%	0%	18%	0%	1%	0%	0%	0%	0%
1969	Wet	0%	-8%	1%	0%	0%	0%	0%	1%	-15%	0%	0%	-2%
1970	Above Normal	3%	54%	0%	0%	0%	3%	0%	6%	-8%	-10%	0%	0%
1971	Below Normal	0%	4%	3%	0%	0%	40%	0%	0%	0%	0%	0%	3%
1972	Dry	0%	0%	4%	6%	-100%	28%	0%	1%	-17%	-2%	7%	0%
1973	Above Normal	0%	4%	1%	0%	0%	3%	-100%	22%	0%	-3%	0%	0%
1974	Wet	0%	3%	1%	0%	0%	0%	3%	10%	1%	-11%	0%	2%
1975	Wet	81%	0%	5%	-23%	1%	-1%	15%	1%	11%	0%	0%	0%
1976	Critical	3%	24%	14%	0%	0%	0%	0%	0%	0%	6%	-8%	0%
1977	Critical	2%	0%	-5%	0%	0%	0%	0%	0%	-1%	1%	1%	0%
1978	Wet	-1%	1%	-1%	0%	-7%	-2%	0%	1%	0%	0%	0%	0%
1979	Above Normal	0%	-51%	-16%	1%	4%	-20%	0%	2%	0%	0%	0%	0%
1980	Wet	0%	37%	2%	0%	0%	-1%	35%	13%	15%	0%	0%	0%
1981	Dry	0%	0%	0%	6%	0%	-78%	23%	0%	0%	-5%	9%	0%
1982	Wet	-8%	2%	0%	0%	0%	-5%	0%	-3%	6%	0%	0%	0%
1983	Wet	1%	-2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1984	Above Normal	1%	0%	0%	0%	0%	4%	0%	1%	-4%	-4%	0%	0%
1985	Dry	158%	-5%	-8%	0%	0%	0%	27%	-2%	0%	-4%	11%	0%
1986	Wet	0%	-27%	4%	2%	0%	0%	19%	-50%	21%	-36%	0%	0%
1987	Critical	0%	0%	-3%	-7%	21%	13%	0%	2%	0%	3%	-11%	0%
1988	Critical	0%	0%	6%	1%	0%	0%	5%	0%	0%	0%	0%	0%
1989	Critical	3%	-1%	-5%	-1%	0%	3%	5%	0%	0%	6%	-9%	0%
1990	Critical	0%	0%	7%	2%	0%	0%	0%	1%	0%	15%	-11%	0%
1991	Critical	10%	-6%	7%	-15%	0%	18%	0%	42%	0%	-29%	14%	0%
1992	Critical	0%	-1%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%
1993	Wet	2%	0%	-6%	1%	0%	11%	31%	55%	10%	0%	0%	0%
1994	Critical	0%	0%	46%	-100%	0%	0%	2%	-2%	0%	79%	-44%	0%
1995	Wet	0%	-49%	515%	0%	18%	0%	8%	-1%	-1%	0%	0%	0%
1996	Wet	8%	0%	1%	1%	0%	-2%	5%	-1%	0%	0%	-9%	5%
1997	Wet	0%	-20%	0%	0%	-1%	-37%	-22%	15%	61%	-18%	0%	0%
1998	Wet	0%	0%	3%	0%	0%	0%	3%	-2%	-3%	-4%	0%	0%
1999	Above Normal	1%	1%	0%	0%	0%	2%	7%	1%	1%	-2%	0%	4%
2000	Above Normal	0%	115%	0%	4%	0%	2%	0%	0%	0%	-4%	0%	0%
2001	Dry	0%	0%	-23%	2%	1%	0%	0%	1%	0%	-1%	-100%	0%
2002	Dry	0%	-15%	5%	3%	0%	0%	17%	1%	0%	-4%	10%	0%
2003	Below Normal	0%	5%	-1%	0%	0%	0%	-4%	0%	0%	-1%	0%	0%

Table 3.8-30.
Simulated Monthly Surplus Delta Outflows, Existing Conditions (2005), Sacramento Valley Index Year Type

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0	0	3,607	0	13,030	4,729	10,672	41,270	15,757	0	0	0
1923	Above Normal	0	0	16,697	18,514	0	0	8,796	6,062	0	2,475	1,018	0
1924	Critical	0	0	0	2,940	5,603	0	1,377	0	532	0	2,570	0
1925	Below Normal	938	1,830	534	0	51,410	0	7,676	3,917	0	0	1,318	0
1926	Dry	1,438	0	0	2,794	24,598	0	9,520	0	0	0	1,935	0
1927	Above Normal	0	7,517	3,975	24,111	74,674	20,393	30,149	2,785	0	4,989	0	0
1928	Below Normal	0	3,885	1,200	8,291	0	74,116	2,452	0	0	2,866	0	0
1929	Critical	0	559	1,337	0	159	0	0	0	0	0	2,299	0
1930	Critical	1,205	1,454	3,411	6,036	0	14,220	2,506	1,443	0	1,569	1,055	0
1931	Critical	1,278	0	0	402	0	0	0	0	3,147	0	2,344	0
1932	Above Normal	1,120	1,958	5,959	5,961	0	0	0	3,246	0	0	0	0
1933	Dry	1,590	0	0	3,231	0	0	0	0	0	0	2,138	0
1934	Critical	1,049	1,661	2,201	5,724	0	0	0	0	0	0	1,878	0
1935	Above Normal	1,393	1,477	2,225	15,424	0	4,797	38,466	0	0	2,438	0	0
1936	Above Normal	0	0	1,788	26,988	54,737	5,659	7,909	0	0	2,962	0	0
1937	Wet	0	0	1,256	2,709	32,773	29,532	8,803	0	0	0	0	0
1938	Wet	0	11,729	56,759	24,698	74,124	74,552	57,577	51,501	25,949	0	0	5,735
1939	Dry	3,745	0	0	285	0	0	0	3,456	0	3,355	984	0
1940	Above Normal	0	0	1,101	18,751	29,355	73,932	48,187	0	0	5,588	0	0
1941	Wet	0	737	29,540	71,235	73,662	67,914	55,617	25,795	0	0	0	3,499
1942	Wet	0	0	49,665	66,063	74,337	4,977	33,488	15,251	8,085	0	0	4,801
1943	Wet	0	3,974	17,362	68,864	31,986	66,688	11,019	0	804	2,293	0	0
1944	Below Normal	0	797	1,105	233	6,364	0	1,500	2,948	0	1,822	1,689	0
1945	Above Normal	0	1,193	3,110	0	37,865	0	1,668	2,986	0	2,188	0	0
1946	Above Normal	0	1,079	59,907	35,103	0	0	4,710	2,485	0	2,694	0	0
1947	Dry	0	0	2,797	0	0	0	0	3,763	80	2,995	0	0
1948	Below Normal	937	0	1,720	1,451	7,021	0	12,172	10,498	0	0	2,599	0
1949	Below Normal	0	0	1,266	1,346	15,521	11,116	2,243	1,703	0	0	2,559	0
1950	Below Normal	0	0	1,327	4,883	11,688	1,153	6,951	3,010	0	0	0	0
1951	Above Normal	0	40,372	74,682	57,102	52,490	9,060	0	5,777	607	4,723	0	0
1952	Wet	0	332	30,599	65,872	47,852	43,334	51,339	50,450	21,096	3,483	2,155	9,991
1953	Below Normal	1,057	0	30,235	71,276	0	0	5,140	10,828	4,341	0	0	2,937
1954	Below Normal	0	951	0	18,764	31,191	21,148	17,596	0	0	4,864	0	0
1955	Dry	0	358	10,356	4,103	0	0	3,476	4,044	0	1,543	1,527	0
1956	Wet	0	0	74,100	75,038	64,578	21,114	2,852	28,591	3,201	0	0	4,959
1957	Below Normal	813	0	129	3,179	12,275	20,239	0	5,275	0	2,671	0	0
1958	Wet	5,451	1,357	9,661	23,879	74,346	73,802	73,529	32,599	13,761	0	2,176	8,477
1959	Dry	2,264	0	0	21,093	21,368	0	1,299	2,758	884	3,537	0	0
1960	Critical	0	0	2,610	0	8,089	0	0	2,971	945	3,189	0	0
1961	Critical	1,524	0	2,733	0	12,043	0	0	3,229	0	2,129	2,494	0
1962	Below Normal	0	0	2,310	0	30,044	0	2,628	0	411	4,952	0	0
1963	Above Normal	23,058	1,484	13,768	1,751	38,776	0	70,876	5,443	0	5,738	0	0
1964	Dry	0	13,609	0	8,693	0	0	4,377	5,406	409	2,206	2,172	0
1965	Wet	0	939	67,671	74,172	8,705	0	31,802	0	485	3,062	0	0
1966	Below Normal	0	9,086	2,507	18,368	0	2,709	1,619	0	322	4,224	0	0
1967	Wet	0	80	21,709	31,166	21,534	33,159	34,347	36,234	26,941	8,550	1,360	9,605
1968	Dry	3,020	162	606	17,433	36,236	4,424	0	3,436	0	3,896	0	0
1969	Wet	0	840	9,849	73,845	73,935	43,421	39,716	42,575	16,706	0	0	6,843
1970	Above Normal	2,471	406	46,792	76,488	59,447	19,325	0	6,444	1,681	4,487	0	0
1971	Below Normal	0	5,051	45,210	35,536	0	10,098	0	15,064	0	4,145	0	3,535
1972	Dry	0	0	2,631	1,137	199	9,767	0	1,842	731	2,611	1,422	0
1973	Above Normal	0	5,932	11,719	69,180	61,550	33,439	1,205	6,117	0	3,294	0	0
1974	Wet	0	44,858	56,449	74,625	13,527	73,697	45,784	2,353	5,356	2,014	937	7,372
1975	Wet	413	0	2,684	3,097	45,736	62,301	3,797	17,899	4,822	0	0	6,354
1976	Critical	2,734	1,866	785	0	0	0	0	0	0	1,999	1,200	0
1977	Critical	2,395	0	3,279	0	0	0	0	0	1,455	1,336	1,953	0
1978	Wet	1,249	1,071	3,430	50,501	22,328	43,341	21,032	1,785	4,466	0	0	0
1979	Above Normal	0	247	1,868	8,238	9,716	13,751	0	4,927	0	0	0	0
1980	Wet	0	696	5,935	74,182	74,174	42,762	2,218	4,072	4,687	0	0	0
1981	Dry	0	0	1,156	12,509	0	3,833	2,767	2,069	0	2,313	1,085	0
1982	Wet	897	19,563	73,974	60,573	73,996	62,548	74,620	26,023	6,190	0	1,008	13,768
1983	Wet	12,827	34,917	64,052	70,660	75,028	77,207	58,073	54,492	51,751	23,688	14,108	18,487
1984	Above Normal	7,085	64,098	75,284	47,575	19,037	16,471	0	5,639	2,044	4,127	0	0
1985	Dry	178	17,473	7,588	0	0	0	2,788	1,611	0	2,498	1,370	0
1986	Wet	0	597	2,549	6,451	78,796	74,533	7,357	1,351	3,754	1,453	0	0
1987	Critical	0	0	1,369	2,294	2,422	7,314	0	3,974	0	2,537	1,224	0
1988	Critical	0	0	1,877	12,062	0	0	2,573	0	0	0	2,284	0
1989	Critical	1,197	2,349	876	4,986	0	22,714	8,475	0	0	2,867	1,800	0
1990	Critical	0	0	2,858	3,256	0	0	0	1,381	0	2,254	1,921	0
1991	Critical	1,289	1,467	1,453	1,161	0	2,162	0	1,121	0	1,627	2,426	0
1992	Critical	0	2,371	0	3,172	8,677	0	0	0	0	0	1,254	0
1993	Wet	2,115	0	2,062	48,907	26,794	6,437	5,799	5,011	7,755	0	0	0
1994	Critical	0	0	1,357	1,144	0	0	2,570	3,023	0	1,278	4,046	0
1995	Wet	0	2,842	469	73,849	16,806	76,617	45,536	66,532	24,498	16,052	4,850	9,590
1996	Wet	1,118	0	12,471	33,511	74,604	53,589	23,647	29,362	0	0	1,053	3,938
1997	Wet	0	3,835	69,227	78,756	52,126	8,598	2,703	4,238	1,323	2,785	0	0
1998	Wet	0	0	5,375	49,055	74,767	67,831	42,306	36,579	60,256	21,073	9,031	15,563
1999	Above Normal	4,898	15,415	22,423	28,888	70,494	39,828	9,676	7,493	2,400	2,840	0	2,138
2000	Above Normal	0	268	0	17,946	72,405	40,613	0	0	0	4,075	0	0
2001	Dry	0	0	2,485	2,513	1,566	0	0	3,332	0	1,952	1,268	0
2002	Dry	0	1,272	17,525	35,120	0	0	4,424	1,840	0	2,475	2,483	0
2003	Below Normal	0	3,900	20,360	45,047	0	0	12,008	25,231	0	3,505	0	0

Table 3.8-31.
Simulated Monthly Surplus Delta Outflows, Alternative B (2005), Sacramento Valley Index Year Type

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0	0	3,687	0	13,168	5,011	9,441	41,381	16,348	0	0	0
1923	Above Normal	0	0	17,564	18,491	0	0	6,986	5,459	0	2,346	1,211	0
1924	Critical	0	0	0	2,917	5,535	0	1,371	0	536	0	2,581	0
1925	Below Normal	932	1,861	462	0	51,410	0	7,354	3,784	0	0	1,243	0
1926	Dry	1,530	0	0	2,872	23,079	0	10,333	0	0	2,154	0	0
1927	Above Normal	0	7,626	4,724	18,475	74,769	21,047	30,987	2,915	0	4,906	0	0
1928	Below Normal	0	4,063	1,307	8,359	0	74,100	3,515	0	0	2,858	0	0
1929	Critical	152	154	1,869	0	0	0	0	0	0	0	2,289	0
1930	Critical	1,239	1,466	3,316	6,102	0	14,846	2,681	1,442	0	1,456	1,126	0
1931	Critical	1,255	0	0	292	0	907	0	0	3,177	0	2,336	0
1932	Above Normal	1,126	1,947	5,959	5,959	0	0	1,122	4,276	0	0	0	0
1933	Dry	1,150	0	0	3,866	0	0	0	0	0	0	2,144	0
1934	Critical	1,099	1,724	1,896	7,255	0	0	0	0	0	0	1,880	0
1935	Above Normal	1,417	1,882	835	15,494	0	6,540	38,154	0	942	2,418	0	0
1936	Above Normal	0	0	1,609	27,058	52,661	6,311	8,835	0	0	3,119	0	0
1937	Wet	0	0	0	1,148	30,964	32,593	9,896	0	0	0	0	0
1938	Wet	0	12,466	55,539	24,633	74,112	74,552	57,577	51,016	24,059	0	0	5,887
1939	Dry	3,814	0	0	56	0	0	0	3,447	0	3,242	980	0
1940	Above Normal	0	0	941	18,832	29,775	73,940	48,984	0	0	5,553	0	0
1941	Wet	0	0	28,036	70,355	73,667	67,053	53,598	26,777	0	0	0	3,519
1942	Wet	0	0	51,681	66,051	74,337	3,925	31,584	15,659	8,430	0	0	4,795
1943	Wet	0	4,263	17,403	68,865	30,393	66,686	11,658	0	868	2,092	0	0
1944	Below Normal	511	0	1,038	91	5,068	0	1,876	2,046	0	1,819	1,313	0
1945	Above Normal	0	1,398	3,182	0	36,911	0	775	3,036	0	1,955	1,070	0
1946	Above Normal	0	2,221	60,619	35,232	0	0	4,116	2,529	0	2,639	1,106	0
1947	Dry	0	380	2,951	0	0	0	940	3,700	65	2,880	0	0
1948	Below Normal	960	0	0	2,043	4,322	0	12,658	11,401	0	0	1,651	0
1949	Below Normal	0	0	2,044	0	0	13,420	2,391	1,773	0	0	2,955	0
1950	Below Normal	0	0	0	5,481	9,686	0	6,359	3,530	0	0	0	0
1951	Above Normal	0	41,480	74,693	57,083	52,130	9,716	0	5,920	869	4,439	0	0
1952	Wet	0	343	32,594	65,638	47,887	45,187	52,911	49,217	19,943	3,489	2,162	10,016
1953	Below Normal	1,129	0	30,316	71,487	0	0	6,426	11,819	4,316	0	0	3,357
1954	Below Normal	0	1,210	0	19,596	31,156	22,297	19,081	0	0	4,878	0	0
1955	Dry	0	411	10,338	4,175	0	0	3,885	3,600	0	974	1,102	0
1956	Wet	918	0	74,194	75,020	64,629	21,783	3,218	27,107	5,126	0	0	5,616
1957	Below Normal	2,124	0	0	2,376	13,130	17,764	0	6,921	0	2,766	0	0
1958	Wet	4,192	1,641	9,739	24,716	74,483	73,800	73,529	33,115	13,966	0	2,183	8,509
1959	Dry	2,337	0	0	21,221	21,436	0	1,592	2,785	876	3,578	0	0
1960	Critical	0	0	2,491	0	8,126	0	0	2,966	943	3,241	0	0
1961	Critical	1,514	0	2,671	0	12,250	0	0	3,291	0	2,327	2,297	0
1962	Below Normal	0	0	2,290	0	29,837	0	4,250	920	479	4,667	0	0
1963	Above Normal	23,405	1,706	13,847	1,816	41,108	0	68,831	5,479	0	5,716	0	0
1964	Dry	0	14,279	0	8,860	0	0	4,328	5,398	413	2,192	2,246	0
1965	Wet	0	1,167	67,955	74,172	7,457	0	29,900	0	312	3,002	0	0
1966	Below Normal	0	7,987	3,000	18,159	0	0	2,424	0	550	4,099	0	0
1967	Wet	0	354	21,787	31,289	21,871	31,751	34,379	36,101	25,526	8,633	1,367	9,630
1968	Dry	3,094	381	685	17,530	36,361	5,191	0	3,442	0	3,914	0	0
1969	Wet	0	766	9,929	73,850	73,934	43,422	39,717	43,163	14,234	0	0	6,700
1970	Above Normal	2,545	623	46,870	76,488	59,589	19,935	0	6,817	1,574	4,049	0	0
1971	Below Normal	0	5,263	46,303	35,590	0	14,166	1,591	15,105	0	4,157	0	3,635
1972	Dry	0	0	2,733	1,204	0	12,401	1,545	1,868	623	2,583	1,502	0
1973	Above Normal	0	6,107	11,784	69,367	61,619	34,337	0	7,468	0	3,193	0	0
1974	Wet	0	46,045	56,873	74,625	13,587	73,697	47,173	2,589	5,405	1,781	938	7,493
1975	Wet	751	0	2,806	2,375	46,010	61,912	4,313	17,990	5,329	0	0	6,343
1976	Critical	2,807	2,309	894	0	0	0	0	0	0	2,122	1,109	0
1977	Critical	2,449	0	3,120	0	0	0	0	0	1,446	1,344	1,963	0
1978	Wet	1,243	1,080	3,404	50,502	20,776	42,613	20,969	1,810	4,466	0	0	0
1979	Above Normal	0	121	1,570	8,287	10,064	10,988	1,226	5,019	0	0	0	0
1980	Wet	0	957	6,055	74,192	74,174	42,159	2,992	4,621	5,381	0	0	0
1981	Dry	0	0	1,154	13,239	0	836	3,381	2,004	0	2,225	1,159	0
1982	Wet	832	19,813	73,981	60,503	73,996	59,126	74,620	25,176	6,554	0	1,011	13,799
1983	Wet	12,900	34,095	64,051	70,660	75,028	77,207	58,073	54,491	51,750	23,687	14,115	18,511
1984	Above Normal	7,171	64,097	75,284	47,575	19,054	17,180	0	5,638	1,961	3,980	0	0
1985	Dry	483	16,629	7,035	0	0	0	3,533	1,526	0	2,427	1,510	0
1986	Wet	0	465	2,630	6,566	78,795	74,552	8,767	670	4,526	931	0	0
1987	Critical	0	0	1,322	2,137	2,925	8,245	0	4,062	0	2,634	1,073	0
1988	Critical	0	0	1,972	12,128	0	0	2,699	0	0	0	2,275	0
1989	Critical	1,232	2,331	833	4,922	0	23,307	8,833	0	0	3,080	1,604	0
1990	Critical	0	0	3,063	3,313	0	0	0	1,394	0	2,588	1,702	0
1991	Critical	1,414	1,372	1,530	1,048	0	2,561	0	1,568	0	1,197	2,743	0
1992	Critical	0	2,335	0	3,234	8,708	0	0	0	0	0	1,268	0
1993	Wet	2,130	0	1,992	49,330	26,884	7,141	7,512	7,602	8,392	0	0	274
1994	Critical	0	0	1,986	0	0	0	2,599	2,989	0	2,259	2,245	0
1995	Wet	1,568	1,408	2,963	73,673	19,903	76,616	49,217	66,109	24,179	16,066	4,867	9,627
1996	Wet	1,212	0	12,561	33,838	74,604	52,730	24,847	29,129	0	0	957	4,135
1997	Wet	0	3,065	69,239	78,756	51,524	5,420	2,086	4,772	2,056	2,370	0	0
1998	Wet	0	0	5,547	49,198	74,767	67,831	43,611	35,944	58,337	20,251	9,038	15,588
1999	Above Normal	4,971	15,634	22,503	28,985	70,449	40,547	10,298	7,520	2,449	2,755	0	2,207
2000	Above Normal	0	570	379	18,567	72,406	41,518	0	1,091	0	3,933	0	0
2001	Dry	0	0	1,909	2,572	1,582	0	0	3,326	0	1,956	906	0
2002	Dry	1,040	1,110	18,311	36,152	0	0	5,153	1,842	0	2,389	2,729	0
2003	Below Normal	0	4,119	20,108	44,963	0	0	11,574	25,215	0	3,487	0	0

Table 3.8-32.
Change in Simulated Monthly Surplus Delta Outflows, Alternative B (2005) – Existing Conditions (2005), Sacramento Valley Index Year Type

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0	0	79	0	139	282	-1,230	111	591	0	0	0
1923	Above Normal	0	0	868	-23	0	0	-1,810	-604	0	-128	192	0
1924	Critical	0	0	0	-24	-68	0	-5	0	5	0	10	0
1925	Below Normal	-6	32	-72	0	-1	0	-322	-133	0	0	-75	0
1926	Dry	92	0	0	78	-1,519	0	813	0	0	2,154	-1,935	0
1927	Above Normal	0	109	749	-5,635	95	654	839	129	0	-83	0	0
1928	Below Normal	0	178	107	68	0	-16	1,063	0	0	-8	0	0
1929	Critical	152	-405	532	0	-159	0	0	0	0	0	-10	0
1930	Critical	34	12	-94	66	0	626	175	-1	0	-113	71	0
1931	Critical	-24	0	0	-110	0	907	0	0	30	0	-8	0
1932	Above Normal	6	-11	0	-2	0	0	1,122	1,031	0	0	0	0
1933	Dry	-439	0	0	635	0	0	0	0	0	0	7	0
1934	Critical	49	62	-304	1,531	0	0	0	0	0	0	2	0
1935	Above Normal	24	404	-1,391	70	0	1,743	-311	0	942	-20	0	0
1936	Above Normal	0	0	-179	70	-2,077	653	926	0	0	157	0	0
1937	Wet	0	0	-1,256	-1,561	-1,809	3,061	1,093	0	0	0	0	0
1938	Wet	0	737	-1,219	-65	-13	0	1	-485	-1,889	0	0	151
1939	Dry	69	0	0	-229	0	0	0	-9	0	-113	-5	0
1940	Above Normal	0	0	-160	81	419	8	798	0	0	-35	0	0
1941	Wet	0	-737	-1,504	-880	6	-862	-2,019	983	0	0	0	20
1942	Wet	0	0	2,016	-11	0	-1,052	-1,904	408	345	0	0	-6
1943	Wet	0	289	42	1	-1,593	-2	639	0	65	-201	0	0
1944	Below Normal	511	-797	-68	-142	-1,296	0	376	-902	0	-3	-376	0
1945	Above Normal	0	205	72	0	-954	0	-893	50	0	-233	1,070	0
1946	Above Normal	0	1,142	712	128	0	0	-594	44	0	-56	1,106	0
1947	Dry	0	380	155	0	0	0	940	-63	-15	-115	0	0
1948	Below Normal	23	0	-1,720	591	-2,699	0	486	904	0	0	-948	0
1949	Below Normal	0	0	778	-1,346	-15,521	2,305	148	70	0	0	396	0
1950	Below Normal	0	0	-1,327	598	-2,002	-1,153	-592	520	0	0	0	0
1951	Above Normal	0	1,109	11	-18	-360	656	0	143	263	-284	0	0
1952	Wet	0	11	1,995	-234	34	1,853	1,571	-1,233	-1,152	7	7	25
1953	Below Normal	73	0	81	211	0	0	1,286	991	-25	0	0	420
1954	Below Normal	0	259	0	832	-35	1,150	1,485	0	0	14	0	0
1955	Dry	0	52	-18	72	0	0	409	-444	0	-569	-426	0
1956	Wet	918	0	95	-18	51	669	366	-1,484	1,925	0	0	657
1957	Below Normal	1,311	0	-129	-803	854	-2,475	0	1,646	0	95	0	0
1958	Wet	-1,259	284	78	838	138	-1	0	516	204	0	7	32
1959	Dry	73	0	0	127	68	0	293	27	-8	40	0	0
1960	Critical	0	0	-119	0	36	0	0	-5	-2	52	0	0
1961	Critical	-9	0	-62	0	206	0	0	62	0	198	-197	0
1962	Below Normal	0	0	-20	0	-206	0	1,622	920	68	-284	0	0
1963	Above Normal	346	221	79	66	2,332	0	-2,045	36	0	-22	0	0
1964	Dry	0	670	0	168	0	0	-49	-8	4	-13	74	0
1965	Wet	0	228	284	0	-1,249	0	-1,902	0	-173	-60	0	0
1966	Below Normal	0	-1,099	493	-208	0	-2,709	806	0	228	-125	0	0
1967	Wet	0	274	78	122	337	-1,408	32	-133	-1,415	83	7	25
1968	Dry	74	220	80	97	125	767	0	6	0	18	0	0
1969	Wet	0	-74	80	5	0	1	1	589	-2,472	0	0	-143
1970	Above Normal	74	217	78	0	142	610	0	374	-107	-439	0	0
1971	Below Normal	0	212	1,093	54	0	4,068	1,591	41	0	12	0	100
1972	Dry	0	0	102	67	-199	2,634	1,545	26	-108	-28	80	0
1973	Above Normal	0	175	65	188	70	898	-1,205	1,352	0	-100	0	0
1974	Wet	0	1,187	425	0	60	0	1,390	236	49	-232	1	121
1975	Wet	338	0	122	-722	273	-389	517	91	507	0	0	-11
1976	Critical	73	444	109	0	0	0	0	0	0	122	-91	0
1977	Critical	53	0	-159	0	0	0	0	0	-9	8	10	0
1978	Wet	-7	9	-26	0	-1,552	-727	-63	25	0	0	0	0
1979	Above Normal	0	-127	-298	49	348	-2,763	1,226	91	0	0	0	0
1980	Wet	0	261	120	9	0	-603	774	549	694	0	0	0
1981	Dry	0	0	-2	730	0	-2,998	615	-65	0	-89	74	0
1982	Wet	-65	250	7	-69	0	-3,422	0	-846	364	0	3	31
1983	Wet	72	-822	-1	0	0	0	0	0	-1	0	6	24
1984	Above Normal	86	0	0	0	17	709	0	-1	-83	-147	0	0
1985	Dry	305	-844	-553	0	0	0	745	-84	0	-72	140	0
1986	Wet	0	-132	81	114	-1	18	1,411	-681	773	-521	0	0
1987	Critical	0	0	-47	-157	503	931	0	88	0	96	-151	0
1988	Critical	0	0	96	65	0	0	126	0	0	0	-9	0
1989	Critical	35	-18	-43	-64	0	593	358	0	0	214	-196	0
1990	Critical	0	0	205	57	0	0	0	12	0	333	-219	0
1991	Critical	125	-95	76	-113	0	399	0	447	0	-430	317	0
1992	Critical	0	-37	0	62	32	0	0	0	0	0	14	0
1993	Wet	15	0	-71	423	90	704	1,713	2,591	637	0	0	274
1994	Critical	0	0	630	-1,144	0	0	29	-34	0	981	-1,801	0
1995	Wet	1,568	-1,434	2,494	-176	3,097	-1	3,681	-423	-319	14	17	37
1996	Wet	95	0	90	327	0	-859	1,199	-233	0	0	-97	197
1997	Wet	0	-770	12	0	-602	-3,178	-617	534	734	-416	0	0
1998	Wet	0	0	172	143	0	0	1,305	-634	-1,920	-821	7	25
1999	Above Normal	73	219	79	97	-46	720	622	26	49	-85	0	69
2000	Above Normal	0	302	379	621	0	905	0	1,091	0	-142	0	0
2001	Dry	0	0	-577	59	16	0	0	-6	0	4	-362	0
2002	Dry	1,040	-162	786	1,032	0	0	729	2	0	-86	246	0
2003	Below Normal	0	219	-252	-85	0	0	-434	-16	0	-18	0	0

Table 3.8-33.
Percent Change in Simulated Monthly Surplus Delta Outflows from Existing Conditions (2005), Alternative B (2005), Sacramento Valley Index Year Type

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0%	0%	2%	0%	1%	6%	-12%	0%	4%	0%	0%	0%
1923	Above Normal	0%	0%	5%	0%	0%	0%	-21%	-10%	0%	-5%	19%	0%
1924	Critical	0%	0%	0%	-1%	-1%	0%	0%	0%	1%	0%	0%	0%
1925	Below Normal	-1%	2%	-14%	0%	0%	0%	-4%	-3%	0%	0%	-6%	0%
1926	Dry	6%	0%	0%	3%	-6%	0%	9%	0%	0%	0%	-100%	0%
1927	Above Normal	0%	1%	19%	-23%	0%	3%	3%	5%	0%	-2%	0%	0%
1928	Below Normal	0%	5%	9%	1%	0%	0%	43%	0%	0%	0%	0%	0%
1929	Critical	0%	-73%	40%	0%	-100%	0%	0%	0%	0%	0%	0%	0%
1930	Critical	3%	1%	-3%	1%	0%	4%	7%	0%	0%	-7%	7%	0%
1931	Critical	-2%	0%	0%	-27%	0%	0%	0%	0%	1%	0%	0%	0%
1932	Above Normal	1%	-1%	0%	0%	0%	0%	0%	32%	0%	0%	0%	0%
1933	Dry	-28%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	0%
1934	Critical	5%	4%	-14%	27%	0%	0%	0%	0%	0%	0%	0%	0%
1935	Above Normal	2%	27%	-62%	0%	0%	36%	-1%	0%	0%	-1%	0%	0%
1936	Above Normal	0%	0%	-10%	0%	-4%	12%	12%	0%	0%	5%	0%	0%
1937	Wet	0%	0%	-100%	-58%	-6%	10%	12%	0%	0%	0%	0%	0%
1938	Wet	0%	6%	-2%	0%	0%	0%	0%	-1%	-7%	0%	0%	3%
1939	Dry	2%	0%	0%	-80%	0%	0%	0%	0%	0%	-3%	0%	0%
1940	Above Normal	0%	0%	-15%	0%	1%	0%	2%	0%	0%	-1%	0%	0%
1941	Wet	0%	-100%	-5%	-1%	0%	-1%	-4%	4%	0%	0%	0%	1%
1942	Wet	0%	0%	4%	0%	0%	-21%	-6%	3%	4%	0%	0%	0%
1943	Wet	0%	7%	0%	0%	-5%	0%	6%	0%	8%	-9%	0%	0%
1944	Below Normal	0%	-100%	-6%	-61%	-20%	0%	25%	-31%	0%	0%	-22%	0%
1945	Above Normal	0%	17%	2%	0%	-3%	0%	-54%	2%	0%	-11%	0%	0%
1946	Above Normal	0%	106%	1%	0%	0%	0%	-13%	2%	0%	-2%	0%	0%
1947	Dry	0%	0%	6%	0%	0%	0%	0%	-2%	-19%	-4%	0%	0%
1948	Below Normal	2%	0%	-100%	41%	-38%	0%	4%	9%	0%	0%	-36%	0%
1949	Below Normal	0%	0%	61%	-100%	-100%	21%	7%	4%	0%	0%	15%	0%
1950	Below Normal	0%	0%	-100%	12%	-17%	-100%	-9%	17%	0%	0%	0%	0%
1951	Above Normal	0%	3%	0%	0%	-1%	7%	0%	2%	43%	-6%	0%	0%
1952	Wet	0%	3%	7%	0%	0%	4%	3%	-2%	-5%	0%	0%	0%
1953	Below Normal	7%	0%	0%	0%	0%	0%	25%	9%	-1%	0%	0%	14%
1954	Below Normal	0%	27%	0%	4%	0%	5%	8%	0%	0%	0%	0%	0%
1955	Dry	0%	15%	0%	2%	0%	0%	12%	-11%	0%	-37%	-28%	0%
1956	Wet	0%	0%	0%	0%	0%	3%	13%	-5%	60%	0%	0%	13%
1957	Below Normal	161%	0%	-100%	-25%	7%	-12%	0%	31%	0%	4%	0%	0%
1958	Wet	-23%	21%	1%	4%	0%	0%	0%	2%	1%	0%	0%	0%
1959	Dry	3%	0%	0%	1%	0%	0%	23%	1%	-1%	1%	0%	0%
1960	Critical	0%	0%	-5%	0%	0%	0%	0%	0%	0%	2%	0%	0%
1961	Critical	-1%	0%	-2%	0%	2%	0%	0%	2%	0%	9%	-8%	0%
1962	Below Normal	0%	0%	-1%	0%	-1%	0%	62%	0%	17%	-6%	0%	0%
1963	Above Normal	2%	15%	1%	4%	6%	0%	-3%	1%	0%	0%	0%	0%
1964	Dry	0%	5%	0%	2%	0%	0%	-1%	0%	1%	-1%	3%	0%
1965	Wet	0%	24%	0%	0%	-14%	0%	-6%	0%	-36%	-2%	0%	0%
1966	Below Normal	0%	-12%	20%	-1%	0%	-100%	50%	0%	71%	-3%	0%	0%
1967	Wet	0%	341%	0%	0%	2%	-4%	0%	0%	-5%	1%	1%	0%
1968	Dry	2%	136%	13%	1%	0%	17%	0%	0%	0%	0%	0%	0%
1969	Wet	0%	-9%	1%	0%	0%	0%	0%	1%	-15%	0%	0%	-2%
1970	Above Normal	3%	54%	0%	0%	0%	3%	0%	6%	-6%	-10%	0%	0%
1971	Below Normal	0%	4%	2%	0%	0%	40%	0%	0%	0%	0%	0%	3%
1972	Dry	0%	0%	4%	6%	-100%	27%	0%	1%	-15%	-1%	6%	0%
1973	Above Normal	0%	3%	1%	0%	0%	3%	-100%	22%	0%	-3%	0%	0%
1974	Wet	0%	3%	1%	0%	0%	0%	3%	10%	1%	-12%	0%	2%
1975	Wet	82%	0%	5%	-23%	1%	-1%	14%	1%	11%	0%	0%	0%
1976	Critical	3%	24%	14%	0%	0%	0%	0%	0%	0%	6%	-8%	0%
1977	Critical	2%	0%	-5%	0%	0%	0%	0%	0%	-1%	1%	1%	0%
1978	Wet	-1%	1%	-1%	0%	-7%	-2%	0%	1%	0%	0%	0%	0%
1979	Above Normal	0%	-51%	-16%	1%	4%	-20%	0%	2%	0%	0%	0%	0%
1980	Wet	0%	38%	2%	0%	0%	-1%	35%	13%	15%	0%	0%	0%
1981	Dry	0%	0%	0%	6%	0%	-78%	22%	-3%	0%	-4%	7%	0%
1982	Wet	-7%	1%	0%	0%	0%	-5%	0%	-3%	6%	0%	0%	0%
1983	Wet	1%	-2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1984	Above Normal	1%	0%	0%	0%	0%	4%	0%	0%	-4%	-4%	0%	0%
1985	Dry	171%	-5%	-7%	0%	0%	0%	27%	-5%	0%	-3%	10%	0%
1986	Wet	0%	-22%	3%	2%	0%	0%	19%	-50%	21%	-36%	0%	0%
1987	Critical	0%	0%	-3%	-7%	21%	13%	0%	2%	0%	4%	-12%	0%
1988	Critical	0%	0%	5%	1%	0%	0%	5%	0%	0%	0%	0%	0%
1989	Critical	3%	-1%	-5%	-1%	0%	3%	4%	0%	0%	7%	-11%	0%
1990	Critical	0%	0%	7%	2%	0%	0%	0%	1%	0%	15%	-11%	0%
1991	Critical	10%	-6%	5%	-10%	0%	18%	0%	40%	0%	-26%	13%	0%
1992	Critical	0%	-2%	0%	2%	0%	0%	0%	0%	0%	0%	1%	0%
1993	Wet	1%	0%	-3%	1%	0%	11%	30%	52%	8%	0%	0%	0%
1994	Critical	0%	0%	46%	-100%	0%	0%	1%	-1%	0%	77%	-45%	0%
1995	Wet	0%	-50%	532%	0%	18%	0%	8%	-1%	-1%	0%	0%	0%
1996	Wet	8%	0%	1%	1%	0%	-2%	5%	-1%	0%	0%	-9%	5%
1997	Wet	0%	-20%	0%	0%	-1%	-37%	-23%	13%	55%	-15%	0%	0%
1998	Wet	0%	0%	3%	0%	0%	0%	3%	-2%	-3%	-4%	0%	0%
1999	Above Normal	1%	1%	0%	0%	0%	2%	6%	0%	2%	-3%	0%	3%
2000	Above Normal	0%	113%	0%	3%	0%	2%	0%	0%	0%	-3%	0%	0%
2001	Dry	0%	0%	-23%	2%	1%	0%	0%	0%	0%	0%	-29%	0%
2002	Dry	0%	-13%	4%	3%	0%	0%	16%	0%	0%	-3%	10%	0%
2003	Below Normal	0%	6%	-1%	0%	0%	0%	-4%	0%	0%	-1%	0%	0%

