Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
1163	1	DWR's comments support the Board's changes to the south Delta salinity objectives but also recommends additional changes because of the direct effect on the State Water Project (SWP) operations.	Please see Master response 1.1, General Comments, for responses to comments that provide general support for the plan amendments.
1163	2	Voluntary Agreements DWR strongly supports the Board's consideration of voluntary agreements as an implementation mechanism in the amended WQCP to help achieve the water quality objectives to benefit fish and wildlife. DWR believes that voluntary agreements can provide both flow and non-flow measures that will expedite the Board's successful implementation of the flow objectives and provide durable solutions in the Bay-Delta Watershed. DWR is committed to working with stakeholders interested in voluntary agreements to find effective and timely solutions, and in particular, recognizes the unique contribution that a combination of flow and non-flow measures can make in reaching the Board's overall goals for the Bay-Delta Watershed.	Please see Master Response 1.1, General Comments, and Master Response 2.1, Amendments to the Water Quality Control Plan, for responses to comments by the State Water Board supporting voluntary agreements.
1163	3	South Delta Agricultural Salinity Objectives The Board's proposed amendment of the WQCP Program of Implementation (POI) would update the existing requirements as to the interior south Delta salinity objectives but does not change the assumption that DWR and the U.S. Bureau of Reclamation (Reclamation) have control over water quality in the south Delta. DWR recommends the Board take a broader view and reconsider its assumption, supported by recent studies on sources of salinity in the south Delta, and amend the POI in a manner that meets the updated objectives by allocating responsibility for the objectives to those water users that contribute to south delta water quality degradation.	Please see Master Response 3.3, Southern Delta Water Quality, regarding the responsibility of U.S. Bureau of Reclamation (USBR) and California Department of Water Resources (DWR) in meeting Delta water quality standards.
1163	4	Over the last three decades, DWR has provided technical information and comments to the Board to support analysis of south Delta salinity. As recent as 2014, the Board's Delta Watermaster, DWR, and the South Delta Water Agency met and agreed to engage Dr. Russ Brown of ICF, Inc. to study the salinity patterns and the effects of tidal flows and temporary barriers in the south Delta and to prepare a report documenting the findings. This report Evaluation of Salinity Patterns and Effects of Tidal Flows and Temporary Barriers in the South Delta, was completed in September 2016 and attached to this letter (2016 South Delta Salinity Report, see Attachment C [footnote 2: Also available at: http:l/baydeltaoffice.water.ca.gov/sdb/tbp/web_pg/pub_doc/salinity_report/South%20Delta%20Salinity%20Finai%20Sept%2 02016%20kc%2012.21.16.pdf.]. DWR recommends that the Board consider this report and prior information in its analysis of proposed amendments for the POI to meet the south Delta salinity objectives. DWR believes this information is important in showing that the SWP is not responsible for and lacks control over south Delta salinity conditions, and it is therefore not reasonable to impose responsibilities on DWR for meeting the proposed water quality objectives in the SED and the WQCP amendment, including the POI. The draft POI proposal to change the south Delta spring salinity objective from 0.7 to 1.0 dS/m Electrical Conductivity (EC) is consistent with the conclusions in the 2016 South Delta Salinity Report. The report identifies sources of high salinity water in Paradise and Sugar Cuts and explains how this high salinity water is tidally mixed with the Old River flow and increases the measured EC at the Old River near Tracy Road Bridge water quality compliance station (ORT). The report provides an increased understanding of the south Delta channel	Please see Master Response 3.3, Southern Delta Water Quality, regarding the responsibility of USBR and DWR in meeting Delta water quality standards.

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		flows and salinity patterns, explains the effects of Central Valley Project (CVP) and SWP pumping on south Delta salinity, and demonstrates that export pumping and barrier operations do not increase the measured salinity or the frequency of exceedances. For these reasons, DWR recommends that the Board no longer include DWR and Reclamation as having responsibility for compliance of the ORT station.	
1163	5	DWR recommends expanding the proposed amendment that changes the salinity objectives from 0.7 to 1.0 EC during the April through August irrigation period to include a recognition of water quality degradation in the interior south Delta channels in the remaining non-irrigation months (fall and winter) caused by Delta agricultural drainage. This expanded amendment should include Delta agricultural water users as responsible entities to meet the objectives to address the high salt loading from agricultural soil leaching that typically occurs in the fall and winter months and from high salinity subsurface drainage.[footnote 3: Amending the POI to include other entities besides DWR and Reclamation in the responsibility for meeting the interior south Delta objectives would be consistent with water law decisions. In the State Water Resources Control Bd. Cases (2006) 136 Cal.App.4th 674, 734, Justice Robie indicated that the SWRCB must develop a water quality control plan that is implementable in the water rights administration phase of developing revised standards for the estuary. If the SWRCB allocates responsibility to parties who are unable to meet the objectives, the allocation is illusory and the WQCP cannot be implemented. The Racanelli decision, U.S. v. State Water Resources Control Bd. (1986) 182 Cal.App.3d 82, 150, held that the WQCP process cannot be arbitrary, capricious, or lacking in evidentiary support.] In addition, by continuing the Vernalis EC objective at 1.0 EC in the non-irrigation season and also adding responsibility for degradation downstream of Vernalis to those agricultural water users that discharge in these areas would be consistent with the approach in the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) initiative, which was started in 2006 to assist the Central Valley Regional Water Quality Control Board in working on its long-term planning efforts regarding salinity and nitrate problems. The Board's proposed amendment replaces the three salinity compliance stations in the interior south Delta with three extended channel segments, or reaches, for monitoring and measuring salinity compliance. DWR believes that meeting water quality objectives by channel reach would be very difficult. Salinity changes from in-Delta agricultural diversions and discharges along the reach are difficult to anticipate and are not controlled by DWR. Flows downstream of Vernalis at ORT and at Old River at Middle River are naturally low during the irrigation season, and modeling indicates that almost all of the incoming flow in these areas is diverted by in-Delta uses. In addition, the reduced amount of water returned to the channels by these diversions is of further degraded water quality. DWR recommends that the Board provide additional information on the methods they anticipate could be used to achieve compliance by channel reach. In order to help identify a method to achieve compliance by channel reach, the proposed amended POI requires DWR and Reclamation to complete a "Comprehensive Operations Plan, Monitoring Special Study, and Modeling, Monitoring, and Reporting Plan" that would include locations and methods to assess attainment of the south Delta salinity objectives by channel reach. DWR agrees that it can assist the Board in doing additional studies of the south Delta area but recommends that there is clarification on the purpose of requiring or requesting DWR to perform the studies. DWR suggests that the studies be requested from DWR as an agency partner and not as an entity responsible for the cause of salinity degradation. DWR also recommends deleting the requirement that DWR and Reclamation	Please see Master Response 3.3, Southern Delta Water Quality, regarding the responsibility of USBR and DWR in meeting Delta water quality standards, meeting the water quality objective in the channel reach, and the Comprehensive Operations Plan (COP). Please refer to Appendix K and Master Response 3.3 for discussion of the requirements of the COP. In addition, please see Master Response 3.3, as well as Appendix E, Salt Tolerance of Crops in the Southern Sacramento-San Joaquin Delta, regarding the scientific justification for the salinity objective. Please see Master Response 2.1, Amendments to the Water Quality Control Plan, regarding suggested modifications to the plan amendments.

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		provide an operations plan related to SWP and CVP based on the above comments regarding lack of control of salinity in south Delta channels. Furthermore, DWR believes that the Board already has sufficient data and information to appropriately allocate responsibility for south Delta water quality objectives, whether compliance would be by reach or by fixed location, without requiring DWR and Reclamation perform additional studies.	
1163	6	Narrative and Numeric Flow Objectives DWR staff reviewed the analysis of the narrative and numeric flow objectives to protect fish species in the SJR and its tributaries. DWR recommends using additional and more updated publications and data on various fish species of concern and has included references in Attachment A [see ATT:1]. DWR also recommends that the Board consider a more flexible approach that includes non-flow actions that, in combination with flow, can achieve the desired protections of beneficial uses. For example, as discussed above, voluntary agreements by water users on the SJR tributaries could implement flow and non-flow actions to help achieve fish objectives in these tributaries and the Delta. In addition, the Board should include habitat restoration actions that are proposed by California EcoRestore and the Delta Smelt Resiliency Strategy.	Please see Master Response 1.1, General Comments, for responses to comments that either make a general comment regarding the plan amendments or do not raise significant environmental issues. Please see Master Response 1.1 regarding voluntary agreements. Please see Master Response 5.2, Incorporation of Non-Flow Measures, regarding the incorporation of non-flow measures into the plan amendments and regarding the State Water Board's authority as it relates to non-flow measures. The State Water Board reviewed Ecosystem Restoration Program Projects (i.e., EcoRestore) information in preparation of information contained in Chapter 16, Evaluation of Other Indirect and Additional Actions. The Delta Smelt Resiliency Strategy is specific to Delta Smelt and does not extend geographically into the three eastside tributaries identified in the plan amendments. Additionally, the Resiliency Strategy is not a water quality control plan, and would not establish water quality objectives and consider beneficial uses that rely on the water quality. The State Water Board reviewed best available science in the preparation of the SED, including Chapter 19, Analyses of Benefits to Native Fish Populations from Increased Flow between February 1 and June 30. Please refer to Master Response 3.1, Fish Protection, regarding the use of best available science. The State Water Board reviewed and included a wide variety of peer review studies and data into the development of the plan amendments as well as the response to comments to the SED. In addition, the State Water Board reviewed and considered information provided by commenters during the preparation of this Final SED.
1163	7	DWR recommends that the Board consider updated information on unimpaired and natural flow calculations to aid in its determination of flow objectives. OWR has produced a draft report entitled Estimates of Natural and Unimpaired Flows for the Central Valley of California: Water Years 1922-2014, published in March 2016 [footnote 4: Available at: https://msb.water.ca.gov/documents/86728/a 702a57f-ae7a-41a3-8bff-722e144059d6.] that could be of assistance. The approach within the DWR report takes into consideration vegetative consumptive use, riparian water needs, stream gains and losses, and over-bank toppings during high flow flood events.	Please see Master Response 3.2, Surface Water Analyses and Modeling, regarding the calculation of unimpaired flow.
1163	8	The State's understanding of climate change impacts has substantially improved since the 2006 update of the WQCP [footnote 5: http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/wq_control_plansl2006wqcp/]. DWR recommends adding additional descriptions or explanations of climate change and the changing landscape that would result in sea level rise and changes in hydrologic patterns, and how these changes affect the modeling analysis presented throughout the SED.	The State Water Board used the best available science throughout the SED. A variety of data were obtained for the water quality planning process, including quantitative data from peer-reviewed published literature on topics specific to the plan area; peer-reviewed published literature outside the plan area but on topics relevant to the plan amendments; unpublished quantitative data from within the plan area and from outside of the plan area; qualitative data or personal communication with topical experts; and expert opinion if no other sources. Chapter 14, Energy and Greenhouse Gases, Section 14.2.3, Climate Change, and Section 14.3, Regulatory Background, describe the changes that are expected to occur in the San Joaquin Valley and the Delta as a result of climate change. Climate change is discussed under Impact EG-5 in Chapter 14, Section 14.4.3, Impacts and Mitigation Measures. Please see Master Response 3.2, Surface Water Analyses and Modeling, regarding the modeling of the 82-year period, the adequacy of the model inputs and parameters, and climate change as it relates to the quantitative analysis. Please see Master Response 3.7, Greenhouse Gas Emissions and Analysis regarding quantifying GHG emissions and the scope and approach of the GHG analysis in Chapter 14.

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1163	9	Groundwater Analysis and Flow Objectives DWR recommends adding additional information in the SED regarding evaluation of impacts to groundwater and implementation of the Sustainable Groundwater Management Act (SGMA). The SED acknowledges that groundwater in basins are subject to the SGMA and will be impacted by the increased flow alternatives, some of them significantly. The SED appears to assume that the Groundwater Sustainability Plans can bring the basins to sustainable conditions without consideration of the impact of additional groundwater pumping caused by meeting the proposed alternative flow requirements. In order to help the Board and other entities that may be allocated responsibility for implementing flow objectives, DWR recommends that the SED be updated to include data collected after 2010 to inform an analysis reflective of current groundwater conditions. To assist in this effort, DWR has provided references to recent groundwater data and maps in our comments on SGMA (see Attachment A, page 6, comment G:10.)	Please see response to Comment 1163-23 regarding topics related to groundwater resources, including, but not limited to the approach to the groundwater impact analysis, and the Sustainable Groundwater Management Act.
1163	10	The SED also acknowledges that the proposed alternatives will exacerbate problems and impact groundwater. Some quantification of the impacts in the SED can provide insight into the incremental burden that the adoption of the unimpaired flows would place on the stressed groundwater basins. The SED states the annual average groundwater balance can be expected to be reduced in terms of the equivalent of about 1 inch across each of the sub-basins. It is unclear what this means as the adverse impacts cannot be evaluated or compared when pumping is expressed qualitatively and location specific information is not provided. DWR recommends the amount of additional groundwater extracted to replace the loss of surface water deliveries should be expressed as a volumetric unit such as acre-feet and be location-specific in order to identify where the actual impacts will be.	Please see response to Comment 1163-23 regarding topics related to groundwater resources, including, but not limited to the approach to the groundwater impact analysis, and the Sustainable Groundwater Management Act.
1163	11	Flood Risk Impact Analysis DWR recommends including additional analysis and documentation on potential flooding effects due to the proposed flow objectives to aid in the analysis of impacts. Actions that change the baseline flow conditions should be analyzed carefully to ensure that they do not increase the probability of levee failure. DWR also suggests that sedimentation that has resulted in a reduction of capacity on the SJR be considered in the analysis.	Please see comment responses 1163-70, -73, -74, and -77 regarding flooding, erosion, and sedimentation. Please see Master Response 3.2, Surface Water Analyses and Modeling for discussion regarding the flooding, sediment and erosion analysis.
1163	12	ATT:1: California Department of Water Resources Table of Specific Comments Responses to the Document: September 2016 Recirculated Draft Substitute Environmental Document in Support of Potential Changes to the Water Quality Control Plan for the San Francisco Bay-Sacramento San Joaquin Delta Estuary San Joaquin River Flows and Southern Delta Water Quality (SED) Date: March 17, 2017	The commenter provided this attachment for reference purposes in support of their comments. Those comments are addressed in these responses to comments; therefore, no additional response is required.
1163	13	[From ATT1:] SOUTH DELTA SALINITY REPORT The executive summary and following chapters start with an existing condition that assumes that the California Department of Water Resources (DWR) and the U.S. Bureau of Reclamation (Reclamation) have control over the water quality in the south Delta. However, DWR believes that the SED should update and clarify this assumption using information	The feasibility of controlling salinity in the southern Delta and the appropriateness of current compliance locations will be determined as part of the Comprehensive Operations Plan (COP) and Additional Monitoring Studies described in the Program of Implementation of Appendix K, Revised Water Quality Control Plan. Please refer to Master Response 3.3, Southern Delta Water Quality, for discussion of the COP and Additional Monitoring Studies.

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		from recent studies on sources of salinity in the south Delta. The 2016 South Delta Salinity Report provides information that can help inform the State Water Resources Control Board (Board) on the feasibility of controlling salinity in the south Delta, particularly at the Old River at Tracy Road Bridge compliance station.	
1163	14	[From ATT1:] The South Delta Salinity Report identifies sources of relatively high electrical conductivity (EC) water in Paradise and Sugar Cuts and explains how this higher EC water is tidally mixed with the Old River flow and increases the measured EC at the Tracy Boulevard Bridge station. The report explains the effects of San Joaquin River (SJR) inflows, agricultural diversions and drainage discharges, Central Valley Project (CVP) and State Water Project (SWP) export pumping, tidal flows, and the temporary barriers on tidal flows and EC. The report provides an increased understanding of the south Delta channel flows and salinity patterns, explains the effects of CVP and SWP pumping on south Delta EC, and demonstrates that export pumping does not increase the Old River at Tracy Boulevard EC measurements or the frequency of D-1641 exceedances. The proposed Delta salinity requirement within the SED provides a "relaxation" of the 0.7 EC objective to 1.0 at the interior south Delta channel segments in the summer months and maintains 0.7 EC at Vernalis during these months based on the Salt Tolerance Report that describes salinity needs for crops in the south Delta. During the fall and winter months of the year, when barriers are not in operation, the proposed objectives are 1.0 EC at Vernalis and the interior channel segments. If the Vernalis objective is 1.0 EC during this period, the objectives for the interior locations should be higher (1.3 to 1.4 EC recommended) to account for degradation downstream of Vernalis particularly when fall/winter agricultural leaching activities are discharging to the channels. The degradation at the interior channels certainly will occur and based on data provided by DWR and on the 2016 South Delta Salinity report, that degradation is not caused by DWR operations.	For more information on the responsibilities of DWR and USBR, please see Master Response 3.3, Southern Delta Water Quality. Please see Master Response 2.4, Alternatives to the Water Quality Control Plan Amendments, regarding proposed changes to the numeric salinity objectives.
1163	15	[From ATT1:] DWR DATA AND EXHIBITS DEVELOPED FOR HEARINGS AND WORKSHOPS Chapter 5 of the SED includes DSM2 study results from the 2005 South Delta Improvements Program (SDIP), but they do not address degradation in the interior south Delta. The 2016 SED does not include Delta modeling studies that examine how DWR and Reclamation have caused or impacted the salinity degradation in the interior south Delta. Through the hearings on the Cease and Desist Order and workshops on the southern Delta salinity objectives, DWR has provided information and methodologies that could be helpful. The studies [footnote 3: DWR Exhibits for CDO (http://www.waterboards.ca.gov/waterrights/water_issues/programs/hearings/delta_salinity/exhibits.shtml#dwr) Investigation of factors affecting water quality at Brandt Bridge, Middle River at Union Point, and Old River at Tracy (http://www.waterboards.ca.gov/waterrights/water_issues/programs/hearings/delta_salinity/exhibits/dwr/dwr20.pdf) Modifications of Order WR 2006-0006 Hearing Exhibit List (http://www.waterboards.ca.gov/waterrights/water_issues/programs/hearings/wr2006_0006/exhibits.shtml#dwr) Testimony for the Board Public Hearing on June 25, 2009 Regarding Modeling Project Operations' Effects in the South Delta] look at "with" and "without" scenarios, i.e., with and without pumping and barriers. DWR believes that these studies and the data from the South Delta Salinity Report complement each other and together provide	The information provided in the comment could be used to inform the Comprehensive Operations Plan and Additional Monitoring Studies. Please see Master Response 3.3, Southern Delta Water Quality, for discussion of the responsibilities of DWR and USBR and the Comprehensive Operations Plan.