**Table 3.8-34.
Simulated Monthly Surplus Delta Outflows, Existing Conditions (2005), Sacramento Valley Index Year Type**

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0	0	3,607	0	13,030	4,729	10,672	41,270	15,757	0	0	0
1923	Above Normal	0	0	16,697	18,514	0	0	8,796	6,062	0	2,475	1,018	0
1924	Critical	0	0	0	2,940	5,603	0	1,377	0	532	0	2,570	0
1925	Below Normal	938	1,830	534	0	51,410	0	7,676	3,917	0	0	1,318	0
1926	Dry	1,438	0	0	2,794	24,598	0	9,520	0	0	0	1,935	0
1927	Above Normal	0	7,517	3,975	24,111	74,674	20,393	30,149	2,785	0	4,989	0	0
1928	Below Normal	0	3,885	1,200	8,291	0	74,116	2,452	0	0	2,866	0	0
1929	Critical	0	559	1,337	0	159	0	0	0	0	0	2,299	0
1930	Critical	1,205	1,454	3,411	6,036	0	14,220	2,506	1,443	0	1,569	1,055	0
1931	Critical	1,278	0	0	402	0	0	0	0	3,147	0	2,344	0
1932	Above Normal	1,120	1,958	5,959	5,961	0	0	0	3,246	0	0	0	0
1933	Dry	1,590	0	0	3,231	0	0	0	0	0	0	2,138	0
1934	Critical	1,049	1,661	2,201	5,724	0	0	0	0	0	0	1,878	0
1935	Above Normal	1,393	1,477	2,225	15,424	0	4,797	38,466	0	0	2,438	0	0
1936	Above Normal	0	0	1,788	26,988	54,737	5,659	7,909	0	0	2,962	0	0
1937	Wet	0	0	1,256	2,709	32,773	29,532	8,803	0	0	0	0	0
1938	Wet	0	11,729	56,759	24,698	74,124	74,552	57,577	51,501	25,949	0	0	5,735
1939	Dry	3,745	0	0	285	0	0	0	3,456	0	3,355	984	0
1940	Above Normal	0	0	1,101	18,751	29,355	73,932	48,187	0	0	5,588	0	0
1941	Wet	0	737	29,540	71,235	73,662	67,914	55,617	25,795	0	0	0	3,499
1942	Wet	0	0	49,665	66,063	74,337	4,977	33,488	15,251	8,085	0	0	4,801
1943	Wet	0	3,974	17,362	68,864	31,986	66,688	11,019	0	804	2,293	0	0
1944	Below Normal	0	797	1,105	233	6,364	0	1,500	2,948	0	1,822	1,689	0
1945	Above Normal	0	1,193	3,110	0	37,865	0	1,668	2,986	0	2,188	0	0
1946	Above Normal	0	1,079	59,907	35,103	0	0	4,710	2,485	0	2,694	0	0
1947	Dry	0	0	2,797	0	0	0	0	3,763	80	2,995	0	0
1948	Below Normal	937	0	1,720	1,451	7,021	0	12,172	10,498	0	0	2,599	0
1949	Below Normal	0	0	1,266	1,346	15,521	11,116	2,243	1,703	0	0	2,559	0
1950	Below Normal	0	0	1,327	4,883	11,688	1,153	6,951	3,010	0	0	0	0
1951	Above Normal	0	40,372	74,682	57,102	52,490	9,060	0	5,777	607	4,723	0	0
1952	Wet	0	332	30,599	65,872	47,852	43,334	51,339	50,450	21,096	3,483	2,155	9,991
1953	Below Normal	1,057	0	30,235	71,276	0	0	5,140	10,828	4,341	0	0	2,937
1954	Below Normal	0	951	0	18,764	31,191	21,148	17,596	0	0	4,864	0	0
1955	Dry	0	358	10,356	4,103	0	0	3,476	4,044	0	1,543	1,527	0
1956	Wet	0	0	74,100	75,038	64,578	21,114	2,852	28,591	3,201	0	0	4,959
1957	Below Normal	813	0	129	3,179	12,275	20,239	0	5,275	0	2,671	0	0
1958	Wet	5,451	1,357	9,661	23,879	74,346	73,802	73,529	32,599	13,761	0	2,176	8,477
1959	Dry	2,264	0	0	21,093	21,368	0	1,299	2,758	884	3,537	0	0
1960	Critical	0	0	2,610	0	8,089	0	0	2,971	945	3,189	0	0
1961	Critical	1,524	0	2,733	0	12,043	0	0	3,229	0	2,129	2,494	0
1962	Below Normal	0	0	2,310	0	30,044	0	2,628	0	411	4,952	0	0
1963	Above Normal	23,058	1,484	13,768	1,751	38,776	0	70,876	5,443	0	5,738	0	0
1964	Dry	0	13,609	0	8,693	0	0	4,377	5,406	409	2,206	2,172	0
1965	Wet	0	939	67,671	74,172	8,705	0	31,802	0	485	3,062	0	0
1966	Below Normal	0	9,086	2,507	18,368	0	2,709	1,619	0	322	4,224	0	0
1967	Wet	0	80	21,709	31,166	21,534	33,159	34,347	36,234	26,941	8,550	1,360	9,605
1968	Dry	3,020	162	606	17,433	36,236	4,424	0	3,436	0	3,896	0	0
1969	Wet	0	840	9,849	73,845	73,935	43,421	39,716	42,575	16,706	0	0	6,843
1970	Above Normal	2,471	406	46,792	76,488	59,447	19,325	0	6,444	1,681	4,487	0	0
1971	Below Normal	0	5,051	45,210	35,536	0	10,098	0	15,064	0	4,145	0	3,535
1972	Dry	0	0	2,631	1,137	199	9,767	0	1,842	731	2,611	1,422	0
1973	Above Normal	0	5,932	11,719	69,180	61,550	33,439	1,205	6,117	0	3,294	0	0
1974	Wet	0	44,858	56,449	74,625	13,527	73,697	45,784	2,353	5,356	2,014	937	7,372
1975	Wet	413	0	2,684	3,097	45,736	62,301	3,797	17,899	4,822	0	0	6,354
1976	Critical	2,734	1,866	785	0	0	0	0	0	0	1,999	1,200	0
1977	Critical	2,395	0	3,279	0	0	0	0	0	1,455	1,336	1,953	0
1978	Wet	1,249	1,071	3,430	50,501	22,328	43,341	21,032	1,785	4,466	0	0	0
1979	Above Normal	0	247	1,868	8,238	9,716	13,751	0	4,927	0	0	0	0
1980	Wet	0	696	5,935	74,182	74,174	42,762	2,218	4,072	4,687	0	0	0
1981	Dry	0	0	1,156	12,509	0	3,833	2,767	2,069	0	2,313	1,085	0
1982	Wet	897	19,563	73,974	60,573	73,996	62,548	74,620	26,023	6,190	0	1,008	13,768
1983	Wet	12,827	34,917	64,052	70,660	75,028	77,207	58,073	54,492	51,751	23,688	14,108	18,487
1984	Above Normal	7,085	64,098	75,284	47,575	19,037	16,471	0	5,639	2,044	4,127	0	0
1985	Dry	178	17,473	7,588	0	0	0	2,788	1,611	0	2,498	1,370	0
1986	Wet	0	597	2,549	6,451	78,796	74,533	7,357	1,351	3,754	1,453	0	0
1987	Critical	0	0	1,369	2,294	2,422	7,314	0	3,974	0	2,537	1,224	0
1988	Critical	0	0	1,877	12,062	0	0	2,573	0	0	0	2,284	0
1989	Critical	1,197	2,349	876	4,986	0	22,714	8,475	0	0	2,867	1,800	0
1990	Critical	0	0	2,858	3,256	0	0	0	1,381	0	2,254	1,921	0
1991	Critical	1,289	1,467	1,453	1,161	0	2,162	0	1,121	0	1,627	2,426	0
1992	Critical	0	2,371	0	3,172	8,677	0	0	0	0	0	1,254	0
1993	Wet	2,115	0	2,062	48,907	26,794	6,437	5,799	5,011	7,755	0	0	0
1994	Critical	0	0	1,357	1,144	0	0	2,570	3,023	0	1,278	4,046	0
1995	Wet	0	2,842	469	73,849	16,806	76,617	45,536	66,532	24,498	16,052	4,850	9,590
1996	Wet	1,118	0	12,471	33,511	74,604	53,589	23,647	29,362	0	0	1,053	3,938
1997	Wet	0	3,835	69,227	78,756	52,126	8,598	2,703	4,238	1,323	2,785	0	0
1998	Wet	0	0	5,375	49,055	74,767	67,831	42,306	36,579	60,256	21,073	9,031	15,563
1999	Above Normal	4,898	15,415	22,423	28,888	70,494	39,828	9,676	7,493	2,400	2,840	0	2,138
2000	Above Normal	0	268	0	17,946	72,405	40,613	0	0	0	4,075	0	0
2001	Dry	0	0	2,485	2,513	1,566	0	0	3,332	0	1,952	1,268	0
2002	Dry	0	1,272	17,525	35,120	0	0	4,424	1,840	0	2,475	2,483	0
2003	Below Normal	0	3,900	20,360	45,047	0	0	12,008	25,231	0	3,505	0	0

Table 3.8-35.
Simulated Monthly Surplus Delta Outflows, Alternative C (2005), Sacramento Valley Index Year Type

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0	0	3,687	0	13,168	5,011	9,441	41,381	16,348	0	0	0
1923	Above Normal	0	0	17,564	18,491	0	0	7,093	5,367	0	2,340	1,213	0
1924	Critical	0	0	0	2,916	5,535	0	1,371	0	536	0	2,580	0
1925	Below Normal	933	1,857	472	0	51,410	0	7,179	3,784	0	0	1,245	0
1926	Dry	1,483	0	0	2,873	24,724	0	10,385	0	0	1,533	1,396	0
1927	Above Normal	1,323	7,767	4,633	23,071	74,694	21,173	31,006	2,919	0	4,907	0	0
1928	Below Normal	0	4,060	1,307	8,360	0	74,119	3,517	0	0	2,858	0	0
1929	Critical	133	0	1,519	0	0	0	0	0	0	0	2,288	0
1930	Critical	1,168	1,245	3,319	6,098	0	14,803	2,707	1,442	0	1,558	1,071	0
1931	Critical	1,152	0	0	274	0	0	0	0	3,212	0	2,329	0
1932	Above Normal	1,131	1,937	5,967	5,965	0	0	1,142	4,292	0	0	0	0
1933	Dry	1,593	0	0	3,868	0	0	0	0	0	0	2,155	0
1934	Critical	1,031	1,533	1,802	7,214	0	0	0	0	0	0	1,880	0
1935	Above Normal	1,355	1,748	857	15,360	0	6,624	37,872	0	942	2,414	0	0
1936	Above Normal	0	0	1,613	27,056	52,616	6,306	8,842	0	0	3,088	0	0
1937	Wet	0	0	0	1,186	30,986	32,623	9,898	0	0	0	0	0
1938	Wet	0	12,465	55,554	24,633	74,111	74,552	57,577	51,015	24,059	0	0	5,854
1939	Dry	3,814	0	0	58	0	0	0	3,447	0	3,243	980	0
1940	Above Normal	0	0	940	18,701	29,772	73,940	48,980	0	0	5,552	0	0
1941	Wet	0	0	28,033	70,354	73,667	67,052	53,597	26,777	0	0	0	3,518
1942	Wet	0	0	51,678	66,051	74,337	3,924	31,583	15,658	8,441	0	0	4,794
1943	Wet	0	4,204	17,435	68,863	30,391	66,686	11,658	0	868	2,092	0	0
1944	Below Normal	511	0	1,038	91	5,067	0	1,002	2,046	0	1,805	1,357	0
1945	Above Normal	0	1,180	3,182	0	36,450	0	686	3,089	0	1,870	1,150	0
1946	Above Normal	0	2,241	60,617	35,231	0	0	3,636	2,539	0	2,626	1,112	0
1947	Dry	0	318	2,949	0	0	0	0	3,700	63	2,894	0	0
1948	Below Normal	909	0	0	2,028	4,402	0	12,647	11,231	0	0	1,731	0
1949	Below Normal	0	0	2,039	0	0	13,423	2,367	1,773	0	0	2,990	0
1950	Below Normal	0	0	0	4,960	8,738	745	6,358	3,533	0	0	0	0
1951	Above Normal	0	41,618	74,692	57,085	51,989	9,703	0	5,865	878	4,425	0	0
1952	Wet	0	137	32,606	65,624	47,887	45,237	52,911	49,216	19,943	3,489	2,162	10,016
1953	Below Normal	1,129	0	30,316	71,487	0	0	6,124	11,650	4,314	0	0	3,185
1954	Below Normal	0	1,210	0	19,057	31,579	22,580	19,111	0	0	4,885	0	0
1955	Dry	0	185	10,338	4,175	0	0	3,056	3,608	0	974	1,154	0
1956	Wet	0	0	74,182	75,016	64,426	21,771	3,215	27,107	5,126	0	0	5,616
1957	Below Normal	2,124	0	0	2,376	13,129	17,764	0	6,921	0	2,766	0	0
1958	Wet	4,192	1,641	9,739	24,716	74,483	73,800	73,529	33,115	13,966	0	2,183	8,509
1959	Dry	2,337	0	0	21,221	21,437	0	1,277	2,768	852	3,616	0	0
1960	Critical	0	0	2,498	0	8,126	0	0	2,966	942	3,242	0	0
1961	Critical	1,461	0	2,652	0	12,532	0	0	3,279	0	2,237	2,373	0
1962	Below Normal	0	0	2,281	0	29,866	0	3,507	920	471	4,668	0	0
1963	Above Normal	23,433	1,705	13,847	1,816	41,032	0	69,387	5,445	0	5,735	0	0
1964	Dry	0	14,236	0	8,861	0	0	4,328	5,398	413	2,192	2,246	0
1965	Wet	0	941	67,954	74,172	7,456	0	29,674	0	314	3,002	0	0
1966	Below Normal	0	7,749	2,983	18,123	0	0	1,711	0	563	4,097	0	0
1967	Wet	0	137	21,818	31,318	21,857	31,751	34,379	36,101	25,527	8,633	1,367	9,630
1968	Dry	3,094	381	685	17,530	36,361	5,191	0	3,442	0	3,914	0	0
1969	Wet	0	559	9,929	73,850	73,934	43,422	39,717	43,162	14,234	0	0	6,699
1970	Above Normal	2,545	623	46,870	76,488	59,589	19,935	0	6,817	1,574	4,048	0	0
1971	Below Normal	0	5,266	46,303	35,591	0	14,167	1,202	15,105	0	4,170	0	3,652
1972	Dry	0	0	2,734	1,205	47	12,744	1,562	1,869	620	2,581	1,504	0
1973	Above Normal	0	6,094	11,782	69,367	61,619	34,337	0	7,468	0	3,193	0	0
1974	Wet	0	46,043	56,873	74,625	13,587	73,697	47,173	2,589	5,405	1,781	938	7,493
1975	Wet	751	0	2,805	2,375	46,009	61,726	4,346	18,003	5,358	0	0	6,368
1976	Critical	2,807	2,318	893	0	0	0	0	0	0	2,125	1,107	0
1977	Critical	2,448	0	3,118	0	0	0	0	0	1,446	1,343	1,963	0
1978	Wet	1,242	1,083	3,397	50,500	20,774	42,615	20,966	1,810	4,466	0	0	0
1979	Above Normal	0	121	1,570	8,287	10,062	10,988	1,226	5,019	0	0	0	0
1980	Wet	0	957	6,055	74,192	74,174	42,159	2,992	4,621	5,381	0	0	0
1981	Dry	0	0	1,154	13,239	0	839	2,751	1,980	0	2,236	1,138	0
1982	Wet	818	19,803	73,981	60,439	73,996	59,177	74,620	25,176	6,554	0	1,011	13,799
1983	Wet	12,900	34,095	64,051	70,660	75,028	77,207	58,073	54,492	51,750	23,687	14,115	18,511
1984	Above Normal	7,171	64,098	75,284	47,575	19,054	17,180	0	5,638	1,893	4,009	0	0
1985	Dry	387	16,630	7,057	0	0	0	2,782	1,528	0	2,421	1,518	0
1986	Wet	0	232	2,631	6,574	78,795	74,556	8,770	670	4,526	931	0	0
1987	Critical	0	0	1,322	2,137	2,925	8,255	0	4,062	0	2,634	1,073	0
1988	Critical	0	0	1,973	12,128	0	0	2,699	0	0	0	2,275	0
1989	Critical	1,232	2,114	830	4,926	0	23,305	8,831	0	0	3,080	1,606	0
1990	Critical	0	0	3,063	3,313	0	0	0	1,394	0	2,588	1,702	0
1991	Critical	1,341	1,255	1,530	1,047	0	2,560	0	1,568	0	1,163	2,766	0
1992	Critical	0	2,104	0	3,251	8,708	0	0	0	0	0	1,259	0
1993	Wet	2,142	0	1,987	49,202	26,884	7,137	7,510	7,597	8,455	0	0	266
1994	Critical	0	0	2,001	0	0	0	2,599	2,988	0	2,256	2,254	0
1995	Wet	1,570	1,218	2,917	73,667	19,826	76,616	49,215	66,106	24,177	16,065	4,865	9,625
1996	Wet	1,211	0	12,558	33,837	74,604	52,731	24,846	29,128	0	0	957	4,133
1997	Wet	0	3,064	69,239	78,756	51,523	5,642	1,909	4,541	2,129	2,282	0	0
1998	Wet	0	0	5,543	49,199	74,767	67,831	43,610	35,944	58,336	20,251	9,038	15,588
1999	Above Normal	4,971	15,633	22,502	28,984	70,448	40,546	10,297	7,519	2,453	2,754	0	2,204
2000	Above Normal	0	567	386	18,560	72,406	41,450	0	1,098	0	3,924	0	0
2001	Dry	0	0	1,904	2,572	1,581	0	0	3,325	0	1,957	0	0
2002	Dry	994	0	18,341	36,182	0	0	4,315	1,832	0	2,384	2,762	0
2003	Below Normal	0	4,119	20,108	45,015	0	0	11,573	25,214	0	3,487	0	0

Table 3.8-36.
Change in Simulated Monthly Surplus Delta Outflows, Alternative C (2005) – Existing Conditions (2005), Sacramento Valley Index Year Type

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0	0	79	0	139	282	-1,230	111	591	0	0	0
1923	Above Normal	0	0	868	-23	0	0	-1,703	-695	0	-135	195	0
1924	Critical	0	0	0	-24	-69	0	-5	0	4	0	9	0
1925	Below Normal	-5	27	-61	0	-1	0	-496	-133	0	0	-72	0
1926	Dry	44	0	0	79	126	0	865	0	0	1,533	-540	0
1927	Above Normal	1,323	250	658	-1,039	21	780	858	134	0	-83	0	0
1928	Below Normal	0	175	107	69	0	3	1,065	0	0	-8	0	0
1929	Critical	133	-559	181	0	-159	0	0	0	0	0	-11	0
1930	Critical	-37	-209	-92	62	0	583	201	-1	0	-12	16	0
1931	Critical	-126	0	0	-129	0	0	0	0	64	0	-16	0
1932	Above Normal	11	-21	9	4	0	0	1,142	1,046	0	0	0	0
1933	Dry	4	0	0	637	0	0	0	0	0	0	17	0
1934	Critical	-18	-129	-399	1,490	0	0	0	0	0	0	2	0
1935	Above Normal	-38	270	-1,368	-63	0	1,827	-594	0	942	-24	0	0
1936	Above Normal	0	0	-175	68	-2,122	647	933	0	0	126	0	0
1937	Wet	0	0	-1,256	-1,524	-1,787	3,091	1,095	0	0	0	0	0
1938	Wet	0	737	-1,204	-65	-13	0	0	-486	-1,889	0	0	119
1939	Dry	70	0	0	-227	0	0	0	-9	0	-112	-5	0
1940	Above Normal	0	0	-161	-50	417	8	794	0	0	-36	0	0
1941	Wet	0	-737	-1,507	-881	5	-862	-2,019	982	0	0	0	19
1942	Wet	0	0	2,013	-12	0	-1,053	-1,905	407	357	0	0	-7
1943	Wet	0	230	74	-1	-1,596	-2	638	0	65	-201	0	0
1944	Below Normal	511	-797	-68	-142	-1,296	0	-498	-902	0	-17	-332	0
1945	Above Normal	0	-13	73	0	-1,415	0	-982	103	0	-318	1,150	0
1946	Above Normal	0	1,162	710	128	0	0	-1,074	54	0	-68	1,112	0
1947	Dry	0	318	152	0	0	0	0	-63	-17	-101	0	0
1948	Below Normal	-28	0	-1,720	576	-2,619	0	475	733	0	0	-868	0
1949	Below Normal	0	0	773	-1,346	-15,521	2,307	124	70	0	0	431	0
1950	Below Normal	0	0	-1,327	76	-2,950	-408	-593	523	0	0	0	0
1951	Above Normal	0	1,246	11	-16	-501	643	0	88	271	-298	0	0
1952	Wet	0	-195	2,007	-248	35	1,903	1,571	-1,234	-1,153	7	7	25
1953	Below Normal	73	0	81	211	0	0	984	822	-27	0	0	248
1954	Below Normal	0	259	0	293	388	1,432	1,515	0	0	22	0	0
1955	Dry	0	-173	-18	72	0	0	-420	-436	0	-569	-373	0
1956	Wet	0	0	82	-22	-152	657	363	-1,485	1,925	0	0	657
1957	Below Normal	1,311	0	-129	-803	854	-2,475	0	1,646	0	95	0	0
1958	Wet	-1,259	284	78	837	138	-1	0	516	204	0	7	32
1959	Dry	73	0	0	128	68	0	-23	10	-32	79	0	0
1960	Critical	0	0	-112	0	37	0	0	-5	-3	52	0	0
1961	Critical	-62	0	-81	0	489	0	0	49	0	109	-122	0
1962	Below Normal	0	0	-29	0	-178	0	880	920	61	-284	0	0
1963	Above Normal	375	221	79	66	2,256	0	-1,489	2	0	-3	0	0
1964	Dry	0	627	0	168	0	0	-49	-8	4	-13	74	0
1965	Wet	0	2	283	0	-1,249	0	-2,128	0	-172	-60	0	0
1966	Below Normal	0	-1,337	476	-245	0	-2,709	93	0	241	-126	0	0
1967	Wet	0	57	109	151	322	-1,408	32	-133	-1,414	83	7	25
1968	Dry	73	219	79	97	124	766	0	6	0	18	0	0
1969	Wet	0	-281	80	5	0	1	1	587	-2,473	0	0	-144
1970	Above Normal	74	217	78	0	142	610	0	374	-107	-439	0	0
1971	Below Normal	0	214	1,094	55	0	4,069	1,202	41	0	25	0	116
1972	Dry	0	0	103	68	-151	2,977	1,562	27	-111	-30	82	0
1973	Above Normal	0	163	62	188	70	898	-1,205	1,352	0	-100	0	0
1974	Wet	0	1,186	424	0	60	0	1,389	236	49	-232	1	121
1975	Wet	337	0	121	-722	273	-574	549	104	536	0	0	14
1976	Critical	73	453	108	0	0	0	0	0	0	125	-93	0
1977	Critical	52	0	-162	0	0	0	0	0	-8	7	10	0
1978	Wet	-8	12	-33	-1	-1,554	-725	-66	25	0	0	0	0
1979	Above Normal	0	-127	-297	49	346	-2,763	1,226	91	0	0	0	0
1980	Wet	0	262	120	9	0	-603	774	548	694	0	0	0
1981	Dry	0	0	-2	730	0	-2,994	-16	-89	0	-78	53	0
1982	Wet	-79	240	7	-134	0	-3,371	0	-846	364	0	3	31
1983	Wet	72	-821	0	0	0	0	0	0	0	0	6	25
1984	Above Normal	86	0	0	0	17	709	0	-1	-151	-118	0	0
1985	Dry	209	-843	-531	0	0	0	-6	-83	0	-77	148	0
1986	Wet	0	-365	82	123	-1	23	1,413	-681	773	-521	0	0
1987	Critical	0	0	-47	-157	503	941	0	88	0	97	-151	0
1988	Critical	0	0	96	66	0	0	126	0	0	0	-9	0
1989	Critical	35	-235	-46	-60	0	591	356	0	0	213	-194	0
1990	Critical	0	0	204	57	0	0	0	12	0	333	-219	0
1991	Critical	52	-213	76	-114	0	398	0	447	0	-464	340	0
1992	Critical	0	-267	0	79	32	0	0	0	0	0	5	0
1993	Wet	27	0	-75	295	90	699	1,711	2,586	700	0	0	266
1994	Critical	0	0	645	-1,144	0	0	30	-34	0	978	-1,792	0
1995	Wet	1,570	-1,625	2,448	-182	3,019	-1	3,679	-426	-321	13	16	36
1996	Wet	93	0	87	326	0	-858	1,198	-234	0	0	-97	196
1997	Wet	0	-772	12	0	-603	-2,956	-794	303	806	-504	0	0
1998	Wet	0	0	168	145	0	0	1,304	-635	-1,921	-822	6	24
1999	Above Normal	73	218	79	96	-46	719	621	26	54	-86	0	67
2000	Above Normal	0	299	386	615	0	838	0	1,098	0	-151	0	0
2001	Dry	0	0	-581	59	16	0	0	-7	0	5	-1,268	0
2002	Dry	994	-1,272	816	1,061	0	0	-109	-8	0	-91	279	0
2003	Below Normal	0	220	-252	-33	0	0	-435	-17	0	-18	0	0

Table 3.8-37.
Percent Change in Simulated Monthly Surplus Delta Outflows from Existing Conditions (2005), Alternative C (2005), Sacramento Valley Index Year Type

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0%	0%	2%	0%	1%	6%	-12%	0%	4%	0%	0%	0%
1923	Above Normal	0%	0%	5%	0%	0%	0%	-19%	-11%	0%	-5%	19%	0%
1924	Critical	0%	0%	0%	-1%	-1%	0%	0%	0%	1%	0%	0%	0%
1925	Below Normal	-1%	1%	-12%	0%	0%	0%	-6%	-3%	0%	0%	-5%	0%
1926	Dry	3%	0%	0%	3%	1%	0%	9%	0%	0%	0%	-28%	0%
1927	Above Normal	0%	3%	17%	-4%	0%	4%	3%	5%	0%	-2%	0%	0%
1928	Below Normal	0%	4%	9%	1%	0%	0%	43%	0%	0%	0%	0%	0%
1929	Critical	0%	-100%	14%	0%	-100%	0%	0%	0%	0%	0%	0%	0%
1930	Critical	-3%	-14%	-3%	1%	0%	4%	8%	0%	0%	-1%	2%	0%
1931	Critical	-10%	0%	0%	-32%	0%	0%	0%	0%	2%	0%	-1%	0%
1932	Above Normal	1%	-1%	0%	0%	0%	0%	0%	32%	0%	0%	0%	0%
1933	Dry	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	1%	0%
1934	Critical	-2%	-8%	-18%	26%	0%	0%	0%	0%	0%	0%	0%	0%
1935	Above Normal	-3%	18%	-61%	0%	0%	38%	-2%	0%	0%	-1%	0%	0%
1936	Above Normal	0%	0%	-10%	0%	-4%	11%	12%	0%	0%	4%	0%	0%
1937	Wet	0%	0%	-100%	-56%	-5%	10%	12%	0%	0%	0%	0%	0%
1938	Wet	0%	6%	-2%	0%	0%	0%	0%	-1%	-7%	0%	0%	2%
1939	Dry	2%	0%	0%	-80%	0%	0%	0%	0%	0%	-3%	0%	0%
1940	Above Normal	0%	0%	-15%	0%	1%	0%	2%	0%	0%	-1%	0%	0%
1941	Wet	0%	-100%	-5%	-1%	0%	-1%	-4%	4%	0%	0%	0%	1%
1942	Wet	0%	0%	4%	0%	0%	-21%	-6%	3%	4%	0%	0%	0%
1943	Wet	0%	6%	0%	0%	-5%	0%	6%	0%	8%	-9%	0%	0%
1944	Below Normal	0%	-100%	-6%	-61%	-20%	0%	-33%	-31%	0%	-1%	-20%	0%
1945	Above Normal	0%	-1%	2%	0%	-4%	0%	-59%	3%	0%	-15%	0%	0%
1946	Above Normal	0%	108%	1%	0%	0%	0%	-23%	2%	0%	-3%	0%	0%
1947	Dry	0%	0%	5%	0%	0%	0%	0%	-2%	-21%	-3%	0%	0%
1948	Below Normal	-3%	0%	-100%	40%	-37%	0%	4%	7%	0%	0%	-33%	0%
1949	Below Normal	0%	0%	61%	-100%	-100%	21%	6%	4%	0%	0%	17%	0%
1950	Below Normal	0%	0%	-100%	2%	-25%	-35%	-9%	17%	0%	0%	0%	0%
1951	Above Normal	0%	3%	0%	0%	-1%	7%	0%	2%	45%	-6%	0%	0%
1952	Wet	0%	-59%	7%	0%	0%	4%	3%	-2%	-5%	0%	0%	0%
1953	Below Normal	7%	0%	0%	0%	0%	0%	19%	8%	-1%	0%	0%	8%
1954	Below Normal	0%	27%	0%	2%	1%	7%	9%	0%	0%	0%	0%	0%
1955	Dry	0%	-48%	0%	2%	0%	0%	-12%	-11%	0%	-37%	-24%	0%
1956	Wet	0%	0%	0%	0%	0%	3%	13%	-5%	60%	0%	0%	13%
1957	Below Normal	161%	0%	-100%	-25%	7%	-12%	0%	31%	0%	4%	0%	0%
1958	Wet	-23%	21%	1%	4%	0%	0%	0%	2%	1%	0%	0%	0%
1959	Dry	3%	0%	0%	1%	0%	0%	-2%	0%	-4%	2%	0%	0%
1960	Critical	0%	0%	-4%	0%	0%	0%	0%	0%	0%	2%	0%	0%
1961	Critical	-4%	0%	-3%	0%	4%	0%	0%	2%	0%	5%	-5%	0%
1962	Below Normal	0%	0%	-1%	0%	-1%	0%	33%	0%	15%	-6%	0%	0%
1963	Above Normal	2%	15%	1%	4%	6%	0%	-2%	0%	0%	0%	0%	0%
1964	Dry	0%	5%	0%	2%	0%	0%	-1%	0%	1%	-1%	3%	0%
1965	Wet	0%	0%	0%	0%	-14%	0%	-7%	0%	-35%	-2%	0%	0%
1966	Below Normal	0%	-15%	19%	-1%	0%	-100%	6%	0%	75%	-3%	0%	0%
1967	Wet	0%	71%	1%	0%	1%	-4%	0%	0%	-5%	1%	1%	0%
1968	Dry	2%	136%	13%	1%	0%	17%	0%	0%	0%	0%	0%	0%
1969	Wet	0%	-33%	1%	0%	0%	0%	0%	1%	-15%	0%	0%	-2%
1970	Above Normal	3%	54%	0%	0%	0%	3%	0%	6%	-6%	-10%	0%	0%
1971	Below Normal	0%	4%	2%	0%	0%	40%	0%	0%	0%	1%	0%	3%
1972	Dry	0%	0%	4%	6%	-76%	30%	0%	1%	-15%	-1%	6%	0%
1973	Above Normal	0%	3%	1%	0%	0%	3%	-100%	22%	0%	-3%	0%	0%
1974	Wet	0%	3%	1%	0%	0%	0%	3%	10%	1%	-12%	0%	2%
1975	Wet	82%	0%	5%	-23%	1%	-1%	14%	1%	11%	0%	0%	0%
1976	Critical	3%	24%	14%	0%	0%	0%	0%	0%	0%	6%	-8%	0%
1977	Critical	2%	0%	-5%	0%	0%	0%	0%	0%	-1%	1%	1%	0%
1978	Wet	-1%	1%	-1%	0%	-7%	-2%	0%	1%	0%	0%	0%	0%
1979	Above Normal	0%	-51%	-16%	1%	4%	-20%	0%	2%	0%	0%	0%	0%
1980	Wet	0%	38%	2%	0%	0%	-1%	35%	13%	15%	0%	0%	0%
1981	Dry	0%	0%	0%	6%	0%	-78%	-1%	-4%	0%	-3%	5%	0%
1982	Wet	-9%	1%	0%	0%	0%	-5%	0%	-3%	6%	0%	0%	0%
1983	Wet	1%	-2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1984	Above Normal	1%	0%	0%	0%	0%	4%	0%	0%	-7%	-3%	0%	0%
1985	Dry	117%	-5%	-7%	0%	0%	0%	0%	-5%	0%	-3%	11%	0%
1986	Wet	0%	-61%	3%	2%	0%	0%	19%	-50%	21%	-36%	0%	0%
1987	Critical	0%	0%	-3%	-7%	21%	13%	0%	2%	0%	4%	-12%	0%
1988	Critical	0%	0%	5%	1%	0%	0%	5%	0%	0%	0%	0%	0%
1989	Critical	3%	-10%	-5%	-1%	0%	3%	4%	0%	0%	7%	-11%	0%
1990	Critical	0%	0%	7%	2%	0%	0%	0%	1%	0%	15%	-11%	0%
1991	Critical	4%	-14%	5%	-10%	0%	18%	0%	40%	0%	-29%	14%	0%
1992	Critical	0%	-11%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%
1993	Wet	1%	0%	-4%	1%	0%	11%	29%	52%	9%	0%	0%	0%
1994	Critical	0%	0%	48%	-100%	0%	0%	1%	-1%	0%	77%	-44%	0%
1995	Wet	0%	-57%	522%	0%	18%	0%	8%	-1%	-1%	0%	0%	0%
1996	Wet	8%	0%	1%	1%	0%	-2%	5%	-1%	0%	0%	-9%	5%
1997	Wet	0%	-20%	0%	0%	-1%	-34%	-29%	7%	61%	-18%	0%	0%
1998	Wet	0%	0%	3%	0%	0%	0%	3%	-2%	-3%	-4%	0%	0%
1999	Above Normal	1%	1%	0%	0%	0%	2%	6%	0%	2%	-3%	0%	3%
2000	Above Normal	0%	112%	0%	3%	0%	2%	0%	0%	0%	-4%	0%	0%
2001	Dry	0%	0%	-23%	2%	1%	0%	0%	0%	0%	0%	-100%	0%
2002	Dry	0%	-100%	5%	3%	0%	0%	-2%	0%	0%	-4%	11%	0%
2003	Below Normal	0%	6%	-1%	0%	0%	0%	-4%	0%	0%	-1%	0%	0%

Table 3.8-38.
Simulated Monthly Surplus Delta Outflows, No-Action (2030), Sacramento Valley Index Year Type

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0	0	3,710	0	12,047	7,933	10,001	41,092	15,490	1,176	946	0
1923	Above Normal	868	0	18,148	17,726	0	0	10,778	5,981	0	2,608	1,127	1,702
1924	Critical	0	1,693	0	3,601	922	0	1,044	0	786	1,251	2,188	0
1925	Below Normal	1,184	1,469	1,385	0	55,558	0	7,752	3,520	909	945	943	0
1926	Dry	1,749	0	0	2,571	26,895	0	9,902	0	0	1,923	2,244	0
1927	Above Normal	1,346	7,502	5,972	24,101	74,756	19,671	30,370	2,256	0	5,208	0	0
1928	Below Normal	0	2,091	197	9,059	0	74,270	2,095	0	0	4,518	0	1,374
1929	Critical	0	0	2,120	0	0	0	0	0	924	956	2,284	0
1930	Critical	1,235	1,322	3,919	7,343	0	12,754	2,280	1,320	1,057	1,055	3,265	1,047
1931	Critical	0	0	0	458	0	0	0	0	3,255	1,261	2,179	0
1932	Above Normal	1,238	1,836	6,067	6,591	3,193	0	0	2,995	988	922	0	663
1933	Dry	1,246	0	0	4,492	0	0	0	0	0	0	2,224	0
1934	Critical	1,041	1,765	2,108	7,762	0	0	0	0	964	0	1,954	0
1935	Above Normal	1,343	1,622	1,528	15,649	0	8,474	38,322	0	965	2,172	2,571	0
1936	Above Normal	0	0	1,575	27,945	56,094	5,642	8,225	0	920	2,889	2,297	0
1937	Wet	0	0	869	1,393	32,509	33,500	9,301	962	1,008	932	951	0
1938	Wet	0	12,272	58,201	24,611	74,270	74,721	57,638	50,760	25,598	0	0	3,398
1939	Dry	2,987	0	0	1,178	7,932	0	0	3,468	0	3,734	1,983	0
1940	Above Normal	0	0	0	17,593	28,234	74,090	48,011	0	14	5,437	1,064	669
1941	Wet	0	0	26,788	71,311	73,809	67,555	55,989	25,509	0	0	0	2,857
1942	Wet	0	0	47,358	66,107	74,528	4,195	33,959	14,897	7,717	0	0	3,964
1943	Wet	0	2,133	17,367	69,005	32,428	66,833	10,696	0	0	2,454	0	0
1944	Below Normal	0	0	1,983	0	4,285	0	1,644	3,145	0	1,932	3,052	0
1945	Above Normal	0	612	2,564	0	39,330	0	1,310	2,698	945	2,143	2,500	0
1946	Above Normal	0	45	58,257	35,604	0	0	4,305	1,168	0	3,199	1,019	602
1947	Dry	698	0	1,983	0	0	0	0	4,009	709	2,944	1,881	0
1948	Below Normal	0	0	0	2,131	6,488	0	11,017	9,955	593	2,253	1,808	1,417
1949	Below Normal	677	0	485	3,134	354	11,359	1,130	962	0	1,298	1,585	1,115
1950	Below Normal	0	0	0	5,250	8,135	0	6,467	2,429	0	978	1,715	0
1951	Above Normal	0	38,474	74,806	56,787	52,155	9,568	0	5,305	369	4,991	0	0
1952	Wet	0	0	28,195	65,637	47,027	45,084	51,023	49,886	20,830	3,171	1,513	9,323
1953	Below Normal	708	0	30,174	70,926	0	0	5,125	11,378	4,571	1,412	0	2,281
1954	Below Normal	0	490	0	19,247	31,279	21,885	17,758	0	0	6,233	1,345	0
1955	Dry	0	236	7,255	3,741	0	0	4,253	4,168	0	955	2,756	0
1956	Wet	0	0	74,176	75,200	67,742	20,539	3,043	27,711	2,848	0	0	4,962
1957	Below Normal	420	0	7	4,229	13,834	22,153	0	5,062	688	2,865	940	747
1958	Wet	1,336	1,071	9,374	23,824	74,566	73,974	73,729	32,129	12,935	0	1,329	7,176
1959	Dry	1,955	0	0	20,060	21,377	0	1,221	2,773	1,008	2,372	0	0
1960	Critical	0	0	1,102	1,194	7,220	0	0	1,780	1,570	2,591	2,447	0
1961	Critical	1,627	0	2,430	0	10,173	0	0	3,169	52	3,049	1,612	1,252
1962	Below Normal	0	0	2,761	0	28,727	0	2,255	0	0	5,842	1,737	0
1963	Above Normal	17,665	207	13,294	1,016	38,294	0	68,243	4,747	0	5,853	0	0
1964	Dry	0	10,456	0	8,229	0	0	4,449	4,775	11	2,266	2,735	1,062
1965	Wet	0	883	66,539	74,325	13,631	0	31,703	0	0	3,113	0	0
1966	Below Normal	0	8,884	1,695	16,673	0	2,420	3,191	0	0	4,986	936	588
1967	Wet	0	0	18,399	31,560	20,667	32,926	34,511	35,725	26,396	8,756	0	8,844
1968	Dry	2,705	0	881	18,588	37,474	4,151	0	4,044	943	3,479	0	0
1969	Wet	0	859	8,672	74,080	74,106	43,385	39,793	42,073	16,370	0	0	4,597
1970	Above Normal	2,196	0	46,231	76,663	59,200	19,290	0	6,193	2,104	4,647	0	0
1971	Below Normal	0	5,339	45,046	34,985	0	13,059	0	14,453	0	4,422	0	1,265
1972	Dry	0	0	2,183	796	2,954	7,133	0	1,848	837	2,713	1,667	1,799
1973	Above Normal	0	5,849	7,836	66,755	62,183	34,365	1,366	5,496	0	3,798	983	0
1974	Wet	0	44,639	56,140	74,791	13,958	73,876	45,679	2,123	5,104	2,191	938	6,883
1975	Wet	0	0	2,596	2,038	43,827	62,730	3,889	16,164	4,421	0	0	4,705
1976	Critical	2,580	997	360	0	422	0	0	0	164	1,080	3,517	906
1977	Critical	0	2,448	1,085	2,531	5,886	0	0	0	3,003	1,400	1,993	0
1978	Wet	1,115	1,415	2,420	49,160	22,387	44,396	22,662	1,695	2,995	0	1,113	0
1979	Above Normal	0	563	1,184	8,235	10,080	16,595	0	4,517	0	2,752	1,401	0
1980	Wet	0	368	5,941	74,192	74,357	42,392	2,148	3,907	4,402	947	942	0
1981	Dry	0	0	1,237	13,233	2,504	3,853	2,825	2,688	0	2,620	1,512	960
1982	Wet	221	15,369	73,955	59,483	74,166	63,499	74,804	25,692	5,866	0	0	11,208
1983	Wet	12,736	34,927	64,071	70,718	75,220	77,380	58,443	54,135	51,169	22,979	13,321	17,888
1984	Above Normal	6,762	64,546	75,449	47,531	18,792	15,764	0	5,594	1,772	4,282	0	0
1985	Dry	1,033	16,719	6,537	0	0	0	3,021	1,671	0	2,695	1,552	1,247
1986	Wet	423	0	1,957	6,188	78,791	74,672	7,616	1,852	2,825	1,814	0	0
1987	Critical	0	0	1,208	3,150	3,543	6,895	0	4,136	0	2,607	2,056	0
1988	Critical	0	0	1,868	12,209	0	0	2,462	962	923	958	2,235	0
1989	Critical	1,167	2,434	842	4,719	0	17,821	7,680	0	0	3,553	2,188	0
1990	Critical	0	0	2,278	3,122	0	0	0	2,033	0	2,662	2,724	0
1991	Critical	0	2,282	0	1,846	0	1,644	0	1,779	0	1,004	2,909	0
1992	Critical	0	2,169	0	3,159	7,500	0	0	0	964	0	2,079	0
1993	Wet	1,072	1,826	440	45,636	24,851	7,575	7,734	5,846	6,797	0	1,384	0
1994	Critical	0	0	2,334	0	0	0	2,670	3,463	0	3,075	1,558	2,548
1995	Wet	1,038	0	4,479	73,347	19,252	76,787	47,914	66,301	24,057	15,197	4,050	8,703
1996	Wet	738	0	13,226	34,583	74,798	53,371	23,797	29,110	0	0	1,006	2,068
1997	Wet	0	3,309	69,535	78,936	53,243	8,354	2,824	4,152	1,898	3,392	0	0
1998	Wet	0	0	4,865	48,397	74,916	68,077	42,880	36,539	58,726	20,301	8,242	14,858
1999	Above Normal	4,589	15,360	22,313	31,185	70,259	39,942	9,996	6,724	1,436	3,105	0	642
2000	Above Normal	0	0	1,852	17,804	72,457	41,579	0	951	0	4,791	1,726	0
2001	Dry	0	0	2,605	1,460	3,477	0	0	3,433	905	963	1,850	1,317
2002	Dry	0	0	16,554	34,602	0	0	4,485	2,761	0	2,633	2,687	1,295
2003	Below Normal	1,003	0	19,573	44,367	0	0	12,511	24,610	0	3,750	841	0

Table 3.8-39.
Simulated Monthly Surplus Delta Outflows, Alternative A (2030), Sacramento Valley Index Year Type

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0	0	3,788	0	12,180	8,280	8,771	41,194	16,082	1,175	945	0
1923	Above Normal	503	182	18,192	18,727	0	0	8,554	4,917	0	2,474	1,822	2,960
1924	Critical	0	0	0	2,534	6,168	0	1,138	0	532	1,243	2,326	0
1925	Below Normal	1,096	1,717	848	0	55,429	0	6,580	3,395	909	945	953	0
1926	Dry	1,763	0	0	2,649	27,205	0	10,674	0	0	1,829	2,173	725
1927	Above Normal	0	7,785	5,055	23,578	74,794	20,423	31,056	2,367	0	5,100	0	0
1928	Below Normal	0	2,383	297	9,128	0	74,236	3,188	0	0	4,552	0	1,241
1929	Critical	0	0	1,817	0	0	0	0	0	924	956	2,341	0
1930	Critical	1,224	1,447	3,568	8,543	0	13,458	2,507	1,141	1,057	1,055	3,108	0
1931	Critical	0	0	0	334	0	0	0	0	3,340	1,258	2,160	0
1932	Above Normal	1,248	1,816	6,072	6,332	3,499	0	964	3,549	1,047	922	0	0
1933	Dry	1,479	0	0	6,017	0	0	0	0	0	0	2,069	0
1934	Critical	1,206	1,554	2,361	7,846	0	0	0	0	964	0	1,958	0
1935	Above Normal	1,369	2,048	749	15,997	0	9,197	37,873	0	965	2,193	2,570	0
1936	Above Normal	0	0	1,522	27,881	54,830	6,273	9,099	0	920	2,652	2,294	0
1937	Wet	0	0	0	1,412	30,544	31,700	10,291	0	1,008	932	952	0
1938	Wet	0	12,489	57,456	24,604	74,234	74,721	57,635	50,263	23,704	0	0	3,885
1939	Dry	3,041	0	0	703	0	0	0	3,474	0	3,240	1,899	0
1940	Above Normal	0	0	0	17,293	29,690	74,107	48,958	0	659	5,275	1,064	781
1941	Wet	0	0	26,189	70,760	73,819	67,642	55,819	26,532	0	0	1,257	2,878
1942	Wet	0	0	48,615	66,100	74,528	4,942	31,738	15,342	8,073	0	0	3,204
1943	Wet	0	2,570	17,384	69,004	29,800	66,833	11,390	0	1,132	2,182	0	0
1944	Below Normal	0	0	1,969	0	6,506	0	2,027	2,270	0	1,902	3,164	0
1945	Above Normal	0	827	2,641	845	38,614	0	693	2,807	945	1,763	1,362	524
1946	Above Normal	0	143	60,276	34,746	0	0	3,707	2,257	0	2,760	1,160	952
1947	Dry	273	0	2,134	0	0	0	0	4,046	787	2,771	1,709	1,393
1948	Below Normal	0	0	0	1,721	0	0	11,635	11,308	0	1,545	2,323	1,659
1949	Below Normal	0	0	1,793	0	0	11,716	1,735	0	0	1,412	1,720	890
1950	Below Normal	0	0	0	5,153	8,164	0	6,201	2,569	0	1,587	2,077	0
1951	Above Normal	0	39,217	74,829	56,799	51,815	10,258	546	5,296	688	4,650	0	0
1952	Wet	0	0	29,107	65,630	46,784	44,777	52,599	48,624	19,630	3,178	1,520	9,349
1953	Below Normal	782	0	30,255	71,138	0	0	6,642	11,743	4,571	1,325	0	2,831
1954	Below Normal	0	814	0	19,291	32,270	22,708	19,251	0	0	6,172	914	0
1955	Dry	0	414	7,294	3,806	0	0	4,062	4,136	0	955	2,747	0
1956	Wet	0	0	74,359	75,199	67,746	21,203	3,256	26,221	4,795	0	0	4,839
1957	Below Normal	2,251	0	0	2,640	12,562	21,325	0	6,086	873	2,898	940	2,111
1958	Wet	732	1,327	9,341	23,862	74,606	73,974	73,730	32,642	13,282	0	1,338	7,214
1959	Dry	2,030	0	0	21,038	21,350	0	1,604	2,872	1,008	2,786	0	0
1960	Critical	0	0	1,095	1,217	6,491	0	0	1,840	1,565	2,641	2,382	0
1961	Critical	1,202	0	2,395	0	10,425	0	0	3,212	0	3,242	1,604	1,089
1962	Below Normal	0	0	2,863	0	28,225	0	3,873	0	372	5,280	1,671	0
1963	Above Normal	17,728	739	13,372	1,082	38,324	0	68,481	4,936	0	5,891	0	0
1964	Dry	0	10,732	0	8,298	0	0	4,044	5,491	9	2,327	1,745	2,072
1965	Wet	0	1,099	66,711	74,326	13,194	0	31,218	0	0	2,987	0	0
1966	Below Normal	0	9,041	1,840	17,767	0	1,471	4,033	0	0	4,894	937	668
1967	Wet	0	352	18,747	31,674	20,889	30,613	34,711	35,589	24,975	8,632	0	8,871
1968	Dry	2,779	0	964	18,681	37,834	4,958	0	4,078	943	3,505	0	0
1969	Wet	0	771	8,753	74,088	74,106	43,387	39,795	42,663	13,853	0	0	4,506
1970	Above Normal	2,270	0	46,526	76,663	59,344	19,912	0	6,581	2,022	4,623	0	0
1971	Below Normal	0	5,556	45,749	35,042	0	12,574	1,665	14,574	0	4,444	0	1,358
1972	Dry	0	0	2,283	861	1,945	8,668	1,239	1,819	399	2,432	1,682	859
1973	Above Normal	0	6,082	8,207	68,510	60,548	35,108	924	6,566	0	3,645	923	0
1974	Wet	0	45,438	56,245	74,791	12,370	73,876	46,918	2,357	5,418	1,930	1,157	6,999
1975	Wet	0	0	2,715	2,613	43,867	60,858	4,436	16,240	4,936	0	0	4,750
1976	Critical	2,655	1,250	470	0	0	0	922	0	0	1,077	3,605	1,437
1977	Critical	0	1,675	2,957	0	0	0	0	0	3,136	1,387	1,908	902
1978	Wet	1,191	1,302	2,639	49,176	22,607	43,932	22,415	1,724	3,235	0	1,441	0
1979	Above Normal	0	358	1,526	8,295	8,774	15,529	0	4,570	0	2,108	1,515	0
1980	Wet	0	641	5,753	74,238	74,357	41,786	2,932	4,570	5,318	947	942	0
1981	Dry	0	0	1,017	11,426	0	4,541	3,523	2,771	0	2,535	1,508	859
1982	Wet	0	15,975	73,989	59,652	74,166	60,901	74,804	24,841	6,221	0	0	11,259
1983	Wet	12,812	34,126	64,073	70,718	75,220	77,380	58,446	54,138	51,172	22,981	13,330	17,915
1984	Above Normal	6,850	64,550	75,449	47,534	18,801	16,501	0	5,631	2,041	4,045	0	0
1985	Dry	661	16,913	6,455	0	0	0	3,575	1,575	0	2,603	1,710	1,481
1986	Wet	189	0	2,051	6,242	78,831	74,672	9,005	1,132	3,630	1,243	0	0
1987	Critical	0	0	1,296	3,205	3,583	7,792	0	4,225	0	2,699	2,054	0
1988	Critical	0	0	1,981	12,266	0	0	2,626	962	923	958	2,221	0
1989	Critical	1,204	2,392	856	4,586	0	18,270	8,120	0	0	3,515	1,994	0
1990	Critical	0	0	2,152	3,184	0	0	0	2,003	0	2,781	2,654	0
1991	Critical	0	2,392	0	1,705	0	2,044	0	1,843	0	1,000	2,688	0
1992	Critical	0	2,404	0	2,842	7,541	0	0	0	964	0	2,070	0
1993	Wet	1,122	1,816	369	45,713	24,930	7,735	8,960	9,483	7,557	0	1,085	0
1994	Critical	0	260	1,700	0	0	1,034	2,173	3,168	0	3,392	1,312	1,797
1995	Wet	0	3,017	478	73,519	19,580	76,787	48,980	65,712	23,645	15,212	4,068	8,740
1996	Wet	831	0	13,312	33,784	74,798	52,493	24,693	28,874	0	0	0	2,285
1997	Wet	0	1,485	69,563	78,936	50,787	7,717	2,390	4,885	3,151	2,287	0	0
1998	Wet	0	0	5,036	48,114	74,916	68,009	44,189	35,907	56,798	19,490	8,251	14,885
1999	Above Normal	4,664	15,581	22,393	31,105	70,337	40,687	10,654	6,780	1,462	3,032	0	692
2000	Above Normal	0	402	881	17,874	72,456	42,305	1,215	1,440	0	4,628	1,725	0
2001	Dry	0	0	2,363	1,526	3,530	0	1,091	3,460	905	963	1,680	0
2002	Dry	942	1,037	17,415	35,259	0	0	5,579	2,779	0	2,507	2,878	1,349
2003	Below Normal	996	0	19,658	44,940	0	0	12,635	25,159	0	3,732	0	0

**Table 3.8-40.
Change in Simulated Monthly Surplus Delta Outflows, Alternative A (2030) – No-Action (2030), Sacramento Valley Index Year Type**

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0	0	78	0	133	346	-1,230	102	592	0	-1	0
1923	Above Normal	-366	182	44	1,001	0	0	-2,224	-1,064	0	-133	695	1,258
1924	Critical	0	-1,693	0	-1,067	5,246	0	94	0	-254	-8	138	0
1925	Below Normal	-88	247	-536	0	-130	0	-1,172	-126	0	0	10	0
1926	Dry	14	0	0	78	310	0	772	0	0	-94	-71	725
1927	Above Normal	-1,346	283	-916	-523	38	753	686	111	0	-107	0	0
1928	Below Normal	0	293	100	69	0	-34	1,094	0	0	35	0	-133
1929	Critical	0	0	-302	0	0	0	0	0	0	0	57	0
1930	Critical	-11	125	-351	1,200	0	704	227	-179	0	0	-157	-1,047
1931	Critical	0	0	0	-124	0	0	0	0	85	-3	-19	0
1932	Above Normal	10	-20	5	-259	306	0	964	553	59	0	0	-663
1933	Dry	233	0	0	1,524	0	0	0	0	0	0	-156	0
1934	Critical	165	-211	254	83	0	0	0	0	0	0	4	0
1935	Above Normal	26	427	-779	348	0	722	-448	0	0	21	-1	0
1936	Above Normal	0	0	-53	-64	-1,265	631	873	0	0	-237	-3	0
1937	Wet	0	0	-869	18	-1,965	-1,801	990	-962	0	0	1	0
1938	Wet	0	217	-745	-6	-36	0	-3	-497	-1,894	0	0	486
1939	Dry	54	0	0	-475	-7,932	0	0	6	0	-494	-84	0
1940	Above Normal	0	0	0	-300	1,456	17	946	0	645	-162	0	112
1941	Wet	0	0	-599	-552	10	87	-169	1,023	0	0	1,257	21
1942	Wet	0	0	1,257	-7	0	747	-2,220	445	356	0	0	-760
1943	Wet	0	437	18	-1	-2,627	-1	693	0	1,132	-272	0	0
1944	Below Normal	0	0	-15	0	2,220	0	383	-875	0	-31	112	0
1945	Above Normal	0	215	77	845	-716	0	-617	109	0	-380	-1,138	524
1946	Above Normal	0	98	2,019	-858	0	0	-598	1,089	0	-439	141	350
1947	Dry	-425	0	152	0	0	0	0	37	78	-173	-172	1,393
1948	Below Normal	0	0	0	-410	-6,488	0	618	1,353	-593	-708	515	241
1949	Below Normal	-677	0	1,308	-3,134	-354	357	605	-962	0	114	135	-225
1950	Below Normal	0	0	0	-97	28	0	-266	140	0	609	362	0
1951	Above Normal	0	743	22	12	-340	690	546	-10	319	-341	0	0
1952	Wet	0	0	912	-7	-243	-307	1,576	-1,262	-1,200	7	7	26
1953	Below Normal	74	0	82	212	0	0	1,517	365	0	-87	0	549
1954	Below Normal	0	323	0	45	991	823	1,493	0	0	-61	-430	0
1955	Dry	0	178	39	65	0	0	-190	-32	0	0	-9	0
1956	Wet	0	0	183	-1	4	664	213	-1,489	1,948	0	0	-123
1957	Below Normal	1,831	0	-7	-1,589	-1,272	-828	0	1,024	185	33	0	1,364
1958	Wet	-605	256	-33	38	40	0	0	513	347	0	9	38
1959	Dry	75	0	0	978	-27	0	383	100	0	414	0	0
1960	Critical	0	0	-7	23	-729	0	0	60	-5	50	-65	0
1961	Critical	-425	0	-35	0	252	0	0	43	-52	193	-8	-163
1962	Below Normal	0	0	101	0	-502	0	1,618	0	372	-562	-66	0
1963	Above Normal	63	531	78	67	30	0	238	189	0	39	0	0
1964	Dry	0	276	0	69	0	0	-405	716	-1	61	-991	1,009
1965	Wet	0	216	171	0	-437	0	-485	0	0	-125	0	0
1966	Below Normal	0	156	145	1,093	0	-949	842	0	0	-92	0	80
1967	Wet	0	352	347	113	222	-2,313	200	-135	-1,421	-124	0	27
1968	Dry	74	0	82	93	360	807	0	34	0	26	0	0
1969	Wet	0	-89	81	8	0	2	2	590	-2,516	0	0	-92
1970	Above Normal	74	0	296	0	143	622	0	387	-82	-24	0	0
1971	Below Normal	0	217	703	56	0	-485	1,665	121	0	22	0	92
1972	Dry	0	0	99	65	-1,009	1,535	1,239	-30	-438	-281	16	-940
1973	Above Normal	0	233	372	1,754	-1,635	743	-441	1,070	0	-153	-60	0
1974	Wet	0	799	105	0	-1,589	0	1,239	234	314	-261	219	116
1975	Wet	0	0	118	576	41	-1,872	547	76	514	0	0	45
1976	Critical	75	253	110	0	-422	0	922	0	-164	-3	88	531
1977	Critical	0	-773	1,872	-2,531	-5,886	0	0	0	134	-13	-85	902
1978	Wet	76	-113	218	16	220	-464	-247	29	240	0	328	0
1979	Above Normal	0	-204	341	59	-1,306	-1,066	0	53	0	-644	114	0
1980	Wet	0	273	-188	46	0	-606	784	663	916	0	0	0
1981	Dry	0	0	-220	-1,806	-2,504	688	697	83	0	-86	-4	-101
1982	Wet	-221	607	34	169	0	-2,598	0	-851	355	0	0	51
1983	Wet	76	-801	3	1	0	0	3	2	3	2	9	27
1984	Above Normal	89	4	0	3	9	736	0	37	268	-237	0	0
1985	Dry	-372	194	-82	0	0	0	555	-96	0	-91	158	234
1986	Wet	-234	0	94	54	40	0	1,389	-720	805	-571	0	0
1987	Critical	0	0	88	55	40	897	0	89	0	92	-1	0
1988	Critical	0	0	113	56	0	0	164	0	0	0	-14	0
1989	Critical	37	-42	14	-133	0	449	440	0	0	-38	-194	0
1990	Critical	0	0	-125	63	0	0	0	-29	0	120	-70	0
1991	Critical	0	110	0	-142	0	400	0	63	0	-4	-221	0
1992	Critical	0	235	0	-317	40	0	0	0	0	0	-8	0
1993	Wet	50	-10	-71	77	79	160	1,226	3,637	761	0	-298	0
1994	Critical	0	260	-634	0	0	1,034	-497	-295	0	316	-246	-751
1995	Wet	-1,038	3,017	-4,001	172	329	0	1,066	-589	-412	15	18	37
1996	Wet	93	0	86	-799	0	-877	897	-236	0	0	-1,006	218
1997	Wet	0	-1,824	28	0	-2,456	-637	-433	734	1,252	-1,105	0	0
1998	Wet	0	0	171	-283	0	-68	1,309	-632	-1,928	-811	9	27
1999	Above Normal	75	221	80	-81	78	745	658	56	27	-73	0	50
2000	Above Normal	0	402	-971	70	0	726	1,215	489	0	-163	0	0
2001	Dry	0	0	-242	66	52	0	1,091	27	0	0	-170	-1,317
2002	Dry	942	1,037	861	657	0	0	1,094	18	0	-126	190	53
2003	Below Normal	-7	0	85	573	0	0	124	548	0	-18	-841	0

Table 3.8-41.
Percent Change in Simulated Monthly Surplus Delta Outflows from No-Action (2030), Alternative A (2030), Sacramento Valley Index Year Type

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0%	0%	2%	0%	1%	4%	-12%	0%	4%	0%	0%	0%
1923	Above Normal	-42%	0%	0%	6%	0%	0%	-21%	-18%	0%	-5%	62%	74%
1924	Critical	0%	-100%	0%	-30%	569%	0%	9%	0%	-32%	-1%	6%	0%
1925	Below Normal	-7%	17%	-39%	0%	0%	0%	-15%	-4%	0%	0%	1%	0%
1926	Dry	1%	0%	0%	3%	1%	0%	8%	0%	0%	-5%	-3%	0%
1927	Above Normal	-100%	4%	-15%	-2%	0%	4%	2%	5%	0%	-2%	0%	0%
1928	Below Normal	0%	14%	51%	1%	0%	0%	52%	0%	0%	1%	0%	-10%
1929	Critical	0%	0%	-14%	0%	0%	0%	0%	0%	0%	0%	2%	0%
1930	Critical	-1%	9%	-9%	16%	0%	6%	10%	-14%	0%	0%	-5%	-100%
1931	Critical	0%	0%	0%	-27%	0%	0%	0%	0%	3%	0%	-1%	0%
1932	Above Normal	1%	-1%	0%	-4%	10%	0%	0%	18%	6%	0%	0%	-100%
1933	Dry	19%	0%	0%	34%	0%	0%	0%	0%	0%	0%	-7%	0%
1934	Critical	16%	-12%	12%	1%	0%	0%	0%	0%	0%	0%	0%	0%
1935	Above Normal	2%	26%	-51%	2%	0%	9%	-1%	0%	0%	1%	0%	0%
1936	Above Normal	0%	0%	-3%	0%	-2%	11%	11%	0%	0%	-8%	0%	0%
1937	Wet	0%	0%	-100%	1%	-6%	-5%	11%	-100%	0%	0%	0%	0%
1938	Wet	0%	2%	-1%	0%	0%	0%	0%	-1%	-7%	0%	0%	14%
1939	Dry	2%	0%	0%	-40%	-100%	0%	0%	0%	0%	-13%	-4%	0%
1940	Above Normal	0%	0%	0%	-2%	5%	0%	2%	0%	4497%	-3%	0%	17%
1941	Wet	0%	0%	-2%	-1%	0%	0%	0%	4%	0%	0%	0%	1%
1942	Wet	0%	0%	3%	0%	0%	18%	-7%	3%	5%	0%	0%	-19%
1943	Wet	0%	21%	0%	0%	-8%	0%	6%	0%	0%	-11%	0%	0%
1944	Below Normal	0%	0%	-1%	0%	52%	0%	23%	-28%	0%	-2%	4%	0%
1945	Above Normal	0%	35%	3%	0%	-2%	0%	-47%	4%	0%	-18%	-46%	0%
1946	Above Normal	0%	218%	3%	-2%	0%	0%	-14%	93%	0%	-14%	14%	58%
1947	Dry	-61%	0%	8%	0%	0%	0%	0%	1%	11%	-6%	-9%	0%
1948	Below Normal	0%	0%	0%	-19%	-100%	0%	6%	14%	-100%	-31%	28%	17%
1949	Below Normal	-100%	0%	269%	-100%	-100%	3%	54%	-100%	0%	9%	9%	-20%
1950	Below Normal	0%	0%	0%	-2%	0%	0%	-4%	6%	0%	62%	21%	0%
1951	Above Normal	0%	2%	0%	0%	-1%	7%	0%	0%	87%	-7%	0%	0%
1952	Wet	0%	0%	3%	0%	-1%	-1%	3%	-3%	-6%	0%	0%	0%
1953	Below Normal	10%	0%	0%	0%	0%	0%	30%	3%	0%	-6%	0%	24%
1954	Below Normal	0%	66%	0%	0%	3%	4%	8%	0%	0%	-1%	-32%	0%
1955	Dry	0%	75%	1%	2%	0%	0%	-4%	-1%	0%	0%	0%	0%
1956	Wet	0%	0%	0%	0%	0%	3%	7%	-5%	68%	0%	0%	-2%
1957	Below Normal	435%	0%	-100%	-38%	-9%	-4%	0%	20%	27%	1%	0%	183%
1958	Wet	-45%	24%	0%	0%	0%	0%	0%	2%	3%	0%	1%	1%
1959	Dry	4%	0%	0%	5%	0%	0%	31%	4%	0%	17%	0%	0%
1960	Critical	0%	0%	-1%	2%	-10%	0%	0%	3%	0%	2%	-3%	0%
1961	Critical	-26%	0%	-1%	0%	2%	0%	0%	1%	-100%	6%	0%	-13%
1962	Below Normal	0%	0%	4%	0%	-2%	0%	72%	0%	0%	-10%	-4%	0%
1963	Above Normal	0%	256%	1%	7%	0%	0%	0%	4%	0%	1%	0%	0%
1964	Dry	0%	3%	0%	1%	0%	0%	-9%	15%	-13%	3%	-36%	95%
1965	Wet	0%	24%	0%	0%	-3%	0%	-2%	0%	0%	-4%	0%	0%
1966	Below Normal	0%	2%	9%	7%	0%	-39%	26%	0%	0%	-2%	0%	14%
1967	Wet	0%	0%	2%	0%	1%	-7%	1%	0%	-5%	-1%	0%	0%
1968	Dry	3%	0%	9%	1%	1%	19%	0%	1%	0%	1%	0%	0%
1969	Wet	0%	-10%	1%	0%	0%	0%	0%	1%	-15%	0%	0%	-2%
1970	Above Normal	3%	0%	1%	0%	0%	3%	0%	6%	-4%	-1%	0%	0%
1971	Below Normal	0%	4%	2%	0%	0%	-4%	0%	1%	0%	1%	0%	7%
1972	Dry	0%	0%	5%	8%	-34%	22%	0%	-2%	-52%	-10%	1%	-52%
1973	Above Normal	0%	4%	5%	3%	-3%	2%	-32%	19%	0%	-4%	-6%	0%
1974	Wet	0%	2%	0%	0%	-11%	0%	3%	11%	6%	-12%	23%	2%
1975	Wet	0%	0%	5%	28%	0%	-3%	14%	0%	12%	0%	0%	1%
1976	Critical	3%	25%	31%	0%	-100%	0%	0%	0%	-100%	0%	2%	59%
1977	Critical	0%	-32%	172%	-100%	-100%	0%	0%	0%	4%	-1%	-4%	0%
1978	Wet	7%	-8%	9%	0%	1%	-1%	-1%	2%	8%	0%	29%	0%
1979	Above Normal	0%	-36%	29%	1%	-13%	-6%	0%	1%	0%	-23%	8%	0%
1980	Wet	0%	74%	-3%	0%	0%	-1%	37%	17%	21%	0%	0%	0%
1981	Dry	0%	0%	-18%	-14%	-100%	18%	25%	3%	0%	-3%	0%	-11%
1982	Wet	-100%	4%	0%	0%	0%	-4%	0%	-3%	6%	0%	0%	0%
1983	Wet	1%	-2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1984	Above Normal	1%	0%	0%	0%	0%	5%	0%	1%	15%	-6%	0%	0%
1985	Dry	-36%	1%	-1%	0%	0%	0%	18%	-6%	0%	-3%	10%	19%
1986	Wet	-55%	0%	5%	1%	0%	0%	18%	-39%	28%	-31%	0%	0%
1987	Critical	0%	0%	7%	2%	1%	13%	0%	2%	0%	4%	0%	0%
1988	Critical	0%	0%	6%	0%	0%	0%	7%	0%	0%	0%	-1%	0%
1989	Critical	3%	-2%	2%	-3%	0%	3%	6%	0%	0%	-1%	-9%	0%
1990	Critical	0%	0%	-5%	2%	0%	0%	0%	-1%	0%	4%	-3%	0%
1991	Critical	0%	5%	0%	-8%	0%	24%	0%	4%	0%	0%	-8%	0%
1992	Critical	0%	11%	0%	-10%	1%	0%	0%	0%	0%	0%	0%	0%
1993	Wet	5%	-1%	-16%	0%	0%	2%	16%	62%	11%	0%	-22%	0%
1994	Critical	0%	0%	-27%	0%	0%	0%	-19%	-9%	0%	10%	-16%	-29%
1995	Wet	-100%	0%	-89%	0%	2%	0%	2%	-1%	-2%	0%	0%	0%
1996	Wet	13%	0%	1%	-2%	0%	-2%	4%	-1%	0%	0%	-100%	11%
1997	Wet	0%	-55%	0%	0%	-5%	-8%	-15%	18%	66%	-33%	0%	0%
1998	Wet	0%	0%	4%	-1%	0%	0%	3%	-2%	-3%	-4%	0%	0%
1999	Above Normal	2%	1%	0%	0%	0%	2%	7%	1%	2%	-2%	0%	8%
2000	Above Normal	0%	0%	-52%	0%	0%	2%	0%	51%	0%	-3%	0%	0%
2001	Dry	0%	0%	-9%	5%	2%	0%	0%	1%	0%	0%	-9%	-100%
2002	Dry	0%	0%	5%	2%	0%	0%	24%	1%	0%	-5%	7%	4%
2003	Below Normal	-1%	0%	0%	1%	0%	0%	1%	2%	0%	0%	-100%	0%