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		useful tools and methodology for analysis. Additionally, through the Methodology for Flow and Salinity Estimates in the Sacramento-San Joaquin Delta and Suisun Marsh Annual Report to the Board, information has been provided on the effects of barriers and exports on circulation in the South Delta.	
1163	16	[From ATT1:] Relationships between Vernalis flow and water quality at the current objective locations are developed within the document and used to show that there are fewer occurrences of water quality violations with higher San Joaquin flow alternatives. Since the proposed water quality alternatives are looking at water quality along channel reaches and not at specific locations, this analysis needs some additional work. Relationships between Vernalis flow and salinity at the current objective locations are developed in Appendix F.2 (Section F.2.4) and are referenced within the main body of the SED (chapter 5). The regressions have a fair amount of scatter, which reflects times when at a particular Vernalis flow, the salinity may be higher or lower than what is indicated by the regression equation. For this reason, a buffer value is added to account for the scatter (page F.2-86). Below are some comments concerning this approach. Slide 14 from the presentation Flows and Salinity in the South Delta [footnote 4: Tara Smith, Flows and Salinity in the South Delta, January 6, 2011 (available at: http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/sds_srjf/sjr/docs/dwr_flows_salinity010611.pdf).] shows 30 day running average graphs of Vernalis flows (lavender shading), DSM2 Old River at Tracy flows (black shading), Vernalis EC (blue line), and Old River at Tracy EC (black line). Generally, when there is an increase in Vernalis flows, there is an improvement in salinity at Vernalis but not in all cases. Water quality in July and August of 2008 when there is lower flow (slightly less than 1000 cfs) is similar to water quality in December 2006 - March 2007 when flows are closer to 2500 cfs. This will be reflected in the scatter of the regression developed in Appendix F.2. Increased flow, without significantly improved water quality at Vernalis, will not greatly impact the water quality in the Middle River reach and the Old River reach due to smaller flows in the two channels even at higher Vernalis flows. Data and modeling simulations show that a large increase in Vernalis flow will not result in a proportional increase in flow in Old and Middle Rivers. The additional flow will move down Grant Line Canal. Without barriers, flows move on average from upstream to downstream on Old and Middle River. The current objective locations are upstream in the channel reaches. Slide 14 shows that increasing flows at Vernalis (lavender shaded area) does not result in a proportional increase in flow at Old River at Tracy (black shaded area) due to the limited flow ability of the channel. Changes in flows are impacted by the barriers with the Head of Old River Barrier having the most significant effect on direction of flow. With or without barriers, flows in Old River are on the order of a few hundred cfs. Due to that lower flow, consumptive use on Old River and agricultural return quality will have a larger impact on the water quality moving through Old River. For example, for the channel reach from Old River at Tracy west to just beyond the Old River barrier location, the average July (2007-2011) estimated diversion is 225 cfs, which is a large percentage of the total flow moving through the channel. The seepage into the island is estimated at 11 cfs and the drainage back into the channel for the reach is 82 cfs with an estimated EC of 739 umhos/cm. During winter	The commenter expresses concerns that the Chapter 5, Surface Hydrology and Water Quality, analysis of EC in the southern Delta focused on the current compliance locations, which could be changed in the future in response to implementation of the SDWQ alternatives. As described in Chapter 5, while the monitoring locations could change in response to implementation of SDWQ Alternatives 2 and 3, the historic monitoring locations specified in the 2006 Bay-Delta Plan were used to assess water quality impacts because much data has been collected at these locations. The Chapter 5 evaluation allows for a quantitative assessment of how the LSJR alternatives may affect water quality at these locations, and estimated changes in water quality at these locations are indicative of how water quality may change at other southern Delta locations. The commenter also asserts that there are locations within the southern Delta that may be even less responsive to changes in flow at Vernalis than the current compliance locations. This potential lack of response to changes in Vernalis flows at some locations would mean that there are some locations in the southern Delta that may be less effected by the LSJR alternatives and would be more similar to baseline conditions. The commenter expressed concerned about the scatter in the relationship between flow and EC at Vernalis that is exhibited in the measured data. A particular flow at Vernalis does not always result in a particular EC at Vernalis, but as mentioned in the comment, generally, when there is an increase in Vernalis flow, there is a general reduction in salinity at Vernalis. The method used for estimating Vernalis EC (described in Chapter 5 and Appendix F.1) estimates the reduction in EC that might generally be expected when fresh water from the Stanislaus, Tuolumne, and Merced Rivers is added to the baseline salt load. The commenter expressed concerned about the degree of scatter in the relationship between flow at Vernalis and the EC increment between Vernalis and downstream compliance locations as indicated in the measured data. As explained by the commenter, some of this scatter is due to the influence of local sources of salinity on Delta channels with flow that stays relatively low regardless of increases in flow at Vernalis. The SED does not claim there is a strong relationship between flow at Vernalis and the EC increment. The goal of the Chapter 5 analysis is to use the relationship exhibited in the measured data to estimate whether the LSJR alternatives would negatively affect EC in the southern Delta. For more information about water quality in the southern Delta, please see Master Response 3.3, Southern Delta Water Quality.

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		months, such as January, the EC is estimated to be 1352 umhos/cm. In addition, for higher flows, flow may be moving from the San Joaquin River into Paradise cut which may be flushing out concentrated salinity and peaks of higher EC may affect the channel reach. Because of this lower flow in Old and Middle Rivers, even with higher San Joaquin River (SJR) flow at Vernalis, water quality at Vernalis is significantly more important to water quality values in the interior of the south Delta than flow amount in the SJR. In order to offset the impact of in-Delta sources along the whole channel reach, the water quality at Vernalis would have to be appreciably better than the current or proposed objectives.	
1163	17	[From ATT1:] CLIMATE CHANGE The SED does not address or discuss climate change. Suggest adding additional description or explanation of climate change and the changing landscape that would result in sea level rise and changes in hydrologic patterns, and how these changes affect the modeling analysis presented throughout the SED.	Please see response to comment 1163-8 regarding climate change.
1163	18	[From ATT1:] DWR DOES NOT CONTRIBUTE TO SOUTH DELTA WATER QUALITY DEGRADATION It has been argued in the past, by some, that DWR has some responsibility for salt loading in the south Delta due to the use of JPOD for CVP. By wheeling CVP water to its contractors through JPOD, the argument follows that the SWP enables additional water supply delivery to CVP San Joaquin Valley contractors, which furthers agricultural/irrigation development and leads to increased salt levels in drainage return flows from the San Joaquin Valley into the south Delta via Vernalis flows. But this additional water is a small fraction of CVP system deliveries, only between 1-3% on average. Also, additional groundwater pumping in the San Joaquin Valley would occur to make up the surface supply deficit should the SWP not wheel the additional supplies. The groundwater would contain even more salt loading than the surface supplies.	Please see Master Response 3.3, Southern Delta Water Quality, for discussion of the responsibilities of DWR and USBR. The State Water Board acknowledges the commenter's comment regarding the contribution to salinity in the southern Delta. The USBR has sole responsibility for meeting the salinity objective at Vernalis. However, as discussed in D-1641 and Master Response 3.3, DWR is responsible for mitigating the effects of the SWP on interior southern Delta salinity.
1163	19	[From ATT1:] The salt loading in the south Delta occurs from salts entering the south Delta at Vernalis and other point and non-point discharges in the south Delta. DWR does not discharge salts into the south Delta and has no reservoir on the San Joaquin River watershed to release dilution water from; thus DWR is free from any attribution of salt loading in the south Delta. Regarding the subtraction of salts from the system, Clifton Court/Banks Pumping Plant exports from the south Delta remove some salts from the system, but the pumps are used in a dynamic sense to provide water supplies to south-of-Delta exporters and minimize adverse impacts to sensitive fisheries. Therefore, it is not practicable to use the pumps for south Delta salinity control as this may have unintended, adverse impacts to export water supplies or Delta fisheries. In any case, the removal of salts from the south Delta service area due to export operations will have minimal effect.	Please see response to comment 1163-19. The facilities and operations needed to address these impacts will be determined in the Comprehensive Operations Plan. Please see Master Response 3.3, Southern Delta Water Quality, for discussion of the responsibilities of DWR and USBR and the Comprehensive Operations Plan.
1163	20	[From ATT1:] There is a considerable amount of salt loading in the south Delta service area, downstream of Vernalis that occurs primarily through local drainage return flows. This additional salt	Please see Master Response 3.3, Southern Delta Water Quality, for discussion of the responsibilities of DWR and USBR.

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		load is not attributable to either the CVP or SWP, and it is not reasonable to expect the water projects, either separately or together, to control it. The Board's plan for implementing the standards for salinity in the south Delta should recognize the occurrence of this area-wide degradation of salinity by including Delta diverters with agricultural drainage in the requirements for achieving the salinity standards in the reaches downstream of Vernalis. (See DWR specific comments below on Appendix K for more details.)	
1163	21	[From ATT1:] It has been demonstrated through various reports and measurement/analysis that salinity at the ORT station is heavily influenced by saline return flows that originate in the Paradise and Sugar Cut areas of the south Delta. Therefore, it is not reasonable to set salinity standards for DWR and Reclamation to achieve at this location (see, e.g., South Delta Salinity Report). DWR believes that the Board may have sufficient information to appropriately assign responsibility to local Delta diverters who can help implement the south Delta water quality objectives.	Please note that the specific monitoring locations and procedures will be developed through the Comprehensive Operations Plan and Monitoring Studies. Please see Master Response 3.3, Southern Delta Water Quality, for discussion of the responsibilities of USBR and DWR with regards to southern Delta salinity and the Comprehensive Operations Plan. Also, please see Master Response 3.3 regarding the measurement of salinity in the interior southern delta.
1163	22	[From ATT1:] The SED acknowledges that among the alternatives considered (Alternatives 1, 2 and 3), there is not expected to be any change in water quality because the Temporary Barriers Program (TBP) would be implemented in each alternative and Reclamation would have the same responsibilities it currently has to meet Vernalis water quality objectives. Since there is no change in water quality (stated in SED) among the alternatives and the actual water quality of irrigation water used will affect agricultural productivity in the south Delta, DWR recommends that the program of implementation be changed to include a local agricultural drainage control program discussed in DWR Comments K:2 and K:3, below. A change in the program of implementation is needed given that the CVP and SWP do not have the ability to affect south Delta water quality affected by local drainage through operational changes.	The Program of Implementation in Appendix K assigns the Central Valley Regional Water Board with responsibility to regulate in-Delta discharges of salt. Please see Master Response 3.3, Southern Delta Water Quality, for discussion of the responsibilities of USBR and DWR with regards to southern Delta salinity
1163	23	[From ATT1:] DWR has concerns with respect to the SED and evaluation of impacts to groundwater and implementation of the Sustainable Groundwater Management Act (SGMA). The SED acknowledges that groundwater in basins are subject to the SGMA and will be impacted by the increased flow alternatives, some of them significantly. The SED also assumes that the Groundwater Sustainability Plans can bring the basins to sustainable conditions without consideration of the impact of additional groundwater pumping caused by meeting the proposed alternative flow requirements in known critically overdrafted basins. Deflecting the burden to address unquantified impacts from additional groundwater pumping to the Groundwater Sustainability Agencies required under SGMA could result in the failure to reach sustainable groundwater management in the basins. The SED acknowledges that the proposed alternatives will exacerbate problems and impact groundwater. Some quantification of the impacts in the SED can provide insight into the incremental burden that the adoption of the unimpaired flows would place on the already stressed groundwater basins. The quantitative evaluation could serve to determine if the additional constraints will lead to failure to achieve sustainability in the groundwater basin or just further stress the basin current conditions but could be managed to absorb the increased pumping resulting from the unimpaired flow requirements. A qualitative evaluation does not provide the needed information to assess the degree of the impact.	Please see Master Response 1.1, General Comments, for a discussion the programmatic scope of the SED, adequacy of the approach, State CEQA Guidelines for a program-level analysis, use of best available data, and substantial evidence. The level of detail in the SED is reasonable and appropriate for a program-level analysis. The State Water Board acknowledges that uncertainty is inherent in any programmatic planning effort of this geographic and temporal scale. In preparing the SED, the State Water Board strived to use the best available science, consistent with State CEQA Guidelines. A wide range of published literature, official reports and personal communication is cited to reasonably and objectively disclose the environmental setting of the plan area. The State Water Board acknowledges there is more than one way to approach an impact analysis and many data sources are available. However, the State Water Board is not obligated to conduct an exhaustive analysis using every approach, modeling tool, and data set available. Please see Master Response 3.4, Groundwater and the Sustainable Groundwater Management Act for discussions on the approach to the groundwater impact analysis, the criteria used to evaluate impacts on groundwater resources (including the one-inch regional threshold), modeling and use of groundwater data, potential increases in groundwater pumping, and SED consideration of SGMA. Chapter 9, Groundwater Resources, Section 9.2.2, Subbasin Groundwater Use, provides an overview of groundwater conditions in the four main subbasins underlying the plan area (Eastern San Joaquin, Modesto, Turlock, and extended Merced Subbasin), using the best available data that could reasonably collect at the time the SED was being developed. Chapter 22, Integrated Discussion of Potential Municipal and Domestic Water Supply Management Options, Section 22.2, Water Supply, summarizes the existing and recent

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Although SGMA is in the early stages, some level of quantitative evaluation should be included in the SED.	overdraft conditions of the four groundwater subbasins. Information regarding groundwater conditions after 2010 and in recent droughts is provided (as appropriate) to facilitate discussions in those chapters. Furthermore, figure 9-6 , Drought Evaluation, presents analyses that show the Water Supply Effects (WSE) model adequately characterizes recent drought conditions. The groundwater impact analysis was appropriate for a program-level evaluation and is not meant to be, nor required to be, a site-specific analysis. Estimating changes in groundwater balances, declines in groundwater levels, sustainable yield, and groundwater-surface water interactions would require groundwater modeling and site-specific information, which is beyond the scope of the SED. A static water balance spreadsheet does not evaluate dynamic changes in groundwater elevations and subsurface flow; however, such dynamic modeling is unnecessary in order to make reasonable determinations of potential changes in groundwater demand and use for the SED programmatic analysis. Detailed discussion regarding the assumptions for the groundwater balance, methodology used in the groundwater impact analysis is provided in Appendix G, Agricultural Economic Effects of Lower San Joaquin River Flow Alternatives: Methodology and Modeling Result. Potential impacts of the plan amendments on groundwater resources are discussed in Chapter 9, Groundwater Resources, Section 9.4.3, Impacts and Mitigation Measures. Chapter 9 recognizes that overdraft can lead to significant impacts such as decreases in groundwater levels, increases in pumping costs, land subsidence, and degradation of groundwater quality. It is speculative to assume how pumpers in each area will respond to implementation of the flow objectives, because it will depend on many individual and collective decisions including, but not limited to, the discrete actions of local water users in response to reductions in surface water, crop choices in response to markets and other factors, conservation measures, and implementation of SGMA. SGMA requires local public agencies to sustainably manage groundwater basins that are subject to SGMA without causing "undesirable results" (Water Code § 10721(x)). Local public agencies in the plan area are required to form groundwater sustainability agencies (GSAs) by June 30, 2017 and draft groundwater sustainability plans (GSPs) by 2020 for critically overdrafted basins and 2022 for all other basins. GSAs have 20 years to implement GSPs and achieve sustainability. GSAs are now formed in the plan area, but GSPs have yet to be drafted or implemented. It would be speculative to assume how pumpers in each area would respond to implementation of the flow objectives because it would depend on many individual and collective decisions including, but not limited to, the discrete actions of local water users in response to reductions in surface water, crop choices in response to markets and other factors, conservation measures, and implementation of SGMA. Furthermore, the SED baseline was established at the publication date of the SED Notice of Preparation (NOP). The NOP was released in February 2009, followed by the first public draft of the SED in December 2012. These releases predate SGMA, which came into effect in September 2014. Please see Master Response 2.5, Baseline and No Project, for general information on State CEQA Guidelines baseline requirements. The SED and plan amendments do not require or encourage increased groundwater pumping. The SED analyses reflect that the historical local response to reduced surface water availability has been to choose to increase groundwater pumping; therefore, the SED was required to analyze this reasonably foreseeable action and its impacts on the groundwater basin from this local response. The State Water Board acknowledges reaching sustainability in these overdrafted basins will be challenging, but the plan amendments do not limit GSAs' ability to comply with SGMA. Instead, knowledge of the plan amendments during the GSP drafting phase allows for integrated planning of scarce water resources that does not trade impacts between surface and groundwater.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
1163	24	[From ATT1:] The SED states the annual average groundwater balance can be expected to be reduced in terms of the equivalent of about 1 inch across each of the sub-basins. It is unclear what this means as the adverse impacts cannot be evaluated or compared when pumping is expressed qualitatively and location specific information is not provided. Extent of impacts of groundwater pumping should not be averaged across the entire basin. DWR recommends the amount of additional groundwater extracted to replace the loss of surface water deliveries should be expressed as a volumetric unit such as acre-feet and be location-specific in order to identify where the actual impacts will be. The groundwater data used in the SED are not current and reflect data from 2010 or earlier and is not reflective of current groundwater conditions that have been affected by the recent five years of drought and the current wet winter. Groundwater extraction and subsidence has increased significantly during the drought and groundwater elevations have not recovered. The SED references the DWR report, California's Groundwater Update 2013: A Compilation of Enhanced Content for California Water Plan Update 2013 Groundwater Update completed as part of the California Water Plan published in April 2015. However, most of the groundwater data and evaluation of the groundwater basins in the report are based on data from 2005 through 2010, although some data is as recent as 2012. Groundwater use and change in groundwater storage evaluations are based on data from 2005 through 2010, which predates the multi-year drought. Chapter 8 from the above mentioned report is specific to the San Joaquin River Hydrologic Basin and is posted at http://www.water.ca.gov/waterplan/docs/groundwater/update2013/content/hydrologic_region/GWU2013_Ch8_SanJoaquinRiver_Final.pdf. The starting point for the evaluation of the alternatives should reflect current groundwater conditions, be more location-specific, express impacts in quantifiable units, and take into consideration future climate change impacts. Additional resources for more recent groundwater data and maps include: -DWR Groundwater Information Center (GIC) Interactive Map http://www.water.ca.gov/groundwater/MAP_APP/index.cfm -GIC Maps and Reports http://www.water.ca.gov/groundwater/maps_and_reports/index.cfm -Critically Overdrafted Groundwater Basins (2016) http://www.water.ca.gov/groundwater/sgm/cod.cfm -Water Data Library http://www.water.ca.gov/waterdatalibrary/ -CASGEM Online System http://www.water.ca.gov/groundwater/casgem/	Please see response to Comment 1163-23 regarding topics related to groundwater resources, including, but not limited to the approach to the groundwater impact analysis, and the Sustainable Groundwater Management Act.
1163	25	[From ATT1:] Comment #: ES:2 Page #: ES-50, 2nd paragraph Section #: ES6.1	Please see response to comment 1163-3 regarding responsibilities of USBR and DWR.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Comment: These sections state that DWR is required to design a comprehensive operations plan to address the effects of CVP and SWP pumping operations on assimilative capacity in the south Delta. This statement assumes that there is a causation of water quality degradation by DWR pumping with no supporting evidence in the SED document. Water levels in south Delta channels are affected by SWP pumping operations but the temporary barriers provide mitigation for this effect. With the current design of the barriers, the low tide water levels are higher than the water levels that would have occurred without exports. The barriers also provide incidental benefits to circulation and as result help with the overall improvement of water quality. Please see comment G:2 for more information.	
1163	26	[From ATT1:] Comment #: ES:3 Page #: ES-50 Section #: ES6.2, first sentence Comment: SWDQ Alternative 2 states "year-round salinity objectives of 1.0 dS/m at Vernalis and…" This is not correct. The Vernalis objective would remain 0.7 dS/m from April to August. There are many places in the overall WQCP where text is inconsistent when describing the Vernalis objective or stating that all four compliance stations would have a "year-round" objective of 1.0 dS/m when the alternatives intend that only the three interior stations would be changed.	The Executive Summary correctly describes the South Delta Water Quality objective which is also described in Appendix K. For more information on implementation of the objective by USBR and DWR please see Master Response 3.3, Southern Delta Water Quality.
1163	27	[From ATT1:] Comment #: ES:4 Page #: ES-58 Section #: ES8.2, last bullet item Comment: Low lift pumps are not a "reasonably foreseeable method[] of compliance." DWR has analyzed this concept and provided the results of its analysis in an April 2011 report to the Board (http://baydeltaoffice.water.ca.gov/). [footnote 5: DWR, Low Head Pump Salinity Control Study, April 2011. at pages 55-60 (available at: http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/lhscs_rpt.pdf).] The report showed that low lift pumps were not "reasonable" given the enormous costs and the small improvement in reducing water quality exceedances at the south Delta interior compliance stations. If the Board increases the salinity objective to 1.0 dS/m EC, exceedances would be greatly reduced, making the argument for low lift pumps even further unjustified.	The plan amendments do not mandate or require any action evaluated in Chapter 16, Evaluation of Other Indirect and Additional Actions, to be implemented. Low-lift pumps were included in Chapter 16, Evaluation of Other Indirect and Additional Actions, because documents indicated they had previously been under consideration. Although agencies may elect not to pursue certain methods of compliance under particular circumstances, it is reasonable to include them in a portfolio of possible actions because they were considered in the past and may be appropriate for further consideration depending on how circumstances change. Furthermore, if these actions do not occur, the potential environmental impacts and estimated costs associated with these actions, as disclosed in Chapter 16, would not occur.
1163	28	[From ATT1:] Comment #: C1:1 Page #: 1-9; 1-11 Section #: 1.5.2, 3rd paragraph	For more information on the responsibilities of DWR and USBR, as well as a discussion of the September 2016 report cited in the comment, please see Master Response 3.3, Southern Delta Water Quality. Based on the information in the master response, the section cited by the commenter does not need revisions.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Comment: The SED describes the various factors that cause elevated salinity in the south Delta. In the first full paragraph on page 1-11, the SED states that DWR and Reclamation will develop and implement a special study to characterize the spatial and temporal distribution and associated dynamics of water level, flow, and salinity conditions in the south Delta waterways. It also states DWR's and Reclamation's water rights will be conditioned to require gathering of information to determine the appropriate locations and methods to assess attainment of the salinity objectives in the interior south Delta. Suggest updating this section based on the September 2016 report by ICF entitled, "Evaluation of Salinity Patterns and Effects of Tidal Flows and Temporary Barriers in South Delta Channels." Through this document and other data and modeling studies provided previously, DWR maintains that it is not the cause for the salinity degradation in the south Delta.	
1163	29	[From ATT1:] Imposing conditions on water right holders should be done in Phase 3 of the Water Quality Control Plan (WQCP) update, not Phase 1.	Please see Master Response 1.1, General Comments, and Master Response 1.2, Water Quality Control Planning Process, for a discussion of the water quality control planning process, including the State Water Board's authorities and process under which amending the Bay-Delta plan is occurring. Please see Master Response 3.3, Southern Delta Water Quality, regarding maintaining the southern Delta salinity requirements, the program of implementation for the SDWQ objectives, and the responsibility of DWR and USBR.
1163	30	[From ATT1:] Comment #: C2:1 Page #: 2-2 Section #: 2.1.1 General Comment Comment: Suggest reorganizing the information on this page to improve understanding by grouping concepts.	Due to the highly complex and technical nature of the analysis contained in the Recirculated SED, the State Water Board made every attempt to present the information in a clear format and in plain language to aid the public, agencies and decision-makers in their review. The suggestion to reorganize the content on page 2-2 of the Recirculated SED does not raise a significant environmental issue; therefore, no change has been made.
1163	31	[From ATT1:] Comment #: C2:2 Page #: 2-2, 2nd paragraph Section #: 2.1.1 Comment: Paragraph 2 on this page introduces the minor eastside tributaries of the SJR before mentioning and identifying the major tributaries. Also, only the Chowchilla and Fresno rivers are mentioned. Not mentioned are Bear Creek and Owens river. Strictly speaking, all of these minor eastside tributaries flow into the Chowchilla and Eastside Bypass first before making it back to the SJR just upstream of where the SJR crosses 165.	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. No further response is required.
1163	32	[From ATT1:] Comment #: C2:3 Page #: 2-2 Section #: 2.1.1	As is further described in Chapter 2, Water Resources, Section 2.1.1, for the purposes of the SED, the Lowe San Joaquin River is defined as the portion of the San Joaquin River between its confluence with the Merced River and downstream to Vernalis. Section 2.2.1, provides additional discussion regarding the existing surface and groundwater resources on the Upper San Joaquin River are discussed in the Recirculated SED.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Comment: This section mentions both the Eastside and Westside tributaries of the SJR, but does not talk about the Salt and Mud Slough waterways that drain the Grasslands area. While their impacts to the water quality of the SJR due to their high salinity might not be appropriate to discuss here, they do contribute a large portion of the flow in the portion of the SJR before the confluence of the Merced River.	
1163	33	[From ATT1:] Comment #: C2:4 Page #: 2-5, 2-6 Section #: 2.1.3 Comment: This section mentions water quality impacts to the groundwater due to agricultural and industry, but does not mention municipal impacts due to wastewater treatment plants and septic tanks.	It is unclear what change is being suggested. Chapter 13, Service Providers, addresses the potential impacts of the plan amendments on service providers and includes a discussion regarding wastewater treatment and septic systems. Discussion regarding wastewater as it pertains to hazards is included in Appendix B, State Water Board's Environmental Checklist. No further response can be provided.
1163	34	[From ATT1:] Comment #: C2:5 Page #: 2-25, 1st paragraph Section #: 2.5.1 Comment: The first paragraph describes the Stanislaus River as meeting the SJR 3 miles upstream of Vernalis at Ripon. This station name is unfamiliar. However, the two rivers meet about 1.5 miles upstream of the stream gauge station known as Vernalis at Airport Way, also referred to as SJR Vernalis. Vernalis and Ripon are towns that are about 11.5 miles apart along an east/west lines.	The text referenced in the comment was revised to state "The Stanislaus River originates in the high elevations of the Sierra Nevada and flows into the LSJR approximately 3 miles upstream of Vernalis near Ripon." This modification does not change impact determinations or conclusions identified in the SED.
1163	35	[From ATT1:] Comment #: C2:6 Page #: 2-31, 2nd paragraph Section #: 2.5.3 Comment: Suggest adding text that notes: Although the Vernalis Adaptive Management Plan expired in 2011, the Board encourages parties on the SJR to enter into new voluntary agreements that could help achieve these flows, especially given the inadequate water supplies in New Melones.	Please see Master Response 1.1, General Comments regarding voluntary agreements.
1163	36	[From ATT1:] Comment #: C2:7 Page #: 2-34 Section #: 2.6.1, 1st paragraph	This comment does not make a general comment regarding the plan amendments or raise significant environmental. No further response is required.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Comment: The first paragraph describes Vernalis as an unincorporated community downstream of the Stanislaus River and where the LSJR enters the Delta. For clarification, DWR suggests revising because Vernalis is not on the SJR. It is a small community on Highway 33 just south of Highway 132. Also, it is approximately 3.5 miles west of the SJR. There is a small cluster of houses just downstream of Airport Way on the SJR, but this is the San Joaquin River Club, not Vernalis.	
1163	37	[From ATT1:] Comment #: C2:8 Page #: 2-38, Last paragraph Section #: 2.7.1 Comment: "Export conditions (described further below) pull water from the Sacramento River and create cross-Delta water conditions. This cross-Delta water flows south (upstream) in the portions of Old and Middle Rivers that are north of the exports." Exports are described as pulling water across the Delta upstream. DWR recommends revising to clarify that, although it appears exports are pulling water across the Delta, if flows are averaged over a tidal day, it is more correct to describe the movement of water as follows: Tides provide the biggest energy moving the fresher water upstream with a very small increase in flow due to SWP exports when Clifton Court Forebay (CCFB) captures that water after the peak water level of the flood tide and less water makes it back downstream on the ebb tide. (This flow behavior can be seen in "with" and "without" exports modeling results at locations near the Old and Middle River gauges (north or downstream of CCFB). Results in channels close to CCFB at times show unidirectional flow towards the exports.	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. No further response is required.
1163	38	[From ATT1:] Comment #: C2:9 Page #: 2-39, 2nd paragraph Section #: 2.7.1 Comment: ". . . constituting an average tidal flow of about 3,500 cfs flowing onto these channels during the flood tides (for about 12 hours each day) and about 3,500 cfs flowing out during the ebb tides." Tidal flows into Old River (east or upstream of CCFB) are closer to 100 cfs as indicated in section 5.2.7. More concentrated water quality impacts occur when diversions and drainages are of the same magnitude.	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. No further response is required.
1163	39	[From ATT1:] Comment #: C2:10 Page #: 2-40, 3rd paragraph Section #: 2.7.2 Comment: Add text that notes SWP exports can also meet direct demands of California	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. No further response is required.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Aqueduct water upstream of San Luis Reservoir. Change last sentence from "The total..." to "The maximum..."	
1163	40	[From ATT1:] Comment #: C2:11 Page #: 2-40, last paragraph Section #: 2.7.2 Comment: Add: Export pumping may also be limited to assist with Delta Outflow requirements and water quality objectives in the west Delta or because of maximum export/inflow ratio requirements in D-1641. Can then delete the third paragraph of "CVP and SWP Exports" section entirely.	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. No further response is required.
1163	41	[From ATT1:] Comment #: C2:12 Page #: 2-43 Section #: 2.7.4, 1st paragraph Comment: This paragraph should be revised. It implies that DWR can help meet salinity standards in the south Delta by changing its water project operations, which, as explained in prior comments and in the South Delta Salinity Report, is not possible. The Board's plan for implementing the standards for salinity in the south Delta should include Delta diverters with agricultural drainage in the requirements for achieving the salinity standards in the reaches downstream of Vernalis.	The text has been modified for clarity. Please see Master Response 3.3, Southern Delta Water Quality, for more information on implementation of the SDWQ objectives and the responsibilities of DWR and USBR. Please see Chapter 16, Evaluation of Other Indirect and Additional Actions, Section 16.4.4, Agricultural Return Flow Salinity Control, for a discussion of real-time management of agricultural return flow and how that relates to the SDWQ alternatives.
1163	42	[From ATT1:] Comment #: C2:13 Page #: 2-43 Section #: 2.7.4 Comment: The SED states that the Lower San Joaquin River (LSJR) flow at Vernalis has a large effect on the salinity at Vernalis and in the south Delta. As stated in the general comments, for the water quality alternatives, DWR will be held responsible not just for the current objective locations, but for EC in reaches of channels. Due to the lower flow of Old and Middle Rivers, the in-Delta sources of diversions/returns and EC will have a larger impact on water quality regardless of the increase in Vernalis flows. The water quality at Vernalis would have to be significantly improved in order to meet the new objectives or even if at a significantly improved EC, the alternative water quality objectives along the channel reach may not be achieved due to a large impact by in- Delta sources. As DWR presented to the Board in 2011, information shows that local drainage water quality rather than flow amount has the biggest influence on water quality in Old and Middle Rivers. [footnote 6: Tara Smith, Flows and Salinity in the South Delta, January 6, 2011, see Slide 14 (available at:	For more information on implementation of the salinity standards and objectives in the southern Delta please see Master Response 3.3, Southern Delta Water Quality. This Master Response includes consideration of salinity sources in the southern Delta, operation of temporary barriers, and export effects. The appropriate locations and methods to assess salinity in the southern Delta as part of the plan amendments have not yet been determined and will be developed as part of the Comprehensive Operations Plan.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/sds_srjf/sjr/docs/dwr_flows_salinity010611.pdf).] The SED states that higher CVP and SWP pumping also have a large effect on south Delta salinity as higher pumping brings more Sacramento River water across the Delta to the export pumps and results in lower salinity. Better quality Sacramento River water can make it into the south Delta (Old and Middle River – east or upstream of CCFB) when the barriers are operating. This water is also mixed with water from the ocean and other inflows. The amount of water moved by the tides into the South Delta is limited since the barriers are rock with culverts and the tidal flows into Old River for example, are relatively small, on the order of a hundred or less cubic feet per second. With higher SJR flow and no barriers, tidal impacts are considerably less.	
1163	43	[From ATT1:] Comment #: C4:1 Page #: 4-16 Section #: 4.3.2, CVP and SWP Comment: The SED states: ". . . it is reasonably foreseeable that DWR for SWP operations and Reclamation for CVP operations would take the following actions to comply with the water level and flow conditions of the SDWQ alternatives in the event that such modifications are warranted." DWR believes that suggesting such actions is premature. Imposing conditions on water right holders should be done in Phase 3 of the WQCP update, not Phase 1.	Please see response to comment 1163-29 regarding the program of implementation and implementing the SDWQ objective.
1163	44	[From ATT1:] Comment #: C5:1 Section #: General comment Comment: Although municipal and domestic supplies were designated as beneficial uses of water for community, military, or individual water supply systems including drinking water supplies, Chapter 5 did not address any drinking water constituents of concern for example, organic carbon or bromide.	Impacts related to drinking water quality (Impact SP-2a) are addressed in Chapter 13, Service Providers.
1163	45	[From ATT1:] Comment #: C5:2 Page #: 5-6, 3rd paragraph Section #: 5.2.1 Comment: Regarding the statement "Unimpaired flow is the river flow at a specified location that would occur if all runoff from the watershed remained in the river, without storage or diversion." This may be true for upper watersheds that have no upstream watersheds flowing into them. However, for the valley floor any inflow is subject to	Please see Master Response 1.1, General Comments, for a general discussion of unimpaired flow requirements and Master Response 2.1, Amendments to the Water Quality Control Plan, regarding a description of the plan amendments, including the percent of unimpaired flow requirement. Please see Master Response 3.2, Surface Water Analyses and Modeling, regarding the calculation of unimpaired flow and a discussion of unimpaired flow versus natural flow. Master Response 2.4, Alternatives to the Water Quality Control Plan Amendments, also contains a discussion of unimpaired and natural flows.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		depletions, seepage, runoff, and bank overflow. This conflation between runoff and actual stream flow occurs throughout the report when talking about San Joaquin river at Vernalis. (see for example p.5-30 Sec 5.2.6 "...SJR at Vernalis unimpaired flow...", and p.5-31 Sec 5-31 comparing UF and historical flow). The statement does not mention natural stream-groundwater interaction and natural flooding conditions. Unimpaired flow estimates should consider impacts of natural stream-groundwater interaction and natural flooding conditions since the natural water losses from the valley floor river to groundwater and/or flood plain can significantly alter the unimpaired flow amount and timing in the LSJR valley floor in critical dry, dry and wet years. DWR's "Estimates of Natural and Unimpaired Flows for the Central Valley of California: Water Years 1922- 2014," published in March 2016 (UF report) is not reporting SJR flow at Vernalis: it is adding the runoff of the valley floor to the outflow from the upper watershed. In other words, it is more appropriately the cumulative runoff at Vernalis. This distinction between cumulative runoff at a location, and the streamflow at a location should be clearly identified and treated accordingly.	
1163	46	[From ATT1:] Comment #: C5:3 Page #: 5-7, below table Section #: 5.2.1 Comment: Suggest changing the title of this sub-section to Beneficial Uses.	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. The suggested edit does not contradict the information contained in Chapter 5, Surface Hydrology and Water Quality, and would not change the discussion in Chapter 5. Therefore the suggested change identified by the commenter has not been made.
1163	47	[From ATT1:] Comment #: C5:4 Page #: 5-9, below table Section #: 5.2.1 Comment: Suggest adding title to this sub-section (Water Quality Impairments.)	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. The suggested edit by the commenter does not contradict the information contained in Chapter 5, Surface Hydrology and Water Quality, and would not change the discussion in Chapter 5. Therefore the suggested change identified by the commenter has not been made.
1163	48	[From ATT1:] Comment #: C5:5 Page #: 5-34, 1st paragraph Section #: 5.2.8 Comment: In the first sentence, suggest replacing "controlled" with "limited." Suggest editing the last sentence to indicate that CVP and SWP share allowable pumping equally under ESA export limits.	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. The suggested edit by the commenter does not contradict the information contained in Chapter 5, Surface Hydrology and Water Quality, and would not change the discussion in Chapter 5. Therefore the suggested change identified by the commenter has not been made.
1163	49	[From ATT1:] Comment #: C5:6	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. The suggested edit by the commenter does not contradict the information contained in Chapter 5, Surface Hydrology and Water Quality and would not change the discussion in Chapter 5.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Page #: 5-34, last paragraph Section #: 5.2.8 Comment: Consider adding a percentage and a source the percentage is based on to the sentence "[t]he combined pumping is almost always greater than the SJR flow at Vernalis."	Therefore the suggested change identified by the commenter has not been made.
1163	50	[From ATT1:] Comment #: C5:7 Page #: 5-36, last paragraph Section #: 5.2.8 Comment: Replace "(towards the estuary)" and "(away from the estuary)" with "(downstream)" and "(upstream)," respectively for clarity.	The text was modified to clarify. This edit does not change any conclusions made in Chapter 5, Surface Hydrology and Water Quality, or impact determinations.
1163	51	[From ATT1:] Comment #: C5:8 Page #: 5-37, 1st paragraph, lines 1-3 Section #: 5.2.8 Comment: A high salinity discharge, such as agricultural drainage, will increase the salinity in the receiving channel. Tidal flows will affect the rate of change of the measured salinity, but do not dilute the salts. Higher tidal flows will slow the rate of change in salinity compared with lower tidal flows, but do not change the resulting channel salinity that occurs over time. Recommend revising to use the term "net flow" instead of "tidal flow," because salts are diluted by the addition of fresher water to the channel and removing the higher salinity water from the discharge area.	The text was modified to clarify. This edit does not change any conclusions made in Chapter 5, Surface Hydrology and Water Quality, or impact determinations.
1163	52	[From ATT1:] Comment #: C5:9 Page #: 5-37, 2nd paragraph, last sentence Section #: 5.2.8 Comment: "The temporary barrier affects flow in Old River upstream of the barrier, as discussed below." The net flow in Old River with temporary barriers is not greatly reduced; in fact, it is almost identical to "no barrier/no export" net flow. The maximum flows of the flood/ebb flows are greatly reduced, but the net flow remains about -70 cfs. [footnote 7: Jones & Stokes, South Delta Improvements Program, Final Environmental Impact Statement/Environmental Impact Report (SDIP EIR/EIS), December 2006, at Section 5.2-31, Table 5.2-4 (available at: http://baydeltaoffice.water.ca.gov/sdb/sdip/documents/draft_eis_eir/vol-1/doc/chapter_05.pdf)]	The information provided by the commenter is already included in the Chapter 5, Surface Hydrology and Water Quality, Section 5.2.8, Southern Delta, Effects of Pumping and Barriers on Water Levels and Flows, along with additional relevant material that is not included in the summary.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
1163	53	[From ATT1:] Comment #: C5:10 Page #: 5-37, 3rd paragraph, last sentence Section #: 5.2.8 Comment: The barriers do not "block" tidal flow. Instead, they reduce both the flood and ebb tide upstream of the barriers. Culverts and weir height allow flow and the rock itself is substantially leaky.	Text in the Chapter 5, Section 5.2.8, Southern Delta section titled "Effects of Pumping and Barriers on Water Levels and Flows" has been modified to remove the suggestion that the temporary barriers completely block flow. The text revision does not change any conclusions in Chapter 5, Surface Hydrology and Water Quality.
1163	54	[From ATT1:] Comment #: C5:11 Page #: 5-38, 1st paragraph, lines 12-13 Section #: 5.2.8 Comment: Downstream flow was 675 cfs, not 1,340 cfs. The 1,340 number is the af/day, not flow. Upstream flow was -746 cfs, not -1,480 cfs. The -1,480 number is also the af/day, not flow. [footnote 8: Ibid.]	The upstream and downstream tidal flows only occur for approximately half a day each. 1 cfs for a day is approximately 2 af. 1 cfs for half a day is only about 1 af. This is why the tidal upstream and downstream flows in cfs (for half a day) are approximately equal to the daily upstream and downstream volumes in af/day. No change has been made.
1163	55	[From ATT1:] Comment #: C5:12 Page #: 5-40, 1st paragraph, lines 3-5 Section #: 5.2.8 Comment: Incorrect figures for flows. 680 cfs should be 343 cfs, and -712 cfs should be -359 cfs. The larger figures are af/day, not flow. The net flow was NOT increased, but the net (upstream) flow decreased from -71 (no pumping, no gates/barriers) to -17 (full pumping, no gates/barriers). The minus sign (-) indicates flow direction, not increase/decrease.	Please see response to comment 1163-54 regarding af/day to cfs conversion. A change in flow from -71 cfs to minus -17 cfs represents an increase; however, text was modified to clarify. This edit does not change any conclusions made in Chapter 5, Surface Hydrology and Water Supply.
1163	56	[From ATT1:] Comment #: C5:13 Page #: 5-41, 1st paragraph, lines 8-9 Section #: 5.2.8 Comment: "Upstream flow through the weir culverts can begin with the flood tide, although the greatest upstream flow occurs when the tidal elevation downstream of the weir rises above the weir height." Although this text was taken from the SDIP EIR/EIS, it is misleading. While upstream flow over the weir does not take place until water levels downstream reach 2.0 feet MSL, the text suggests the barrier is blocking the flood tide completely until that level is reached. This is not true. The Old River barrier contains nine 4-foot diameter culverts that have flap gates	Please see response to comment 1163-53. The text in Chapter 5, Surface Hydrology and Water Quality, does not imply that the barrier completely blocks the flood tide until the weir is overtopped. The text contains descriptions of flow over the weir.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		on the upstream end of the culverts. These flap gates open on the flood tide to allow tidal flow through these culverts, well before the tide reaches the level of the weir when weir overflow begins. All three barriers on Middle River, Grant Line Canal, and Old River operate this way; however, the barriers on Middle River and Grant Line Canal contain six culverts instead of nine. These designs were intentional to ensure unidirectional net flows upstream on Old River and Middle River and downstream on Grant Line Canal. The normal operation of the temporary barriers overall slightly reduces the number of stagnant or "null zones" above the barriers compared with no barriers/no exports. [footnote 9: DWR, Methodology for Flow and Salinity Estimates in the Sacramento-San Joaquin Delta and Suisun Marsh, 33rd Annual Progress Report, Chapter 4, South Delta Null Zone Study, June 2012 (this study looks at the circulation effects with and without barriers and exports; available at: http://baydeltaoffice.water.ca.gov/modeling/deltamodeling/AR2012/Chapter%204_2012_W eb.pdf).]	
1163	57	[From ATT1:] Comment #: C5:14 Page #: 5-42, 1st paragraph, lines 4-5 Section #: 5.2.8 Comment: The barriers under the Temporary Barrier Program do not add salt to the channels and do not increase salinity in the south Delta. As described in comments C5:10 and C5:11, tidal flows do not dilute saline discharges to the channels, but rather influence the rate of change of salinity in the receiving waters. The barriers may reduce the tidal flow flux above the barriers, but they do not change the net flows out of the south Delta, which is the primary factor in diluting saline agricultural drainage discharging into south Delta channels.	The sentence in Chapter 5, Surface Hydrology and Water Quality, the commenter is referring to is: "The TBP does increase the low tidal levels (MLW) by approximately 1–2 ft, but the TBP may also cause increased salinity in portions of the channels upstream of the barriers, because of reduced tidal flow mixing (dilution)." While net flow is required to move salinity permanently away from an area, tidal flow can also dilute local areas of high salinity as a result of upstream and downstream mixing. This mixing has the tendency of averaging out salinity values, thereby reducing salinity in some locations that might otherwise have high salinity. Because tidal mixing may reduce salinity in portions of channels, as indicated in the Chapter 5 text above, no change is necessary.
1163	58	[From ATT1:] Comment #: C5:15 Page #: 5-42, 1st paragraph Section #: 5.2.8 Comment: The statement that "the TBP may also cause increased salinity in portions of the channels upstream of the barriers, because of reduced tidal flow mixing (dilution)" is inaccurate and should be revised. The normal operation of the TBP barriers reduces the occurrence of stagnant areas or "null zones" when compared with no barriers/no export conditions. When DWR manipulates the culvert operations under specific tidal conditions, improved circulation is provided to further reduce the possibility of null zones and reduce localized poor water quality conditions; however the improved circulation reduces water levels upstream of the barriers which may not be tolerable for local agricultural diversion operations, depending on agricultural demand at the time. DWR coordinates culvert operations with SDWA to determine whether water levels or circulation is more important. [Footnote 10: Ibid.]	Please see responses to comments 1163-5. The effect of the temporary barriers on circulation, water quality, water levels, and fish survival is variable and complex. In some cases the original benefit intended by the installation of the barriers has not been fully realized. SDWQ objectives do not require any specific modification to the operation of the temporary barriers or specific objectives regarding circulation. Instead, the effect of the barriers and potential changes to the operation of the barriers are to be evaluated in the Comprehensive Operations Plan as described in Appendix K, Revised Water Quality Control Plan. Please also see Master Response 3.3, Southern Delta Water Quality, for a discussion regarding temporary barriers and the responsibilities of DWR and USBR.
1163	59	[From ATT1:]	The SED acknowledges the potential for in-Delta discharges to increase EC within the southern Delta. Please