Table 3.8-42.
Simulated Monthly Surplus Delta Outflows, No-Action (2030), Sacramento Valley Index Year Type

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0	0	3,710	0	12,047	7,933	10,001	41,092	15,490	1,176	946	0
1923	Above Normal	868	0	18,148	17,726	0	0	10,778	5,981	0	2,608	1,127	1,702
1924	Critical	0	1,693	0	3,601	922	0	1,044	0	786	1,251	2,188	0
1925	Below Normal	1,184	1,469	1,385	0	55,558	0	7,752	3,520	909	945	943	0
1926	Dry	1,749	0	0	2,571	26,895	0	9,902	0	0	1,923	2,244	0
1927	Above Normal	1,346	7,502	5,972	24,101	74,756	19,671	30,370	2,256	0	5,208	0	0
1928	Below Normal	0	2,091	197	9,059	0	74,270	2,095	0	0	4,518	0	1,374
1929	Critical	0	0	2,120	0	0	0	0	0	924	956	2,284	0
1930	Critical	1,235	1,322	3,919	7,343	0	12,754	2,280	1,320	1,057	1,055	3,265	1,047
1931	Critical	0	0	0	458	0	0	0	0	3,255	1,261	2,179	0
1932	Above Normal	1,238	1,836	6,067	6,591	3,193	0	0	2,995	988	922	0	663
1933	Dry	1,246	0	0	4,492	0	0	0	0	0	0	2,224	0
1934	Critical	1,041	1,765	2,108	7,762	0	0	0	0	964	0	1,954	0
1935	Above Normal	1,343	1,622	1,528	15,649	0	8,474	38,322	0	965	2,172	2,571	0
1936	Above Normal	0	0	1,575	27,945	56,094	5,642	8,225	0	920	2,889	2,297	0
1937	Wet	0	0	869	1,393	32,509	33,500	9,301	962	1,008	932	951	0
1938	Wet	0	12,272	58,201	24,611	74,270	74,721	57,638	50,760	25,598	0	0	3,398
1939	Dry	2,987	0	0	1,178	7,932	0	0	3,468	0	3,734	1,983	0
1940	Above Normal	0	0	0	17,593	28,234	74,090	48,011	0	14	5,437	1,064	669
1941	Wet	0	0	26,788	71,311	73,809	67,555	55,989	25,509	0	0	0	2,857
1942	Wet	0	0	47,358	66,107	74,528	4,195	33,959	14,897	7,717	0	0	3,964
1943	Wet	0	2,133	17,367	69,005	32,428	66,833	10,696	0	0	2,454	0	0
1944	Below Normal	0	0	1,983	0	4,285	0	1,644	3,145	0	1,932	3,052	0
1945	Above Normal	0	612	2,564	0	39,330	0	1,310	2,698	945	2,143	2,500	0
1946	Above Normal	0	45	58,257	35,604	0	0	4,305	1,168	0	3,199	1,019	602
1947	Dry	698	0	1,983	0	0	0	0	4,009	709	2,944	1,881	0
1948	Below Normal	0	0	0	2,131	6,488	0	11,017	9,955	593	2,253	1,808	1,417
1949	Below Normal	677	0	485	3,134	354	11,359	1,130	962	0	1,298	1,585	1,115
1950	Below Normal	0	0	0	5,250	8,135	0	6,467	2,429	0	978	1,715	0
1951	Above Normal	0	38,474	74,806	56,787	52,155	9,568	0	5,305	369	4,991	0	0
1952	Wet	0	0	28,195	65,637	47,027	45,084	51,023	49,886	20,830	3,171	1,513	9,323
1953	Below Normal	708	0	30,174	70,926	0	0	5,125	11,378	4,571	1,412	0	2,281
1954	Below Normal	0	490	0	19,247	31,279	21,885	17,758	0	0	6,233	1,345	0
1955	Dry	0	236	7,255	3,741	0	0	4,253	4,168	0	955	2,756	0
1956	Wet	0	0	74,176	75,200	67,742	20,539	3,043	27,711	2,848	0	0	4,962
1957	Below Normal	420	0	7	4,229	13,834	22,153	0	5,062	688	2,865	940	747
1958	Wet	1,336	1,071	9,374	23,824	74,566	73,974	73,729	32,129	12,935	0	1,329	7,176
1959	Dry	1,955	0	0	20,060	21,377	0	1,221	2,773	1,008	2,372	0	0
1960	Critical	0	0	1,102	1,194	7,220	0	0	1,780	1,570	2,591	2,447	0
1961	Critical	1,627	0	2,430	0	10,173	0	0	3,169	52	3,049	1,612	1,252
1962	Below Normal	0	0	2,761	0	28,727	0	2,255	0	0	5,842	1,737	0
1963	Above Normal	17,665	207	13,294	1,016	38,294	0	68,243	4,747	0	5,853	0	0
1964	Dry	0	10,456	0	8,229	0	0	4,449	4,775	11	2,266	2,735	1,062
1965	Wet	0	883	66,539	74,325	13,631	0	31,703	0	0	3,113	0	0
1966	Below Normal	0	8,884	1,695	16,673	0	2,420	3,191	0	0	4,986	936	588
1967	Wet	0	0	18,399	31,560	20,667	32,926	34,511	35,725	26,396	8,756	0	8,844
1968	Dry	2,705	0	881	18,588	37,474	4,151	0	4,044	943	3,479	0	0
1969	Wet	0	859	8,672	74,080	74,106	43,385	39,793	42,073	16,370	0	0	4,597
1970	Above Normal	2,196	0	46,231	76,663	59,200	19,290	0	6,193	2,104	4,647	0	0
1971	Below Normal	0	5,339	45,046	34,985	0	13,059	0	14,453	0	4,422	0	1,265
1972	Dry	0	0	2,183	796	2,954	7,133	0	1,848	837	2,713	1,667	1,799
1973	Above Normal	0	5,849	7,836	66,755	62,183	34,365	1,366	5,496	0	3,798	983	0
1974	Wet	0	44,639	56,140	74,791	13,958	73,876	45,679	2,123	5,104	2,191	938	6,883
1975	Wet	0	0	2,596	2,038	43,827	62,730	3,889	16,164	4,421	0	0	4,705
1976	Critical	2,580	997	360	0	422	0	0	0	164	1,080	3,517	906
1977	Critical	0	2,448	1,085	2,531	5,886	0	0	0	3,003	1,400	1,993	0
1978	Wet	1,115	1,415	2,420	49,160	22,387	44,396	22,662	1,695	2,995	0	1,113	0
1979	Above Normal	0	563	1,184	8,235	10,080	16,595	0	4,517	0	2,752	1,401	0
1980	Wet	0	368	5,941	74,192	74,357	42,392	2,148	3,907	4,402	947	942	0
1981	Dry	0	0	1,237	13,233	2,504	3,853	2,825	2,688	0	2,620	1,512	960
1982	Wet	221	15,369	73,955	59,483	74,166	63,499	74,804	25,692	5,866	0	0	11,208
1983	Wet	12,736	34,927	64,071	70,718	75,220	77,380	58,443	54,135	51,169	22,979	13,321	17,888
1984	Above Normal	6,762	64,546	75,449	47,531	18,792	15,764	0	5,594	1,772	4,282	0	0
1985	Dry	1,033	16,719	6,537	0	0	0	3,021	1,671	0	2,695	1,552	1,247
1986	Wet	423	0	1,957	6,188	78,791	74,672	7,616	1,852	2,825	1,814	0	0
1987	Critical	0	0	1,208	3,150	3,543	6,895	0	4,136	0	2,607	2,056	0
1988	Critical	0	0	1,868	12,209	0	0	2,462	962	923	958	2,235	0
1989	Critical	1,167	2,434	842	4,719	0	17,821	7,680	0	0	3,553	2,188	0
1990	Critical	0	0	2,278	3,122	0	0	0	2,033	0	2,662	2,724	0
1991	Critical	0	2,282	0	1,846	0	1,644	0	1,779	0	1,004	2,909	0
1992	Critical	0	2,169	0	3,159	7,500	0	0	0	964	0	2,079	0
1993	Wet	1,072	1,826	440	45,636	24,851	7,575	7,734	5,846	6,797	0	1,384	0
1994	Critical	0	0	2,334	0	0	0	2,670	3,463	0	3,075	1,558	2,548
1995	Wet	1,038	0	4,479	73,347	19,252	76,787	47,914	66,301	24,057	15,197	4,050	8,703
1996	Wet	738	0	13,226	34,583	74,798	53,371	23,797	29,110	0	0	1,006	2,068
1997	Wet	0	3,309	69,535	78,936	53,243	8,354	2,824	4,152	1,898	3,392	0	0
1998	Wet	0	0	4,865	48,397	74,916	68,077	42,880	36,539	58,726	20,301	8,242	14,858
1999	Above Normal	4,589	15,360	22,313	31,185	70,259	39,942	9,996	6,724	1,436	3,105	0	642
2000	Above Normal	0	0	1,852	17,804	72,457	41,579	0	951	0	4,791	1,726	0
2001	Dry	0	0	2,605	1,460	3,477	0	0	3,433	905	963	1,850	1,317
2002	Dry	0	0	16,554	34,602	0	0	4,485	2,761	0	2,633	2,687	1,295
2003	Below Normal	1,003	0	19,573	44,367	0	0	12,511	24,610	0	3,750	841	0

Table 3.8-43.
Simulated Monthly Surplus Delta Outflows, Alternative B (2030), Sacramento Valley Index Year Type

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0	0	3,788	0	12,180	8,280	8,771	41,194	16,082	1,175	945	0
1923	Above Normal	503	182	18,192	18,727	0	0	8,250	4,866	0	2,493	1,875	3,119
1924	Critical	0	0	0	2,646	5,904	0	1,132	0	544	1,247	2,278	0
1925	Below Normal	1,126	1,627	1,016	0	55,310	0	6,730	3,408	0	938	967	0
1926	Dry	1,737	0	0	2,648	27,174	0	10,595	0	0	1,752	2,235	727
1927	Above Normal	0	7,696	6,998	24,108	74,756	20,472	31,063	2,368	0	5,100	0	0
1928	Below Normal	0	2,384	296	9,128	0	74,236	3,165	0	0	4,481	0	1,123
1929	Critical	0	0	1,949	0	0	0	0	0	916	949	2,357	0
1930	Critical	1,217	1,473	3,509	8,792	0	13,467	2,530	962	1,013	1,017	2,935	0
1931	Critical	0	0	0	338	0	0	0	0	3,343	1,260	2,162	0
1932	Above Normal	1,253	1,787	6,072	6,186	3,807	0	986	3,606	1,047	922	0	0
1933	Dry	1,462	0	0	5,961	0	0	0	0	0	0	2,073	0
1934	Critical	1,202	1,560	2,346	7,846	0	0	0	0	964	0	1,958	0
1935	Above Normal	1,365	2,052	748	15,984	0	9,196	37,858	0	967	2,189	2,570	0
1936	Above Normal	0	0	1,513	27,647	54,794	6,261	9,099	0	920	2,651	2,294	0
1937	Wet	0	0	0	1,411	30,545	31,694	10,292	0	1,008	932	952	0
1938	Wet	0	12,492	57,460	24,605	74,234	74,721	57,636	50,264	23,705	0	0	3,896
1939	Dry	3,042	0	0	706	0	0	0	3,474	0	3,140	1,945	0
1940	Above Normal	0	0	0	17,355	29,623	74,114	48,803	0	639	5,271	1,064	779
1941	Wet	0	0	26,198	70,756	73,819	67,691	55,820	26,532	0	0	1,257	2,879
1942	Wet	0	0	48,616	66,100	74,528	4,942	31,738	15,342	8,073	0	0	3,205
1943	Wet	0	2,572	17,385	69,005	29,801	66,833	11,390	0	1,132	2,182	0	0
1944	Below Normal	0	0	1,970	0	6,505	0	2,009	2,250	0	1,923	3,151	0
1945	Above Normal	0	820	2,640	499	39,036	0	968	2,761	945	1,784	1,277	757
1946	Above Normal	0	149	59,868	34,753	0	5	4,054	2,247	0	2,780	1,153	881
1947	Dry	372	0	2,134	0	0	0	0	4,024	778	2,798	1,964	1,133
1948	Below Normal	0	0	0	1,699	0	0	12,185	11,331	0	1,557	2,317	1,640
1949	Below Normal	0	0	1,796	0	0	11,670	1,707	0	0	1,399	1,748	905
1950	Below Normal	0	0	0	5,141	8,160	0	6,109	2,547	0	1,563	2,126	0
1951	Above Normal	0	39,814	74,832	56,802	51,821	10,236	1,026	5,309	596	4,683	0	0
1952	Wet	0	0	28,715	65,635	46,616	44,875	52,599	48,626	19,630	3,178	1,520	9,349
1953	Below Normal	782	0	30,256	71,138	0	0	6,674	11,728	4,571	1,353	0	2,728
1954	Below Normal	0	890	0	19,289	32,361	22,691	19,213	0	0	5,787	1,485	0
1955	Dry	0	331	7,293	3,809	0	0	4,052	4,148	0	956	2,709	0
1956	Wet	0	0	74,160	75,200	67,743	21,207	3,256	26,221	4,795	0	0	4,840
1957	Below Normal	2,250	0	0	2,641	12,562	21,243	0	6,100	808	2,862	940	2,106
1958	Wet	712	1,306	9,336	23,858	74,614	73,974	73,730	32,639	13,280	0	1,338	7,213
1959	Dry	2,029	0	0	21,038	21,349	0	1,579	2,802	1,008	2,511	0	0
1960	Critical	0	0	1,050	1,163	6,933	0	0	1,810	1,557	2,656	2,381	0
1961	Critical	1,299	0	2,242	0	10,490	0	0	3,224	0	3,345	1,763	0
1962	Below Normal	0	0	2,940	0	28,120	0	3,806	0	0	5,395	1,715	0
1963	Above Normal	17,701	615	13,370	1,079	38,327	0	68,432	4,917	0	5,889	0	0
1964	Dry	0	10,721	0	8,295	0	0	4,036	5,473	9	2,337	1,617	2,150
1965	Wet	0	1,095	66,783	74,326	13,188	0	30,959	0	0	2,763	0	0
1966	Below Normal	0	9,003	1,988	17,841	0	385	3,934	0	0	4,931	937	666
1967	Wet	0	367	18,710	31,597	20,831	30,614	34,711	35,589	24,974	8,607	0	8,871
1968	Dry	2,779	0	963	18,681	37,834	4,936	0	4,047	943	3,392	0	0
1969	Wet	0	617	8,748	74,051	74,106	43,386	39,794	42,662	13,853	0	0	4,472
1970	Above Normal	2,271	0	46,525	76,663	59,343	19,893	0	6,593	2,023	4,623	0	0
1971	Below Normal	0	5,548	45,584	35,041	0	12,099	1,631	14,558	0	4,455	0	1,331
1972	Dry	0	0	2,277	858	2,390	8,209	1,209	1,811	387	2,277	1,797	832
1973	Above Normal	0	6,068	8,205	68,693	60,589	35,100	962	6,564	0	3,646	923	0
1974	Wet	0	45,421	56,240	74,791	12,370	73,876	46,918	2,382	5,419	1,932	1,156	6,999
1975	Wet	0	0	2,715	2,598	43,867	60,825	4,360	16,247	4,869	0	0	4,732
1976	Critical	2,654	1,250	470	0	0	0	922	0	0	1,076	3,605	1,429
1977	Critical	0	1,685	2,934	0	0	0	0	0	3,136	1,386	1,907	902
1978	Wet	1,190	1,303	2,623	49,172	22,627	43,932	22,426	1,724	3,235	0	1,441	0
1979	Above Normal	0	359	1,526	8,294	8,784	15,534	0	4,570	0	2,105	1,518	0
1980	Wet	0	641	5,753	74,238	74,357	41,785	2,930	4,572	5,318	947	942	0
1981	Dry	0	0	1,017	11,426	0	4,514	3,491	2,718	0	2,536	1,507	671
1982	Wet	0	15,879	73,987	59,643	74,166	60,970	74,804	24,841	6,221	0	0	11,256
1983	Wet	12,811	34,125	64,073	70,718	75,220	77,380	58,445	54,137	51,172	22,981	13,329	17,915
1984	Above Normal	6,850	64,550	75,449	47,534	18,800	16,477	0	5,596	1,492	4,200	0	0
1985	Dry	652	16,907	6,184	0	0	0	3,548	1,562	0	2,625	1,694	1,394
1986	Wet	264	0	2,034	6,215	78,833	74,676	9,012	1,150	3,686	1,220	0	0
1987	Critical	0	0	1,298	3,210	3,584	7,813	0	4,211	0	2,711	2,075	0
1988	Critical	0	0	1,976	12,264	0	0	2,622	951	935	952	2,219	0
1989	Critical	1,203	2,383	874	4,567	0	18,272	8,085	0	0	3,534	2,071	0
1990	Critical	0	0	2,121	3,183	0	0	0	2,006	0	2,784	2,652	0
1991	Critical	0	2,394	0	1,703	0	2,042	0	1,820	0	989	2,709	0
1992	Critical	0	2,390	0	2,855	7,538	0	0	0	964	0	2,070	0
1993	Wet	1,113	1,823	360	45,716	24,927	7,775	8,922	9,321	7,457	0	1,083	0
1994	Critical	0	263	1,709	0	0	1,000	2,139	3,195	0	3,394	1,313	1,679
1995	Wet	1,023	2,672	693	73,539	19,691	76,787	48,522	65,703	23,649	15,212	4,068	8,740
1996	Wet	832	0	13,311	33,785	74,798	52,496	24,693	28,874	0	0	0	2,283
1997	Wet	0	1,484	69,563	78,936	50,787	7,692	2,449	4,774	3,007	2,357	0	0
1998	Wet	0	0	5,032	47,925	74,917	68,009	44,188	35,906	56,797	19,490	8,251	14,885
1999	Above Normal	4,664	15,580	22,393	31,104	70,337	40,663	10,617	6,767	1,459	2,980	0	695
2000	Above Normal	0	472	0	17,871	72,456	42,183	1,184	1,439	0	4,631	1,725	0
2001	Dry	0	0	2,378	1,526	3,530	0	1,077	3,441	0	956	1,663	0
2002	Dry	962	967	17,311	35,240	0	0	5,553	2,757	0	2,526	2,863	1,350
2003	Below Normal	996	0	19,658	44,806	0	0	12,605	25,167	0	3,740	0	0

**Table 3.8-44.
Change in Simulated Monthly Surplus Delta Outflows, Alternative B (2030) – No-Action (2030), Sacramento Valley Index Year Type**

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0	0	78	0	133	346	-1,230	102	592	0	-1	0
1923	Above Normal	-366	182	44	1,001	0	0	-2,529	-1,115	0	-115	748	1,416
1924	Critical	0	-1,693	0	-954	4,982	0	87	0	-241	-5	91	0
1925	Below Normal	-58	158	-368	0	-248	0	-1,022	-113	-909	-7	25	0
1926	Dry	-12	0	0	77	279	0	694	0	0	-170	-9	727
1927	Above Normal	-1,346	194	1,026	7	0	801	693	112	0	-107	0	0
1928	Below Normal	0	293	99	68	0	-34	1,071	0	0	-36	0	-251
1929	Critical	0	0	-170	0	0	0	0	0	-9	-7	73	0
1930	Critical	-19	151	-410	1,449	0	713	250	-358	-44	-38	-330	-1,047
1931	Critical	0	0	0	-119	0	0	0	0	88	-1	-17	0
1932	Above Normal	16	-49	5	-405	614	0	986	611	59	0	0	-663
1933	Dry	216	0	0	1,468	0	0	0	0	0	0	-151	0
1934	Critical	161	-205	238	84	0	0	0	0	0	0	4	0
1935	Above Normal	21	430	-781	335	0	722	-464	0	2	18	-1	0
1936	Above Normal	0	0	-62	-298	-1,301	619	874	0	0	-238	-3	0
1937	Wet	0	0	-869	18	-1,965	-1,807	991	-962	0	0	1	0
1938	Wet	0	220	-741	-6	-36	0	-2	-496	-1,894	0	0	498
1939	Dry	55	0	0	-472	-7,932	0	0	6	0	-594	-38	0
1940	Above Normal	0	0	0	-238	1,389	25	792	0	625	-166	0	110
1941	Wet	0	0	-590	-555	10	136	-169	1,024	0	0	1,257	21
1942	Wet	0	0	1,258	-7	0	747	-2,220	445	357	0	0	-760
1943	Wet	0	439	18	0	-2,627	0	693	0	1,132	-272	0	0
1944	Below Normal	0	0	-14	0	2,220	0	365	-895	0	-10	99	0
1945	Above Normal	0	209	76	499	-294	0	-342	63	0	-359	-1,223	757
1946	Above Normal	0	104	1,611	-851	0	5	-251	1,079	0	-419	134	279
1947	Dry	-326	0	151	0	0	0	0	15	69	-145	82	1,133
1948	Below Normal	0	0	0	-432	-6,488	0	1,168	1,376	-593	-696	509	223
1949	Below Normal	-677	0	1,310	-3,134	-354	312	577	-962	0	101	163	-211
1950	Below Normal	0	0	0	-109	24	0	-358	119	0	584	411	0
1951	Above Normal	0	1,341	26	15	-334	668	1,026	3	227	-308	0	0
1952	Wet	0	0	520	-2	-410	-209	1,576	-1,260	-1,199	7	7	26
1953	Below Normal	74	0	82	212	0	0	1,549	351	0	-59	0	447
1954	Below Normal	0	400	0	42	1,082	806	1,455	0	0	-447	141	0
1955	Dry	0	95	38	68	0	0	-200	-19	0	1	-47	0
1956	Wet	0	0	-16	0	2	668	213	-1,490	1,947	0	0	-122
1957	Below Normal	1,830	0	-7	-1,588	-1,272	-910	0	1,037	120	-3	0	1,358
1958	Wet	-624	235	-38	33	48	0	0	510	345	0	9	37
1959	Dry	74	0	0	977	-27	0	358	29	0	139	0	0
1960	Critical	0	0	-52	-30	-287	0	0	29	-13	64	-66	0
1961	Critical	-328	0	-188	0	317	0	0	55	-52	296	151	-1,252
1962	Below Normal	0	0	179	0	-607	0	1,551	0	0	-447	-22	0
1963	Above Normal	36	408	77	63	33	0	189	170	0	36	0	0
1964	Dry	0	265	0	66	0	0	-413	698	-2	71	-1,119	1,087
1965	Wet	0	212	243	0	-444	0	-743	0	0	-349	0	0
1966	Below Normal	0	118	293	1,167	0	-2,034	743	0	0	-55	0	78
1967	Wet	0	367	311	37	164	-2,313	199	-135	-1,422	-149	0	27
1968	Dry	74	0	82	93	360	785	0	3	0	-88	0	0
1969	Wet	0	-243	77	-29	0	1	1	589	-2,516	0	0	-125
1970	Above Normal	76	0	294	0	143	603	0	400	-81	-24	0	0
1971	Below Normal	0	208	538	55	0	-959	1,631	105	0	34	0	66
1972	Dry	0	0	94	62	-564	1,076	1,209	-37	-451	-436	130	-967
1973	Above Normal	0	220	369	1,937	-1,594	735	-404	1,068	0	-152	-60	0
1974	Wet	0	782	100	0	-1,589	0	1,239	259	315	-259	218	116
1975	Wet	0	0	119	560	41	-1,905	471	83	448	0	0	28
1976	Critical	75	253	110	0	-422	0	922	0	-164	-3	88	522
1977	Critical	0	-763	1,849	-2,531	-5,886	0	0	0	134	-14	-85	902
1978	Wet	76	-111	203	12	240	-464	-236	29	240	0	328	0
1979	Above Normal	0	-204	341	59	-1,296	-1,061	0	53	0	-647	116	0
1980	Wet	0	273	-188	46	0	-607	783	665	916	0	0	0
1981	Dry	0	0	-220	-1,807	-2,504	661	666	30	0	-84	-5	-290
1982	Wet	-221	510	31	160	0	-2,528	0	-851	355	0	0	48
1983	Wet	75	-802	2	0	0	0	2	2	2	2	9	27
1984	Above Normal	88	4	0	3	8	712	0	2	-280	-82	0	0
1985	Dry	-382	188	-354	0	0	0	527	-109	0	-70	142	147
1986	Wet	-158	0	77	26	42	4	1,396	-702	861	-593	0	0
1987	Critical	0	0	90	61	41	919	0	75	0	104	20	0
1988	Critical	0	0	108	55	0	0	161	-12	12	-7	-17	0
1989	Critical	36	-51	32	-152	0	451	406	0	0	-20	-118	0
1990	Critical	0	0	-156	61	0	0	0	-27	0	123	-72	0
1991	Critical	0	112	0	-144	0	398	0	41	0	-15	-200	0
1992	Critical	0	222	0	-304	37	0	0	0	0	0	-9	0
1993	Wet	41	-3	-80	80	76	200	1,188	3,474	660	0	-301	0
1994	Critical	0	263	-625	0	0	1,000	-531	-268	0	319	-245	-869
1995	Wet	-15	2,672	-3,786	192	440	0	608	-598	-409	15	18	37
1996	Wet	93	0	85	-799	0	-874	896	-236	0	0	-1,006	215
1997	Wet	0	-1,825	28	0	-2,456	-662	-374	623	1,108	-1,035	0	0
1998	Wet	0	0	167	-472	1	-68	1,308	-632	-1,929	-811	9	27
1999	Above Normal	75	221	80	-81	78	721	621	43	24	-125	0	54
2000	Above Normal	0	472	-1,852	66	0	604	1,184	488	0	-160	0	0
2001	Dry	0	0	-227	66	52	0	1,077	8	-905	-7	-187	-1,317
2002	Dry	962	967	757	639	0	0	1,068	-4	0	-107	175	54
2003	Below Normal	-7	0	85	439	0	0	94	557	0	-10	-841	0

Table 3.8-45.
Percent Change in Simulated Monthly Surplus Delta Outflows from No-Action (2030), Alternative B (2030), Sacramento Valley Index Year Type

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0%	0%	2%	0%	1%	4%	-12%	0%	4%	0%	0%	0%
1923	Above Normal	-42%	0%	0%	6%	0%	0%	-23%	-19%	0%	-4%	66%	83%
1924	Critical	0%	-100%	0%	-27%	540%	0%	8%	0%	-31%	0%	4%	0%
1925	Below Normal	-5%	11%	-27%	0%	0%	0%	-13%	-3%	-100%	-1%	3%	0%
1926	Dry	-1%	0%	0%	3%	1%	0%	7%	0%	0%	-9%	0%	0%
1927	Above Normal	-100%	3%	17%	0%	0%	4%	2%	5%	0%	-2%	0%	0%
1928	Below Normal	0%	14%	50%	1%	0%	0%	51%	0%	0%	-1%	0%	-18%
1929	Critical	0%	0%	-8%	0%	0%	0%	0%	0%	-1%	-1%	3%	0%
1930	Critical	-2%	11%	-10%	20%	0%	6%	11%	-27%	-4%	-4%	-10%	-100%
1931	Critical	0%	0%	0%	-26%	0%	0%	0%	0%	3%	0%	-1%	0%
1932	Above Normal	1%	-3%	0%	-6%	19%	0%	0%	20%	6%	0%	0%	-100%
1933	Dry	17%	0%	0%	33%	0%	0%	0%	0%	0%	0%	-7%	0%
1934	Critical	15%	-12%	11%	1%	0%	0%	0%	0%	0%	0%	0%	0%
1935	Above Normal	2%	27%	-51%	2%	0%	9%	-1%	0%	0%	1%	0%	0%
1936	Above Normal	0%	0%	-4%	-1%	-2%	11%	11%	0%	0%	-8%	0%	0%
1937	Wet	0%	0%	-100%	1%	-6%	-5%	11%	-100%	0%	0%	0%	0%
1938	Wet	0%	2%	-1%	0%	0%	0%	0%	-1%	-7%	0%	0%	15%
1939	Dry	2%	0%	0%	-40%	-100%	0%	0%	0%	0%	-16%	-2%	0%
1940	Above Normal	0%	0%	0%	-1%	5%	0%	2%	0%	4357%	-3%	0%	16%
1941	Wet	0%	0%	-2%	-1%	0%	0%	0%	4%	0%	0%	0%	1%
1942	Wet	0%	0%	3%	0%	0%	18%	-7%	3%	5%	0%	0%	-19%
1943	Wet	0%	21%	0%	0%	-8%	0%	6%	0%	0%	-11%	0%	0%
1944	Below Normal	0%	0%	-1%	0%	52%	0%	22%	-28%	0%	0%	3%	0%
1945	Above Normal	0%	34%	3%	0%	-1%	0%	-26%	2%	0%	-17%	-49%	0%
1946	Above Normal	0%	230%	3%	-2%	0%	0%	-6%	92%	0%	-13%	13%	46%
1947	Dry	-47%	0%	8%	0%	0%	0%	0%	0%	10%	-5%	4%	0%
1948	Below Normal	0%	0%	0%	-20%	-100%	0%	11%	14%	-100%	-31%	28%	16%
1949	Below Normal	-100%	0%	270%	-100%	-100%	3%	51%	-100%	0%	8%	10%	-19%
1950	Below Normal	0%	0%	0%	-2%	0%	0%	-6%	5%	0%	60%	24%	0%
1951	Above Normal	0%	3%	0%	0%	-1%	7%	0%	0%	62%	-6%	0%	0%
1952	Wet	0%	0%	2%	0%	-1%	0%	3%	-3%	-6%	0%	0%	0%
1953	Below Normal	10%	0%	0%	0%	0%	0%	30%	3%	0%	-4%	0%	20%
1954	Below Normal	0%	82%	0%	0%	3%	4%	8%	0%	0%	-7%	10%	0%
1955	Dry	0%	40%	1%	2%	0%	0%	-5%	0%	0%	0%	-2%	0%
1956	Wet	0%	0%	0%	0%	0%	3%	7%	-5%	68%	0%	0%	-2%
1957	Below Normal	435%	0%	-100%	-38%	-9%	-4%	0%	20%	17%	0%	0%	182%
1958	Wet	-47%	22%	0%	0%	0%	0%	0%	2%	3%	0%	1%	1%
1959	Dry	4%	0%	0%	5%	0%	0%	29%	1%	0%	6%	0%	0%
1960	Critical	0%	0%	-5%	-3%	-4%	0%	0%	2%	-1%	2%	-3%	0%
1961	Critical	-20%	0%	-8%	0%	3%	0%	0%	2%	-100%	10%	9%	-100%
1962	Below Normal	0%	0%	6%	0%	-2%	0%	69%	0%	0%	-8%	-1%	0%
1963	Above Normal	0%	197%	1%	6%	0%	0%	0%	4%	0%	1%	0%	0%
1964	Dry	0%	3%	0%	1%	0%	0%	-9%	15%	-15%	3%	-41%	102%
1965	Wet	0%	24%	0%	0%	-3%	0%	-2%	0%	0%	-11%	0%	0%
1966	Below Normal	0%	1%	17%	7%	0%	-84%	23%	0%	0%	-1%	0%	13%
1967	Wet	0%	0%	2%	0%	1%	-7%	1%	0%	-5%	-2%	0%	0%
1968	Dry	3%	0%	9%	1%	1%	19%	0%	0%	0%	-3%	0%	0%
1969	Wet	0%	-28%	1%	0%	0%	0%	0%	1%	-15%	0%	0%	-3%
1970	Above Normal	3%	0%	1%	0%	0%	3%	0%	6%	-4%	-1%	0%	0%
1971	Below Normal	0%	4%	1%	0%	0%	-7%	0%	1%	0%	1%	0%	5%
1972	Dry	0%	0%	4%	8%	-19%	15%	0%	-2%	-54%	-16%	8%	-54%
1973	Above Normal	0%	4%	5%	3%	-3%	2%	-30%	19%	0%	-4%	-6%	0%
1974	Wet	0%	2%	0%	0%	-11%	0%	3%	12%	6%	-12%	23%	2%
1975	Wet	0%	0%	5%	27%	0%	-3%	12%	1%	10%	0%	0%	1%
1976	Critical	3%	25%	31%	0%	-100%	0%	0%	0%	-100%	0%	3%	58%
1977	Critical	0%	-31%	170%	-100%	-100%	0%	0%	0%	4%	-1%	-4%	0%
1978	Wet	7%	-8%	8%	0%	1%	-1%	-1%	2%	8%	0%	29%	0%
1979	Above Normal	0%	-36%	29%	1%	-13%	-6%	0%	1%	0%	-24%	8%	0%
1980	Wet	0%	74%	-3%	0%	0%	-1%	36%	17%	21%	0%	0%	0%
1981	Dry	0%	0%	-18%	-14%	-100%	17%	24%	1%	0%	-3%	0%	-30%
1982	Wet	-100%	3%	0%	0%	0%	-4%	0%	-3%	6%	0%	0%	0%
1983	Wet	1%	-2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1984	Above Normal	1%	0%	0%	0%	0%	5%	0%	0%	-16%	-2%	0%	0%
1985	Dry	-37%	1%	-5%	0%	0%	0%	17%	-7%	0%	-3%	9%	12%
1986	Wet	-37%	0%	4%	0%	0%	0%	18%	-38%	30%	-33%	0%	0%
1987	Critical	0%	0%	7%	2%	1%	13%	0%	2%	0%	4%	1%	0%
1988	Critical	0%	0%	6%	0%	0%	0%	7%	-1%	1%	-1%	-1%	0%
1989	Critical	3%	-2%	4%	-3%	0%	3%	5%	0%	0%	-1%	-5%	0%
1990	Critical	0%	0%	-7%	2%	0%	0%	0%	-1%	0%	5%	-3%	0%
1991	Critical	0%	5%	0%	-8%	0%	24%	0%	2%	0%	-1%	-7%	0%
1992	Critical	0%	10%	0%	-10%	0%	0%	0%	0%	0%	0%	0%	0%
1993	Wet	4%	0%	-18%	0%	0%	3%	15%	59%	10%	0%	-22%	0%
1994	Critical	0%	0%	-27%	0%	0%	0%	-20%	-8%	0%	10%	-16%	-34%
1995	Wet	-1%	0%	-85%	0%	2%	0%	1%	-1%	-2%	0%	0%	0%
1996	Wet	13%	0%	1%	-2%	0%	-2%	4%	-1%	0%	0%	-100%	10%
1997	Wet	0%	-55%	0%	0%	-5%	-8%	-13%	15%	58%	-31%	0%	0%
1998	Wet	0%	0%	3%	-1%	0%	0%	3%	-2%	-3%	-4%	0%	0%
1999	Above Normal	2%	1%	0%	0%	0%	2%	6%	1%	2%	-4%	0%	8%
2000	Above Normal	0%	0%	-100%	0%	0%	1%	0%	51%	0%	-3%	0%	0%
2001	Dry	0%	0%	-9%	5%	2%	0%	0%	0%	-100%	-1%	-10%	-100%
2002	Dry	0%	0%	5%	2%	0%	0%	24%	0%	0%	-4%	7%	4%
2003	Below Normal	-1%	0%	0%	1%	0%	0%	1%	2%	0%	0%	-100%	0%