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Comment #: C5:16 Page #: 5-44 Section #: 5.2.8 Comment: The findings are very clear that salinity in the Delta downstream of Vernalis is impacted by discharges from agricultural lands in the south Delta. This is substantiated by measured EC data that is higher at monitoring stations downstream of Vernalis, such as Brandt Bridge. Thus, the following sentence should indicate that Vernalis EC "partly controls" interior south delta salinity: "The monthly salinity is controlled by the Vernalis EC and is then slightly increased by agricultural drainage and treated municipal wastewater." The SED acknowledges in-Delta discharges as contributing to increase in salinity between Vernalis and monitoring locations. Also, Appendix F.2, page 2-65 describes the effects of agricultural drainage and treated wastewater discharge on EC downstream of Vernalis. See comments below and ES:4 and C5:20.	see Figure 23-1 and 23-2 of Chapter 23, Antidegradation. These graphs demonstrate that the increase in salinity at the interior southern Delta stations is generally a fraction of the salinity at Vernalis.
1163	60	[From ATT1:] Comment #: C5:17 Page #: 5-46, 1st paragraph Section #: 5.2.8 Comment: SED states that "High salinity that exceeds the existing EC objectives in about half of the years in the irrigation months of April-August has been routinely measured at Tracy Road Bridge." Add statement "This indicates that large agricultural discharges beyond the control/influence of the TBP are occurring in this area." This statement factually explains what various reports and data analysis have concluded in the various information previously submitted to the Board.	Section 5.2.8 of the SED describes salinity conditions in the southern Delta and acknowledges that agricultural drainage and treated municipal wastewater contribute to exceedances of the EC objective below Vernalis.
1163	61	[From ATT1:] Comment #: C5:18 Page #: 5-46, 1st paragraph Section #: 5.2.8 Comment: A series of tables on the amount of exceedances of the Vernalis standard from 1985 to 2011 show that "[t]here have been periodic exceedances of the objectives in recent dry years, but high salinity is not the general pattern." The observation is that monthly salinity is controlled by the standard at Vernalis, and then increased by discharges from agricultural lands and municipal wastewater discharges. In the LSJR, DWR is partnering with many agencies in working to reduce salinity discharges to the SJR and improving the quality of the river through CV-Salts. For instance, DWR provides assistance to the Grasslands Bypass Project and Panoche Drainage District to purchase land that is irrigated with	The State Water Board encourages the continuation of projects that help reduce salinity in the San Joaquin River and the southern Delta. Please see Appendix K for discussion of current projects and actions that help control salinity in the southern Delta.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		drainage water which would have otherwise drained to the LSJR. This has resulted in near zero discharge to the SJR. These actions have had an impact in achieving compliance with the current Vernalis standards and will continue to show improvements.	
1163	62	[From ATT1:] Comment #: C5:19 Page #: 5-49, 1st paragraph, last sentence Section #: 5.2.8 Comment: Water quality in Old River at Tracy Boulevard Bridge does not accurately indicate the salinity of the water supplied to Old River. The Old River at Tracy Boulevard Bridge station should not be a compliance station for south Delta salinity objectives. This station poorly reflects the water quality being supplied to the south. DWR and the Reclamation have long explained to the Board that exceedances at this station are adversely impacted by local high salinity discharges, particularly in Paradise Cut, and that under certain tidal and flow conditions will cause spikes in salinity measurements at this station. These spikes cannot be influenced or controlled by SWP and CVP operations. The South Delta Salinity Report describes the sources of high salinity in the area measured at the Old River at Tracy Boulevard compliance station and clearly indicates that the salinity problems in the area are not caused by, nor can they be controlled by, CVP or SWP operations. The Board's plan for implementing the standards for salinity in the south Delta should include Delta diverters with agricultural drainage in the requirements for achieving the salinity standards in the reaches downstream of Vernalis.	Please note that the specific monitoring locations and procedures should be developed through the Comprehensive Operations Plan and Monitoring Studies. Please see Master Response 3.3, Southern Delta Water Quality, for discussion of the responsibilities of USBR and DWR with regards to southern Delta salinity and the Comprehensive Operations Plan. Also please see Master Response 3.3 regarding the measurement of salinity in the interior southern delta. As described in the Program of Implementation in Appendix K, the Central Valley Regional Water Board has the responsibility to regulate in-Delta discharges of salt.
1163	63	[From ATT1:] Comment #: C5:20 Page #: 5-54 Section #: 5.4.2 Comment: The Board developed a Water Supply Effects (WSE) spreadsheet model for allocating/routing stream flows in the San Joaquin River Basin, most of which, under SGMA, are priority basins for mitigating ground water- related problems such as reduced ground water elevations and decreased storages. The spreadsheet model cannot address these issues adequately. Suggest including in the analysis tools such as DWR's C2VSIM or USGS' CVHM models.	Please reference Master Response 3.4, Groundwater and the Sustainable Groundwater Management Act, for further information regarding appropriateness of the approach used in Chapter 9, Groundwater Resources, to evaluate groundwater impacts and the incorporation of SGMA.
1163	64	[From ATT1:] Comment #: C5:21 Page #: 5-56, Figure 5-6 Section #: 5.4.2 Comment: Annual values are too coarse a level of aggregation to establish how well	Chapter 5, Surface Hydrology and Water Quality, Figure 5-6, Annual WSE Model Baseline SJR Flow at Vernalis and Three Tributary Total Diversion Compared to State Water Board CalSim Results, provides an annual summary of the match between the State Water Board-CALSIM run and the WSE model at one location. As discussed in Appendix F.1, Hydrologic and Water Quality Modeling, during the actual process of model development, monthly values for each of the tributaries were evaluated. Please also see Master Response 3.2, Surface Water Analyses and Modeling, regarding calibration of the model. This comment does not raise significant environmental issues.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		monthly model results compare.	
1163	65	[From ATT1:] Comment #: C5:22 Page #: 5-62, 4th paragraph, lines 1-4 Section #: 5.4.2 Comment: Assimilative capacity is not related to water levels, but to water depth or more specifically, the volume of water in a channel. For example, water levels in Middle River and Grant Line Canal can be at the same level, such as 1.0 feet MSL, but the assimilative capacity is dramatically different. This is because Middle River is much shallower and carries much less flow than Grant Line Canal. Water level objectives are only meaningful for south Delta agriculture for diverting water on low tides, but are not a meaningful surrogate for water quality. Moreover, assimilative capacity is primarily related to net flows.	The sentence has been modified to discuss assimilative capacity as potentially affected by hydrodynamic conditions. The text revision does not change any conclusions in Chapter 5, Surface Hydrology and Water Quality.
1163	66	[From ATT1:] Comment #: C5:24 Page #: 5-62, 5th paragraph, lines 4-6 Section #: 5.4.2 Comment: The SDWQ alternatives should not call for or require installation of the barriers to address water quality concerns arising in the south Delta as the barriers are not a cause of salinity in the South Delta. And since improving water levels is not a water quality issue, DWR does not think that it is appropriate that the Board suggest that DWR install the barriers to address water level impacts in the south Delta channels caused by Project operations.	The Program of Implementation in Appendix K requires DWR and USBR to address the impacts of the SWP and CVP on salinity conditions. The SDWQ alternatives assume continued installation of the temporary barriers, which is one of the primary methods by which DWR and USBR mitigate SWP and CVP impacts in the southern Delta. Ultimately, the suite of facilities and operations used to address the impacts of the SWP and CVP on salinity conditions would be determined when developing the Comprehensive Operations Plan. Please see to Master Response 3.3, Southern Delta Water Quality, for discussion of DWR and USBR's responsibilities.
1163	67	[From ATT1:] Comment #: C5:25 Page #: 5-73 Section #: 5.4.2 Comment: It is unclear how the cuts in surface water diversions are going to be met and whether there will be increased groundwater pumping. GSAs will now have to address increased ground water pumping or fallowing in preparing their GSPs. However the WSE modeling does not adequately show what the impacts on groundwater conditions will be.	Please see Master Response 3.4, Groundwater and the Sustainable Groundwater Management Act, for information regarding the SED groundwater analysis, including the SED approach to incorporating the Sustainable Groundwater Management Act (SGMA). Chapter 9, Groundwater Resources, describes the quantitative approach for estimating increased, groundwater pumping, reduced recharge, and related effects (e.g., subsidence) that could occur as a result of the effect of the LSJR alternatives on surface water supplies. The SED does not require or encourage increased groundwater pumping. The SED analyses reflect that the historical local response to reduced surface water availability has been to choose to increase groundwater pumping. As identified in Impact GW-1, the actual amount and location of pumping is uncertain and unknowable, because it will depend on the individual decisions locals choose to make in response to potential water supply reductions. Chapter 17, Cumulative Impacts, Growth-Inducing Effects, and Irreversible Commitment of Resources, acknowledges that implementation of SGMA could result in a reduction of irrigated acres.
1163	68	[From ATT1:] Comment #: C5:26 Page #: 5-87	Please see Appendix F.1, Hydrologic and Water Quality Modeling, Section F.1.5, Salinity Modeling, for discussion of the regression analyses used to model salinity changes between Vernalis and the interior Delta stations. The regression analysis in figure F.1.5-2a shows that the relationships between Vernalis flow and the measured EC at both Old River at Middle River and Brandt Bridge are similar despite the influence of Sacramento river water at Brandt Bridge.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Section #: 5.4.3, Table 5-25 Comment: Low salinity Sacramento River water reaches Brandt Bridge, but rarely, if ever, does it reach Old River near Middle River. This indicates that EC at Brandt Bridge is likely different from EC at Old River at Middle River for the same conditions of EC/flow at Vernalis. Also, objective is for "reaches" while impacts are shown at points.	Currently, compliance with the salinity objective is measured at the interior Delta stations even though the objectives actually apply throughout the southern Delta. In the future the monitoring locations or procedures that should be used to characterize southern Delta salinity and measure compliance versus the salinity objectives will be determined through the Comprehensive Operations Plan and Additional Monitoring Studies. Please see Master Response 3.3, Southern Delta Water Quality, for discussion of the Comprehensive Operations Plan and regarding the measurement of salinity in the interior southern delta.
1163	69	[From ATT1:] Comment #: C6:1 Section #: General Comment Comment: Condition of Levee on the San Joaquin River and Tributaries: According to the U.S. Army Corps of Engineers' 2002 Lower San Joaquin River Assessment, "The reliability of the levees in the study area varies significantly. Many levees are in poor condition and would require strengthening to safely pass design flood flows or higher project flows." According to DWR's Flood Control System Status Report (FCSSR, DWR, December 2011 [California Department of Water Resources (DWR), 2011. Flood Control System Status Report (FCSSR). December. Available: http://www.water.ca.gov/cvfmp/docs/FCSSRDec2011_FullDocument.pdf]), the State Plan of Flood Control (SPFC) Levees in the San Joaquin River and Tributaries area consist of 398 miles of levees, and approximately 291 of those miles, representing 73% of the total mileage, are considered "high hazard" levees due to various risk factors. These factors include inadequate levee geometry, seepage, structural instability, erosion, settlement, penetrations, levee vegetation, rodent damage, and encroachments. The Draft 2016 FCSSR Update (DWR, 2016 [California Department of Water Resources (DWR), 2016. Draft Flood System Status Report (FSSR). December. Available: http://www.water.ca.gov/cvfmp/docs/FSSR-Draft-Update-Compiled-2016.pdf]) provides additional and more specific graphical information for the State Plan of Flood Control (SPFC) LSJR levee reaches with high risk factors. Given the generally poor condition of the levees along the San Joaquin River and tributaries, DWR believes that the Board should include consideration and analysis of these conditions in any proposed action that changes the baseline flow conditions to ensure that implementation would not increase the probability of levee failure due to increased river stage that impinges on the levee section. Recently, DWR incident command teams noted and responded to through levee seepage on many of the levee reaches on the Mid-San Joaquin River between the SJR Confluence with the Merced and downstream to the City of Lathrop (Reclamation District 17) and requests by the levee reclamation districts for technical assistance and emergency contracting. Reclamation district board members indicated that through-levee seepage has been a historical problem with the levees in the Mid San Joaquin area (Merced River to Lathrop). Changes in flow regime that result in water surface elevations moving higher on the levee section could exacerbate the levee seepage and levee threat situation. If flows with the SED changes remain in the main channel and do not impact the levee section, there should not be an issue.	Please see Master Response 3.2, Surface Water Analyses and Modeling for discussion regarding flooding, sediment and erosion.
1163	70	[From ATT1:] Comment #: C6:2	Flow data for each alternative for each river are presented in Appendix F. For example, Table F.1.3-6d. Merced River Flows at Stevenson (cfs) for LSJR Alternative 2 (20 percent unimpaired flow). Parallel tables for each river and alternative are presented. Baseline flow conditions are also presented in Appendix F. For example, Table F.1.3-5d presents baseline distributions of target flows for the Merced River at Stevenson.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Section #: General Comment Comment: Need for hypothetical or historical flow data for each alternative: DWR believes that Chapter 6 of the SED does not provide sufficient flow data for baseline conditions and each flow alternative for a sample "normal" year and a sample "wet" year. DWR recommends that flow data be provided so that the hypothetical or historical flows can be used in a steady state hydraulic simulation model to compute river stages at leveed river cross sections. Computed river stages at leveed river cross sections will then allow a determination if the change in river stage at a cross-section affects a "high hazard" SPFC levee. Without knowing the change in river stage at cross sections, DWR believes that it is difficult to determine if actual implementation of an alternative will have a less than significant impact on the probability of flooding.	Parallel tables for each river are presented. These data are in cubic feet per second (cfs) and applicable for the identified use. Please see Master Response 3.2, Surface Water Analyses and Modeling for discussion regarding the flooding, sediment and erosion analysis.
1163	71	[From ATT1:] Comment #: C6:3 Section #: General Comment Comment: Sedimentation: DWR suggests that the current and changing capacity of the channels due to recent data on sedimentation be considered in the analysis and suggests that the SED's proposed plan include how it will potentially affect aggradation. Following is information that may be useful as a start. The Geomorphic and Sediment Evaluation of the San Joaquin River from the Delta to the Confluence with the Merced River and Major Tributaries (USACE, 2000 [U. S. Army Corps of Engineers (USACE), 2000. Sacramento and San Joaquin River Basin Comprehensive Study, California Geomorphic and Sediment Baseline Evaluation of the San Joaquin River from the Delta to the Confluence with the Merced River and Major Tributaries. April. Available: www.water.ca.gov/.../docs/FEIR.../SJR_Sediment_Eval_Report_4-2000.pdf]) reviewed historical records and reports, conducted new analyses, and concluded that of the four study reaches of the Lower San Joaquin River, three reaches show the channel thalweg in degradation and the thalweg in Reach 2 is in aggradation. The Lower San Joaquin River Assessment (USACE, 2002 [U. S. Army Corps of Engineers (USACE), 2002. Sacramento and San Joaquin River Basin Comprehensive Study, Lower San Joaquin River Assessment. March.]) includes profiles that show additional reaches of the Lower San Joaquin River that are in aggradation. The USACE 2000 and 2002 reports are not in agreement on channel degradation and aggradation. Of primary concern to the USACE, and confirmed by DWR in the Draft 2016 FCSSR, is a lack of channel capacity due to sedimentation and vegetation encroachment in the reach of the San Joaquin River between the Tuolumne River (River Mile 84) and the Merced River (River Mile 118). The USACE compared channel profiles developed in 1951 and 1998, which show a trend of sediment aggradation for each of the four sub-reaches, which appear to be in conflict with the USACE (2000) assessment that show three of four sub-reaches have degraded over time (1914 to 1998). The USACE concludes in the 2002 Lower San Joaquin Report that since 1951, the four sub-reaches are aggrading and thus losing channel capacity. This may be attributed to the construction of dams on the main-stem San Joaquin River (1942) and on the Merced (1967), Tuolumne (1971), and Stanislaus (1978) rivers, which have resulted in highly regulated and reduced peak river flows. DWR supports the USACE conclusions in the USACE 2002 LSJR Assessment that the LSJR is generally aggrading.	Please see Master Response 3.2 Surface Water Analyses and Modeling for discussion regarding the flooding, sediment and erosion analysis.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
1163	72	[From ATT1:] Comment #: C6:4 Section #: General Comment Comment: Channel Capacity: Appendix B of the Draft 2016 FCSSR shows various locations in the Lower San Joaquin River with channel capacities significantly less than the USACE Design Manual Channel Capacity and the USACE Operations and Maintenance Manual Channel Capacity. Estimates were derived using the most current topographic and bathymetric data and hydraulic simulation models developed as part of the DWR-led Central Valley Floodplain Evaluation and Delineation (CVFED) Project. The CVFED project was reviewed for quality assurance by the USACE. Sediment transport in the project area may be affected by the implementation of an SED flow alternative. If additional sediment is transported and deposited in a leveed river reach with existing channel capacity less than USACE channel design capacity or Operations and Maintenance channel capacity, the area's flood risk may be incrementally compromised. Table B-2 of Appendix B of the Draft 2016 FCSSR, entitled "San Joaquin River Channel Capacity Status" shows channel capacity deficiencies on the LSJR from the Merced River to Bear Creek, LSJR from the Tuolumne River to gap in project levees, LSJR from Stanislaus River to Tuolumne River, Stanislaus River from the San Joaquin River to the end of Project Levees, and Tuolumne River from the San Joaquin River to the end of Project Levees. DWR concludes that channel capacity is compromised in certain LSJR and tributary reaches and for the federally authorized and state sponsored Lower San Joaquin Flood Control Project to function properly and provide the authorized protection levels (Design Manual flows and Operations and Maintenance manual flows), channel capacities need to be restored and maintained. As suggested previously, DWR recommends that the Board update the SED with the recent information on channel reaches that have inadequate capacity to the SED analysis for potential impacts of the proposed adopted flow alternative.	Please see Master Response 3.2, Surface Water Analyses and Modeling for discussion regarding the flooding, sediment and erosion analysis.
1163	73	[From ATT1:] Comment #: C6:5 Section #: General Comment Comment: Erosion: Some SPFC levees in the Lower San Joaquin River and Tributaries have bank protection improvements put in place by the local reclamation district or private landowners. The DWR Draft 2016 FCSSR states, "The majority of levees in the San Joaquin River watershed were categorized as having a low erosion hazard. The approximately one-eighth of SPFC NULE (Non-Urban Levee Evaluations) levee segments with high erosion hazard are predominantly located on the Lower San Joaquin River (downstream from the Tuolumne River confluence), at Berenda Slough, and on the Fresno River." If a flow alternative described in the SED is implemented, the Board should collaborate with DWR and local levee reclamation districts to monitor historical erosion sites and monitor levee and river banks for significant changes in geometry and condition possibly due to erosion caused by changes in stream discharge implemented for satisfying the LSJR flow objectives proposed by the Board.	Please see Master Response 3.2, Surface Water Analyses and Modeling with respect to the information on levee erosion condition from the DWR Draft FCSSR (2016). The plan amendments provide several opportunities for coordination and collaboration. Please see Master Response 2.1, Amendments to the Water Quality Control Plan, regarding the purpose of the STM Working Group and the roles and responsibilities of the participants of the STM Working Group as described in the program of implementation of Appendix K of the SED. The STM Working Group will assist with the implementation, monitoring and effectiveness assessment of the February through June flow requirements and will include participants from state and federal agencies, water users, and others. In addition, the plan amendments provide for a comprehensive monitoring, special studies, evaluation, and monitoring program where parties are encouraged to work collaboratively in one or more groups and in consultation with the STM Working Group, USBR, and CDWR.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
1163	74	[From ATT1:] Comment #: C6:6 Page #: 6-10 Section #: 6.2.2 Comment: Table 6.4, used by the Board to analyze whether proposed flow levels would cause flood damage, may not reflect best available data and analysis completed by DWR for the Draft 2016 FCSSR. DWR suggests that the Board update Table 6-4 to reflect the most current DWR flood risk information and analyses reflecting levee evaluations, levee maintenance, and channel capacity.	Please see Master Response 3.2, Surface Water Analyses and Modeling with respect with respect to the new information on channel capacity from the DWR Draft FCSSR (2016). The action and minor flows in Table 6-4 are lower than those in DWR Draft FCSSR (2016). The information in Table 6-4 remains useful for understanding flooding at specific locations as indicated.
1163	75	[From ATT1:] Comment #: C6:7 Page #: 6-2 to 6-4 and 6-28 to 6-40 Section #: 6.1 Table 6-1, and 6.4.3 Comment: Increase in flows can increase erosion of the levees and banks that may result in more frequent flooding. The rate and extent of levee and bank erosion for a system, not a specific site, cannot be determined. There have been a number of studies attempting to estimate erosion impacts; however, due to the complexity of the contributing factors, it cannot be estimated with any degree of certainty for a system, especially over a long period of time. Therefore, given this concern, DWR believes the SED should include additional information to help support a finding of less than significant impact on levee erosion and flooding. The SED does not evaluate the impacts of sedimentation on channel capacity. In order to analyze the impacts of increased flow regimes in a flood control system over a longer period of time that is known to be "sediment rich" with respect to flooding, channel capacity reduction should be considered. This consideration may not be important for a flow increase of a single occasion, but it will likely have impacts, such as more frequent flooding over many years as planned. DWR recommends that the Board add information to address sedimentation and reduced channel capacity over the long-term to support its findings on potential impacts on flooding.	Please see Master Response 3.2, Surface Water Analyses and Modeling discussion regarding the flooding, sediment and erosion analysis.
1163	76	[From ATT1:] Comment #: C6:8 Page #: 6-30 to 6-40 Section #: 6.4.3 Comment: Adaptive management creates a degree of uncertainty regarding flooding impacts that may exacerbate the erosion and sedimentation, thereby further increasing the frequency of flooding.	Please refer to Chapter 6, Flooding, Sediment, and Erosion, for a discussion of flood conditions and the LSJR alternatives. Adaptive implementation was analyzed for each LSJR alternative in Chapter 6. Please see Appendix K, regarding the protection of public health and safety with respect to implementing the plan amendments and flooding. Please also see response to comment 1163-73 regarding the STM working group and adaptive implementation.
1163	77	[From ATT1:]	The text reference has been broadened to include all of Cal. Code Regs. tit. 23 which includes reference to the indicated CFR. The text revision does not change any conclusions in Chapter 6, Flooding, Sediment, and