Table 3.8-46.
Simulated Monthly Surplus Delta Outflows, No-Action (2030), Sacramento Valley Index Year Type

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0	0	3,710	0	12,047	7,933	10,001	41,092	15,490	1,176	946	0
1923	Above Normal	868	0	18,148	17,726	0	0	10,778	5,981	0	2,608	1,127	1,702
1924	Critical	0	1,693	0	3,601	922	0	1,044	0	786	1,251	2,188	0
1925	Below Normal	1,184	1,469	1,385	0	55,558	0	7,752	3,520	909	945	943	0
1926	Dry	1,749	0	0	2,571	26,895	0	9,902	0	0	1,923	2,244	0
1927	Above Normal	1,346	7,502	5,972	24,101	74,756	19,671	30,370	2,256	0	5,208	0	0
1928	Below Normal	0	2,091	197	9,059	0	74,270	2,095	0	0	4,518	0	1,374
1929	Critical	0	0	2,120	0	0	0	0	0	924	956	2,284	0
1930	Critical	1,235	1,322	3,919	7,343	0	12,754	2,280	1,320	1,057	1,055	3,265	1,047
1931	Critical	0	0	0	458	0	0	0	0	3,255	1,261	2,179	0
1932	Above Normal	1,238	1,836	6,067	6,591	3,193	0	0	2,995	988	922	0	663
1933	Dry	1,246	0	0	4,492	0	0	0	0	0	0	2,224	0
1934	Critical	1,041	1,765	2,108	7,762	0	0	0	0	964	0	1,954	0
1935	Above Normal	1,343	1,622	1,528	15,649	0	8,474	38,322	0	965	2,172	2,571	0
1936	Above Normal	0	0	1,575	27,945	56,094	5,642	8,225	0	920	2,889	2,297	0
1937	Wet	0	0	869	1,393	32,509	33,500	9,301	962	1,008	932	951	0
1938	Wet	0	12,272	58,201	24,611	74,270	74,721	57,638	50,760	25,598	0	0	3,398
1939	Dry	2,987	0	0	1,178	7,932	0	0	3,468	0	3,734	1,983	0
1940	Above Normal	0	0	0	17,593	28,234	74,090	48,011	0	14	5,437	1,064	669
1941	Wet	0	0	26,788	71,311	73,809	67,555	55,989	25,509	0	0	0	2,857
1942	Wet	0	0	47,358	66,107	74,528	4,195	33,959	14,897	7,717	0	0	3,964
1943	Wet	0	2,133	17,367	69,005	32,428	66,833	10,696	0	0	2,454	0	0
1944	Below Normal	0	0	1,983	0	4,285	0	1,644	3,145	0	1,932	3,052	0
1945	Above Normal	0	612	2,564	0	39,330	0	1,310	2,698	945	2,143	2,500	0
1946	Above Normal	0	45	58,257	35,604	0	0	4,305	1,168	0	3,199	1,019	602
1947	Dry	698	0	1,983	0	0	0	0	4,009	709	2,944	1,881	0
1948	Below Normal	0	0	0	2,131	6,488	0	11,017	9,955	593	2,253	1,808	1,417
1949	Below Normal	677	0	485	3,134	354	11,359	1,130	962	0	1,298	1,585	1,115
1950	Below Normal	0	0	0	5,250	8,135	0	6,467	2,429	0	978	1,715	0
1951	Above Normal	0	38,474	74,806	56,787	52,155	9,568	0	5,305	369	4,991	0	0
1952	Wet	0	0	28,195	65,637	47,027	45,084	51,023	49,886	20,830	3,171	1,513	9,323
1953	Below Normal	708	0	30,174	70,926	0	0	5,125	11,378	4,571	1,412	0	2,281
1954	Below Normal	0	490	0	19,247	31,279	21,885	17,758	0	0	6,233	1,345	0
1955	Dry	0	236	7,255	3,741	0	0	4,253	4,168	0	955	2,756	0
1956	Wet	0	0	74,176	75,200	67,742	20,539	3,043	27,711	2,848	0	0	4,962
1957	Below Normal	420	0	7	4,229	13,834	22,153	0	5,062	688	2,865	940	747
1958	Wet	1,336	1,071	9,374	23,824	74,566	73,974	73,729	32,129	12,935	0	1,329	7,176
1959	Dry	1,955	0	0	20,060	21,377	0	1,221	2,773	1,008	2,372	0	0
1960	Critical	0	0	1,102	1,194	7,220	0	0	1,780	1,570	2,591	2,447	0
1961	Critical	1,627	0	2,430	0	10,173	0	0	3,169	52	3,049	1,612	1,252
1962	Below Normal	0	0	2,761	0	28,727	0	2,255	0	0	5,842	1,737	0
1963	Above Normal	17,665	207	13,294	1,016	38,294	0	68,243	4,747	0	5,853	0	0
1964	Dry	0	10,456	0	8,229	0	0	4,449	4,775	11	2,266	2,735	1,062
1965	Wet	0	883	66,539	74,325	13,631	0	31,703	0	0	3,113	0	0
1966	Below Normal	0	8,884	1,695	16,673	0	2,420	3,191	0	0	4,986	936	588
1967	Wet	0	0	18,399	31,560	20,667	32,926	34,511	35,725	26,396	8,756	0	8,844
1968	Dry	2,705	0	881	18,588	37,474	4,151	0	4,044	943	3,479	0	0
1969	Wet	0	859	8,672	74,080	74,106	43,385	39,793	42,073	16,370	0	0	4,597
1970	Above Normal	2,196	0	46,231	76,663	59,200	19,290	0	6,193	2,104	4,647	0	0
1971	Below Normal	0	5,339	45,046	34,985	0	13,059	0	14,453	0	4,422	0	1,265
1972	Dry	0	0	2,183	796	2,954	7,133	0	1,848	837	2,713	1,667	1,799
1973	Above Normal	0	5,849	7,836	66,755	62,183	34,365	1,366	5,496	0	3,798	983	0
1974	Wet	0	44,639	56,140	74,791	13,958	73,876	45,679	2,123	5,104	2,191	938	6,883
1975	Wet	0	0	2,596	2,038	43,827	62,730	3,889	16,164	4,421	0	0	4,705
1976	Critical	2,580	997	360	0	422	0	0	0	164	1,080	3,517	906
1977	Critical	0	2,448	1,085	2,531	5,886	0	0	0	3,003	1,400	1,993	0
1978	Wet	1,115	1,415	2,420	49,160	22,387	44,396	22,662	1,695	2,995	0	1,113	0
1979	Above Normal	0	563	1,184	8,235	10,080	16,595	0	4,517	0	2,752	1,401	0
1980	Wet	0	368	5,941	74,192	74,357	42,392	2,148	3,907	4,402	947	942	0
1981	Dry	0	0	1,237	13,233	2,504	3,853	2,825	2,688	0	2,620	1,512	960
1982	Wet	221	15,369	73,955	59,483	74,166	63,499	74,804	25,692	5,866	0	0	11,208
1983	Wet	12,736	34,927	64,071	70,718	75,220	77,380	58,443	54,135	51,169	22,979	13,321	17,888
1984	Above Normal	6,762	64,546	75,449	47,531	18,792	15,764	0	5,594	1,772	4,282	0	0
1985	Dry	1,033	16,719	6,537	0	0	0	3,021	1,671	0	2,695	1,552	1,247
1986	Wet	423	0	1,957	6,188	78,791	74,672	7,616	1,852	2,825	1,814	0	0
1987	Critical	0	0	1,208	3,150	3,543	6,895	0	4,136	0	2,607	2,056	0
1988	Critical	0	0	1,868	12,209	0	0	2,462	962	923	958	2,235	0
1989	Critical	1,167	2,434	842	4,719	0	17,821	7,680	0	0	3,553	2,188	0
1990	Critical	0	0	2,278	3,122	0	0	0	2,033	0	2,662	2,724	0
1991	Critical	0	2,282	0	1,846	0	1,644	0	1,779	0	1,004	2,909	0
1992	Critical	0	2,169	0	3,159	7,500	0	0	0	964	0	2,079	0
1993	Wet	1,072	1,826	440	45,636	24,851	7,575	7,734	5,846	6,797	0	1,384	0
1994	Critical	0	0	2,334	0	0	0	2,670	3,463	0	3,075	1,558	2,548
1995	Wet	1,038	0	4,479	73,347	19,252	76,787	47,914	66,301	24,057	15,197	4,050	8,703
1996	Wet	738	0	13,226	34,583	74,798	53,371	23,797	29,110	0	0	1,006	2,068
1997	Wet	0	3,309	69,535	78,936	53,243	8,354	2,824	4,152	1,898	3,392	0	0
1998	Wet	0	0	4,865	48,397	74,916	68,077	42,880	36,539	58,726	20,301	8,242	14,858
1999	Above Normal	4,589	15,360	22,313	31,185	70,259	39,942	9,996	6,724	1,436	3,105	0	642
2000	Above Normal	0	0	1,852	17,804	72,457	41,579	0	951	0	4,791	1,726	0
2001	Dry	0	0	2,605	1,460	3,477	0	0	3,433	905	963	1,850	1,317
2002	Dry	0	0	16,554	34,602	0	0	4,485	2,761	0	2,633	2,687	1,295
2003	Below Normal	1,003	0	19,573	44,367	0	0	12,511	24,610	0	3,750	841	0

Table 3.8-47.
Simulated Monthly Surplus Delta Outflows, Alternative C (2030), Sacramento Valley Index Year Type

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0	0	3,788	0	12,180	8,280	8,771	41,194	16,082	1,175	945	0
1923	Above Normal	503	182	18,191	18,721	0	0	7,249	4,725	0	2,490	1,877	3,119
1924	Critical	0	0	0	2,646	5,904	0	1,132	0	545	1,247	2,277	0
1925	Below Normal	1,127	1,622	1,038	0	55,318	0	6,548	3,408	0	938	965	0
1926	Dry	1,693	0	0	2,646	27,186	0	10,286	0	0	1,750	2,234	726
1927	Above Normal	0	7,696	6,952	24,139	74,754	20,465	31,060	2,367	0	5,100	0	0
1928	Below Normal	0	2,375	296	9,126	0	74,236	2,597	0	0	4,567	0	1,504
1929	Critical	0	0	865	245	0	0	0	0	916	949	2,281	0
1930	Critical	1,195	1,115	3,822	8,033	0	13,457	2,531	1,403	1,013	1,048	3,132	1,281
1931	Critical	0	0	0	335	0	0	0	0	3,340	1,256	2,162	0
1932	Above Normal	1,249	1,805	6,069	7,054	3,185	0	1,035	3,597	1,047	922	0	0
1933	Dry	1,478	0	0	6,513	0	0	0	0	0	0	2,130	0
1934	Critical	1,087	1,417	2,229	7,844	0	0	0	0	964	0	1,958	0
1935	Above Normal	1,300	1,921	767	15,882	0	9,198	37,556	0	967	2,192	2,570	0
1936	Above Normal	0	0	1,512	27,617	54,662	6,247	9,099	0	920	2,652	2,294	0
1937	Wet	0	0	0	1,412	30,544	32,162	10,309	0	1,008	932	952	0
1938	Wet	0	12,492	57,458	24,604	74,234	74,721	57,636	50,264	23,705	0	0	3,914
1939	Dry	3,041	0	0	699	0	0	0	3,475	0	3,139	1,945	0
1940	Above Normal	0	0	0	17,229	29,627	74,114	48,800	0	639	5,271	1,064	779
1941	Wet	0	0	26,201	70,756	73,819	67,680	55,820	26,533	0	0	1,257	2,879
1942	Wet	0	0	48,618	66,102	74,528	4,943	31,739	15,343	8,073	0	0	3,205
1943	Wet	0	2,578	17,386	69,006	29,803	66,834	11,391	0	1,133	2,182	0	0
1944	Below Normal	0	0	1,970	0	6,505	0	1,149	2,250	0	1,910	3,159	0
1945	Above Normal	0	607	2,639	391	38,787	0	677	2,808	945	1,766	1,461	318
1946	Above Normal	0	271	60,301	34,747	0	0	3,557	2,256	0	2,742	1,169	1,047
1947	Dry	254	0	2,136	0	0	0	0	4,035	789	2,779	1,551	1,558
1948	Below Normal	0	0	0	1,502	0	0	11,644	11,031	0	1,549	2,330	1,652
1949	Below Normal	0	0	1,821	0	0	11,362	0	0	0	1,384	1,805	838
1950	Below Normal	0	0	0	5,086	8,162	0	5,763	2,364	0	1,530	2,197	0
1951	Above Normal	0	39,725	74,830	56,800	51,680	10,221	0	5,308	604	4,675	0	0
1952	Wet	0	0	28,677	65,635	46,392	44,921	52,599	48,626	19,630	3,178	1,520	9,349
1953	Below Normal	782	0	30,256	71,138	0	0	6,032	11,540	4,571	1,362	0	2,825
1954	Below Normal	0	742	0	19,164	32,044	22,663	18,206	0	0	5,796	1,563	0
1955	Dry	0	124	7,295	3,809	0	0	3,074	4,149	0	956	2,704	0
1956	Wet	0	0	74,149	75,200	67,743	21,198	3,254	26,221	4,795	0	0	4,839
1957	Below Normal	2,250	0	0	2,641	12,562	21,243	0	6,100	808	2,862	940	2,107
1958	Wet	711	1,308	9,336	23,858	74,614	73,974	73,730	32,639	13,280	0	1,338	7,213
1959	Dry	2,029	0	0	21,038	21,349	0	1,187	2,789	1,008	2,653	0	0
1960	Critical	0	0	1,087	977	6,996	0	0	1,821	1,557	2,655	2,376	0
1961	Critical	1,649	0	1,643	0	11,304	0	0	3,195	0	3,249	1,739	0
1962	Below Normal	0	0	2,989	0	28,296	0	3,067	0	0	5,375	1,730	0
1963	Above Normal	17,738	653	13,372	1,081	38,213	0	67,578	4,844	0	5,890	0	0
1964	Dry	0	10,720	0	8,294	0	0	3,572	5,439	9	2,334	1,701	2,096
1965	Wet	0	877	66,683	74,326	13,051	0	30,708	0	0	2,767	0	0
1966	Below Normal	0	8,806	1,943	17,819	0	421	3,098	0	0	4,919	937	668
1967	Wet	0	335	18,717	31,622	20,831	30,613	34,710	35,589	24,974	8,607	0	8,871
1968	Dry	2,779	0	963	18,681	37,833	4,936	0	4,047	943	3,392	0	0
1969	Wet	0	413	8,749	74,051	74,106	43,387	39,794	42,661	13,853	0	0	4,472
1970	Above Normal	2,271	0	46,525	76,663	59,343	19,727	0	6,593	2,022	4,625	0	0
1971	Below Normal	0	5,546	45,576	35,041	0	12,076	1,202	14,559	0	4,466	0	1,330
1972	Dry	0	0	2,277	858	2,362	8,540	0	1,800	295	2,282	1,914	1,208
1973	Above Normal	0	6,075	8,159	68,453	60,183	34,797	944	6,530	0	3,639	923	0
1974	Wet	0	45,410	56,236	74,791	12,369	73,876	46,914	2,356	5,418	1,929	1,157	6,999
1975	Wet	0	0	2,715	2,632	43,867	60,673	4,404	16,240	4,935	0	0	4,750
1976	Critical	2,655	1,250	470	0	0	0	922	0	0	1,077	3,604	1,433
1977	Critical	0	1,681	2,943	0	0	0	0	0	3,136	1,387	1,908	902
1978	Wet	1,191	1,302	2,639	49,177	22,605	43,932	22,424	1,724	3,235	0	1,441	0
1979	Above Normal	0	358	1,526	8,295	8,786	15,535	0	4,570	0	2,103	1,518	0
1980	Wet	0	639	5,752	74,238	74,357	41,785	2,931	4,571	5,318	947	942	0
1981	Dry	0	0	1,017	11,428	0	4,518	2,868	2,694	0	2,546	1,509	731
1982	Wet	0	15,672	73,987	59,589	74,166	60,924	74,804	24,841	6,221	0	0	11,258
1983	Wet	12,812	34,125	64,073	70,718	75,220	77,380	58,446	54,138	51,172	22,981	13,330	17,915
1984	Above Normal	6,850	64,550	75,449	47,534	18,801	16,477	0	5,596	1,610	4,200	0	0
1985	Dry	595	16,697	6,265	0	0	0	2,999	1,563	0	2,618	1,701	1,400
1986	Wet	244	0	2,033	6,224	78,834	74,672	9,000	1,138	3,657	1,232	0	0
1987	Critical	0	0	1,297	3,207	3,584	7,795	0	4,214	0	2,707	2,068	0
1988	Critical	0	0	1,974	12,264	0	0	2,380	951	935	952	2,217	0
1989	Critical	1,140	2,154	892	4,405	0	18,273	8,078	0	0	3,535	2,074	0
1990	Critical	0	0	2,119	3,183	0	0	0	2,006	0	2,768	2,661	0
1991	Critical	0	2,271	0	1,711	0	2,042	0	1,820	0	989	2,708	0
1992	Critical	0	2,175	0	2,723	7,539	0	0	0	964	0	2,070	0
1993	Wet	1,055	1,584	398	45,589	24,924	7,785	8,774	9,314	7,521	0	1,081	0
1994	Critical	0	262	1,701	0	0	1,023	2,140	3,195	0	3,403	1,312	1,714
1995	Wet	909	2,675	362	73,531	19,640	76,787	48,983	65,715	23,652	15,212	4,067	8,739
1996	Wet	831	0	13,310	34,047	74,798	52,504	24,692	28,874	0	0	0	2,280
1997	Wet	0	1,483	69,563	78,936	50,786	7,917	2,271	4,552	3,124	2,274	0	0
1998	Wet	0	0	5,035	48,112	74,916	68,008	44,188	35,906	56,797	19,490	8,250	14,884
1999	Above Normal	4,663	15,580	22,392	31,104	70,336	40,663	9,947	6,726	1,436	3,022	0	680
2000	Above Normal	0	176	871	17,870	72,456	42,165	1,206	1,439	0	4,627	1,725	0
2001	Dry	0	0	2,364	1,525	3,529	0	0	3,223	0	956	1,897	0
2002	Dry	0	0	16,721	34,846	0	0	4,610	2,748	0	2,515	2,871	1,240
2003	Below Normal	996	0	19,651	45,154	0	0	12,207	25,166	0	3,741	0	0

Table 3.8-48.
Change in Simulated Monthly Surplus Delta Outflows, Alternative C (2030) – No-Action (2030), Sacramento Valley Index Year Type

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0	0	78	0	133	346	-1,230	102	592	0	-1	0
1923	Above Normal	-366	182	43	994	0	0	-3,529	-1,256	0	-117	749	1,416
1924	Critical	0	-1,693	0	-955	4,982	0	87	0	-241	-5	90	0
1925	Below Normal	-57	153	-347	0	-240	0	-1,204	-113	-909	-7	22	0
1926	Dry	-56	0	0	75	291	0	385	0	0	-173	-10	726
1927	Above Normal	-1,346	194	980	37	-2	795	690	111	0	-107	0	0
1928	Below Normal	0	284	99	67	0	-34	502	0	0	50	0	130
1929	Critical	0	0	-1,255	245	0	0	0	0	-9	-7	-3	0
1930	Critical	-40	-207	-97	690	0	703	250	82	-44	-7	-133	234
1931	Critical	0	0	0	-123	0	0	0	0	85	-5	-17	0
1932	Above Normal	11	-31	2	463	-8	0	1,035	602	59	0	0	-663
1933	Dry	232	0	0	2,021	0	0	0	0	0	0	-95	0
1934	Critical	47	-348	122	82	0	0	0	0	0	0	4	0
1935	Above Normal	-44	299	-761	234	0	724	-766	0	2	20	-1	0
1936	Above Normal	0	0	-64	-328	-1,432	605	874	0	0	-237	-4	0
1937	Wet	0	0	-869	18	-1,966	-1,338	1,008	-962	0	0	1	0
1938	Wet	0	220	-743	-6	-37	0	-2	-496	-1,894	0	0	515
1939	Dry	54	0	0	-479	-7,932	0	0	7	0	-594	-39	0
1940	Above Normal	0	0	0	-364	1,393	25	789	0	625	-167	0	110
1941	Wet	0	0	-586	-556	10	125	-168	1,024	0	0	1,257	22
1942	Wet	0	0	1,260	-5	0	748	-2,219	446	357	0	0	-759
1943	Wet	0	445	20	1	-2,625	1	695	0	1,133	-272	0	0
1944	Below Normal	0	0	-14	0	2,220	0	-495	-895	0	-22	107	0
1945	Above Normal	0	-5	75	391	-543	0	-633	110	0	-377	-1,039	318
1946	Above Normal	0	226	2,044	-857	0	0	-748	1,088	0	-457	150	445
1947	Dry	-444	0	153	0	0	0	0	27	80	-164	-330	1,558
1948	Below Normal	0	0	0	-629	-6,488	0	627	1,077	-593	-704	522	234
1949	Below Normal	-677	0	1,335	-3,134	-354	4	-1,130	-962	0	86	220	-277
1950	Below Normal	0	0	0	-164	27	0	-704	-65	0	552	482	0
1951	Above Normal	0	1,251	24	13	-475	653	0	3	235	-316	0	0
1952	Wet	0	0	483	-2	-635	-163	1,576	-1,261	-1,200	7	7	26
1953	Below Normal	74	0	82	213	0	0	907	163	0	-51	0	544
1954	Below Normal	0	252	0	-83	765	778	449	0	0	-437	218	0
1955	Dry	0	-112	39	68	0	0	-1,179	-19	0	1	-52	0
1956	Wet	0	0	-26	0	1	659	211	-1,490	1,947	0	0	-123
1957	Below Normal	1,829	0	-7	-1,588	-1,272	-910	0	1,037	120	-3	0	1,360
1958	Wet	-626	236	-38	33	48	0	0	510	345	0	9	37
1959	Dry	74	0	0	977	-27	0	-34	16	0	281	0	0
1960	Critical	0	0	-15	-217	-224	0	0	41	-13	64	-71	0
1961	Critical	22	0	-787	0	1,131	0	0	26	-52	201	127	-1,252
1962	Below Normal	0	0	228	0	-431	0	812	0	0	-467	-7	0
1963	Above Normal	73	446	78	65	-81	0	-665	97	0	38	0	0
1964	Dry	0	264	0	65	0	0	-877	664	-1	68	-1,034	1,034
1965	Wet	0	-6	143	0	-580	0	-995	0	0	-345	0	0
1966	Below Normal	0	-78	249	1,146	0	-1,999	-93	0	0	-67	0	81
1967	Wet	0	335	318	61	164	-2,314	199	-136	-1,421	-149	0	26
1968	Dry	74	0	82	93	360	784	0	3	0	-88	0	0
1969	Wet	0	-447	77	-29	0	1	1	588	-2,517	0	0	-125
1970	Above Normal	75	0	294	0	143	436	0	399	-83	-22	0	0
1971	Below Normal	0	207	530	55	0	-983	1,202	106	0	44	0	65
1972	Dry	0	0	94	62	-592	1,407	0	-48	-543	-431	247	-590
1973	Above Normal	0	227	324	1,698	-1,999	432	-421	1,034	0	-159	-60	0
1974	Wet	0	771	96	0	-1,589	0	1,234	233	314	-262	219	116
1975	Wet	0	0	118	594	41	-2,057	515	76	514	0	0	45
1976	Critical	75	253	110	0	-422	0	922	0	-164	-3	87	526
1977	Critical	0	-767	1,858	-2,531	-5,886	0	0	0	134	-13	-85	902
1978	Wet	76	-113	219	18	218	-464	-238	29	240	0	328	0
1979	Above Normal	0	-204	341	60	-1,294	-1,060	0	53	0	-649	117	0
1980	Wet	0	271	-189	46	0	-606	783	664	916	0	0	0
1981	Dry	0	0	-220	-1,805	-2,504	665	43	6	0	-75	-4	-229
1982	Wet	-221	304	31	106	0	-2,574	0	-851	355	0	0	50
1983	Wet	76	-801	3	1	0	0	3	2	3	2	9	27
1984	Above Normal	88	4	0	3	9	713	0	2	-162	-82	0	0
1985	Dry	-438	-22	-272	0	0	0	-21	-108	0	-77	149	153
1986	Wet	-178	0	76	36	43	0	1,383	-714	832	-582	0	0
1987	Critical	0	0	88	57	41	900	0	78	0	100	13	0
1988	Critical	0	0	106	55	0	0	-82	-12	12	-7	-18	0
1989	Critical	-28	-279	50	-314	0	452	399	0	0	-18	-114	0
1990	Critical	0	0	-158	62	0	0	0	-27	0	106	-63	0
1991	Critical	0	-11	0	-135	0	398	0	40	0	-15	-201	0
1992	Critical	0	6	0	-435	39	0	0	0	0	0	-9	0
1993	Wet	-17	-243	-42	-47	74	211	1,040	3,468	724	0	-302	0
1994	Critical	0	262	-633	0	0	1,023	-530	-268	0	328	-246	-834
1995	Wet	-129	2,675	-4,116	184	388	0	1,069	-587	-405	14	17	36
1996	Wet	93	0	84	-536	0	-867	896	-236	0	0	-1,006	213
1997	Wet	0	-1,826	28	0	-2,457	-437	-553	400	1,225	-1,118	0	0
1998	Wet	0	0	170	-285	0	-69	1,308	-633	-1,929	-812	8	26
1999	Above Normal	74	220	79	-81	77	720	-49	2	1	-83	0	39
2000	Above Normal	0	176	-981	66	0	586	1,206	488	0	-163	0	0
2001	Dry	0	0	-241	66	52	0	0	-210	-905	-7	47	-1,317
2002	Dry	0	0	166	245	0	0	125	-13	0	-118	184	-55
2003	Below Normal	-7	0	78	788	0	0	-305	556	0	-9	-841	0

Table 3.8-49.
Percent Change in Simulated Monthly Surplus Delta Outflows from No-Action (2030), Alternative C (2030), Sacramento Valley Index Year Type

Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	Wet	0%	0%	2%	0%	1%	4%	-12%	0%	4%	0%	0%	0%
1923	Above Normal	-42%	0%	0%	6%	0%	0%	-33%	-21%	0%	-4%	66%	83%
1924	Critical	0%	-100%	0%	-27%	540%	0%	8%	0%	-31%	0%	4%	0%
1925	Below Normal	-5%	10%	-25%	0%	0%	0%	-16%	-3%	-100%	-1%	2%	0%
1926	Dry	-3%	0%	0%	3%	1%	0%	4%	0%	0%	-9%	0%	0%
1927	Above Normal	-100%	3%	16%	0%	0%	4%	2%	5%	0%	-2%	0%	0%
1928	Below Normal	0%	14%	50%	1%	0%	0%	24%	0%	0%	1%	0%	9%
1929	Critical	0%	0%	-59%	0%	0%	0%	0%	0%	-1%	-1%	0%	0%
1930	Critical	-3%	-16%	-2%	9%	0%	6%	11%	6%	-4%	-1%	-4%	22%
1931	Critical	0%	0%	0%	-27%	0%	0%	0%	0%	3%	0%	-1%	0%
1932	Above Normal	1%	-2%	0%	7%	0%	0%	0%	20%	6%	0%	0%	-100%
1933	Dry	19%	0%	0%	45%	0%	0%	0%	0%	0%	0%	-4%	0%
1934	Critical	4%	-20%	6%	1%	0%	0%	0%	0%	0%	0%	0%	0%
1935	Above Normal	-3%	18%	-50%	1%	0%	9%	-2%	0%	0%	1%	0%	0%
1936	Above Normal	0%	0%	-4%	-1%	-3%	11%	11%	0%	0%	-8%	0%	0%
1937	Wet	0%	0%	-100%	1%	-6%	-4%	11%	-100%	0%	0%	0%	0%
1938	Wet	0%	2%	-1%	0%	0%	0%	0%	-1%	-7%	0%	0%	15%
1939	Dry	2%	0%	0%	-41%	-100%	0%	0%	0%	0%	-16%	-2%	0%
1940	Above Normal	0%	0%	0%	-2%	5%	0%	2%	0%	4361%	-3%	0%	16%
1941	Wet	0%	0%	-2%	-1%	0%	0%	0%	4%	0%	0%	0%	1%
1942	Wet	0%	0%	3%	0%	0%	18%	-7%	3%	5%	0%	0%	-19%
1943	Wet	0%	21%	0%	0%	-8%	0%	6%	0%	0%	-11%	0%	0%
1944	Below Normal	0%	0%	-1%	0%	52%	0%	-30%	-28%	0%	-1%	4%	0%
1945	Above Normal	0%	-1%	3%	0%	-1%	0%	-48%	4%	0%	-18%	-42%	0%
1946	Above Normal	0%	501%	4%	-2%	0%	0%	-17%	93%	0%	-14%	15%	74%
1947	Dry	-64%	0%	8%	0%	0%	0%	0%	1%	11%	-6%	-18%	0%
1948	Below Normal	0%	0%	0%	-29%	-100%	0%	6%	11%	-100%	-31%	29%	17%
1949	Below Normal	-100%	0%	275%	-100%	-100%	0%	-100%	-100%	0%	7%	14%	-25%
1950	Below Normal	0%	0%	0%	-3%	0%	0%	-11%	-3%	0%	56%	28%	0%
1951	Above Normal	0%	3%	0%	0%	-1%	7%	0%	0%	64%	-6%	0%	0%
1952	Wet	0%	0%	2%	0%	-1%	0%	3%	-3%	-6%	0%	0%	0%
1953	Below Normal	10%	0%	0%	0%	0%	0%	18%	1%	0%	-4%	0%	24%
1954	Below Normal	0%	51%	0%	0%	2%	4%	3%	0%	0%	-7%	16%	0%
1955	Dry	0%	-47%	1%	2%	0%	0%	-28%	0%	0%	0%	-2%	0%
1956	Wet	0%	0%	0%	0%	0%	3%	7%	-5%	68%	0%	0%	-2%
1957	Below Normal	435%	0%	-100%	-38%	-9%	-4%	0%	20%	17%	0%	0%	182%
1958	Wet	-47%	22%	0%	0%	0%	0%	0%	2%	3%	0%	1%	1%
1959	Dry	4%	0%	0%	5%	0%	0%	-3%	1%	0%	12%	0%	0%
1960	Critical	0%	0%	-1%	-18%	-3%	0%	0%	2%	-1%	2%	-3%	0%
1961	Critical	1%	0%	-32%	0%	11%	0%	0%	1%	-100%	7%	8%	-100%
1962	Below Normal	0%	0%	8%	0%	-1%	0%	36%	0%	0%	-8%	0%	0%
1963	Above Normal	0%	215%	1%	6%	0%	0%	-1%	2%	0%	1%	0%	0%
1964	Dry	0%	3%	0%	1%	0%	0%	-20%	14%	-14%	3%	-38%	97%
1965	Wet	0%	-1%	0%	0%	-4%	0%	-3%	0%	0%	-11%	0%	0%
1966	Below Normal	0%	-1%	15%	7%	0%	-83%	-3%	0%	0%	-1%	0%	14%
1967	Wet	0%	0%	2%	0%	1%	-7%	1%	0%	-5%	-2%	0%	0%
1968	Dry	3%	0%	9%	0%	1%	19%	0%	0%	0%	-3%	0%	0%
1969	Wet	0%	-52%	1%	0%	0%	0%	0%	1%	-15%	0%	0%	-3%
1970	Above Normal	3%	0%	1%	0%	0%	2%	0%	6%	-4%	0%	0%	0%
1971	Below Normal	0%	4%	1%	0%	0%	-8%	0%	1%	0%	1%	0%	5%
1972	Dry	0%	0%	4%	8%	-20%	20%	0%	-3%	-65%	-16%	15%	-33%
1973	Above Normal	0%	4%	4%	3%	-3%	1%	-31%	19%	0%	-4%	-6%	0%
1974	Wet	0%	2%	0%	0%	-11%	0%	3%	11%	6%	-12%	23%	2%
1975	Wet	0%	0%	5%	29%	0%	-3%	13%	0%	12%	0%	0%	1%
1976	Critical	3%	25%	31%	0%	-100%	0%	0%	0%	-100%	0%	2%	58%
1977	Critical	0%	-31%	171%	-100%	-100%	0%	0%	0%	4%	-1%	-4%	0%
1978	Wet	7%	-8%	9%	0%	1%	-1%	-1%	2%	8%	0%	29%	0%
1979	Above Normal	0%	-36%	29%	1%	-13%	-6%	0%	1%	0%	-24%	8%	0%
1980	Wet	0%	74%	-3%	0%	0%	-1%	36%	17%	21%	0%	0%	0%
1981	Dry	0%	0%	-18%	-14%	-100%	17%	2%	0%	0%	-3%	0%	-24%
1982	Wet	-100%	2%	0%	0%	0%	-4%	0%	-3%	6%	0%	0%	0%
1983	Wet	1%	-2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1984	Above Normal	1%	0%	0%	0%	0%	5%	0%	0%	-9%	-2%	0%	0%
1985	Dry	-42%	0%	-4%	0%	0%	0%	-1%	-6%	0%	-3%	10%	12%
1986	Wet	-42%	0%	4%	1%	0%	0%	18%	-39%	29%	-32%	0%	0%
1987	Critical	0%	0%	7%	2%	1%	13%	0%	2%	0%	4%	1%	0%
1988	Critical	0%	0%	6%	0%	0%	0%	-3%	-1%	1%	-1%	-1%	0%
1989	Critical	-2%	-11%	6%	-7%	0%	3%	5%	0%	0%	-1%	-5%	0%
1990	Critical	0%	0%	-7%	2%	0%	0%	0%	-1%	0%	4%	-2%	0%
1991	Critical	0%	0%	0%	-7%	0%	24%	0%	2%	0%	-1%	-7%	0%
1992	Critical	0%	0%	0%	-14%	1%	0%	0%	0%	0%	0%	0%	0%
1993	Wet	-2%	-13%	-10%	0%	0%	3%	13%	59%	11%	0%	-22%	0%
1994	Critical	0%	0%	-27%	0%	0%	0%	-20%	-8%	0%	11%	-16%	-33%
1995	Wet	-12%	0%	-92%	0%	2%	0%	2%	-1%	-2%	0%	0%	0%
1996	Wet	13%	0%	1%	-2%	0%	-2%	4%	-1%	0%	0%	-100%	10%
1997	Wet	0%	-55%	0%	0%	-5%	-5%	-20%	10%	65%	-33%	0%	0%
1998	Wet	0%	0%	4%	-1%	0%	0%	3%	-2%	-3%	-4%	0%	0%
1999	Above Normal	2%	1%	0%	0%	0%	2%	0%	0%	0%	-3%	0%	6%
2000	Above Normal	0%	0%	-53%	0%	0%	1%	0%	51%	0%	-3%	0%	0%
2001	Dry	0%	0%	-9%	4%	1%	0%	0%	-6%	-100%	-1%	3%	-100%
2002	Dry	0%	0%	1%	1%	0%	0%	3%	0%	0%	-4%	7%	-4%
2003	Below Normal	-1%	0%	0%	2%	0%	0%	-2%	2%	0%	0%	-100%	0%

CCWD-7: The sensitivity analyses represent a comprehensive range of RPA implementations for the 2008 USFWS CVP/SWP Operations BO and 2009 NMFS CVP/SWP Operations BO (2009a), including a range of potential changes to flows in Old and Middle rivers and the frequency that Delta exports are limited by the RPA requirements. These analyses, presented in Appendix C, "CVP/SWP Long-Term Operations Sensitivity Analyses," of this Final PEIS/R, support evaluation of the potential for the RPAs to change the anticipated effects of the program alternatives from those presented in the Draft PEIS/R. See also response to comment CCWD-1.