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Comment #: C6:9 Page #: 6-18 and 6-19 Section #: 6.3.2 Comment: The Central Valley Flood Protection Board's (CVFPB's) responsibility for encroachment control has been mentioned. DWR recommends that additional information be included regarding the assurances provided to USACE for operation and maintenance of the system in accordance with 33 CFR 208.10.	Erosion.
1163	78	[From ATT1:] Comment #: C6:10 Page #: 6-19 Section #: 6.3.2 Comment: The SED references the 2012 Central Valley Flood Protection Plan, but it should also consider the content of the 2017 update (available here: http://www.water.ca.gov/cvfmp/2017-cvfpp-docs.cfm).	Please see Master Response 3.2, Surface Water Analyses and Modeling discussion regarding the flooding, sediment and erosion analysis. Please also see response to comment 1163-74.
1163	79	[From ATT1:] Comment #: C6:11 Page #: 6-28 to 6-40 Section #: 6.4.3 Comment: 33 CFR 208.10 requires channel maintenance, which includes sediment removal. Due to the environmental impacts of such actions, sediment removal often cannot be performed. Therefore, the impacts of higher flows on channel capacity over a long period of time could be significant. Potential mitigation would involve programmatic permitting of sediment removal and funding for periodic sediment removal. DWR believes if mitigation is not an option, then sedimentation could be a significant impact without the possibility to reduce the impacts to a less than significant level.	Please see response to comment 1163-78.
1163	80	[From ATT1:] Comment #: C6:12 Page #: 6-40, 17-26 to 17-30 Section #: 6.5 Comment: DWR believes that the impacts of erosion and sedimentation on flood control works have not been fully addressed. These works are levees, channels, and structures. Maintenance of these works is critical for the proper functioning of the flood control system, specifically to benefit from the system as intended. Potential cumulative impacts from increase in needed maintenance should be addressed. The SED should include information related to the increased need for maintenance and for funding to perform	Please see response to comment 1163-78. Also, please see the response to comments 1163 -73 and 1163-76 indicating the several opportunities for coordination and collaboration with respect to implementation via the STM Working Group, USBR, and CDWR and with respect to public health and safety. Considering that information increased maintenance costs are not anticipated.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		maintenance to address potential impacts on public safety with regard to flood protection.	
1163	81	[From ATT1:] Comment #: C7:1 Section #: General Comment Comment: Throughout the document, recommend rechecking citations to insure appropriateness, check that most relevant and recent citations are used (this section uses nothing newer than 2011), and check for accuracy of stating conclusions of cited documents. Many key citations are missing throughout.	The State Water Board strived to make the SED as complete and accurate as possible. Any missing citations or references are not intentional.
1163	82	[From ATT1:] Comment #: C7:2 Section #: General Comment Comment: Assessments only indicate whether alternative management plans cause a significant negative impact compared to baseline and do not indicate whether or how much alternative management plans will result in improved population numbers or survival. Restoration of a more historical, dynamic hydrograph would generally be expected to benefit native aquatic species by improving native species habitat through natural processes. However, all the scenarios considered were missing two related components that may be necessary to relieve what is generally recognized as a primary cause of mortality for migrating juvenile salmonids: predation in the south Delta. The first missing component is the reestablishment of historical low flows in late summer/early fall that allowed salt water intrusion into much of the south Delta; salt water intrusion would diminish perennial habitat for (and therefore densities of) obligate fresh water predators like largemouth bass. The second component is reestablishment of high flows during late-spring/early summer snow melt that historically transformed much of the south Delta into an extensive freshwater marsh. These floods would dilute predator densities and provide quality rearing habitat for migrant juveniles. Neither of these components is currently possible because of the need to maintain low salinities for south Delta water withdrawals and the need to protect suburban developments in historical flood zones. Without addressing high predation rates in the South Delta, the potential benefits to fish of the proposed changes to the water quality control plan may not be fully realized.	Please see Master Response 3.1, Fish Protection, regarding expected benefits of the plan amendments and the discussion regarding predation. Chapter 7, Aquatic Biological Resources, evaluates environmental impacts on aquatic biological resources that could result from the Lower San Joaquin River (LSJR) alternatives. Also see Chapter 19, Analyses of Benefits to Native Fish Populations from Increased Flow between February 1 and June 30, for an in-depth discussion of benefits expected from implementation of the Plan Amendments, and see Appendix C, Technical Report on the Scientific Basis for Alternative San Joaquin River Flow and Southern Delta Salinity Objectives, for the scientific basis and technical resources that were used in the SED to analyze project effects in accordance with State CEQA Guidelines . Refer to Master Response 3.3, Southern Delta Water Quality, for a discussion of the amendments to the southern Delta salinity objective to protect agricultural and other beneficial uses, including fish and wildlife. Refer to Master Response 1.1, General Comments, regarding the requirements of State CEQA Guidelines and Program level review. Also refer to Master Response 1.2, Water Quality Control Planning Process, regarding the phase approach and discussion of Phase 1 versus the Sacramento Bay-Delta watershed update, and to Master Response 2.4, Alternatives to the Water Quality Control Plan Amendments, regarding the purpose of the evaluations in the SED and discussion of the reasonable range of alternatives evaluated to help lessen, mitigate, or avoid significant environmental impacts potentially caused by the project.
1163	83	[From ATT1:] Comment #: C7:3 Section #: General Comment Comment: Data are out of date for parts of the analysis and updated in other sections. WSE baseline uses 1970-2015 data, yet for temperature 1970-2003 is used.	Both the WSE baseline model and the water temperature model used data from 1970-2003. Chapter 5, Surface Hydrology and Water Quality, summarizes the methodologies of these the section about methods and approach. Chapter 19, Analyses of Benefits to Native Fish Populations from Increased Flow between February 1 and June 30, also summarizes the methodologies of the modeling in the sections about methods of temperature evaluation and methods of the SalSim evaluation (which includes a brief summary of the WSE modeling). Detailed descriptions of WSE and water temperature modeling methodologies and results are provided in Appendix F.1, Hydrologic and Water Quality Modeling.
1163	84	[From ATT1:] Comment #: C7:4	As described in Chapter 7, Aquatic Biological Resources, in the section about impacts and mitigation measures, under Impact AQUA-9: Changes in food availability resulting from changes in flow and floodplain inundation, no substantial long-term negative changes on food web support are expected based on changes in the frequency and magnitude of floodplain inundation over the modeling period as demonstrated by the

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Page #: 7-4, 7-7 Section #: 7.1 Comment: These statements appear to be conflicting: Impact AQUA-9 on page 7-7 states that "no substantial changes are likely to occur in frequency and magnitude of floodplain inundation and associated food web conditions. . . ." However, on page 7-4, compensation for loss of fry habitat in the Tuolumne and Merced Rivers is mitigated for by increased floodplain area in Alternative 2.	modeling results. This is not in conflict with the analysis for Alternative 2 under Impact AQUA-3. In response to implementation of Alternative 2, increase in floodplain habitat area and decrease in water temperature are expected to offset losses of fry habitat (WUA) in the Tuolumne and Merced rivers with respect to overall change in rearing habitat quantity (lessened by decreased WUA) and quality (improved via increased floodplain habitat area and decreased temperature), but are not meant to directly mitigate for those losses. As described in in the section about impacts and mitigation measures, under Impact AQUA- 3: Changes in quantity/quality of physical habitat for spawning and rearing resulting from changes in flow, "While WUA for Chinook salmon fry and juvenile rearing would decrease in the Tuolumne and Merced Rivers, floodplain habitat would increase and water temperatures would decrease in response to higher spring flows. Therefore, adverse impacts would be less than significant." Please also refer to Master Response 3.1, Fish Protection, for discussion of water temperature and floodplain modeling, and expected benefits of the plan amendments.
1163	85	[From ATT1:] Comment #: C7:5 Page #: 7-4, 7-7, 7-97 Section #: 7.1 and 7.4.3 Comment: These statements appear to be conflicting: Alternative 2, impact AQUA-4 states that decreases in exposure of Chinook salmon and steelhead life stages to suboptimal water temperatures would occur. Alternative 2, impact AQUA-10, states "no substantial changes are predicted to occur in habitat availability and water temperatures . . . ." On page 97, the SED indicates "relatively small changes in Chinook salmon and steelhead spawning habitat under LSJR Alt 2."	The first two statements identified by the commenter are contained in the summary table at the beginning of Chapter 7. This summary table is meant to summarize the overall discussion and impact determinations. The statements are not conflicting within the context of the impact discussions that can be found in Section 7.4.3. A decreases in exposure of life stages to suboptimal temperature (AQUA-4) would result in substantial (adverse) changes in habitat availability and water temperatures, but may result in relatively small changes (expected not to be adverse). No change has been made.
1163	86	[From ATT1:] Comment #: C7:6 Page #: 7-10 Section #: 7.2.1 Table 7-2 Comment: The habitat description for green sturgeon should clarify that 8-14 centigrade is the spawning temperature range. Adult habitat temperature can be as high as 22 centigrade as commonly seen on the Feather River.	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. In addition, the modification suggested by the commenter does not contradict the information presented in Chapter 7, Aquatic Biological Resources, and would not change the impact determination made in Chapter 7. For the purposes of the impact analysis the information given is in the context of a sentence about spawning. No change has been made.
1163	87	[From ATT1:] Comment #: C7:7 Page #: 7-10 Section #: 7.2.1 Table 7-2	The distribution of Delta smelt in general terms is stated correctly in Chapter 7. A finer examination of distribution (i.e., examining the extent of distribution, Napa River and Suisun Marsh) would not change conclusions in Chapter 7, Aquatic Biological Resources. No change has been made.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Comment: Location for Delta smelt should include Napa River and Suisun Marsh.	
1163	88	[From ATT1:] Comment #: C7:8 Page #: 7-10 Section #: 7.2.1 Table 7-2 Comment: The habitat description for Delta smelt is outdated and it appears unclear what Delta smelt "prefer." Delta smelt are common in the low salinity zone (1-6 ppt), but also frequently occur in freshwater areas such as Cache Slough Complex (Sommer et al. 2012). Location for Delta smelt should include Napa River and Suisun Marsh.	Please see response to comment 1163-87 regarding the general distribution of delta smelt.
1163	89	[From ATT1:] Comment #: C7:9 Page #: 7-11 Section #: 7.2.1 Table 7-2 Comment: "Salinity tolerance to 35 ppt" for longfin smelt should be changed to "[a]dults can tolerate salinity of 35 ppt." The original sentence implies that 35 ppt is the upper limit of longfin smelt salinity tolerance, which has not yet been determined.	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. In addition, the modification suggested by the commenter does not contradict the information contained in Chapter 7, Aquatic Biological Resources. For the purposes of the impact analysis, the information given is sufficient. No change has been made.
1163	90	[From ATT1:] Comment #: C7:10 Page #: 7-11 Section #: 7.2.1 Table 7-2 Comment: There is a recreational fishery for splittail. The description of splittail habitat is outdated. It should say: "spawn among submerged and flooded vegetation in sloughs, river channels, marshes, and seasonal floodplain."	Table 7-2 was updated to reflect Splittail as a recreational species. This update does not change an impact determination, and the information presented in Chapter 7, Aquatic Biological Resources, regarding Splittail habitat remains sufficient.
1163	91	[From ATT1:] Comment #: C7:11 Page #: 7-14 Section #: 7.2.1 Table 7-3 Comment: It is more appropriate to say "rivers" than "streams" for Striped bass habitat.	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. No change has been made.
1163	92	[From ATT1:] Comment #: C7:12	The update regarding the location of White sturgeon has been made in Chapter 7, Aquatic Biological Resources, in Table 7-3. The update to Table 7-3 does not change conclusions in the chapter, but will alleviate discrepancy between Table 7-3 and the discussion of White sturgeon in section 7.2.1.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Page #: 7-14 Section #: 7.2.1 Table 7-3 Comment: The location of the white sturgeon needs to include the SJR. White sturgeon are frequently caught in the SJR and eggs have been recovered (CDFW, USFWS, publications pending).	
1163	93	[From ATT1:] Comment #: C7:13 Page #: 7-14 Section #: 7.2.1 Table 7-3 Comment: American shad also occur in tributaries such as Yuba, American, and Feather Rivers.	A revision regarding the location of American shad was made in Chapter 7, Aquatic Biological Resources, Table 7-3. There has been no change to the conclusions in Chapter 7 as a result of this revision.
1163	94	[From ATT1:] Comment #: C7:14 Page #: 7-14 Section #: 7.2.1 Table 7-3 Comment: Peak spawning conditions for American shad described here only apply to the Millerton reservoir population. Either expand the temperature range as listed in Moyle 2002 (or other, newer literature) or specify that this range is based on the Millerton reservoir fish.	A revision regarding habitat for American shad to reflect spawning temperature for Millerton reservoir fish has been made in Chapter 7, Aquatic Biological Resources, Table 7-3. There has been no change to the conclusion in Chapter 7 as a result of this revision.
1163	95	[From ATT1:] Comment #: C7:15 Page #: 7-15 Section #: 7.2.1 Chinook Salmon Comment: Critical criteria for species differ throughout the document sections. For example, Table 7-2 lists 8.0- 12.5C/46.5-54.5F for Fall-run Chinook Salmon habitat, but lists 41-55 F for incubation, then on the next page states the preferred ranges are 54-58.5F for rearing and 50-60 F for growth.	A revision to temperatures for Central Valley fall-/late fall-run Chinook salmon, Habitat in Table 7-2, was made to encompass all life history stages. There has been no change to the conclusions in Chapter 7 as a result of this revision.
1163	96	[From ATT1:] Comment #: C7:16 Page #: 7-10, 7-16 Section #: 7.2.1 Chinook Salmon Comment: For Spring-run Chinook Salmon, critical habitat is selected as yes, but then it	Information regarding the reintroduction of spring-run Chinook salmon to the San Joaquin River has been added to Central Valley Spring-Run. The information does not change any conclusions in Chapter 7.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		states they are "not in the plan area." It is unclear whether the Spring-run Chinook Salmon reintroduction program, and thus impacts to Spring-run, were considered or included in this analysis. Page 7-16 states "currently no Spring-run Chinook . . . are found . . . ." This is technically true, but they are in the process of being reintroduced.	
1163	97	[From ATT1:] Comment #: C7:17 Page #: 7-18, last paragraph Section #: 7.2.1 Steelhead Comment: Suggest adding that steelhead juveniles also use seasonal floodplain (Sommer et al. 2001).	Sommer et al 2001 only discusses juvenile Chinook salmon use of floodplain habitat. As such, no updates were made to Chapter 7, Aquatic Biological Resources.
1163	98	[From ATT1:] Comment #: C7:18 Page #: 7-19, 7-20 Section #: 7.2.1 Green Sturgeon Comment: The section on green sturgeon needs to be updated. Many of the comments are based on Moyle 2002 (many assumptions made based on the surrogate white sturgeon); the majority of green sturgeon research occurred after Moyle's publication. Suggest reviewing 5-year review as a good starting point: http://www.nmfs.noaa.gov/pr/listing/southern_dps_green_sturgeon_5-year_review_2015__2_.pdf.	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. Furthermore, the content provided by the commenter does not contradict the information presented in Chapter 7, Aquatic Biological Resources. For the purposes of the impact analysis, the information provided by Moyle 2002 is deemed sufficient; therefore, no changes have been made.
1163	99	[From ATT1:] Comment #: C7:19 Page #: 7-20, 7-21 Section #: 7.2.1 Delta Smelt, 2nd paragraph Comment: Geographic distribution for Delta smelt is described in the second paragraph, in part, as occurring downstream of Isleton, yet the following paragraph states they have been found as far upstream as the confluence with the American River. This is upstream of Isleton. In addition, Delta Juvenile Fish Monitoring Program (DJFMP) data indicates Delta smelt have been sampled at locations above the American River confluence.	The distribution of Delta smelt is primarily located below Isleton on the Sacramento River, as stated by Moyle (2002). Please see response to comment 1163-83. No change has been made.
1163	100	[From ATT1:] Comment #: C7:20 Page #: 7-21 Section #: 7.2.1 Delta Smelt, 2nd paragraph	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. Furthermore, the information provided by the commenter does not contradict the information contained in Chapter 7, Aquatic Biological Resources. No change has been made.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Comment: Outdated. Only some Delta smelt are transported to the low salinity zone. There is much more variability in their behavior. For example, some larvae choose to remain in freshwater (Sommer et al. 2012). Also, consider deleting the sentence that begins "Delta Smelt growth during the fall . . ." as it is outdated. Growth often slows down as fish get older Please correct statement that Delta smelt larvae do not "occur in the open sea."	
1163	101	[From ATT1:] Comment #: C7:21 Page #: 7-21, 3rd paragraph Section #: 7.2.1 Delta Smelt Comment: The last reference should be reviewed as it applies to salmon, not necessarily Delta smelt.	References have been added and the "NMFS 2009a" reference deleted in Chapter 7, Aquatic Biological Resources. The revisions do not change conclusions in Chapter 7, Aquatic Biological Resources.
1163	102	[From ATT1:] Comment #: C7:22 Page #: 7-21 3rd paragraph Section #: 7.2.1 Delta Smelt Comment: The NMFS Biological Opinion (BiOp) is cited in the sentence covering Delta smelt benefits from turbidity when the USFWS BiOp should be cited.	The commenter is referring to the same reference in response to comment 1163 - 101 and is asking specifically for the USFWS 2008 Biological Opinion for the Central Valley Project to be cited. See response to comment 1163-101.
1163	103	[From ATT1:] Comment #: C7:23 Page #: 7-21 last paragraph Section #: 7.2.1 Delta Smelt Comment: The last sentence on the page does not have proper grammar, and it implies that Delta smelt are associated with X2 year round and does not specify how X2 has decreased in area.	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. Please see the entire section on Delta smelt for a discussion of habitat. For the purposes of the impact analysis the information provided in Chapter 7 is sufficient.
1163	104	[From ATT1:] Comment #: C7:24 Page #: 7-22 Section #: 7.2.1 Longfin Smelt, 2nd paragraph Comment: Should change "pelagic (ocean-going)" to "marine-oriented." "Pelagic" is commonly used to simply describe an open-water fish species, which is how it is used elsewhere in the document. The sentence "[t]hus, they have a salinity tolerance up to 35 ppt" should be revised to	The term pelagic was modified to identify species living or occurring in the open water to be consistent with the definition for Delta smelt provided in Chapter 7. This revision does not change any conclusions in Chapter 7.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		"[t]hus, they can tolerate salinity level of 35 ppt." The original sentence seems to imply that there has been a formal study that looked at the salinity tolerance of longfin smelt and that the species' limit is 35 ppt.	
1163	105	[From ATT1:] Comment #: C7:25 Page #: 7-22 Section #: 7.2.1 Longfin Smelt, 3rd paragraph Comment: The sentence regarding longfin smelt spawning, "CDFW surveys have shown that spawning occurs over a larger area." See the following references: http://www.dfg.ca.gov/delta/data/longfinsmelt/documents/LongfinsmeltFactSheet_July09.pdf http://www.fws.gov/cno/es/speciesinformation/Longfin%20Smelt%2012%20month%20finding.pdf	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. Furthermore, the information provided by the commenter does not contradict the information contained in Chapter 7, Aquatic Biological Resources. For the purposes of the impact analysis the information given is sufficient about spawning distribution and no change was made.
1163	106	[From ATT1:] Comment #: C7:26 Page #: 7-22 Section #: 7.2.1 Longfin Smelt, 3rd paragraph Comment: Based on 20 mm survey distributions and Hobbs et al. 2010, longfin smelt spawning is much broader than suggested here. For example, they are common in the north Delta and Napa River.	Please see response to comment 1163-105.
1163	107	[From ATT1:] Comment #: C7:27 Page #: 7-23 Section #: 7.2.1 Sacramento Splittail, last paragraph Comment: This paragraph is outdated. Splittail abundance is primarily driven by access to upstream floodplain habitat (Moyle et al. 2004; Sommer et al. 2007), not salinity intrusion.	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. For the purposes of the impact analysis the information provided about decline in splittail abundance is sufficient and no change was made.
1163	108	[From ATT1:] Comment #: C7:28 Page #: 7-22 Section #: 7.2.1 Splittail, last paragraph Comment: The salinity tolerance of Sacramento splittail larvae has been evaluated in a recent study:	Please see response to comment 1163-105.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Verhille, C. E., T. F. Dabruzzi, D. E. Cocherell, B. Mahardja, F. Feyrer, T. C. Foin, M. R. Baerwald, and N. A. Fangue. 2016. Inter-population differences in salinity tolerance and osmoregulation of juvenile wild and hatchery-born Sacramento splittail. Conservation Physiology. 4(1): cov063. DOI: 10.1093/conphys/cov063	
1163	109	[From ATT1:] Comment #: C7:29 Page #: 7-22, 7-23 Section #: 7.2.1 Splittail Comment: The document should note that splittail was determined by USFWS in 2010 to be comprised of two distinct population segments (DPS): the San Pablo Bay population and Central Valley/Delta population. The WQCP would only affect the Central Valley/Delta population.	Please see response to comment 1163-105. For the purposes of the impact analysis the information provided in Chapter 7, Aquatic Resources, is sufficient to consider Splittail population because the plan area only incorporates the Central Valley/Bay Delta population. No change was made.
1163	110	[From ATT1:] Comment #: C7:30 Page #: 7-23, 3rd paragraph Section #: 7.2.1 Splittail Comment: This discussion is outdated. See Sommer et al. (2008) for an updated understanding of juvenile splittail behavior. Their behavior changes substantially on a daily basis, and as they grow older.	Please see response to comment 1163-105. For the purposes of the impact analysis the information given about juvenile behavior is sufficient and no change was made.
1163	111	[From ATT1:] Comment #: C7:31 Page #: 7-26 Section #: 7.2.1 Largemouth Bass, 5th and 6th paragraphs Comment: Review for apparent inconsistent information. The first sentence in the fifth paragraph states that "[o]ptimal riverine habitat for largemouth bass consists of . . . rivers or pools with fine-grained (sand or mud) substrates," while the sixth paragraph states that "[g]ravel seems to be preferred, while silty substrates are unsuitable."	Section 7.2.1, paragraph 5 describes optimal riverine habitat for adult and rearing largemouth bass as rivers or pools with fine grained substrates. The subsequent paragraph discusses spawning habitat and gravel is used as a substrate for eggs. No changes were made.
1163	112	[From ATT1:] Comment #: C7:32 Page #: 7-27, 1st paragraph Section #: 7.2.1 Striped Bass Comment: Striped bass also can spend the whole year in freshwater (Delta).	It is unclear if a change is being requested. This comment does not make a general comment regarding the plan amendments or raise significant environmental issues.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
1163	113	[From ATT1:] Comment #: C7:33 Page #: 7-27, 2nd paragraph Section #: 7.2.1 Striped Bass Comment: Footnote three makes it seem like striped bass only live near 2 ppt, but their larval distribution is much broader. It is true, however, that juvenile production is typically better in wetter years. The center of juvenile striped bass distribution is affected by the position of the salt field as indexed by X2 (Dege and Brown 2003; Sommer et al. 2012). However, young striped bass have a relatively broad distribution across the low salinity zone and freshwater tidal habitat. X2 has at least a modest effect on annual production of young striped bass, although in recent years the effect has become muted (Sommer et al. 2007).	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. After reviewing Sommer et al 2007, the striped bass larval relationship with outflow changed due to the introduction by Corbula and again during the POD years when abundance indices were below the original relationship with outflow. A change was seen with outflow but not with X2.
1163	114	[From ATT1:] Comment #: C7:34 Page #: 7-27, 2nd paragraph Section #: 7.2.1 Striped Bass Comment: Striped Bass also can spend the whole year in freshwater (Delta).	Please see response to comment 1163-112.
1163	115	[From ATT1:] Comment #: C7:35 Page #: 7-28 Section #: 7.2.1 American Shad, 2nd paragraph Comment: The following statement needs a clarification that it was based on the Lake Millerton shad population: "Peak spawning occurs from mid-May to mid-June at water temperatures of 51.8°F–62.6°F." The American Shad population at the Sacramento River spawns at higher temperatures according to Moyle 2002.	Lake Millerton is outside the geographic scope of the plan area. The clarification that spawning temperatures apply to the Millerton Reservoir population has been made to the Section 7.2.1 American Shad. The revision does not change any conclusions in Chapter 7, Aquatic Biological Resources.
1163	116	[From ATT1:] Comment #: C7:36 Page #: 7-31 Section #: 7.2.2 Table 7-4 Comment: Suggest checking the Rosenfield and Baxter (2007) reference. Their 2008 publication is for longfin smelt, not any of these fishes.	The source was clarified in Table 7-4. Rosenfield and Baxter is cited in Table 7-4 because the style of Table 7-4 is adapted from Rosenfield and Baxter, not because of information related to aquatic resources. The source clarification does not change any conclusions in Chapter 7.
1163	117	[From ATT1:]	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. The escapement information provided in Chapter 7 is sufficient for the impact