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3.8.3 East Bay Municipal District

EBMUD

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EAST BAY
MUNICIPAL UTILITY DISTRICT

RICHARD G. SYKES
DIRECTOR OF WATER AND NATURAL RESOURCES

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July 12, 2011

Ms. Alicia Forsythe
San Joaquin River Restoration Program Manager
U.S. Bureau of Reclamation
2800 Cottage Way, MP-170
Sacramento, CA 95825

SUBJECT: Comments on the San Joaquin River Restoration Program ~~Draft~~ PEIS/R

Dear Ms. Forsythe:

The East Bay Municipal Utility District (EBMUD) appreciates this opportunity to provide comments on the Draft Program Environmental Impact Statement/Environmental Impact Report (Draft PEIS/R) for the San Joaquin River Restoration Program (Program). EBMUD fully supports the broad purpose of the Program and intends that the comments in this letter allow it to accomplish its objectives fully while making adjustments as necessary to mitigate any adverse impacts to other salmonid populations in the Delta.

EBMUD-1a

Salmonids that use the central Delta as a migratory pathway include salmon and steelhead from the Mokelumne River. The Mokelumne fishery, a critical component of the overall Delta fishery, includes fall-run Chinook salmon and Central Valley steelhead. The Mokelumne Chinook salmon fall-run is one of the few Central Valley runs nearly meeting the Central Valley Project Improvement Act doubling goal based on average production for the period 1992-2009. Given its significance, it is important that the Mokelumne fishery be given specific attention to ensure that any actions of the Program that could inadvertently harm the fishery be avoided or fully mitigated.

The primary outmigration period of juvenile salmonids from the Mokelumne River is February through June. These fish use the lower San Joaquin River, including portions of the Old and Middle River (OMR) channels, as a migration corridor to the ocean and are vulnerable to entrainment by flows in these channels towards the export pumps.

EBMUD has two comments on the draft PEIS/R:

Comment 1. The PEIS/R needs an analysis on the risk effects for juvenile salmonids migrating from the central Delta given the higher export flows in critical outmigration months.

Figures 5-15 and 5-16 show, for each month, that there will be many years when OMR reverse flows will increase relative to existing conditions (2005 level of demand) and No Action conditions (2030 level of demand), respectively. For instance, 40% of Aprils will have OMR reverse flow increases greater than 10% relative to existing conditions. These

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increased reverse flows are potentially harmful, especially in the months February through June, because they will presumably draw central Delta-origin juvenile outmigrating salmonids southwards towards the export pumps to a greater degree than under existing or No Action conditions.

EBMUD-1a con't

Analysis of the CalSim II modeling results heightened our concern about adverse impacts on outmigrating salmonids from the Mokelumne River in the months February through June. Results reviewed in the Water Operation Modeling Output - CalSim attached to Appendix H, when summarized by month, show the following frequencies with which net exports (that is, differences in exports minus differences in flows upstream of Vernalis) will *increase* relative to existing and No-Action conditions, respectively:

Level of Development/Alternatives	Increased Frequency of Net Exports				
	Feb	March	April	May	June
2005/Alternatives A	38%	32%	9%	35%	18%
2005/Alternatives B	40%	30%	9%	43%	33%
2005/Alternatives C	39%	33%	6%	41%	34%
2030/Alternatives A	39%	26%	11%	37%	24%
2030/Alternatives B	40%	28%	12%	41%	35%
2030/Alternatives C	40%	28%	10%	39%	38%

For instance, net exports in February will increase in 38% of the 82 years of simulated operations with Alternatives A relative to existing conditions (2005 level of demand). The largest increased frequencies incur in February and May, with net exports for the 2005 level of demand increasing in 35-43% of years, depending on the Alternative selected.

EBMUD-1b

The PEIS/R states that the diversion effects of the project alternatives are related not only to the volume of water diverted but also the changes to flow patterns caused by the diversions and the resultant distribution of fish relative to the south Delta. It concludes that while the higher diversion rates could be expected to result in greater entrainment risk for fish in the south Delta, the offsetting effect of increased San Joaquin River inflows under alternatives A1 through C2 would keep fish away from the south Delta. The PEIS/R's conclusion that there will be no net change in fish entrainment is unsupported by any analysis. There is no specific information to show how changes in export pumping affect the distribution of fish relative to the south Delta. Salmonids migrating from the central Delta may be harmed by higher export levels and changes in OMR reverse flows notwithstanding the increased San Joaquin River inflows.

EBMUD-1c

Reclamation should conduct analysis to show the specific routing of San Joaquin water through the Delta. The analysis should show the sources of water passing through the export pumps. Specifically, the analysis should show how much of the water entering the Delta from the Mokelumne River and Mokelumne forks passes through the pumps

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EBMUD-1c cont'd

relative to existing conditions. To illustrate the type of model analysis that would be useful in this context, the National Marine Fisheries Service (NMFS) 2009 CVP/SWP Operations Biological Opinion (BO) reports on particle tracking simulation of particles injected at various points in the Delta. Particles injected at the confluence of the Mokelumne River and the San Joaquin River (Station 815) showed that as net OMR flow increases southwards from -2,500 to -3,500 cfs, the risk of particle entrainment nearly doubles from 10 to 20 percent and, at -5,000 cfs, quadruples to 40 percent. As may be anticipated, the NMFS BO concludes that as OMR reverse flows increase, the risk of entrainment into the South Delta is increased. Results may show that the entrainment effect would be even more dramatic for particles injected in the San Joaquin River near Little Connection Slough (Station 906), a migratory pathway for Mokelumne salmonids using Little Potato Slough off the Mokelumne South Fork.

EBMUD-1d

In light of the potential for cumulative impacts as explained above, the conclusions of "less than significant" or "less than significant and beneficial" as summarized in Table 5-3 of the PEIS/R for Impacts FSH-35, FSH-36, and FSH-37 are unsupported by any adequate analysis. Based on the analysis provided in the PEIS/R, the conclusions for Impacts FSH-35, FSH-36, and FSH-37 could be potentially significant.

EBMUD-2a

Comment 2. A Mitigation Monitoring and Reporting Program should be established in accordance with CEQA requirements, including specific actions required by named responsible parties, and should include specific timelines to respond to any identified significant impacts. The Mitigation Monitoring and Reporting Program should be linked to an adaptive management program that modifies Program operations or takes other actions to eliminate the effects of incremental entrainment relative to existing conditions or the No Action Alternative, as applicable, for Mokelumne-origin Chinook salmon and steelhead.

The Mitigation Monitoring and Reporting Program should address the potential for significant impacts in (i) changes in diversions and entrainment in the Delta, (ii) changes in predation levels in the Delta, and (iii) changes due to Delta inflow and flow patterns in the Delta. The Mitigation Monitoring and Reporting Program should incorporate acoustic telemetry studies on juvenile Chinook salmon to assess their vulnerability to entrainment into the southern Delta. These studies should incorporate the use of fish released in the central Delta to compare Program conditions with existing conditions or No Action conditions, as applicable. A receiver array should be established to cover the interior Delta from the Delta Cross Channel to the export pumps and to Chipps Island to track the movements of fish.

EBMUD-2b

An adaptive management program should be defined in the PEIS/R that is specific as to the range of operational or other actions Reclamation and/or other parties must take to eliminate impacts related to incremental entrainment of Mokelumne salmonids if such entrainment is shown to result from implementation of the Program.

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EBMUD-3

EBMUD supports the purposes and objectives of the San Joaquin River Restoration Program. The announcement in 2006 of the settlement that led to this Program and enactment of key elements of the settlement into law in 2009 were admirable milestones for all those in California who seek to advance the viability of the State's salmonid fisheries.

EBMUD submits these comments so as to have a complete analysis done to allow for the necessary adjustments to be incorporated in the final stages to mitigate for potential significant impacts to other salmonid populations in the Delta while still meeting the Program's objectives.

If you have any questions, please contact me at (510) 287-1629 or via email – rsykes@ebmud.com.

Sincerely,

Richard G. Sykes
Director of Water and Natural Resources

RGS:JJM:bhw
SJR PEIS-EIR 6-15-11 comment ltr.doc

cc: NMFS, CDF&G
David Mooney, USBR
David Gore, USBR
Kim Webb, USFWS

Responses to Comments from East Bay Municipal Utility District

EBMUD-1a: The operational modeling conducted in support of the Draft PEIS/R analyses was sufficient to support the qualitative evaluation of potential impacts to fish in the Delta, including salmonids, as described in Chapter 5.0, “Biological Resources – Fisheries,” of the Draft PEIS/R. As described on page 5-63 of the Draft PEIS/R, the action alternatives are expected to affect distributions of Delta fish and, thus, the environmental conditions to which they are exposed. Within the Delta, fish distributions would be most directly affected by the program alternatives in the south Delta because changes in both San Joaquin River flow and diversions at Jones and Banks pumping plants would occur in the south Delta. Therefore, the qualitative analysis of potential impacts to fish in the Delta focuses on the south Delta.

As described on pages 5-101 through 5-104 of the Draft PEIS/R, increased reverse flows in upper Old and Middle rivers and higher levels of pumping to recapture the increased inflow would potentially increase entrainment and predation risks and delay migration for fish, including fish originating from the central Delta. These impacts are addressed through evaluation of the south Delta where fish impacts would be greatest. As described in Impacts FSH-35 (page 5-101) and FSH-39 (page 5-107), it is anticipated that the increased San Joaquin River inflow due to Interim and Restoration flows would offset the impact by reducing the number of fish that are likely to migrate through the south Delta, resulting in a less-than-significant impact. When impacts to special-status fish species from pumping threaten to exceed the limits set by the USFWS 2008 CVP/SWP Operations BO and the NMFS 2009 CVP/SWP Operations BO or other regulations in effect at the time, Reclamation would implement actions to reduce pumping and/or inflow.

Accordingly, the qualitative analysis of potential impacts to fish in the Delta largely focuses on relative changes in exports, San Joaquin River inflows, and Old and Middle river reverse flows, similar to the discussions presented in the comment as well as the X2 position. This includes analysis of changes in:

- Water temperatures and dissolved oxygen concentrations (Impact FSH-31 beginning on page 5-98)
- Pollutant discharge and mobilization (Impact FSH-32 on page 5-100)
- Sediment discharge and turbidity (Impact FSH-33 beginning on page 5-100)
- Fish habitat conditions (Impact FSH-34 on page 5-101)
- Diversions and entrainment (Impact FSH-35 beginning on page 5-101)
- Predation levels (Impact FSH-36 beginning on page 5-104)
- Food web support (Impact FSH-37 beginning on page 5-106)
- Salinity (Impact FSH-37 on page 5-107)

- Inflow and flow patterns (Impact FSH-39 beginning on page 5-107)

While the simulated system operations serve as a sufficient representation of expected system response to allow evaluation of potential impacts in the Draft PEIS/R, the simulations do not represent interior Delta operations with sufficient detail and certainty to support a more detailed analysis of Delta flow or water sources, or Particle Tracking Modeling (PTM). More importantly, more detailed Delta flow, water source, and/or particle tracking modeling is not necessary to support the evaluation of impacts of the alternatives on fish in the Delta, as discussed above.

Reclamation is in the process of developing a Recapture and Recirculation Plan, pursuant to Paragraph 16 of the Settlement, in consultation with the Settling Parties, Third Parties, and the State, and will conduct a subsequent site-specific evaluation of implementing the Recapture and Recirculation Plan, in compliance with NEPA and CEQA, as appropriate. The Draft PEIS/R provides a description and analysis of the recapture of Interim and Restoration flows at a project level of detail and recirculation of recaptured flows at a program level of detail. Consistent with the purpose of the PEIS/R, as described in Section 1.2, “Purpose and Uses of PEIS/R,” in the Draft PEIS/R, all subsequent site-specific evaluations, including the evaluation of recapture and recirculation, will be developed based in part on the information presented in the PEIS/R.

EBMUD-1b: The analyses presented in Chapter 5.0, “Biological Resources – Fisheries,” of the Draft PEIS/R include a qualitative analysis of the potential changes in diversions and entrainment in the Delta. This qualitative analysis is identified on page 5-102 for Impact FSH-35 (*Changes in Diversions and Entrainment in the Delta*); and pages 5-107 through 5-111 for Impact FSH-39 (*Changes to Delta Inflow and Flow Patterns in the Delta*). These impact statements indicate that increased San Joaquin River inflows, and ratios of the inflows to reverse flows predicted for Alternatives A1 through C2, are expected to reduce the number of fish that would move through the south Delta, thus reducing the risk of entrainment. As stated in Impact FSH-39, alternatives A1 through C2 would increase San Joaquin River inflows and reverse flows in Old and Middle rivers, and ratios of the inflows to reverse flows. These outcomes would likely result in lower occurrences of most Delta fish species in the south Delta, which would provide a beneficial effect to many Delta fish species, including Central Valley fall-run Chinook salmon, Central Valley steelhead, Sacramento splittail, longfin smelt, and delta smelt.

As described in greater detail in response to EBMUD-1a, this analysis focuses on relative changes in exports, San Joaquin River inflows, and reverse flows in Old and Middle rivers. See response to comment EBMUD-1a for additional information relevant to this comment.

EBMUD-1c: The analysis of potential impacts related to fisheries entrainment in the Delta is based on the best information available at the time the assessment was developed. The PTM recommended in the comment is based on a method that routes particles that follow flow and currents through the Delta. For some applications, the PTM is considered representative for assessing the potential movement of eggs and very small larval fish that are passive movers carried by flow patterns. However, the Lead

Agencies do not consider the PTM a representative tool to assess potential effects to adult fish because adult fish of all fish species analyzed are active movers, and are known to have more complex behaviors that are not solely based on following flows and currents. Therefore, PTM was not considered appropriate for analyses performed for the Draft PEIS/R. Additionally, while the CalSim-II simulated system operations serve as a sufficient representation of expected system response to allow evaluation of potential impacts in the Draft PEIS/R, the simulations do not represent interior Delta operations with sufficient detail and certainty to support a more detailed analysis of Delta flow or water sources, or PTM.

There is a potential for increased risk of entrainment of fish located in the south Delta under any of the action alternatives, as described on pages 5-101 through 5-103 of the Draft PEIS/R. This impact would include an increased risk of entrainment for salmonids migrating to or from the Mokelumne River. This impact was found to be less than significant. See response to comment EBMUD-1a for additional detail regarding the analyses of increased risk of entrainment in the Delta, and the basis for and level of detail in modeling conducted in support of these analyses.

EBMUD-1d: For the reasons set forth in response to comments EBMUD-1a and EBMUD-1c, the lead agencies believe the conclusion of less than significant for Impacts FSH-35, FSH-36, and FSH-37 is valid, and no changes to the PEIS/R are necessary. See response to comments EBMUD-1a and EBMUD-1c.

EBMUD-2a: As described in the Executive Summary of the Draft PEIS/R, DWR as the lead CEQA agency is developing a Mitigation Monitoring and Reporting Program and would adopt the Mitigation Monitoring and Reporting Program in support of a Notice of Determination consistent with CEQA Guidelines Section 15097. Various laws, regulations, BOs, and court orders govern the diversion of water at existing facilities in the Delta, many with a focus on impacts of diversions on Chinook salmon in the Delta. Any diversion of Interim or Restoration flows at existing Delta facilities would occur consistent with the applicable laws, regulations, BOs, and court orders in place at the time the water is recaptured. Reclamation will use the PEIS/R to the greatest extent possible in compliance for the final Recapture and Recirculation Plan. New evaluations in a site-specific evaluation of implementation of the Recapture and Recirculation Plan would be conducted only if the assessment of recapture cannot be supported by the analyses presented in the Draft PEIS/R. As described under Impacts FSH-34, FSH-35, and FSH-39 in Chapter 5.0, “Biological Resources – Fisheries,” of the Draft PEIS/R, compliance with these conditions, as well as substantially increased flows into the south Delta from the San Joaquin River, contributes to the determination of a less-than-significant effect on Delta fishes from recapturing Interim and Restoration flows at Jones and Banks pumping plants. Therefore, acoustic telemetry studies are not currently proposed as mitigation in the Draft PEIS/R and are not deemed necessary since the relevant impact from increased Delta exports has been determined to be less than significant. However, the studies recommended by the commenter could contribute to achieving the Restoration Goal, and none of the action alternatives preclude development and implementation of such a study in the future. The text has not been revised.

EBMUD-2b: As described in response to comments EBMUD-1a, EBMUD-1b, EBMUD-1c, and EBMUD-2a, no significant impacts are anticipated to occur to fish in the Delta, including Mokelumne River salmonids, as a result of implementing the Settlement, and therefore no operational or other actions are proposed in the Draft PEIS/R to mitigate impacts related to changes in diversions and entrainment in the Delta. See also responses to EBMUD-1a, EBMUD-1b, EBMUD-1c, and EBMUD-2a.

3.8.4 San Joaquin River Exchange Contractors Water Authority and the San Joaquin River Resource Management Coalition

EC-1

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September 21, 2011

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Re: Comments of the San Joaquin River Exchange Contractors Water Authority and the San Joaquin River Resource Management Coalition to the Draft Program Environmental Impact Statement/Environmental Impact Report, April 2011 for the San Joaquin River Restoration Program

Dear Ms. Forsythe and Ms. Schulte:

EC1-1 These comments are submitted on behalf of the San Joaquin River Exchange Contractors Water Authority[1] and the San Joaquin River Resource Management Coalition (RMC)[2] (hereafter collectively as "Exchange Contractors"). The Exchange Contractors have been involved as affected third-parties in the

[1] Members of the Exchange Contractors are the Central California Irrigation District, Columbia Canal Company, Firebaugh Canal Water District and the San Luis Canal Company.

[2] Members of the San Joaquin River Resource Management Coalition include landowners and farmers along the San Joaquin River in the restoration area and water agencies that provide water to the region.

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San Joaquin River Restoration Program ("SJRRP" or "program") since before the issuance of the Settlement Agreement in 2006. (For instance, in 2003, the RMC received a grant from the United States Environmental Protection Agency ("EPA") to conduct a study of the potential for fish restoration on the upper San Joaquin River. This study and a further studies (2005 and 2007) were conducted by the independent consulting group CH2MHill. Copies of the CH2MHill reports are included for the record.[3]) The Exchange Contractors very much appreciate the extension of time granted by the Bureau of Reclamation ("Reclamation") and the Department of Water Resources ("DWR") to comment on the Draft Program Environmental Impact Statement/Environmental Impact Report (hereafter "Draft PEIS/R" or "draft"), so that the Exchange Contractors may continue to be involved in the SJRRP.

Preliminary Statement

The SJRRP is suffering from a fundamental flaw that finds its way into the Draft PEIS/R. This flaw is the lack of an overall vision for the successful restoration of the San Joaquin River. If funds were unlimited and parties agreed to a reasonable schedule , perhaps the entire project could be accomplished over the course of several years. Unfortunately, from the time the Settling Parties entered into the Settlement , there were neither adequate funds nor a realistic schedule. In an attempt to "sell" the Settlement and legislation to Congress, the Settling Parties ignored evidence to the contrary and convinced Congress that the SJRRP could be accomplished for approximately $500 million. A fact sheet issued by Reclamation in 2009 estimated the costs as being between $250m-$800m. Since the time of the Settlement, costs have escalated dramatically and any hope of achieving the Restoration Program for $500 million is long gone.

EC1-1 cont'd

Just as the economics of the SJRRP were unrealistic, so too was the schedule. Under the Settlement, Reclamation was afforded six years for environmental review, pre-construction and construction activities, and post-construction testing. This too was not a realistic schedule. For example, the schedule assumed that the final PEIS/R would be completed in 2009. Yet, the PEIS/R will not be completed until 2012 at the earliest, and that assumes that there will be no litigation challenging the documentation. Further, to expect that both the PEIS/R and the necessary project level documents could all be completed on a timely and legal basis by 2014 was even more unrealistic, even without litigation.

As a result of events that were beyond the control of the Settling Parties and third parties, the legislation was delayed two and a half years. Further, federal financing has not materialized. While some revisions to the legislation were successful in making funds available from the Friant repayment contracts, nevertheless the funding has been grossly insufficient. There is currently an attempt in the Senate to obtain additional funding. Even if the Senate effort were successful, and if $40 million per year could be made available from the Friant repayment contract of Friant's capital payments obligation until those funds were exhausted (approximately $188m total for the next 4 years), there still would be vastly insufficient funds to complete the SJRRP. (*See* Section III of these comments).

EC1-2

Prior to the issuance of the Draft PEIS/R, it was hoped that Reclamation would take a step back in the document and develop an overall vision for the successful implementation of the SJRRP. Unfortunately, no

[3] Due to the large size of several documents to be included with these comments, we have provided the documents in electronic format on the accompanying CDs.

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feasibility plan was included. Rather, the Draft simply analyzes the program as if it were entirely feasible and could be accomplished, more or less, as originally planned. Reclamation and DWR must abandon this fiction and deal with the actual circumstances in which the program now finds itself.

EC1-2 cont'd

Realistically, the program is not feasible consistent with the terms of the Settlement. At this point, DWR and Reclamation should halt preparation of the PEIS/R and convene all interested parties to develop a program that could accomplish the Restoration Goal and the Water Management Goal on a realistic basis. If new legislation is needed as an unlikely result, before any legislation moves forward, all stakeholders should be afforded the opportunity to agree to a change to the Act. It is only through a consensus approach that the SJRRP has a chance of being successful.

EC1-3

Due to the delays and lack of funding, the timeline for reintroduction of spring-run salmon must change. The Exchange Contractors have been informed by the National Marine Fisheries Service (NMFS) that unless told otherwise by Reclamation, they expect to commence reintroduction by the end of 2012. It is important to understand that the carefully designed river system blueprint memorialized in the Settlement and now established in law, calls for a major fish protection remodeling of the river. Commencement of reintroduction without the provision of the infrastructure necessary to support the survival of the fish is untenable. If fish are reintroduced between now and the end of 2012, or after 2012 but without the necessary improvements in place, there will be inadequate in-stream and riparian habitat conditions and passage facilities will not have been constructed. The fish will fall prey to the multitude of predators that currently habituate the San Joaquin River, or will be entrained by the numerous diversions along the San Joaquin River. This would be an unreasonable impact on the fishery, as condemning these fish to certain death in a hostile environment is unreasonable, and therefore no Water Code Section 1707 or 1735 permit should issue. Absent a permit from the Water Board, the program cannot be implemented. Further, it would be unreasonable to use substantial volumes of water ostensibly to provide habitat for the reintroduced fish whose demise is certain. Such unreasonable use would violate Article X, Section 2 of the California Constitution.

EC1-4

The Exchange Contractors recommend that the following steps be taken to commence the long-term implementation of the Restoration Program:

1. Reclamation and DWR should meet and confer with the third parties and Settling Parties regarding a going-forward approach to implementation of the SJRRP. These discussions would focus on schedule, funding, prioritization of projects and other agreed upon issues.

2. Reclamation and DWR should not proceed with the PEIS/R until those discussions either have reached a consensus or the parties have agreed that there is an impasse.

3. In the event of impasse, the parties should request that Senator Feinstein reconvene the interested stakeholders and oversee resolution of the impasse.

EC1-5

4. Reclamation and DWR should publish an accounting of spent funds and remaining funds currently available to implement the Program. The accounting should describe what has been accomplished thus far and what can be accomplished with the remaining dollars.

Duane Morris

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EC1-5 con'd 5. Related to no. 4 above, Reclamation and DWR should develop a schedule for implementation of the Program based upon realistic assumptions of future funds. Even assuming $40 million per year was available, it would take at least 20 years to develop the program under the Settling Parties' cost projections.

EC1-6 6. Reclamation must agree that it will not introduce spring-run Chinook salmon into the upper San Joaquin River prior to the completion of the Phase 1 and Phase 2 facilities, or, consistent with the Program as it may be modified through the multiparty consensus process.

EC1-7 7. Reclamation should pay for all past third-party damages prior to the commencement of the consensus discussions. In that way, everyone will be on an equal footing once the discussions commence.

EC1-8 8. Reclamation and DWR should agree that the starting point for any discussions are the conditions imposed by the Water Board in the permit for WY 2011, as those conditions may be enhanced by the permit issued for WY 2012, which the parties have not yet seen.

EC1-9 9. Reclamation and DWR as applicable, should enter into the following agreements, with the following entities, prior to the completion of the consensus discussions:

a. An agreement for the use and maintenance of the flood control bypasses with the Lower San Joaquin Levee District.

b. An operations agreement with the Central California Irrigation District regarding Mendota Dam and Mendota Pool.

c. An operations agreement with the San Luis Canal Company regarding the operations of Sack Dam.

d. An agreement with the San Luis & Delta-Mendota Water Authority regarding the allocation/crediting of restoration and flood flows as between the Authority and the Friant Division.

e. An agreement with the Merced Irrigation District and the San Joaquin River Group regarding operation of the Hills Ferry Barrier and water management on the Lower San Joaquin River and its tributaries to eliminate conflicts between the tributary operations for fall-run salmon and the reintroduction of spring-run salmon to the Upper San Joaquin River.

f. Establish the entity(s) responsible for the long term O&M of river system conveyance, fish passage and protection facilities, and ensure dedicated adequate funding.

EC1-10 10. Reclamation will agree to establish a claims-processing mechanism to pay damage claims promptly, without the necessity for injured third parties to resort to the Federal Tort Claims Act process.

EC1-11 11. Reclamation will enter into a cooperative agreement with the Central California Irrigation District, and other Exchange Contractor members as necessary, for the installation of seepage mitigation

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EC1-11 cont'd

facilities. This cooperative cost-sharing agreement should be finalized prior to the conclusion of the consensus discussions.

Based on the foregoing, the Exchange Contractors believe that the SJRRP could proceed on an ultimately successful path. While the outcome cannot be assured, that is, that the river will be able to maintain a self-sustaining population of spring-run Chinook salmon, through the best efforts of all parties the Program will have the greatest chance for success

EC1-12a

Organization of Comments

These comments are organized into three sections. The first section contains a legal discussion and general comments. The second section contains specific comments to the Draft PEIS/R, including appendices. The third section provides a discussion of a practical approach and alternatives to implementation of the SJRRP in light of funding constraints and likely impediments to the successful implementation of the program.

EC1-12b

I. GENERAL COMMENTS AND LEGAL DISCUSSION

A. <u>Introduction</u>

On September 13, 2006, the "Settling Parties" agreed to terms and conditions for a Settlement that was subsequently approved by the U.S. Eastern District Court of California on October 23, 2006. *See* Executive Summary (hereafter "ES") at 2. The Settling Parties included the Natural Resources Defense Council (NRDC), Friant Water Authority (FWA), the Department of the Interior, United States Bureau of Reclamation, and the Department of Commerce. The settlement was agreed to without consultation with affected third parties located downstream of Friant Dam. Among these specified Third Parties[4] are the Exchange Contractors, whose water agencies are located within the principal restoration area of the SJRRP. Attached to the Settlement was proposed federal legislation that the Settling Parties believed was necessary to implement the Settlement. The Third Parties were not consulted on the proposed legislation prior to its issuance in conjunction with the Settlement.

EC1-12c

The Draft PEIS/R allegedly evaluates alternative ways to implement the proposed action. The proposed action is described as the implementation of the "stipulation of settlement in *NRDC, et al. v. Kirk Rodgers, et al.*, consistent with the San Joaquin River Restoration Settlement Act ("Act") set forth in P.L. 111-11." (ES1)

EC1-12d

The Settlement establishes two primary goals:

[4] Third Parties include the Exchange Contractors and its members, the San Joaquin Tributary Agencies and its members, and the San Luis-Delta Mendota Water Authority and its members. Other parties affected by the Settlement include contractors to the State of California State Water Project.

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- Restoration Goal – to restore and maintain fish populations in "good condition" in the main stem San Joaquin River below Friant Dam to the confluence of the Merced River, including naturally reproducing and self-sustaining populations of salmon and other fish.

- Water Management Goal – to reduce or avoid adverse water supply impacts on all of the Friant Division long-term contractors that may result from the Interim and Restoration flows provided for in the Settlement. (ES2)

To achieve the Restoration Goal, the Settlement requires releases of water from Friant Dam downstream to the confluence with the Merced River, channel and structural modifications along the San Joaquin River below Friant Dam ("Restoration Area"), and reintroduction of Chinook salmon. Pursuant to the Settlement, the Restoration Flows are specific volumes of water (depending on year type) to be released from Friant Dam. The flow hydrographs are set forth in Exhibit B of the Settlement. Interim Flows are flows that began in 2009 and will continue until full Restoration Flows are initiated. The purpose of the Interim Flows is to collect relevant data concerning flows, temperatures, fish needs, seepage losses, recirculation, recapture and reuse of the water, to the benefit of the Friant Contractors. (ES3)

EC1-12d cont'd

The Settlement sets forth specific physical and operational actions concerning the Restoration Goal and Water Management Goal. For example, Settlement paragraph 11 identifies specific channel and structural improvements considered necessary to achieve the Restoration Goal. Settlement paragraph 13 identifies specific volumes of water to be released from Friant Dam during different year types, including volumes and dates for release of flows. Other important provisions in the Settlement include paragraph 28, which requires compliance with the National Environmental Policy Act (NEPA), and Settlement paragraph 7, which states that there will be no material adverse impacts to third parties.

The Act also contains certain requirements regarding implementation of the Settlement. Several of these provisions are of key importance to the third parties regarding environmental impacts. Protection of Third Party interests with respect to environmental impacts are found principally in Sections 10004, 10009, and 10011, which provide, *inter alia*, that the Secretary of the Interior must not only conduct NEPA review of the program, but must actually mitigate any adverse impacts, must mitigate those impacts that are determined to be caused by the flows, must reduce flows to avoid seepage impacts, must assess impacts on the development of Reach 4B for conveyance of Restoration Flows prior to expanding the reach, and must not reintroduce spring run Chinook salmon in a manner that would cause more than *de minimis* impacts on third parties.

When the Settlement was released for public review in 2006, it was evident that the Third Parties were not adequately protected under either the provisions of the Settlement or the proposed legislation. While the Settlement stipulated that the parties did not expect there to be adverse impacts to third parties, no assurances were set forth in either the Settlement or the legislation. As a result, the Third Parties were permitted by the sponsors of the legislation to seek amendments that would provide them with protection. Many of the requests by the Third Parties were opposed by some of the Settling Parties. Nevertheless, the Third Parties received significant protections under the Act.

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The Settling Parties expected that legislation would be enacted shortly after the court approved the settlement in October 2006. The Third Parties found it necessary to insist upon amendments to the proposed legislation that would provide them with adequate protections. Negotiations regarding the sought-after protections were protracted and contentious. The Settling Parties expected that approximately $500 million would be made available to the program[5]. However, due to national financial concerns, Congress changed the rules for appropriation and instituted a limitation referred to as PAYGO. Pursuant to the PAYGO requirements, discretionary spending had to be offset by a reduction in existing spending in order to maintain balance in the budget. As a result of the PAYGO rules, it was necessary to amend the legislation.

One of the effects of the PAYGO rules was to eliminate much of the hoped-for funding for the program until 2019. Of the hundreds of millions of dollars expected to be available through federal appropriations, only $88 million was made available under the PAYGO rules. Once the PAYGO rules were complied with, the legislation was included in the Omnibus Public Lands Management Act of 2009, Public Law 111-11. Title X of PL 111-11 is the San Joaquin River Restoration Settlement Act ("Act").

In 2009, Reclamation published a second edition of the "Questions and Answers Related to Omnibus Public Land Management Act of 2009, Public Law 111-11" (Fact Sheet)[6]. Pursuant to the Fact Sheet, funding for the SJRRP is projected as follows:

EC1-12e

Redirection of the **capital component of water rates paid by Friant Division** water users to Settlement implementation. The legislation directs the Secretary to collect the entire amount owed by the irrigation contractors in the Friant Division by 2014. The estimated amount to be collected is **$180 million by 2014**.

Continuation of and the dedication of the **"Friant Surcharge,"** an environmental fee charged pursuant to the Central Valley Project Improvement Act (CVPIA) of $7 per acre-foot of water delivered to Friant Contractors to fund implementation. Collection from this fee is expected to average about **$7.5 million per year** ($75 million over a 10-year period).

Up to **$2 million annually** of other **CVPIA Restoration Fund** payments made by Friant Division water users under the CVPIA (up to $20 million over a 10-year period).

Up to $250 million of additional **Federal appropriations** to contribute to the implementation; this **requires a non-federal cost-share** of an equivalent amount.

Funding by the State of California will also support the Settlement. In the November 2006 election, State propositions 84 and 1E were passed by the California voters and should

[5] Based upon the CH2MHill report cited previously, the Exchange Contractors always felt that the cost of the program would greatly exceed $500 million and testified to that effect before Congress. In fact, based upon the CH2MHill report, the Exchange Contractors believe the estimated cost of the program is closer to $1.4 billion.