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Comment #: C7:37 Page #: 7-32, 2nd paragraph Section #: 7.2.2 Comment: Escapement information is out of date in both text and graphs, but particularly in the text.	analysis. No change has been made.
1163	118	[From ATT1:] Comment #: C7:38 Page #: 7-35, 2nd paragraph Section #: 7.2.2 Comment: The SED relates predation on the Stanislaus to modeled Winter-run predation rates, but they depend on migration timing and Sacramento River flows. Suggest including survival and predation studies for SJR and/or its tributaries.	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. Please see Master Response 3.1, Fish Protection, regarding predation and recent studies on predation. Also refer to the Chapter 19, Analyses of Benefits to Native Fish Populations from Increased Flow between February 1 and June 30, and to Appendix C, Technical Report on the Scientific Basis for Alternative San Joaquin River Flow and Southern Delta Salinity Objectives, for discussions of predation and how the expected benefits of the increased and more natural flow regime are anticipated to reduce predation.
1163	119	[From ATT1:] Comment #: C7:39 Page #: 7-38, 3rd paragraph Section #: 7.2.2 Comment: Restoration actions have occurred on the tributaries (habitat/floodplain), but they are not included, and thus modeled areas are out of date.	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. For the purposes of the impact analysis the information given is sufficient and no change was made. For a discussion of additional restoration actions that may have taken place, please see Master Response 5.2, Incorporation of Non-Flow Measures.
1163	120	[From ATT1:] Comment #: C7:40 Page #: 7-49, 4th paragraph Section #: 7.2.4 Comment: The second sentence states that exports outside of the range tested by Newman and Brandes (2008) could affect salmon. This may be true, but the sentences that follow do not logically support that statement. Exports affect OMR flows (Sentence 3), but it does not follow that exports outside of the 2008 study could affect salmon.	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. The content provided by the commenter does not contradict the information contained in Chapter 7, Aquatic Biological Resources. For the purposes of the impact analysis the information given is sufficient and no change was made.
1163	121	[From ATT1:] Comment #: C7:41 Page #: 7-50, 1st paragraph Section #: 7.2.4	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. The content provided by the commenter does not contradict the information contained in Chapter 7, Aquatic Biological Resources (see Section 7.2.1, Fish Species, Delta Smelt). For the purposes of the impact analysis the information given is sufficient and no change was made.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Comment: Delta Smelt can occur in the Delta year round.	
1163	122	[From ATT1:] Comment #: C7:42 Page #: 7-50, 5th paragraph Section #: 7.2.4 Comment: Delta smelt do not enter the south Delta unless turbidities are high (Grimaldo et al. 2009).	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. The content provided by the commenter does not contradict the information contained in Chapter 7, Aquatic Biological Resources (see Section 7.2.1, Fish Species, Delta Smelt). For the purposes of the impact analysis the information given is sufficient and no change was made.
1163	123	[From ATT1:] Comment #: C7:43 Page #: 7-50, 5th paragraph Section #: 7.2.4 Comment: Improvements to noted impacts are not identified in the SED: "During the fall adult salmon migration season, when LSJR inflows to the Bay-Delta are less than 1,500 cfs, low DO levels in the SJR at the Stockton Deep Water Ship Channel (e.g., less than 6 ppm) create a chemical migration barrier to upstream migrating adult salmon. Failure of SJR Basin salmon to reach the spawning grounds results in negative spawning impacts on the SJR fall-run Chinook salmon population (CDFG 2011a)." Section should consider adding measures that have been implemented to correct for this. Specifically the Dock 20 Aeration Facility which is funded under a voluntary aeration agreement among participating San Joaquin River DO TMDL stakeholders. The DOCK 20 Aeration Facility, located in the Port of Stockton, injects dissolved oxygen into the San Joaquin River when dissolved oxygen concentrations are less than the Central Valley Water Board's Basin Plan dissolved oxygen water quality objectives. Information regarding DWR's Stockton DWSC Demonstration Dissolved Oxygen Project and the 2012-2016 Agreements can be viewed at: http://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/san_joaquin_oxygen/implementation_activities/index.shtml.	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. The content provided by the commenter does not contradict the information contained in Chapter 7, Aquatic Biological Resources. For the purposes of the impact analysis the information given is sufficient and no change was made.
1163	124	[From ATT1:] Comment #: C7:44 Page #: 7-51, 2nd paragraph Section #: 7.2.4 Comment: The last sentence states that SJR basin outmigrating Fall-run Salmon encounter a plume of low salinity Sacramento River water from the Delta Cross Channel. Suggest revising based on the fact that the outmigration period is late January to early June, and the Delta Cross Channel gate is closed as early as December 15 through May 15, with potentially limited openings through June 15.	The text was revised Section 7.2.4. The revision does not change any conclusions in Chapter 7, Aquatic Biological Resources.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
1163	125	[From ATT1:] Comment #: C7:45 Page #: 7-51 last paragraph Section #: 7.2.4 Comment: Need a citation for the statement that predation in the south Delta is higher than everywhere else. The references that follow do not appear to support that statement. If there is no citation, suggest adding qualifying language to the first sentence, e.g., "There is reason to believe that...."	The statement identified by the commenter is used as a general statement. It is supported by the evidence provided in the following sentences contained in the paragraph and citations contained therein. No change was made.
1163	126	[From ATT1:] Comment #: C7:46 Page #: 7-68, 1st paragraph Section #: 7.4.3 Comment: Logic used to support impact analysis findings in the plan areas above and within the reservoirs is not understood (i.e., bass spawn at depths of 0-15 feet, therefore any reservoir elevations changes of 15 feet or less in a month are not significant).	As described in Chapter 7, Aquatic Biological Resources, Section 7.4.3, Impact and Mitigation Measures, under Impact AQUA-1: Changes in spawning success and habitat availability foFr warmwater species resulting from changes in reservoir water levels, increases or decreases in reservoir surface water elevation of 15 feet or more within a month were used to evaluate adverse effects on warmwater fish species. To evaluate significance of impacts, "A 10 percent increase in the occurrence of 15 foot fluctuations compared to baseline conditions was considered to be significant. A decrease in the occurrence of water level fluctuations of this magnitude would result in a more stable environment for the spawning and rearing life stages of warmwater species and, consequently, would not be considered a significant impact." This 15-foot criteria was based on typical spawning depths for largemouth bass that were identified in the cited references as ranging from the surface to about 15 feet (PG&E 2000; USBR 2011). USBR's (2011) San Joaquin River Restoration Program EIR described the typical range of spawning depths for largemouth bass in Millerton Reservoir as being from the surface to a depth of 15 feet, and used this depth range to evaluate impacts to warmwater fish shallow water habitat (see Section 5.4.4, Impact FSH-15 and Impact FSH-18 of the EIR). PGE's (2000) Hydrodivestiture EIR used the same significance criteria as the SED: an evaluation threshold of a change in reservoir elevation of 15 feet, and fluctuation of elevation over the evaluation threshold in at least 10 percent of the spawning period months for the period of record (see Section 4.4.6.3 Analysis Methodology – Storage Reservoirs of the Hydrodivestiture EIR). This significance criteria was used in the analyses of warmwater fisheries impacts at Lake Britton on the Pit River, Lake Almanore, on the Upper North Fork Feather River, Butt Valley Reservoir on Butt Creek (tributary to Upper North Fork Feather River), Englebright Reservoir on the North Yuba River, Lyons Reservoir on the South Fork Stanislaus River, and Bass Lake on Willow Creek (tributary to the San Joaquin River).
1163	127	[From ATT1:] Comment #: C7:47 Page #: 7-97 Section #: 7.4.3 Comment: Significance of impacts relies on the assumption that juvenile produced in river will all emerge successfully and emigrate to the floodplains. Loss of Weighted Unit Area is not directly mitigated by limited floodplain activation. The floodplain needs to be reconnected and active for several weeks for the benefits to be realized, yet changes to in-river habitat can be detrimentally affected on a much shorter time scale (hourly).	Please refer to Master Response 3.1, Fish Protection, regarding the modeling to support the analyses, including floodplain modeling, and specifically for discussion of appropriateness of using modeled monthly flows as a basis for the SED's floodplain habitat analysis.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
1163	128	[From ATT1:] Comment #: C7:48 Page #: 7-103, 19-10 Section #: 7.4.3 and 19.2.1 Comment: As indicated in the first sentence on page 19-11, "[t]hermal stress can lead to lethal effects either immediately, in a period of days, or even weeks or months from the onset of elevated temperature." Accordingly, NMFS and Reclamation have moved to a daily average temperature target on the Sacramento River for the winter run Chinook salmon. A seven day maximum is not appropriate for looking at temperature effects on salmonids, especially eggs and emergent fry.	Please see Master Response 3.1, Protection of Fish and Wildlife regarding temperature and the 7-day average of the daily maximum as a benchmark.
1163	129	[From ATT1:] Comment #: C8:1 Page #: 8-59 Section #: 8.4.3 Comment: Subsection Impact Bio-3, Area of Potential Indirect Effects. The last paragraph in this subsection states, "[e]xisting agricultural lands that do not receive irrigation water may not necessarily be fallowed in perpetuity or potentially converted to non-agricultural uses." While they may not, the converse of that statement may also be true. Therefore, the statement on Swainson's hawk nesting densities being highest in areas with mixed native habitat and agriculture may not support a less than significant effect determination since the reduction of agricultural acreage of certain crops may have impacts to Swainson's hawk populations.	The comment does not provide any support for the assertion that the plan amendments will cause an overall reduction in Swainson's hawk habitat. According to the California Department of Fish and Wildlife, Swainson's hawks often nest peripheral to riparian systems and their diet is varied, but mainly consists of small rodents, mammals, birds, and also insects. The most recognized threat to Swainson's hawks in the loss of their native foraging and breeding grounds as important foraging areas are converted to urban landscapes or other unsuitable habitat (CDFW, 2018). There is no evidence to suggest the plan amendments would decrease Swainson's hawk habitat. In contrast, Bio-1 recognizes that "in many locations and times of year throughout the area of potential effects, the LSJR alternatives could increase surface water or groundwater elevations, potentially resulting in submergence of the root zones and aboveground aspects of vegetation. This condition may cause dieback of nonnative and upland species that are not adapted to periodic inundation, while an increase in water availability during the growth period for riparian vegetation (generally late spring to early fall) could encourage the growth of native species." In addition to anticipated improvements in riparian habitat, Impact Bio-3 acknowledges that not all areas used to grow forage may be permanently fallowed or converted to non-agricultural use. Permanent conversion of lands designated agricultural to non-agricultural uses occurs for a variety of reasons based on goals and preferences of individual property owners, proximity to urban areas, population changes, economic changes away from the agricultural sector, and numerous other factors (see Chapter 11, Agricultural Resources, Section 11.1.1, Introduction; Section, 11.2.2, Lower San Joaquin River Watershed and Eastside Tributaries, Farmland Conversion; Section 11.4.2, Methods and Approach, LSJR Alternatives, SWAP Model). The plan amendments do not prescribe changes from designated agricultural lands to non-agricultural uses. Depending on the size and type of project, land use changes that require a general plan amendment would be subject to CEQA review, as well as state, federal, and local permit requirements. As noted in the discussion above, in the section cited by the commenter "a mix of native and nonnative vegetation could be expected to become re-established in the area. Such plant growth, even if heavily weighted towards non-native species, may foster a return to, or at least tend towards, increases in habitat diversity. This can favor increased species abundance or species richness (Crooks 2002)", which would help support the Swainson's hawk nesting densities with mixed habitat.
1163	130	[From ATT1:] Comment #: C8:2	The flow increases resulting from the plan amendments would occur primarily in February through June, with some flow occurring outside that time period if adaptive implementation was implemented. These flows would be within the maximum flows experienced for the particular time of year depending on

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Page #: 8-59 Section #: 8.4.3 Comment: Subsection Impact Bio-4. Section 8.2.4 states that most special status plant species occur on in-channel islands with no levees. With flow increases, this may reduce in-channel islands and therefore reduce acreage available to special status plants and result in direct take of individuals.	hydrologic conditions (Chapter 8, Section 8.4.2, Methods and Approach, Rivers). River geomorphology is dynamic, with islands, bars, and other features appearing, shifting, and disappearing throughout the water year, as well as over the course of years. In addition, substantial changes to larger, semi-permanent in-channel islands occur during substantial or major floods such as occurred in 1997, 2006, and 2011 (see Chapter 6, Flooding, Sediment, and Erosion, and Master Response 3.2, Surface Water Analyses and Modeling). Flood release spills would continue to occur in response to implementation of the plan amendments as they do under baseline, and the plan amendments would not add more water to the rivers during high flow events. Furthermore, erosion and sedimentation are not expected to substantially increase, as discussed in Chapter 6, Impact FLO-1, and Master Response 3.2. As such, scour of in-channel islands, substantially beyond that which already occurs in baseline conditions is not expected to occur as a result of the plan amendments.
1163	131	[From ATT1:] Comment #: C8:3 Page #: 8-61 Section #: 8.4.3 Comment: Subsection Impact Bio-4, LSJR Alt 2, Rivers. The first paragraph on this page states, "[a]dditional flows during these seasons, as well as in winter, would have a beneficial effect on these species," in regards to special-status aquatic reptiles. However, no justification for this statement is provided. "Special-status species" is used in CEQA to identify any species with protections (not just ESA) or on lists that have identified a protection need (for example, the California Native Plant Society rare plant inventory).	Chapter 8, Terrestrial Biological Resources, discusses a wide range of special-status species, including CNPS-listed plants that are not listed under the state or federal Endangered Species Act. Aquatic reptiles and rare plants are also addressed. See Table 8-2, Summary of National Wildlife Refuges and Other Wildlife Areas; Table 8-3a, Special-Status Plants with Potential to Occur or Known to Occur within the Area of Potential Effects – LSJR and the Three Eastside Tributaries; Table 8-3b, Special-Status Species with Potential to Occur or Known to Occur within Area of Potential Indirect effects; Table 8-4a, Special-Status Animal Species with Potential to Occur or Known to Occur within the Area of Potential Effects – LSJR and the Three Eastside Tributaries; and Table 8-4b, Special-Status Animal Species with Potential to Occur or Known to Occur within Area of Potential Indirect Effects. As discussed under Impact Bio-4, under baseline conditions, lower flows during the April–June riparian recruitment period typically result in less riparian vegetation, and thus less habitat for special-status species. While flows in response to implementation of LSJR Alternative 2 would remain relatively close to baseline on the Stanislaus River, on the Tuolumne and Merced Rivers, the flows are expected to slightly increase during the riparian recruitment period (i.e., end of April–June) (Chapter 8, Section 8.4.2, Methods and Approach, Rivers; and Impact BIO-1). While established riparian species are adapted to periodic fluctuations in flow, there is potential for increased spring flows to help establish new vegetation (Impact Bio-1). The new vegetation would create additional habitat for special-status aquatic reptiles, thus resulting in a beneficial effect.
1163	132	[From ATT1:] Comment #: C8:4 Page #: 8-62, 8-63 Section #: 8.4.3 Comment: Subsection Impact Bio-4, Adaptive Implementation, Area of Potential Indirect Effects. The discussion of Impact Bio-3 makes the assumption that fallowed agricultural land would not remain that way in perpetuity and that fallowed agricultural land would still be maintained, therefore there would be no increase in invasive plants in the area. However, this section indicates that fallowed agricultural land would not be managed at all (mechanical manipulation or herbicide/pesticide application), which seems inconsistent	Management of fallowed lands is subject to the needs and resources of the particular landowner or farmer. Impact BIO-3 states that fallowed land could still be maintained, which is consistent with current practices that maintain fallowed land to minimize the seed bank of invasive plants near productive agriculture. However, permanent reversion (as opposed to fallowing), could include minimal maintenance of the land, including invasive plants. Impact Bio-3 discusses how such permanent reversion could foster increased habitat diversity over time.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		with the premise that there would be no increase in invasive plants in the area.	
1163	133	[From ATT1:] Comment #: C8:5 Page #: 8-63 Section #: 8.4.3 Comment: Subsection Impact Bio-4, Adaptive Implementation, Area of Potential Indirect Effects. The Conservation Strategy for San Joaquin kit fox includes strategically retiring agricultural lands but that is in conjunction with the subsequent establishment of conservation areas. Fallowed agricultural land is not the equivalent of a conservation area. These areas would be much more susceptible to other agricultural uses as described in the discussion of Impact Bio-3. This has the added effect of potentially attracting special status species when fallowed and impacting them when land use changes as opposed to continuous agricultural use.	Fallowed agricultural land can provide potential habitat due to its lower level of disturbance as compared to intensive agricultural operations. The habitat value of agricultural land fluctuates over time, depending upon its use and intensity of operations. This occurs under baseline conditions, and is expected to continue to occur in response to implementation of plan amendments.
1163	134	[From ATT1:] Comment #: C8:6 Page #: 8-63 Section #: 8.4.3 Comment: Subsection Impact Bio-4, Adaptive Implementation, Area of Potential Indirect Effects. "The existing limited habitat value would be exceeded by eventual establishment of native or suitably adapted introduced vegetation." This statement needs support and justification. Establishment of native vegetation in an area of fallow agricultural land would likely require a lot of management to become established.	As described in Chapter 8, Terrestrial Biological Resources, growth of native and non-native species may foster a return to, or at least trend towards, increases in habitat diversity. This can favor increased species abundance or species richness (Crooks 2002). In some instances, non-native plant species may be useful catalysts for ecosystem restoration (Ewel and Putz 2004). Native or suitably adapted introduced vegetation in fallowed areas could require management input, or require several years to become established. However, as discussed in Chapter 8, such vegetation would be supportive of native species. The invasive species programs described in Section 8.3, Regulatory Background, would continue to be implemented throughout the plan area to reduce and control invasive species.
1163	135	[From ATT1:] Comment #: C8:7 Page #: 8-63 Section #: 8.4.3 Comment: Subsection Impact Bio-4, Adaptive Implementation, Area of Potential Indirect Effects. The statement that native grass and shrub communities provide greater foraging habitat contradicts statements in the discussion of Impact Bio-3 regarding SWHA nesting densities.	It is unclear from the comment what statements are perceived as contradictory. The referenced text from Impact BIO-4 discusses foraging habitat; whereas the referenced text from Impact BIO-3 discusses current Swainson's hawk nesting densities.
1163	136	[From ATT1:]	As described in Chapter 8, Section 8.2.2, Reservoirs, the habitat around the reservoirs primarily consists of annual grasslands and disturbed/barren lands. The increase in water levels at a reservoir is controlled by