[6] http://restoresjr.net/program_library/01-General_Outreach/Q&AlegFactSheet0409.pdf

provide about **$200 million of State bond funds** for projects that will directly contribute to the restoration efforts.[7]

The Settlement included a schedule for completion of the channel and structural improvements set forth in Settlement Paragraph 11 that were considered necessary to achieve the Restoration Goal. These channel and structural improvements were to be completed no later than December 31, 2013 for Phase 1 projects and December 31, 2016 for Phase 2 projects. No later than December 31, 2012, Chinook salmon were to be reintroduced to the river. Priority was assigned to spring-run Chinook salmon over fall-run Chinook salmon. (Settlement Paragraph 14).

Based upon Reclamation's timeline, a programmatic environmental impact statement was to be completed by late 2009 and a Record of Decision was to be signed by early 2010.[8] Reclamation failed to meet that timeline. Thereafter Reclamation issued environmental assessments for water years (WY) 2010, 2011 and 2012 in an effort to implement the San SJRRP consistent with the timeline in the Settlement.

Reclamation and DWR only issued the joint Draft PEIS/R on April 22, 2011. A Record of Decision will not be issued until 2012, about two and one-half years behind schedule.

EC1-12e cont'd

B. Funding Issues

Despite being unable to comply with the original schedule, and the lack of available funding, the Draft PEIS/R fails to address this reality. Rather, it assumes that the program is on schedule and on budget. The lack of funding will severely impact the implementation of the program. The only sources of funding currently available to the program include the approximately $40 million remaining from the $88 million[9] originally made available from the Friant Contractors, annual contributions to the SJRRP from the CVPIA, and money from the State of California. The State originally indicated that it would make as much as $200 million available, but thus far has only been able to produce $110 million in funding. Given the dire financial condition of the State of California, it is highly unlikely that any additional State funds will be forthcoming in the foreseeable future. Currently, Senator Feinstein is seeking additional federal funds that could, if the legislation is enacted, result in $40 million per year for about four years. However, even if these funds are appropriated, the program will be far short of the necessary funds. Yet, nowhere in the Draft PEIS/R is any discussion of the lack of funds and the impacts thereof to the implementation of the program.

Reclamation has indicated that it has a remaining approximately $40 million available to it, exclusive of CVPIA and Friant surcharge funds. Most of this money will be consumed by staff costs and studies being conducted by consultants. The rate of expenditure has been approximately $20 million a year. As the graph below shows, if that expenditure rate is continued, the program will be out of federal funds in two years.

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[7] *Id.*

[8] *See* http://restoresjr.net/program_library/01-General_Outreach/Q&AlegFactSheet0409.pdf (Incorporated herein by reference.) The first version of the fact sheet was published in 2007 and projected the issuance of the PEIS/R in 2009 with a Record of Decision signed in 2009. *See* http://restoresjr.net/program_library/01-General_Outreach/FAQ_FactSheet_121007.pdf (Incorporated herein by reference.)

[9] See letter from Commissioner Connor to Rep. Dennis Cardoza, dated November 10, 2010, included with these comments.

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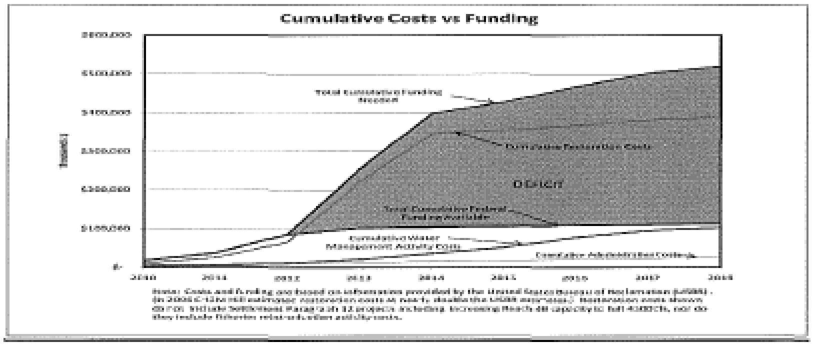

EC1-12e cont'd

Reclamation has been working with the San Luis Canal Company regarding development of a project at Sack Dam and the Arroyo Canal. This project alone is estimated to cost $30 million and it is the first priority project likely to be implemented. Yet, it is evident that there are insufficient funds to even pay for this project. This is compounded by the almost doubling in cost of the Reach 2B/Mendota Pool Bypass project to about $485 million. This cost escalation, together with the lack of funding, calls into question the feasibility of the entire program. In part 3 of these comments, the Exchange Contractors have set forth what they believe to be a realistic funding schedule that will implement this program.[10] The Exchange Contractors have assumed that Congress will appropriate $25-50 million annually. The Exchange Contractors have also re-examined the costs for the SJRRP and have calculated that the SJRRP costs have now escalated to at least $1.6 billion. At the rate of expenditure of $50 million per year, and assuming a program cost of $1.6 billion, it will take 30 or more years to implement this program.

As discussed in the Preliminary Statement above, the Exchange Contractors recommend that before proceeding further, Reclamation step back from the program, and conduct a feasibility assessment that recognizes the delays in program implementation and the lack of adequate funding. This feasibility analysis would then assess how the SJRRP can be implemented based on various funding scenarios. In part 3 of our comments, the Exchange Contractors have identified what they call "no regret" projects. Reclamation should prioritize those projects so that in the event that full funding is never made available, these projects will not be stranded assets. The feasibility analysis would address how the program may be implemented in a manner that causes the least damage to third parties and allows for the eventual full implementation of the program in the event that funding becomes available. Once the feasibility analysis is complete, a revised draft PEIS/R should be issued.

EC1-13a

C. <u>Legal Deficiencies of the draft PEIS/R</u>

1. Reclamation and DWR Have Made "Irretrievable Commitments of Resources" In Violation Of Both NEPA and CEQA.

[10] The funding schedule and costs estimates were prepared by the firm of CH2MHILL.

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NEPA and CEQA require environmental analysis to be conducted at the earliest possible opportunity. Any preemptive actions taken to implement a project prior to issuance of a final EIS/R represent an impermissible "irretrievable commitment of resources"[11] in violation of NEPA and CEQA timing requirements. The actions already taken to begin implementing the SJRRP prior to issuance of a final PEIS/R constitute an impermissible irretrievable commitment of resources. Furthermore, the NEPA and CEQA environmental review processes should have been completed before Reclamation and DWR even *committed* to carry out the actions set forth in the Settlement, because, as they are described in the Draft PEIS/R, the agreements themselves represent an irretrievable commitment of resources that warrants prior environmental review.[12] Examples of the prohibited irretrievable commitments include agreeing in the Settlement to strictly defined flow hydrographs and the Phase 1 and Phase 2 projects; the release of Interim Flows during WY2010 and WY2011; the recovery of those flows to the Friant contractors; the non-volitional passage of fall run salmon to the upper San Joaquin River; the drilling of monitoring wells; and the expenditure of tens of millions of dollars.

EC1-13a cont'd

The Settlement impermissibly obligates Reclamation and DWR to construct specific channel and structural improvements and release Interim and Restoration Flows without first conducting adequate environmental review. The Draft PEIS/R states at the outset that the "proposed action is to implement the Stipulation of Settlement in *NRDC, et al., v. Kirk Rodgers, et al.,* (Settlement) consistent with the San Joaquin River Restoration Settlement Act (Act) in Public Law 111-11." Draft PEIS/R at 1. The Settlement, in turn, "authorize[s] and direct[s] specific physical and operational actions that could potentially directly or indirectly affect environmental conditions in the Central Valley." Draft PEIS/R at 3. The Draft PEIS/R also states that while all "anticipated actions necessary to implement the Settlement are described in this Draft PEIS/R", implementation of the SJRRP in fact "*began in 2009, including the release and recapture of Interim Flows and establishment of the RWA [Recovered Water Account] in October 2009.*" Draft PEIS/R at 6 (emphasis added). While Reclamation and DWR note that "site-specific" NEPA and CEQA environmental compliance documentation was prepared for actions "needed to enable implementation of the Settlement before the release" of the Draft PEIS/R, *id.*, such "documentation" is insufficient to permit preemptively acting upon discrete aspects of a larger project that has yet to be reviewed as a whole.

a. The Bureau of Reclamation Should Have Completed the EIS Prior to Commencing Implementation of the SJRRP and Prior to the Commitments Made in the Settlement.

EC1-13b

Reclamation states that it has prepared "site-specific" NEPA documents for actions "needed to enable implementation of the Settlement before the release" of the Draft PEIS/R, *see* Draft PEIS/R at 6; however,

[11] 42 U.S.C § 4332(C)(v). The Endangered Species Act (ESA) section (7)(d) contains similar language: "After initiation of consultation required under subsection (a)(2), the Federal agency and the permit or license applicant shall not make any *irreversible or* ***irretrievable commitment*** *of resources with respect to the agency action* which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures which would not violate subsection (a)(2) of this section." 16 U.S.C. § 1536(d).

[12] The CEQ regulations contain categories into which various "major federal actions" tend to fall, including the "adoption of programs, such as a group of concerted actions to implement a specific policy or plan; systematic and connected agency decisions allocating agency resources to implement a specific statutory program or executive directive." 40 C.F.R. § 1508.18(b). NEPA, CEQA and the corresponding federal and state implementing regulations are silent as to whether settlement agreements of themselves constitute actions to which the statutes would apply.

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NEPA's implementing regulations and federal case law interpreting NEPA indicate that environmental review should have begun much earlier in the multi-year process that resulted in the Settlement. Furthermore, as early as at the point of settlement, Reclamation committed itself to a strict hydrograph, etc., thereby foreclosing other options and surrendering its right to prevent use of the resources in advance of any required environmental review.

Under the regulations implementing NEPA, an agency must prepare an EIS "early enough so that it can serve practically as an important contribution to the decisionmaking process ***and will not be used to rationalize or justify decisions already made***."[13] For more than forty years, the U.S. Court of Appeals for the Ninth Circuit has acknowledged that delay in preparing an EIS may make all parties less flexible: "After major investment of both time and money, it is likely that more environmental harm will be tolerated."[14] Since the purpose of an EIS is "to apprise decisionmakers of the disruptive environmental effects that may flow from their decisions at a time when they 'retain[] a *maximum range of options*'", toward this end, courts have attempted to define a "'point of commitment' at which the filing of an environmental impact statement is required."[15] NEPA's requirement that an EIS include a statement of any irreversible and irretrievable commitment of resources "[o]bviously … only makes sense if the EIS is prepared prior to the commitment of resources."[16] That irretrievable commitment of resources has been found to occur when the government surrenders the absolute right to prevent the use of the resources.[17]

EC1-13b cont'd

For example, in *Save the Yaak Committee v. Block*,[18] the Ninth Circuit found that the Forest Service had violated NEPA's timing requirements by preparing EAs for a road building project after the project already had begun.[19] In *Metcalf v. Daley*,[20] the Ninth Circuit cited *Save the Yaak* and the NEPA regulations, in concluding that NOAA and NMFS had violated NEPA's timing requirements by preparing a NEPA assessment after making the decision to support whaling by an Indian tribe.[21] In *Idaho Sporting Congress,*

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[13] 40 C.F.R. § 1502.5 (emphasis added).

[14] *Lathan v. Volpe*, 455 F.2d 1111, 1121 (9th Cir. 1971). *See also Calvert Cliffs' Coordinating Committee v. U.S. Atomic Energy Commission*, 449 F.2d 1109, 1128 (D.C. Cir. 1971); *Environmental Defense Fund v. Andrus*, 596 F.2d 848, 853 (9th Cir. 1979); *Confederated Tribes and Bands of the Yakima Indian Nation v. FERC*, 746 F.2d 466, 471-72 (9th Cir. 1984); *Save the Yaak Committee v. Block*, 840 F.2d 714, 718 (9th Cir. 1988); *Pit River Tribe v. United States Forest Serv.*, 469 F.3d 768, 785 (9th Cir. 2006)("dilatory or ex post facto environmental review cannot cure an initial failure to undertake environmental review."); *Te-Moak Tribe of Western Shoshone of Nev. v. United States DOI*, 608 F.3d 592, 609-10 (9th Cir. 2010).

[15] *Conner v. Burford*, 848 F.2d 1441, 1446 (9th Cir. 1988) (emphasis added), citing *Sierra Club v. Peterson*, 717 F.2d 1409, 1414 (D.C.Cir. 1983); *Thomas v. Peterson*, 753 F.2d 754, 760 (9th Cir. 1985); *Environmental Defense Fund v. Andrus*, 596 F.2d 848, 852-53 (9th Cir. 1979); 40 C.F.R. §§ 1501.2, 1502.1, 1502.5(a)).

[16] *Id.* at n. 13.

[17] *Id.* at 1449.

[18] 840 F.2d 714 (9th Cir. 1988).

[19] *Id.* at 718-19, *citing* 40 C.F.R. § 1502.5, *Andrus v. Sierra Club*, 442 U.S. 347, 351 (1979); *California v. Block*, 690 F.2d 753, 761 (9th Cir. 1982); *Confederated Tribes and Bands of the Yakima Indian Nation v. FERC*, 746 F.2d 466, 471-72 (9th Cir. 1984).

[20] 214 F.3d 1135 (9th Cir. 2000).

[21] *Id.* at 1145.

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Inc. v. Alexander,[22] a case involving timber sales, the Ninth Circuit determined that the Forest Service improperly attempted to correct deficient EAs and EISs[23] through issuance of supplemental information reports (SIRs) – which only should be used to determine the significance of new information – rather than by preparing revised EAs and EISs,[24] even though the SIRs were made pursuant to a settlement:

> The record indicates that the SIRs were prepared in response to litigation, years after the original decisions to approve the timber sales were made. Furthermore, although the public was given an opportunity to comment on the SIRs, the Forest Service's decision making process was not formally reopened and no administrative appeal of the SIRs was permitted. The SIRs therefore do not remedy the fact that at the time the Forest Service originally approved the timber sales, it did not have available all the information and analysis [9th Circuit precedent] says it was required to consider.[25]

EC1-13b cont'd

At the point of settlement over five years ago, Reclamation certainly did not have all the information and analysis it was required to consider, and yet Reclamation committed to implement the SJRRP and surrendered its absolute right to prevent the use of the resources, thereby making an irretrievable commitment. At the latest, upon release of the Interim Flows, those resources in fact were utilized, in clear violation of NEPA's timing requirements.

b. *DWR Should Have Completed the EIR Prior to Committing Resources in the Settlement and Prior to Commencing Implementation of the SJRRP.*

EC1-13c

Much like NEPA, under CEQA, project "approval" refers to a public agency decision that "commits the agency to a definite course of action in regard to a project."[26] Environmental review documents cannot be mere "post hoc rationalization" of a project already planned and approved,[27] and an environmental study should not be utilized "to substantiate a program already decided upon."[28] A plan of action, even without specific development authorization, has been found to constitute a "project" for CEQA purposes.[29]

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[22] 222 F.3d 562 (9th Cir. 2000) (*Idaho Sporting Congress*).

[23] The deficiency was based on an intervening case, *Neighbors of Cuddy Mountain v. U.S. Forest Service*, 137 F.3d 1372, 1380 (9th Cir. 1998) (agency must consider cumulative effects of discrete actions).

[24] *Idaho Sporting Congress* at 566. ("[O]nce an agency determines that new information is significant, it must prepare a supplemental EA or EIS; SIRs cannot serve as a substitute.")

[25] *Id.* at 568.

[26] 14 Cal. Code Regs. § 15352(a). Agency approval of a project occurs "upon the earliest commitment to issue or the issuance by the public agency of a discretionary contract, grant, subsidy, loan, or other forms of financial assistance, lease, permit, license, certificate or other entitlement for use of the project." 14 Cal. Code Regs. § 15352(b).

[27] *See Environmental Defense Fund Inc. v. Coastside County Water District*, 27 Cal.App.3d 695, 706 (1972).

[28] *Id.*

[29] The question of whether a particular agency action – entering into a settlement, for example – is in fact a "project" for CEQA purposes is one of law. *See, e.g., Muzzy Ranch Co. v. Solano County Airport Land Use Com.*, 41 Cal.4th 372, 382 (2007) (adoption of airport land use plan held to be a project even though it directly authorized no new development); *Fullerton Joint Union High School Dist. v. State Bd. of Education*, 32 Cal.3d 779, 795 (1982) (adoption of school district succession plan held to be a project even though "further decisions must be made before schools are actually constructed …"). Section 15378 of the CEQA Guidelines

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In *Save Tara v. City of West Hollywood*,[30] the California Supreme Court held that an agreement between a developer and the City of West Hollywood, "coupled with financial support, public statements and other actions" committed the city to the development, and for CEQA purposes, constituted "approval" of the project such that it should have been preceded by preparation of an EIR.[31] The Court held that "post-approval" environmental review of a project is a clear violation of CEQA: "a development decision having potentially significant environmental effects must be *preceded*, not *followed*, by CEQA review."[32]

The Court explained that CEQA mandates must not be reduced "to a process whose result will be largely to generate paper, to produce an EIR that describes a journey whose destination is already predetermined."[33] When an agency "reaches a binding, detailed agreement with a private developer and publicly commits resources and governmental prestige to that project, the agency's reservation of CEQA review until a later, final approval stage is unlikely to convince public observers that before committing itself to the project, the agency fully considered the project's environmental consequences."[34]

The court in *Save Tara* relied on *Laurel Heights Improvement Association v. Regents of the University of California*,[35] in which the California Supreme Court – much like the Ninth Circuit's forty-years'-worth of discussion in the NEPA context – had explained that "the later the environmental review process begins, the more bureaucratic and financial momentum there is behind a proposed project, thus providing a strong incentive to ignore environmental concerns that could be dealt with more easily at an early stage of the project."[36] The Court explained that "[i]f postapproval environmental review were allowed, EIRs would likely become nothing more than *post hoc* rationalizations to support action already taken."[37]

EC1-13c cont'd

Upon Settlement, DWR committed to the "bureaucratic and financial momentum" that should have been preceded by environmental review: DWR not only entered into the Settlement, but also signed a Memorandum of Understanding between the Settling Parties and the State of California, committed to the

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explains: "(a) 'Project' means the whole of an action, which has a potential for resulting in [an environmental change.]. …(c) The term 'project' refers to the activity which is being approved and which may be subject to several discretionary approvals by governmental agencies. The term 'project' does not mean each separate governmental approval." 14 Cal. Code Regs. § 15378.

[30] 45 Cal.4th 116 (2008) (*Save Tara*).

[31] *Id.* at 122.

[32] *Id.* at 134 (emphasis in original).

[33] *Id.* at 135-36. Citing *Natural Resources Defense Council, Inc. v. City of Los Angeles*, 103 Cal.App.4th 268, 271 (2002).

[34] *Id.* at 136. The Court limited its holding by stating "our analysis does not require CEQA analysis before a definite project has been formulated and proposed by the agency. An agency cannot be deemed to have approved a project… unless the proposal or project before it is well enough defined 'to provide meaningful information for environmental assessment.'" *Id.* at 139 (citing 14 Cal. Code Regs. § 15004(b)).

[35] 47 Cal.3d 376 (1988) (*Laurel Heights*).

[36] *Id.* at 395.

[37] *Id.* at 394.

Program Management Plan as an "implementing agency" for the SJRRP, and committed (as an agency of the State of California) about $200 million in bond funds.[38]

EC1-13c cont'd

In light of CEQA's clear regulations and *Save Tara*'s statement that a public agency has not fully considered a project's environmental consequences where that agency reaches a "binding, detailed agreement" to develop a project and "publicly commits resources and governmental prestige to that project" prior to completing environmental review, DWR's "binding, detailed agreement" to implement the SJRRP – and to permit certain aspects of that implementation to commence (requiring resources and the imprimatur of "governmental prestige") prior to issuance of the final EIR – stands in violation of CEQA's timing requirements.

EC-14a

2. Reclamation Has Improperly "Segmented" the Project in Violation Of NEPA and CEQA.

NEPA prohibits "segmenting" or "piecemealing" larger projects by conducting separate environmental reviews on only certain discrete aspects of the overall project rather than conducting a comprehensive and cumulative environmental review of the project as a whole. By specifying that its review would consist only of the channel and structural improvements and Interim and Restoration Flows, Reclamation has improperly segmented the project. Because Phases 1 and 2 are, in fact, a part of the overall SJRRP for which the Draft PEIS/R is being prepared, Reclamation must prepare environmental review of the actions in those phases of the project – including a review of alternatives – as part of its review of the entire project. Phases 1 and 2 cannot be cut away from the larger SJRRP in an effort to evade comprehensive NEPA review.

a. Impermissible Segmentation Under NEPA

Under NEPA and its implementing regulations, all connected, cumulative, or related actions must be assessed together for environmental impact.[39] A "cumulative impact" is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. . . . Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."[40]

For a large-scale project like the SJRRP, with many connected and interrelated actions, the timing of an EIS is especially important. Connected actions must be considered together in order to preclude an agency from impermissibly "dividing a project into several smaller actions, each of which might have an insignificant environmental impact when considered in isolation, but which taken as a whole have a substantial impact."[41] "Segmentation" of the environmental review is improper when the segmented project

[38] Propositions 84 and 1E were passed by California voters in 2006. *See* http://bondaccountability.resources.ca.gov/

[39] *See* 40 C.F.R. §§ 1508.23, 1508.25(a)(2).. *See also Klee v. Sierra Club*, 427 U.S. 390, 410 (1976); *Native Ecosystems Council v. Dombeck*, 304 F.3d 886, 893-94 (9th Cir. 2002); *Churchill County v. Norton*, 276 F.3d 1060, 1075 (9th Cir. 2004).

[40] 40 C.F.R. § 1508.7.

[41] *Morongo Band of Mission Indians v. FAA*, 161 F.3d 569, 579-80 (9th Cir. 1998), citing *Northwest Resource Info. Ctr., Inc. v. National Marine Fisheries Serv.*, 56 F.3d 1060, 1068 (9th Cir. 1995) ("*NRIC*").

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has "*no* independent justification, no life of its own, or is simply illogical when viewed in isolation."[42] It is not appropriate to defer consideration of cumulative impacts to a future date, because "NEPA requires consideration of the potential impact of an action *before* the action takes place."[43] NEPA "clearly requires that consideration of the environmental impacts of proposed projects take place before any licensing decision is made. … After all, once a project begins, the 'pre-project environment' becomes a thing of the past. Evaluating the project's effect on pre-project resources is simply impossible."[44]

In *Trout Unlimited v. Morton*, the U.S. Court of Appeals for the Ninth Circuit stated that an EIS must cover all various stages of a project when "the dependency is such that it would be irrational, or at least unwise, to undertake the first phase if subsequent phases were not also undertaken."[45] In *Daly v. Volpe*, the Ninth Circuit held that the environmental impacts of a single highway segment may *only* be evaluated separately from those of the rest of the highway if the segment has "independent utility."[46]

EC1-14a cont'd

In *Thomas v. Peterson*,[47] a group of plaintiffs sought to prohibit the U.S. Forest Service from constructing a road designed to facilitate timber extraction. The Forest Service developed an EA that discussed only the environmental impacts of the road itself, but did not consider the impacts of the timber sales that the road was designed to facilitate. Subsequently, the Forest Service issued EAs for three separate timber sales. Each EA covered only the effects of a single timber sale – none discussed cumulative impacts of the sales and the road. The Ninth Circuit held that the road construction and timber sales were connected actions that should have been considered together in a single EIS. The Court stated that the Forest Service may not improperly "segment" projects in order to avoid preparing an EIS, and instead must consider related actions in a single EIS: "Not to require this would permit dividing a project's multiple 'actions,' each of which individually has an insignificant environmental impact, but which collectively have a substantial impact."[48] The court cited *Daly* and then *Trout Unlimited* for the notion that the phrase "independent utility" means utility such that the agency might reasonably consider constructing only the segment in question.[49] Because the timber sales could not proceed without the road, and the road would not have been built but for the timber sales, the two were "inextricably intertwined."[50] *Thomas* continued as follows:

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[42] *One Thousand Friends of Iowa v. Mineta*, 364 F.3d 890, 894 (8th Cir. 2004); *see also Hudson River Sloop Clearwater, Inc. v. Dep't of Navy*, 836 F.2d 760, 763-64 (2d Cir. 1988). By contrast, when each project (e.g., an ongoing salmon transportation program and proposed river flow improvement measures) would have taken place with or without the other and "could exist without the other, although each would benefit from the other's presence", the projects thus have "independent utility" and need not be considered together in a single EIS. *NRIC*, 56 F.3d at 1068-69 (9th Cir. 1995), citing *Sylvester v. United States Army Corps of Eng'rs*, 884 F.2d 394, 400 (9th Cir. 1989).

[43] *Neighbors of Cuddy Mountain v. U.S. Forest Service*, 137 F.3d 1372, 1380 (9th Cir. 1998), citing *City of Tenakee Springs v. Clough*, 915 F.2d 1308, 1313 (9th Cir. 1990) (emphasis in original).

[44] *LaFlamme v. FERC*, 852 F.2d 389, 400 (9th Cir. 1988).

[45] 509 F.2d 1276, 1285 (9th Cir. 1974).

[46] 514 F.2d 1106, 1110 (9th Cir. 1975).

[47] 753 F.2d 754 (9th Cir. 1985) ("*Thomas*").

[48] *Id.* at 758.

[49] *Id.* at 759-60.

[50] *Id.* at 759.

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> A central purpose of an EIS is to force the consideration of environmental impacts in the decisionmaking process. … That purpose requires that the NEPA process be integrated with agency planning "at the earliest possible time," 40 C.F.R. § 1501.2, and the purpose ***cannot be fully served if consideration of the cumulative effects of successive, interdependent steps is delayed until the first step has already been taken.***[51]

In *Blue Mountains Biodiversity Project v. Blackwood*,[52] the plaintiffs argued that the Forest Service had failed to consider the cumulative effects of several timber sales in a fire-ravaged portion of the Umatilla National Forest. Following the fire, the Forest Service proposed five logging projects in the same watershed, but performed no assessment of the combined impact of these projects.[53] Importantly, these five projects were to proceed together part of what the Forest Service itself acknowledged was a "coordinated [fire] recovery strategy."[54] Furthermore, the nature of all five logging projects was known in advance of the preparation of each project's environmental assessment: all five sales had been disclosed to logging companies, with estimated sale quantities and timelines, before the environmental assessment at issue had even been prepared.[55] The Ninth Circuit found the five potential logging projects were cumulative and had to be evaluated in a single EIS, because they were reasonably foreseeable and "developed as part of a comprehensive forest recovery strategy."[56]

EC1-14a cont'd

In *Klamath-Siskiyou Wildlands Center v. Bureau of Land Management*,[57] BLM had divided an integrated timber-sale project into four component timber sales, preparing EAs for only two of the sales. The court held that a "Cumulative Effects" section of more than a dozen pages in an EA was inadequate because it discussed the direct effects of the sale at issue on its own minor watershed rather than the combined effects of all sales on all watersheds, and failed to provide objective quantification of the combined environmental impacts.[58] In addition, BLM failed to consider other known, comparable, and concurrent projects that were proceeding in the permitting process in the same watershed.[59] The Ninth Circuit held that the two EAs were "legally insufficient" and did not satisfy the requirements of NEPA because they did not "sufficiently identify or discuss the incremental impact that can be expected from each successive timber sale, or how

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[51] *Id.* at 760 (emphasis added), citing *Columbia Basin Land Protection Ass'n v. Schlesinger*, 643 F.2d 585 (9th Cir. 1981); *City of Davis v. Coleman*, 521 F.2d 661 (9th Cir. 1975); *Lathan v. Brinegar*, 506 F.2d 677, 693 (9th Cir. 1974) (en banc); *Calvert Cliffs' Coordinating Committee v. AEC, Inc.*, 449 F.2d 1109, 1113-1114 (D.C. Cir. 1971).

[52] 161 F.3d 1208 (9th Cir. 1998), cert. denied, *Malheur Lumber Co. v. Blue Mountains Biodiversity Project*, 527 U.S. 1003 (1999).

[53] *Id.* at 1214-15.

[54] *Id.* at 1215.

[55] *Id.*

[56] *Id.*

[57] 387 F.3d 989 (9th Cir. 2004) ("*Klamath-Siskiyou*").

[58] *Id.* at 994.

[59] *Id.* at 995.

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those individual impacts might combine or synergistically interact with each other to affect the . . . environment."[60]

In *Te-Moak Tribe of Western Shoshone of Nevada v. DOI*,[61] the Ninth Circuit addressed a mining company's amendment of a plan of operations for an existing phased mineral exploration project. The EA for the amendment "tiered" to the EA for the original exploration project, in which the direct impacts of the exploration activities were analyzed. The court compared the amendment EA to the EAs at issue in *Klamath Siskiyou*, and found that although BLM took a hard look at the direct impacts in the amendment EA, and although its discussion of reasonable alternatives was proper, BLM violated NEPA by failing to conduct a proper analysis of the *cumulative impacts* of the amendment and other existing and foreseeable projects in the area.[62]

EC1-14a cont'd

The court found inadequate the EA's discussion of the amendment's direct effects in lieu of a discussion of cumulative impacts.[63] The court also concluded that, in order for plaintiffs to demonstrate that the BLM failed to conduct a sufficient cumulative impact analysis, they need not show definitively what cumulative impacts *would* occur, because to hold otherwise "would require the public, rather than the agency, to ascertain the cumulative effects of a proposed action" and such a requirement "would thwart one of the 'twin aims' of NEPA – to 'ensure[ ] that the *agency* will inform the *public* that it has indeed considered environmental concerns in its decisionmaking process.' Instead, we conclude that Plaintiffs must show only the potential for cumulative impact."[64]

As set forth in the Settlement, Phases 1 and 2 are "necessary to fully achieve the Restoration Goal" and that Reclamation "shall promptly commence activities pursuant to applicable law and provisions of this Settlement to implement." Settlement at ¶¶ 9, 11. The Act gave this statement the force of law, "authorizing and directing" Reclamation to "[d]esign and construct channel and structural improvements as described in paragraph 11 of the Settlement". Act at Sec. 10004. Yet, the Act did not authorize the SJRRP to proceed without first complying with NEPA. Section 10006 of the Act explicitly requires Reclamation to comply with NEPA in undertaking the measures in the Act.

EC1-14b

The Draft PEIS/R defines the "environmental baseline" as "Detailed information about habitat conditions and species populations that exist before a project begins." Draft PEIS/R, Glossary and Reader's Guide at Appendix C, 1-15. The Draft PEIS/R defines "without-project conditions" as a "planning baseline for alternatives comparison that is developed by projecting into the future the effects of reasonably foreseeable changes on existing physical, biological, cultural, and socioeconomic conditions. In [NEPA] documents, the future without-project condition is the same as the No-Action Alternative, which represents reasonably foreseeable future conditions without the project or action." Draft PEIS/R, Glossary and

[60] *Id.* at 997.

[61] 608 F.3d 592 (9th Cir. 2010) ("*Te-Moak*").

[62] *Id.* at 602-07. The court affirmed the district court's denial of plaintiffs' motion for summary judgment on the National Historic Preservation Act ("NHPA"), and the Federal Land Policy and Management Act ("FLPMA") claims.

[63] *Id.* at 604.

[64] *Id.* at 605, citing *Balt. Gas & Elec. Co. v. Natural Res. Def. Council, Inc.*, 462 U.S. 87, 97 (1983) (emphasis added in original).

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EC1-14b cont'd

Reader's Guide at Appendix C, 1-47. The Draft PEIS/R also notes that "[m]ost actions to achieve the Restoration Goal are included in all action alternatives (common Restoration actions). *Common Restoration actions would require future, project-specific planning studies and preparation of NEPA and/or CEQA documentation analyzing the effects of implementation.*" Draft PEIS/R, Executive Summary at 27 (emphasis added). The PEIS/R includes Phase 1 and 2 under "common Restoration actions," and lists Phase 1 and 2 actions under a "Program" level NEPA compliance. Draft PEIS/R, Executive Summary, Table ES-5 at 20.

Reclamation's appears to be attempting to treat Phases 1 and 2 as the environmental "baseline" in an attempt to avoid NEPA review of those phases. To do so is a violation of the Settlement, the Act, and its own description of the baseline and the goals of the SJRRP. Reclamation's attempts to conduct NEPA review only on discrete phases, only on a limited number of actions – excluding the common action, and after the program has commenced, also are in violation of NEPA's prohibition on "piecemealing" or improper "segmentation" of a project.

EC1-14c

b. Impermissible Segmentation Under CEQA.

The above discussion of improper segmentation is equally applicable to DWR pursuant to CEQA. Segmentation of a project is not permissible under CEQA essentially on the same basis that segmentation or piecemealing is not permissible under NEPA. Therefore, we will not repeat the arguments or reasoning set forth above. See *Del Mar Terrace Conservancy, Inc. v. City Council* (1992) 10 Cal. App. 4th 712 and *City of Santee v. County of San Diego* (1989) 214 Cal. App. 3d 1438.

EC1-15a

3. Reclamation and DWR Have Defined The Project's Purpose And Need Too Narrowly, Improperly Foreclosing The Required Analysis of Alternatives Under NEPA and CEQA.

a. Reclamation Has Defined The Project's Purpose And Need Too Narrowly.

NEPA and its implementing regulations state that discussion of alternatives to the proposed action forms "the heart of the environmental impact statement."[65] The evaluation of project alternatives is derived from the required "Purpose and Need" section of an EIS, which defines "the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action."[66] Courts have afforded agencies considerable discretion to define the "purpose and need" of a project, which is evaluated under a reasonableness standard.[67] The stated goal of a project therefore dictates the range of "reasonable" alternatives,[68] and thus an agency cannot define its objectives in unreasonably narrow terms,[69] because to do

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[65] 42 U.S.C. § 4332(2)(C)(iii); 40 C.F.R. § 1502.14.

[66] 40 C.F.R. § 1502.13.

[67] *See, e.g. Friends of Southeast's Future v. Morrison*, 153 F.3d 1059, 1066 (9th Cir. 1998).

[68] *See, e.g., Ctr. for Sierra Nev. Conservation v. United States Forest Serv.*, 2011 U.S. Dist. LEXIS 56571 (E.D. Cal. 2011) (scope of "viable" or "reasonable" alternatives is determined by the purpose and need statement articulated by the agency); *'Ilio'Ulaokalani Coalition v. Rumsfeld*, 464 F.3d 1083, 1097 (9th Cir. 2006) ("The scope of reasonable alternatives that an agency must consider is shaped by the purpose and need statement articulated by that agency."); *Nw. Coalition for Alternatives to Pesticides (NCAP) v. Lyng*, 844 F.2d 588, 592 (9th Cir. 1988) ("[I]t is the scope of the program that influences any determination of what alternatives are viable and reasonable.").

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so would constitute an abuse of discretion. Furthermore, an agency issuing an EIS must "*rigorously explore and objectively evaluate* all reasonable alternatives," and "include reasonable alternatives *not within the jurisdiction of the lead agency*."[70] The existence of a "viable but unexamined alternative renders an environmental impact statement inadequate."[71]

In *Citizens Against Burlington, Inc. v. Busey*,[72] the U.S. Court of Appeals for the D.C. Circuit discussed the issue of project alternatives and deference to the agency's definition of objectives.[73] The Court explained:

> Deference, however, does not mean dormancy, and the rule of reason does not give agencies license to fulfill their own prophecies, whatever the parochial impulses that drive them. Environmental impact statements take time and cost money. Yet an agency may not define the objectives of its action in terms so unreasonably narrow that only one alternative from among the environmentally benign ones in the agency's power would accomplish the goals of the agency's action, and the EIS would become a foreordained formality. Nor may an agency frame its goals in terms so unreasonably broad that an infinite number of alternatives would accomplish those goals and the project would collapse under the weight of the possibilities.[74]

EC1-15a cont'd

The court emphasized an agency's scrutiny of its own definition of "purpose," especially considering the views of other parties when the agency is asked to sanction a specific plan, or the views and intent of Congress when the agency is statutorily authorized to act.[75] The court in particular cited *Izaak Walton League of Am. v. Marsh*, an earlier decision of the D.C. Circuit that noted "[w]hen Congress has enacted legislation approving a specific project, the implementing agency's obligation to discuss alternatives in its environmental impact statement is relatively narrow."[76]

Reclamation thus attempts to use the Act and the concept of deference as twin shields against further review of alternatives. Appendix G of the Draft PEIS/R contains the "Plan Formulation" for the SJRRP, in

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[69] *See City of Carmel-by-the-Sea v. United States DOT*, 123 F.3d 1142 , 1155 (9th Cir. 1997).

[70] 40 C.F.R. § 1502.14(a) and (c) (emphasis added).

[71] *Morongo Band of Mission Indians v. Fed. Aviation Admin.*, 161 F.3d 569, 575 (9th Cir. 1998).

[72] 938 F.2d 190, 194-6 (D.C. Cir. 1991).

[73] *Id.* at 194-95, citing *Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc.*, 435 U.S. 519, 551 (1978); 40 C.F.R. §§ 1502.14(a)-(c), 1508.25(b)(2); Forty Most Asked Questions Concerning CEQ's NEPA Regulations, 46 Fed. Reg. 18,026, 18,026 (1981); *North Slope Borough v. Andrus*, 642 F.2d 589, 601 (D.C. Cir. 1980); *Natural Resources Defense Council, Inc. v. Morton*, 458 F.2d 827, 834, 837 (D.C. Cir. 1972); *Alaska v. Andrus*, 580 F.2d 465, 475 (D.C. Cir. 1978); *Allison v. Department of Transp.*, 908 F.2d 1024, 1031 (D.C. Cir. 1990).

[74] *Id.*, citing *City of New York v. Department of Transp.*, 715 F.2d 732, 743 (2d Cir. 1983).

[75] *Id.*, citing 40 C.F.R. § 1508.18(b)(4); *Louisiana Wildlife Fed'n v. York*, 761 F.2d 1044, 1048 (5th Cir. 1985); *Roosevelt Campobello Int'l Park Comm'n v. EPA*, 684 F.2d 1041, 1046-47 (1st Cir. 1982); *City of New York v. Department of Transp.*, 715 F.2d 732, 743-45 (2d Cir. 1983); *Izaak Walton League of Am. v. Marsh*, 655 F.2d 346, 372 (D.C. Cir. 1981), cert. denied, 454 U.S. 1092 (1981).

[76] *Id.*, citing *Izaak Walton League of Am. v. Marsh*, 655 F.2d 346, 372 (D.C. Cir. 1981), cert. denied, 454 U.S. 1092 (1981).

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which Reclamation indicates its view that the actions proposed in the Settlement and the Act are sacrosanct: "The Settlement and the Act authorize and direct *specific physical and operational actions* that could potentially directly or indirectly affect environmental conditions in the Central Valley. … The project-level actions addressed in the PEIS/R include *actions to be undertaken* by Reclamation, and the effects of these actions are the sole responsibility of Reclamation." Draft PEIS/R, App. G at 1-2 (emphasis added).

EC1-15a cont'd

Although Reclamation states that the Plan Formulation "describes the development of alternatives evaluated in the PEIS/R", Reclamation also states clearly that the **purpose** of the proposed action "is *to implement the Settlement* consistent with the Act", and that the Settlement specifies the **need** for the proposed action, "which requires changes to the operation of Friant Dam in support of achieving the Restoration Goal while reducing or avoiding adverse impacts to Friant Division long-term contractors' water deliveries caused by releasing Interim or Restoration flows in support of achieving the Water Management Goal."[77] Reclamation does not acknowledge that it violated NEPA's timing requirements by releasing those Interim Flows in 2009, *see id.* at 1-4, prior to completing a final PEIS/R on the SJRRP, or that such a timing violation also violates the NEPA regulations' requirement that an EIS contain an evaluation of alternatives to the proposed project.[78] Most importantly, Reclamation boldly states that the Draft PEIS/R "evaluates alternative approaches to implement the provisions of the Settlement, but *does not evaluate alternatives to the Settlement* other than the required No-Action Alternative" and, as if to explain its refusal, states that the "Settlement identified *specific actions to be implemented* in achieving the Restoration and Water Management goals." Draft PEIS/R, App. G at 1-7 (emphasis added).[79]

EC1-15b

Almost as an aside, Reclamation includes a short statement of issues to be resolved, including an assessment of additional simulations being prepared to determine the impacts of program alternatives under the 2008 USFWS CVP/SWP Operations BO and the 2009 NMFS CVP/SWP Operations BO. Draft PEIS/R at ES63. Reclamation states that the results of this assessment – which *will be provided in the final PEIS/R* – may change the anticipated effects of the alternatives, but that the relative impacts and overall impact mechanisms are not anticipated to change with the results of the assessment. An assessment of alternatives that will not be available until the final PEIS/R deprives the public of the opportunity to review and comment on such alternatives, in clear violation of the very purpose of NEPA's EIS requirement – to ensure that an agency has information to make its decision and that the public receives information so it might also play a role in the decision making process.[80]

[77] The Exchange Contractors submit that the project purposes should be described as "restoring salmon to the Upper San Joaquin River and recovering as much of the water used to benefit the Friant Division long-term contractors, subject to other priorities."

[78] *See* 40 C.F.R. 1502.14.

[79] At ES60, Reclamation references the SJRRP 2008 Initial Program Alternatives Report ("IPAR") that allegedly discusses why some alternatives were considered and eliminated. Yet, the IPAR only considers some alternatives that in actuality have, in most cases, little to do with the SJRRP. What the IPAR failed to consider were alternatives to the Phase 1 and Phase 2 projects or the flow hydrographs. Further, to the extent Reclamation and DWR are relying on the IPAR to justify a narrow view of alternatives, the IPAR should have been thoroughly discussed in the draft PEIS/R.

[80] *See, e.g., DOT v. Public Citizen*, 541 U.S. 752, 768 (2004).

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EC1-15c

Similarly, the Draft PEIS/R includes a chapter discussing "areas of known controversy" required pursuant to CEQA Guidelines Section 15123(b).[81] Draft PEIS/R at ES61. The chapter mentions that, information acquired since signing the Settlement "indicates that current channel capacities in the Restoration Area may not be sufficient to convey full Restoration Flows. Additional information is needed to better understand the integrity of banks and levees throughout the Restoration Area. Collecting and analyzing this data may take years to complete. Therefore, it may take longer to achieve full Restoration Flows than was anticipated in the Settlement. It is possible that the Settlement could be implemented in a manner consistent with the Act, and the purpose of the project thereby achieved, without the release of the maximum Restoration Flows." This concession that the flow hydrographs must be analyzed at their given level *and* at lower levels – an assessment that Reclamation concedes will take several studies and several years to complete – constitutes an alternative that warrants environmental review, and much more detailed analysis than currently found in the Draft PEIS/R. Draft PEIS/R at ES61-62.

EC1-15d

Although the Ninth Circuit consistently has found agency analysis of project alternatives to be reasonable,[82] the draft PEIS/R is distinguishable from cases in which parties challenged an agency's analysis of project alternatives as inadequate, in that Reclamation states unequivocally that the Draft PEIS/R *does not consider* alternatives to the Settlement. Reclamation claims that the project purpose is "to implement the Settlement." By narrowly defining the purpose and need in this manner, and by then refusing to examine alternatives to the defined purpose and need, Reclamation prepared an inadequate environmental review that aims to be an impermissibly "foreordained formality." Furthermore, even though implementation of the Settlement has been directed by an Act of Congress, that same Act also requires NEPA compliance. Reclamation's outright refusal to consider any alternatives to "implementation of the Settlement" does not even meet the "relatively narrow" consideration obligation for projects directed by Congress as discussed in *Izaak Walton League*. There has not been a "narrow" consideration of alternatives – there has been *no* consideration of alternatives[83]. Reclamation does not even briefly discuss alternatives other than the actions already set forth in the Settlement, impermissibly constraining the environmental review process and thereby compounding its preexisting NEPA violations.

EC1-15e

b. *DWR Also Has Defined an Overly Narrow Statement of Purpose and Need.*

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[81] CEQA Guidelines Section 15123(b) requires that an executive summary identify "areas of controversy known to the lead agency including issues raised by agencies and the public." Significantly, this section in the Draft PEIS/R does not identify the legal ability to use the flood control channel, litigation regarding 4B, water quality impacts, shortages to the CVP Westside Contractors, lack of money, or sequencing of the Phase 1 and Phase 2 projects.

[82] *See, e.g., Nat'l Parks & Conservation Ass'n v. BLM*, 606 F.3d 1058 (9th Cir. 2010); *Westlands Water Dist. v. United States DOI*, 376 F.3d 853 (9th Cir. 2004); *Friends of Southeast's Future v. Morrison*, 153 F.3d 1059, 1066 (9th Cir 1998) ; *City of Carmel-By-The-Sea v. United States DOT*, 123 F.3d 1142, 1155 (9th Cir 1997). The Tenth Circuit also is in accord. *See, e.g., Biodiversity Conservation Alliance v. BLM*, 608 F.3d 709 , 714-15 (10th Cir. 2010); *New Mexico ex rel. Richardson v. Bureau of Land Mgmt.*, 565 F.3d 683, 709 (10th Cir. 2009); *Davis v. Mineta*, 302 F.3d 1104, 1119 (10th Cir. 2002); *Citizens' Comm. to Save Our Canyons v. U.S. Forest Serv.*, 297 F.3d 1012, 1030 (10th Cir. 2002); *Airport Neighbors Alliance, Inc. v. United States*, 90 F.3d 426, 432 (10th Cir. 1996).

[83] The consideration of points of recapture of flows and the flow capacity alternatives at Reach 4B are small elements of the SJRRP and cannot be argued to constitute an alternatives analysis.

Just as NEPA prohibits and overly narrow statement of the purpose and need for a project, so too does CEQA. Again, a discussion of applicable CEQA law is truncated here due to the similarity of the legal infirmity. Nevertheless, the holding in *In Re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings*[84] is instructive. In the Bay-Delta Cases, the Supreme Court stated:

EC1-15e cont'd

> Although a lead agency may not give a project's purpose an artificially narrow definition, a lead agency may structure its EIR alternative analysis around a reasonable definition of underlying purpose and need not study alternatives that cannot achieve that basic goal. For example, if the purpose of the project is to build an oceanfront resort hotel … or a waterfront aquarium … , a lead agency need not consider inland locations.[85]

DWR is not a party to the Settlement. If a court were to find that Reclamation can avoid a more robust NEPA analysis by virtue of having signed the Settlement, the same is not true for DWR. Rather, DWR stands alone and must make its own independent analysis of the environmental impacts of the SJRRP. DWR has no "obligation" to implement the Settlement or the Act. Rather, DWR is assisting Reclamation in implementing the SJRRP. But, DWR does have an obligation to consider project alternatives that may accomplish the basic project objectives, but not necessarily all project objectives.[86] The primary goals of the SJRRP are to restore the San Joaquin River for spring run Chinook salmon and to recapture restoration flows for the benefit of the Friant contractors. Hence, DWR should consider alternatives to the Phase 1 and Phase 2 projects, as well as the hydrographs.

[84] 43 Cal.4th 1143 (Cal. 2008) (Bay-Delta Cases).

[85] *Id.* at 1167 (internal citations omitted).

[86] "The CEQA Guidelines state that an EIR must "describe a range of reasonable alternatives to the project ... which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project . . . ." (Cal. Code Regs., tit. 14, § 15126.6, subd. (a).) An EIR need not consider every conceivable alternative to a project or alternatives that are infeasible." *Id.*, at 1163.

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II. Specific Comments to Draft PEIS/R, including appendices

EC1-16a

A. <u>Overall Comments</u>

1. All comments are applicable to Reclamation and to DWR. While the Exchange Contractors recognize that not all actions are undertaken jointly, since this is a joint PEIS/R, the Exchange Contractors have not attempted to disaggregate the comments as between Reclamation and DWR.

EC1-16b

2. Table ES-2 at page ES4 contains key Settlement milestones:

Interim flows: October 2009
Reintroduction of spring run and fall run: December 2012
Complete Phase 1 improvements: December 2013
Initiate full Restoration Flows: January 2014
Complete Phase 2 improvements: December 2016

Yet, the Draft PEIS/R does not acknowledge that the schedule is unattainable and that the SJRRP must be revamped to reflect the delay in the schedule and the underfunding that has occurred.

EC1-17

3. The Draft PEIS/R fails to analyze a sufficient range of alternatives. The only actions analyzed in the Draft PEIS/R are:

No action alternative
Alternative A1: Reach 4B1 at 475 cfs, Delta Recapture
Alternative A2: Reach 4B1 at 4,500 cfs, Delta Recapture
Alternative B1: Reach 4B1 at 475 cfs, San Joaquin River Recapture
Alternative B2: Reach 4B1 at 475 cfs, San Joaquin River Recapture
Alternative C1: Reach 4B1 at 475 cfs, New Pumping Plant Recapture
Alternative C2: Reach 4B1 at 4,500 cfs, New Pumping Plant Recapture

All other actions are considered "common action." The Draft PEIS/R should analyze the so-called common actions as well.

EC1-18

4. Potential waste of water:

If Restoration Flows are not released beginning January 1, 2014, the Secretary would bank, store, exchange, transfer, or sell water, or release the water from Friant during times of the year other than those specified in the applicable hydrograph. This last provision appears to be a waste of water since it would serve no useful purpose.

EC1-19

5. Figure ES-4 sets forth the flow schedule. Only in the wettest years is there a pulse flow of 4,000 cfs from April 16 – May 1 and then 2,000 cfs of flow from May 1 – July 1. In normal–wet years, flows ramp up to 4,000 cfs and then starting May 1, drop it to 350 cfs through the summer. In normal dry years flows ramp up to 2,500 cfs and from April 16 onward drop to 350 cfs. Adult migration occurs in the

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EC1-19 cont'd January – April timeframe and adult holding occurs during the summer base flow period of roughly April 1 – October 1. Fry and juvenile rearing occurs all year. Out migration occurs September 1 – June 30.

As is evident, the higher flows will occur primarily in wet cycles. During these wet cycles there are typically high natural flows in the San Joaquin River. The Draft PEIS/R should analyze an alternative that relies on naturally occurring high flows to provide attraction, outmigration and gravel mobilization flows.

EC1-20 6. With regard to the Physical Monitoring and Management Plan description for seepage monitoring and management component, the draft identifies the objective as to "reduce or avoid adverse or undesirable groundwater seepage impacts." (ES29) Reduction is unacceptable. Seepage must be reduced such that there are no material adverse impacts. (Act at Sec. 10004(h)(3))

EC1-21 7. The Exchange Contractors are concerned that the introduction and management of non-salmonid sensitive resources in the Restoration Area may negatively affect otherwise lawful land uses. Adjacent landowners need formal and lasting agreements with resource agencies to provide assurances against prosecution for sensitive resource impacts incurred during otherwise lawful activities

B. <u>Specific Comments</u>

EC1-22 Executive Summary

ES3 – Tributaries to the San Joaquin River specifically need to include the Kings River flood water through the Fresno Slough and the westside stream that discharges to the Pool, Panoche-Silver Creek.

EC1-23 ES5 – Sediment removal proposal. It is not clear the proposal includes removal of sediment from the Fresno Slough side of the Mendota Pool. Failure to remove sediments adequately from that area could compromise the ongoing integrity of the San Joaquin River effort. Stored sediments in that area of the Pool could be mobilized by future flood events from the Kings River and based on the type of sediment, sand, or silt, could recreate flow restrictions, smother benthic food sources for migrating salmon, adversely impact facilities (rendering them inoperable) and generally impede the overall success of the Program.

EC1-24 Table ES-3 – Add water quality to the monitoring wells.

EC1-25 Table ES-4 – Add compliance with the Porter-Cologne Act for discharges of agricultural return water, if necessary.

EC1-26 ES17 – Need to acknowledge the need to convey flood water of 4500 cfs from the Kings River flood system, and as a result portions of Mendota Pool that are not currently part of the 2B stretch need to be included as part of the Program and PEIS/R. Levees in the Mendota Pool area also need assessment and likely improvements, because depending on the design of the Reach 2B By-pass project levee failure could adversely impact the Restoration Flows, the Project facilities and/or the adjacent environments, including the Mendota Wildlife Refuge.

Chapter 1. Introduction.

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EC1-27 Page 1-1. Line 25. The San Joaquin River Restoration Settlement Act is the cornerstone of the entire San Joaquin River Restoration Program. Section 10004(d)(2) of the Act specifies that the Secretary shall identify "the measures with shall be implemented to mitigate impacts on adjacent and downstream water users and landowners." As such the following should be added: "as required by NEPA, CEQA, and Section 10004(d)(2) of the San Joaquin River Restoration Settlement Act" after the word "impacts".

EC1-28 Page 1-3. Line 6. Add "Section 10004(d)(2) of the San Joaquin River Restoration Settlement Act also requires that the Secretary identify the measures that shall be implemented to mitigate impacts on adjacent and downstream water users and landowners." as a new sentence after the word "Alternatives".

EC1-29 Page 1-4. Line 1. Section 1.1.1. Table 1-1 identifies restoration and water management actions. The reference is to Settlement Paragraph 11: "Identify specific channel and structural improvements **considered necessary** to achieve the Restoration Goal." (Emphasis added.) Settlement Paragraph 12 "Acknowledges that additional channel or structural improvements not identified in Paragraph 11 may be **needed to achieve** the Restoration Goal." Both Settlement Paragraphs 11 and 12 identify improvements that are necessary to achieve the Restoration Goal. Yet, the fish agencies have stated that if the Paragraph 11 and 12 facilities are not in place, they will seek to "work around" this deficiency. Under the schedule set forth in the Settlement, fish are not to be reintroduced until the Phase 1 improvements are nearly complete. Since the Paragraph 11 and 12 facilities are necessary to achieve the Restoration Goal, then they are necessary for the protection of salmon, such that the fish will not be either entrained, migrate up false pathways, or otherwise suffer a demise due to lack of infrastructure protection. Does Reclamation intend to allow introduction of salmonids prior to the substantial completion of Phase 1 actions? If so, which actions, in the view of Reclamation, need not be completed prior to salmon reintroduction? What will happen to the salmon if (a) none of the Phase 1 facilities are not substantially in place by the time salmon are reintroduced, (b) only some of the facilities are substantially in place by the time salmon are reintroduced, or (c) not all of the Phase 1 facilities are substantially in place by the time salmon are reintroduced? For questions (b) and (c) in the previous sentence, which facilities are not essential to (i) meeting the restoration goal, and (ii) are not essential to salmon survival?

The Draft PEIS/R does not evaluate a program where the Phase 1, Phase 2, or other improvements are not constructed and in place consistent with the schedule. Additional analysis will be necessary to determine impacts to the species, river flow pathways, volumes of water to be released for reasonable and beneficial uses, and other environmental impacts.

EC1-30 Page 1-4. Line 3. Section 1.1.2. The Draft PEIS/R states that Table 1-2 shows milestone dates "recommended" in the Settlement. While the Draft PEIS/R also indicates that the implementing agencies are committed to attaining these milestones (1-4:9), it also indicates that these dates may change. (1-4:10-11). If the milestones are merely recommended dates, why has Reclamation not adjusted the schedule in light of the delay in obtaining the implementing legislation? If the milestone dates are merely recommendations, why is reintroduction not delayed until the Phase 1 facilities are substantially complete? The Draft PEIS/R identifies a number of factors that may cause the schedule to slip, including completion of compliance, coordination, consultation, and data collection. Why is lack of funding not identified when this is likely the most important factor that will result in delay of the SJRRP?

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EC1-31 Page 1-5. Line 6. Table 1-2. Table 1-2 identifies key Settlement milestones. Phase 1 improvements are identified for completion by December 2013. At that same time, the Table indicates that the Secretary of the Interior, in consultation with NRDC and FWA, is to develop full operational guidelines for the Phase 1 improvements, and presumably Friant Dam. Consultation with the affected third parties in the Restoration Area should be added into the consultation. These are the parties who will be most affected by the operation of the Phase 1 and Phase 2 facilities. Further, the 4(d) rule will largely focus on agricultural and water diversion activities occurring downstream of Friant Dam. These all need to be coordinated.

EC1-32 Page 1.7. Line 13. Section 1.2. Purpose and Uses of Draft PEIS/R. The Draft PEIS/R states that the purpose of the draft is "to disclose the potential direct, indirect, and cumulative impacts of implementing the Settlement as directed by the Act, consistent with NEPA/CEQA requirements." This statement is incomplete. Not only must NEPA and CEQA requirements be satisfied, but the "NEPA plus" obligations set forth in the Act, at Section 10004(d), also must be included in implementing the Settlement. This section provides that the Secretary of the Interior must mitigate all impacts to third parties. Section 10004(d) provides as follows:

> (d) MITIGATION OF IMPACTS.—Prior to the implementation of decisions or agreements to construct, improve, operate, or maintain facilities that the Secretary determines are needed to implement the Settlement, the Secretary shall identify—
> (1) the impacts associated with such actions; and
> (2) the measures which shall be implemented to mitigate impacts on adjacent and downstream water users and landowners.

EC1-33 Section 1.2.2. California Environmental Quality Act. Section 15126.6(a) of the CEQA guidelines requires that an EIR evaluate a reasonable range of alternatives that could "feasibly" attain most of the basic project objectives. In Section 3 of this comment letter, you will find alternatives recommended by the Exchange Contractors. Those alternatives address the schedule of implementation, including construction of Phase 1 and Phase 2 facilities, as well as reintroduction of salmon. Nowhere within the Draft PEIS/R has Reclamation or DWR evaluated the feasibility of this program based upon financial reality. Ability to pay for a project is a key component of feasibility.

EC1-34 Page 1-10. Line 14. Section 1.2.3. Type of Environmental Document. The draft PEIS/R states that the draft "provides broad direction for a wide range of possible future actions while allowing the opportunity for flexibility to respond to changing needs and conditions." In fact, when viewing the range of possible future actions, they are remarkably narrow. The only substantial differences in alternatives being analyzed are a flow of 450 cfs or 4,500 cfs through Reach 4B and one of three possible points of rediversion or recapture of flow for the benefit of the Friant Contractors. In terms of the SJRRP, this means that the only action, of all the actions being considered where there is an alternative, is whether or not to increase the capacity of Reach 4B to 475 cfs or 4,500 cfs. To contend that a wide range of possible future actions is being assessed fails the straight face test. Reclamation should be looking at a full range of options. Currently, flows below Sack Dam must be kept below 50 cfs to avoid seepage impacts. This is one alternative that should be considered. Further, Reclamation has not established that it has a legal right to use

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EC1-34 cont'd

the Chowchilla, Mariposa, and Eastside Bypasses. In the event that a court finds that Reclamation does not have the authority to use those bypasses for flood control purposes, Reclamation must develop a program that does not use those bypasses. Further, if Reclamation cannot acquire sufficient funds to expand Reach 4B, the program must also consider that eventuality. In fact, that eventuality is the current circumstance. Reclamation has no money to expand 4B to 475 cfs or 4,500 cfs. Further, among the options considered by Reclamation's value engineering exercise is the use of the San Joaquin River rather than a by-pass to move fish downstream. This option should be considered as well.

EC1-35

Page 1-11. Line 10. The Draft PEIS/R states that water supplies will be made available to Friant Division long-term contractors at a "pre-established rate". It appears that the recapture of water will be opportunistic and depend upon year type and regulatory conditions. What is meant by a pre-established rate?

EC1-36

Page 1-11. Line 11. The Draft PEIS/R states that additional funding will be provided to support additional maintenance activities on a variety of actions. Given that Reclamation is currently out of money for this program (with only $40 million remaining and an approximately $20 million per year spend rate, Reclamation will be out of money by the end of 2013 and will not have constructed a single facility), where will Reclamation get these funds? Reliance on the effort by Senator Feinstein is uncertain, particularly given the resistance in the House of Representatives and the likelihood of a continuing resolution rather than a budget. How much has Reclamation estimated as necessary to meet these additional activities? Reclamation has not analyzed the impact of failure to have sufficient funds to perform all maintenance activities.

EC1-37

Page 1-11. Lines 18-20. Draft PEIS/R includes a more detailed project level analysis of "removing vegetation and sediment by mechanical or chemical means that would cause Interim or Restoration flows to exceed channel capacity (Reclamation action)." Immediate and long-term actions associated with maintaining channel capacities are outlined in Draft PEIS/R Appendix D (Physical Monitoring and Management Plan), chapters 4 and 5. The document needs to provide a more detailed description of how and when these actions would be implemented.

EC1-38

Page 1-12. Line 1. Table 1-3. Table 1-3 sets forth compliance, consultation and coordination efforts that are supported by this Draft PEIS/R. The table fails to identify the 4(d) rule under applicable laws, regulations, permits. Also, under the water rights category, Water Code sections 1707 and 1735 should be listed.

EC1-39

Page 1-13. Section 1.3 identifies the relationship of the Draft PEIS/R to other SJRRP environmental documents. The flow recapture EAs are omitted and should be included.

EC1-40

Page 1-13. Line 25. Section 1.4 identifies the purpose and need for the action and project objectives. The purpose of the proposed action is described as being "to implement the Settlement consistent with the Act." While the law recognizes that Reclamation and DWR may define the purpose and need for the action, both NEPA and CEQA require that the purpose not be so narrowly defined as to avoid meaningful environmental review. Here, Reclamation and DWR have taken a position that the Settlement is the only alternative that may be analyzed. This is too constrained a view of the alternatives requirement. A more appropriate purpose for the project would be to achieve establishment of spring run Chinook salmon (SRCS) and the Water Management Goal. How restoration of SRCS is accomplished should be broadly considered.

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EC1-41 Page 1-14. Line 2. Section 1.4 Purpose and Need for Action and Project Objectives. Add "1)" before the word "reducing".

EC1-42 Page 1-14. Line 4. Add "2) identifying the measures which shall be implemented to mitigate impacts on adjacent and downstream water users and landowners" after the word "Goal".

EC1-43 Page 1-14. Line 6. Section 1.4 Purpose and Need for Action and Project Objectives. Add "Identify the measures which shall be implemented to mitigate impacts on adjacent and downstream water users and landowners" as a new separate bullet.

EC1-44 Page 1-14. Line 32 Add "and identifying the measures which shall be implemented to mitigate impacts on adjacent and downstream water users and landowners" after the word "flows".

EC1-45 Page 1-15. Line 21. Section 1.5 concerns responsibilities of lead agencies, etc., and identifies that DWR, as the CEQA lead agency, may make a statement of overriding considerations if needed. A statement of overriding considerations is unacceptable in that the legislation requires that impacts be fully mitigated. While the legislation identifies NEPA, given that this is a joint document, the obligation falls upon the Secretary to mitigate such impacts.

EC1-46a <u>Chapter 2. Description of Alternatives</u>

Page 2-1. Line 12. The Draft PEIS/R provides "program-level NEPA/CEQA analysis for required actions identified in the Settlement, and project-level NEPA/CEQA analysis for the reoperation of Friant Dam and other actions associated with the release and recapture of Interim and Restoration Flows using existing facilities." Since this Draft PEIS/R analyzes at a program level all actions required in the Settlement, where is the analysis of the Phase 1 and Phase 2 projects? Where is the analysis of the level of Restoration Flows? Where is the analysis of already experienced downstream impacts to landowners?

EC1-46b To define the range of potential implementation of physical actions to achieve the restoration and water management goals, the "Initial Program Alternatives Report" (IPAR) (SJRRP 2008) and Appendix G, "Plan Formulation," were prepared. Since the IPAR is integral to the Draft PEIS/R, it should be included as one of the supporting documents.

EC1-47 Page 2-2. Line 17. Actions to address reoperating Friant Dam and actions to address reintroducing salmon were not described in the IPAR. If those items were not discussed in the IPAR, then they must be discussed in the Draft PEIS/R.

EC1-48 Page 2-2. Line 22. The Draft PEIS/R states that "[b]ecause land access has not been granted to the Implementing Agencies for many key locations in the Restoration Area, despite continued efforts to obtain access, the Implementing Agencies could not initiate studies needed to collect more detailed information about site conditions for developing project-specific plans concurrent with preparation of this Draft PEIS/R." This statement is grossly misleading and must be corrected. First, Reclamation started its negotiations for access with the landowners on a very bad footing. A temporary entry permit had been agreed to. The night of the hearing, Reclamation changed the terms of the TEP without warning. This understandably alienated a number of landowners. Thereafter, the Exchange Contractors and others worked diligently with the

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landowners to craft a TEP that was acceptable. This TEP was in fact used by Reclamation and others to gain access to land. Thereafter, another TEP was desired. Reclamation did not deal in good faith with the landowners for this second TEP, in that Reclamation was unwilling to address data management and privacy issues, it unilaterally inserted "poison pill" language adverse to stake holder interests, and it adopted a "take it or leave it" stance. Thereafter, Reclamation essentially ceased any efforts to develop an acceptable TEP.

Reclamation cannot hide behind its own dilatory and hostile actions to justify its failure to diligently and cooperatively move forward regarding the development of necessary entry permits. Downstream landowners have been remarkably cooperative. This is particularly true in light of the fact that several have been flooded out by Reclamation activities associated with the SJRRP. Yet, none of them have been compensated for their efforts. Rather, Reclamation continues to take the position that it is unable to mitigate such impacts through compensation. Reclamation ignores the provisions within the Act that allow it to enter into cooperative agreements with private individuals. Such a cooperative agreement could allow for the obtaining of a flood or seepage easement that would compensate the landowners for damages to property as well as remediation efforts. Further, Reclamation could have pre-negotiated seepage or flood easements as necessary. Similarly, Reclamation has failed to compensate the Columbia Canal Company for damage to its levee and for loss of income associated with the inability to rent land that has been flooded by the Interim Flows. The offending sentence should either be deleted or rewritten to convey Reclamation's responsibility in its failure to obtain on a timely basis the necessary permits and agreements.

EC1-48 cont'd

In addition to the above, for a substantial period of time Reclamation refused to make use of the Central California Irrigation District (CCID) well monitoring network. This long-established network of monitoring wells was made available to Reclamation by CCID. Eventually, Reclamation included this network information in its database.

Page 2-3. Line 24. In Section 2.2.1, NEPA Requirements, Reclamation cites CEQ regulations regarding requirements for an EIS. Reclamation should also identify Section 10004(d) of the Act which imposes an additional obligation referred to herein as NEPA+. With respect to the CEQ regulations, the NEPA regulations at 40 C.F.R. § 1502.14 (Alternatives including the proposed action) state at the outset that the "analysis of alternatives" section is the "heart" of the EIS. The regulations specify the precision with which alternatives must be analyzed – the analysis should "sharply" define the issues, provide a "clear basis" for choice among options, "rigorously" explore and "objectively" evaluate alternatives, and devote "substantial" treatment to each alternative considered "in detail." Reclamation has engaged in no such precise and thorough analysis of alternatives, but rather has avoided such analysis throughout the Draft PEIS/R, granting essentially no review of the SJRRP other than the smallest of segments, *i.e.* the point of recapture of flows, and, while certainly not insignificant, the capacity of Reach 4B.

EC1-49

In addition, NEPA regulations at 43 C.F.R. Part 46.110 (Incorporating consensus-based management) direct Reclamation to "consider *any* consensus-based alternative(s) put forth by those participating persons, organizations or communities who may be interested in or affected by the proposed action." 43 C.F.R. § 46.110(b) (emphasis added). The regulations note that while there is "no guarantee" that any particular consensus-based alternative will be considered a reasonable alternative or as the preferred alternative, Reclamation "must be able to show that the reasonable consensus-based alternative, if any, is reflected in the

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EC1-49 cont'd evaluation of the proposed action and discussed in the final decision." *Id.* Reclamation has not given meaningful consideration to any alternatives but the Settlement's "recommendations."

EC1-50a Page 2-5. Line 1. Section 2.2 "Overview of Alternatives Evaluated" includes Table 2-1. There is no mention of the Phase 1 and Phase 2 actions that are necessary to implement the Restoration goal. Each of these actions must be evaluated, alternatives identified, and set forth a coherent plan for the implementation of these measures in a manner that demonstrates that the project is feasible.

EC1-50b As phrased, Reclamation has taken an extraordinarily narrow view of this likely $1 billion or more project. Under Reclamation's logic, the only flow alternatives being analyzed are flows routing within Reach 4B and the bypass system at either 475 cfs or 4,500 cfs in Reach 4B, versus use of the bypass system for flows above 475 cfs. Reclamation should also be analyzing a zero flow alternative for Reach 4B and a zero flow usage of the bypass system. Further, the alternatives look at basically three different recapture points for the Restoration Flows. In other words, this entire document limits review to two different flow increments in Reach 4B and three points of recapture of Restoration Flows. Where is the analysis of the rest of the program, including reintroduction of spring-run and fall-run salmon, construction of Phase 1 and Phase 2 actions, the need for subsequent agreements with third party agencies as listed in the recirculation and recapture plan, and other measures necessary to implement the program?

EC1-51 Page 2-7. Line 13. Alternative 1 is described initially as "alternative A1 includes reoperation of Friant Dam, and a range of actions to achieve the Restoration and Water Management Goals." Other actions described under Alternative A1 include flows in Reach 4B1 of at least 475 cfs, the use of the Eastside and Mariposa Bypasses to convey any remaining Interim and Restoration Flows; recapture of flows in the Restoration Area or the Delta using existing diversion facilities; a Physical Monitoring and Management Plan to provide guidelines for observing and adjusting to changes and conditions regarding flow, seepage, channel capacity, propagation of native vegetation, and suitability of spawning gravel; a conservation strategy with management actions necessary to provide a net increase in the extent and quality of riparian and wetland habitats in the Restoration area to avoid reducing the long-term viability of sensitive species and to be consistent with adopted conservation plans. Alternatives A2, B1, B2, C1, and C2 include the same set of actions with the only differences being flows in Reach 4B1 at 4,500 cfs and the location of flow recapture to benefit Friant at either the Delta, on the San Joaquin River, or through the construction of a new pumping plant. (*See* pp. 2-7 and 2-8.) Nowhere within the Draft PEIS/R is there a discussion of the "range of actions to achieve the restoration and water management goals" with the exception of the amount of flow through Reach 4B1 and the recapture locations. Where is there a discussion that compares the utility and obstacles of using either Reach 4B1 as compared to the bypasses; the components of the Physical Monitoring and Management Plan including the guidelines for observing and adjusting changes to conditions regarding flow, seepage, channel capacity, propagation of native vegetation and suitability of spawning gravel? There is no discussion of prior damages resulting from flows, how the program could continue if flows remain constrained, what happens if channel capacity is not increased, what happens if there is insufficient money to construct the Phase 1 and Phase 2 facilities, control vegetation, improve spawning gravels, create enhanced riparian zones and flood plains, and other necessary actions. The same is true regarding the conservation strategy. (*See* comments to paragraph 5).