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Comment #: C8:8 Page #: 8-64 Section #: 8.4.3 Comment: Subsection Impact Bio-4, Adaptive Implementation, Reservoirs. Depending on how quickly water levels rise and the season when it occurs, this may lead to mortality of individuals due to submersion of underground habitat.	inflow from the watershed during a precipitation event and how much water is released from the reservoir during that event. The LSJR alternatives are not expected to affect precipitation. The LSJR alternatives would typically require more water be released during storm events and therefore reduce rises in reservoir levels.
1163	137	[From ATT1:] Comment #: C8:9 Page #: 8-68 Section #: 8.4.4 Comment: Amphibians' ability to move to other aquatic resources nearby would be limited by the availability and quality of nearby aquatic resources but there is no discussion that indicates that was evaluated.	The sentence in Chapter 8, Section 8.4.4, Impacts and Mitigation Measures: Extended Plan Area, regarding amphibian species indicates that some amphibians could move; however, it has been revised to acknowledge the constraints on amphibians' abilities to find appropriate habitat. The impact determination for all alternatives for reservoirs in the Extended Plan Area is significant and unavoidable. The revised sentence does not change conclusions contained in Chapter 8 or impact determinations.
1163	138	[From ATT1:] Comment #: C9:1 Section #: General Comment Comment: The SED does not address the impacts of the increased flow alternatives on implementation of Sustainable Groundwater Management Act (SGMA) in the basins, but does acknowledge that the basins are subject to SGMA. It is likely that increased reduction in diversion of surface flows under the proposed LSJR flow alternatives will likely increase groundwater extraction that can increase or lead to significant undesirable impacts such as subsidence, reduced water quality, and reduced groundwater elevation. There should be better analysis of the impacts of increased flows under the proposed LSJR alternatives on groundwater and subsidence in the four basins. The SED analysis should also address location specific impacts and describe how individual water districts may need to reduce surface water diversions and resulting impacts on groundwater in those areas. Depending on the results obtained using location specific and current data, implementing the increased surface flows could make achieving sustainable groundwater management very difficult or possibly unobtainable in portions of or all four of the subbasins.	Because the SED is a program-level document, the State Water Board was not required to model or assess impacts on specific location. For further discussion regarding the requirements of CEQA as they pertain to a program-level analysis, please see Master Response 1.1, General Comments. Please see response to Comment 1163-23. Please also see Master Response 3.4, Groundwater and the Sustainable Groundwater Management Act for an explanation of why a "with SGMA" baseline is speculative.
1163	139	[From ATT1:] Comment #: C9:2 Section #: General Comment Comment: Chapter 9 references many different sources for data including groundwater elevations, change in groundwater storage, and subsidence. The starting point for the evaluation of the alternatives should reflect current groundwater conditions. Because of the	Please see response to Comment 1163-23.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		multi-year drought, current conditions are more stressed than the conditions that were used for evaluation in SED.	
1163	140	[From ATT1:] Comment #: C9:3 Section #: General Comment Comment: The document does not discuss the importance of the designation of beneficial use of water for groundwater recharge and groundwater banking (conjunctive management). If this designation is not included, the document should state the impact on existing and potential future groundwater recharge projects.	Conjunctive water management is listed as one of the possible mitigation measures to protect groundwater resource in Chapter 9, Section 9.4.3, Impacts and Mitigation Measures. For further discussion on groundwater recharge, please see please see Master Response 3.4, Groundwater and the Sustainable Groundwater Management Act.
1163	141	[From ATT1:] Comment #: C9:4 Section #: General Comment Comment: Recommend adding information on importance of groundwater banking. The California Water Plan, Update 2013, stresses the importance of groundwater banking to the water supply of California. The water plan points out that conjunctive management is used to improve water supply reliability and sustainability, reduce groundwater overdraft and land subsidence, protect water quality, and improve environmental conditions. All are elements of SGMA. California Propositions provide funding for groundwater banking. The State of California recognizes the importance of groundwater banking by providing significant funding to the development of such projects. Proposition 1, the 2014 California Water Bond, allocates thirty-six percent ($2.7 billion) to the public benefit of surface or groundwater storage projects. Proposition 13, the 2000 bond provided $30 million for loans for local agency acquisition and construction of groundwater recharge facilities and grants for feasibility studies of groundwater recharge projects.	Please see response to comment 1163-140.
1163	142	[From ATT1:] Comment #: C9:5 Page #: 9-4 Section #: Table 9-1 Comment: Table 9-1 refers to the annual average groundwater balance expected to be reduced in terms of the equivalent of more or less than 1 inch across each of the subbasins. It is unclear what "1 inch across each of the subbasins" means and how it can be evaluated. Recommend adding more specific information on possible changes in the groundwater within subbasins. The amount of additional groundwater extracted to replace the loss of surface water deliveries should be expressed as a volume in units such as acre-feet. The extent of impact of groundwater pumping cannot be evaluated or compared when expressed as more or less than 1 inch. More or less than 1 inch should be defined and	Please see response to comment 1163-23 regarding the approach to evaluate groundwater resources and impacts to groundwater resources.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		converted to a volumetric measure. Table 9-1 lists alternatives and concludes that the average annual groundwater balance is expected to be reduced by more than 1 inch or less than 1 inch (depending upon the alternative) across the various subbasins. Using the 1 inch measure and, depending on the alternative, the document concludes that there is or is not expected to produce a measurable decrease in groundwater elevations and substantial depletion of groundwater supply. One inch is a small number and would not seem to represent a significant potential for an impact. However, this is an average value, a value that can still represent extremes of groundwater elevation changes from one part of a subbasin to another; e.g., a groundwater depression in one area compared to an area of elevated groundwater. The SED uses the Board's Water Supply Effects (WSE) model to determine impacts. This is a water balance spreadsheet. Spreadsheet water balances are static and lack the capability to perform dynamic analysis of changes in groundwater elevations and subsurface flow through time or geographic location and therefore could miss areas of impact in time or space.	
1163	143	[From ATT1:] Comment #: C10:1 Page #: 10-3 Section #: Table 10-1 Comment: Clarify whether increased frequency of >2500 cfs at Tuolumne River parks has public safety impacts.	Under baseline conditions, flows on the rivers are regulated. This will continue to be the case in response to implementation of the LSJR alternatives. The model results in Chapter 10, Recreation and Aesthetics, are based on monthly model results, and therefore are not indicative of flows on an exact day. Because they are monthly results, flows could be higher or lower on specific days. However, in all cases, flows will remain within the maximum and minimum flows experienced on specific river segment under baseline conditions. The required percentage of unimpaired flow does not apply to an individual tributary during periods when flows from that tributary could cause or contribute to flooding or other related public safety concerns, as determined by the State Water Board or Executive Director through consultation with federal, state, and local agencies and other persons or entities with expertise in flood management (please see Appendix K, Revised Water Quality Control Plan).
1163	144	[From ATT1:] Comment #: C10:2 Page #: 10-4 Section #: 10.1 Table 10-1 Comment: Alt-3 oversimplifies Don Pedro impact as only on "boat ramp availability." Substantial additional impacts to recreation activities/benefits/economics occur at low water, beyond still-useable ramps.	As discussed in Chapter 10, Recreation and Aesthetics, New Don Pedro Reservoir levels below 790 ft MSL generally result in lower recreational use. Under baseline conditions, lower water levels resulting in decreased recreational use occur on an annual basis due to the reservoir performing its primary function of water storage. At the 30 percent cumulative distribution, reservoir elevation would not decrease below 720 feet (the level at which some boat ramps become inoperable and campground and picnicking use begin to decline) for any of the alternatives. Impact 10.4.3 acknowledges that the LSJR alternatives may somewhat impinge on recreationists access to boat ramps, the shoreline, or other recreational facilities.
1163	145	[From ATT1:] Comment #: C10:3 Page #: 10-5 Section #: 10.1 Imp REC-2 Comment: The analysis seems inconsistent in that occasional higher water levels created by Project are "improvement," but lower levels created by Project would "not substantially	The visual quality of reservoirs is acknowledged to be greater at full storage conditions than during periods of lower water levels, when a dry, unvegetated shoreline is visible. The existing visual character of reservoirs includes times when water levels are quite low, thus exposing the dry shoreline. As compared against this baseline condition, the expected decrease in reservoir elevation would not result in a substantial degradation of existing visual character or quality (i.e., as compared to baseline conditions).

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		damage."	
1163	146	[From ATT1:] Comment #: C10:4 Page #: 10-9 Section #: 10.2.1 Comment: Durham Ferry "SRA" no longer exists. It is now County property, and is not open to the public, nor operated as a public park.	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues.
1163	147	[From ATT1:] Comment #: C10:5 Page #: 10-16 Section #: 10.2.4 Comment: Durham Ferry is no longer a public park or a "marina."	Please see response to comment 1163-146.
1163	148	[From ATT1:] Comment #: C10:6 Page #: 10-17 Section #: 10.3.1 Comment: BLM does not "own" or "operate[s]" Exchequer Dam, Lake McClure, or New Don Pedro.	The referenced paragraph of Chapter 10, Recreation and Aesthetics, has been modified. The revision does not change any conclusions in Chapter 10.
1163	149	[From ATT1:] Comment #: C10:7 Page #: 10-19 Section #: 10.3.2 Comment: Relevant "programs" such as Department of Parks and Recreation's "Central Valley Vision," and DPR's "Recreation Proposal for SAC-SJ Delta and Suisun Marsh" should be included.	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. The additional material referenced by the commenter does not contradict the information contained in Chapter 10, Recreation and Aesthetics, and would not change the impact determinations made in Chapter 10. Furthermore, these types of programs are referenced in Chapter 17, Cumulative Impacts, Growth-Inducing Effects, and Irreversible Commitment of Resources. No change has been made.
1163	150	[From ATT1:] Comment #: C10:8 Page #: 10-21 Section #: 10.4.1	Section 10.2 describes water-based recreational activities and also analyzes potential physical impacts on recreational facilities. For rivers, it assesses whether in-river activities would be significantly reduced due to changed flow conditions. Tables 10-4, 10-5, and 10-6 disclose changes in flow that could affect river-based recreation.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Comment: Limiting impact analysis to the CEQA checklist may be incomplete. There is no analysis of reduced non- boat-ramp recreation opportunities, quality, participation (from lower reservoir levels), or reduced river opportunities from higher river levels ("2,500 cfs generally considered unsafe for recreational activities…" per SED, p.10-24).	
1163	151	[From ATT1:] Comment #: C10:9 Page #: 10-28 Section #: 10.4.2 Table 10-4 Comment: Unclear whether the different weights of the "outline" (dark/bold "15" v light "30") in the last column are significant.	The different line weights of the cell outlines are not significant. Please refer to the table notes for information related to the table format.
1163	152	[From ATT1:] Comment #: C10:10 Page #: 10-31 Section #: 10.4.2 Comment: Suggest acknowledging that it is not only aesthetics and smaller reservoir pool that impacts water-dependent and water-enhanced recreation activities, and use of reservoirs' facilities, but also the increasing distance of land-based facilities to the receding shoreline.	The chapter acknowledges that the receding shorelines of the rim reservoirs is a baseline condition. Under low water conditions, the shoreline can be a substantial distance from access points, parking lots, campsites, or picnic areas.
1163	153	[From ATT1:] Comment #: C10:11 Page #: 10-42 2nd paragraph Section #: 10.4.2 Comment: The basis for the claim at the end of the paragraph is not clear. There has been no inventory presented of "similar facilities in the region," and "similar" is not defined.	Recreationists often choose facilities based on current conditions such as weather, river flows, available parking, etc. Substitution of one river access point or recreational area with a different one in the region is possible if current conditions at a particular location are unsuitable to the user.
1163	154	[From ATT1:] Comment #: C10:12 Page #: 10-43, 4th paragraph Section #: 10.4.3 Comment: Changes in water levels can reduce the use of existing facilities at Lake Don Pedro, even if the facilities do not "deteriorate."	Please see Comment 1163-153.
1163	155	[From ATT1:]	The required percentage of unimpaired flow is in addition to flows in the LSJR from sources other than the LSJR tributaries. The required percentage of unimpaired flow does not apply to an individual tributary during

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Comment #: C10:13 Page #: 10-46, last paragraph Section #: 10.4.3 Comment: Though the Threshold of Significance has been set at 10% for the season, the impacts in May/June appear to be potentially significant. This is also a safety issue, because there are many recreation users over Memorial Day during June.	periods when flows from that tributary could cause or contribute to flooding or other related public safety concerns, as determined by the State Water Board or Executive Director through consultation with federal, state, and local agencies and other persons or entities with expertise in flood management.
1163	156	[From ATT1:] Comment #: C10:14 Page #: 10-47, 3rd paragraph Section #: 10.4.3 Comment: The last sentence of the paragraph does not follow from the preceding sentence: "LSJR Alternative 4 would not render existing recreation facilities inoperable and, therefore, would not results (sic) in physical deterioration of the existing facilities.""	The relevant text in Section 10-4.3 has been revised. The revision does not change any conclusion in Chapter 10, Recreation and Aesthetics.
1163	157	[From ATT1:] Comment #: C11:1 Page #: 11-15 Section #: 11.2.2 Comment: In the last few years Oakdale Irrigation District (OID) and some of the other geographical areas have seen a conversion of pasture to almonds. Whereas pasture can be fallowed in years of short surface water, almonds practically cannot be fallowed, so it would be necessary to pump groundwater to meet the consumptive use of the almonds. In each of the six geographical regions of California, double cropping oats or wheat in winter and corn in summer is not completely dependent on irrigation. Oats and wheat are not irrigated except in the driest years when one irrigation is applied. Corn requires irrigation.	The commenter is providing information about almond orchards and agronomic practices on field crops. Please see Master Response 3.5, Agricultural Resources, and Chapter 11, Agricultural Resources, Section 11.2.2, for information on almond water management and agronomic practices on field crops. Please see Master Response 3.4, Groundwater and the Sustainable Groundwater Management Act, and Chapter 9, Groundwater Resources, for information regarding groundwater pumping. In addition, Chapter 11 and Appendix G, Agricultural Economic Effects of the Lower San Joaquin River Flow Alternatives: Methodology and Modeling Results, contain information about groundwater pumping as it relates to the agricultural economic analysis.
1163	158	[From ATT1:] Comment #: C11:2 Page #: 11-15, 4th paragraph Section #: 11.2.2 Comment: Land fallowing may occur during conversion from one type of crop to another, not just for disease control. For example, pasture converted to an orchard. A landowner may decide to convert from pasture to an orchard and included in that decision is the time necessary to perform ground preparation, irrigation system installation, and tree planting. Depending on the landowner, the conversion may take a year.	The commenter is providing general information about when land fallowing can occur. The information contained in Chapter 11, Agricultural Resources; Master Response 3.5, Agricultural Resources; and Appendix G, Agricultural Economic Effects of the Lower San Joaquin River Flow Alternatives: Methodology and Modeling Results, generally do not contradict the commenters' statements. In addition, Master Response 8.1, Local Agricultural Economic Effects and the SWAP Model, acknowledges there are numerous and unknowable individual decisions growers could make with respect to fallowing and conversion to different crops. The information presented in this comment does not make a general comment about the plan amendments or raise a significant environmental issue.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Removal and replanting of an orchard may also take a year.	
1163	159	[From ATT1:] Comment #: C11:3 Page #: 11-16, 1st paragraph Section #: 11.2.2 Comment: Dairies rely on alfalfa, corn, wheat and/or oats for feed.	The commenter is making a statement about what dairy cows eat. Please see Master Response 3.5, Agricultural Resources, and Chapter 11, Agricultural Resources, Section 11.2.2, and Master Response 8.2, Regional Agricultural Economic Effects, for information on dairy feed.
1163	160	[From ATT1:] Comment #: C11:4 Page #: 11-17 Section #: Table 11-5 Comment: Table 11-5 may not include all grain in OID, Modesto Irrigation District, Turlock Irrigation District, and Merced Irrigation District because when DWR surveys and catalogs irrigated acreage it is not always possible to identify all grain fields. For DWR surveys, crop identification field work for surveys takes place June 20 to October 31. If possible, grain fields are identified and cataloged. Information for Table 11-5 does not state the specific year the DWR survey was performed. DWR conducted surveys in Stanislaus County in 2004 and 2010 and Merced County in 2002 and 2012. Land acres and crop acres may be different, because of double cropping: oats or wheat in winter/spring followed by corn in the summer on the same field.	2010 DWR DAU data was used in the analysis because it corresponds to the Baseline period for the SED and because it is part of a statewide, consistent database supported by a sister agency (please see Master Response 8.1, Local Agricultural Economic Effects and the SWAP Model). State CEQA Guidelines do not require that the Baseline be continuously updated. Please see Master Response 2.5, Baseline and No Project, for information regarding the data used in the analysis. The analysis was based on DAU data surveyed in years 1996, 2004, and 2002 for San Joaquin, Stanislaus, and Merced Counties, respectively, and updated to 2010 based on annual county agricultural commissioner reports (Table G.4-2 of Appendix G). The overall cropping patterns shown in Table 11-5 are based on the total irrigated crop area reported by the districts and the relative area of each crop as a proportion of the total irrigated crop area, including multi cropped area, in the DAU data.
1163	161	[From ATT1:] Comment #: C11:5 Page #: 11-23 Section #: 11.2.4 Comment: Potential for crop shift to non-irrigated crops exists just as it does in the LSJR Watershed and Eastside Tributaries.	Please see Master Response 3.5, Agricultural Resources, and Chapter 11, Agricultural Resources, Section 11.2.4, for discussions about crop shifting. Impacts AG-1 and AG-3 discuss the potential for non-irrigated crops and dry land farming techniques to occur in the plan area.
1163	162	[From ATT1:] Comment #: C12:1 Section #: General comment Comment: Update with more recent studies or indicate that the cited studies are the most recent.	The studies used to address impacts in this chapter were derived from the most recent FERC re-licensing reports which include peer-reviewed or published literature on topics specific to the plan area; records searches of the plan area; unpublished quantitative or qualitative information from within the plan area a; information or personal communication with topical experts; or expert opinion if no other sources were available. As such, the integrity of chapter is supported by current research and records.
1163	163	[From ATT1:]	Concurrence has been received. However, concurrence does not change the overall content or conclusions

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Comment #: C12:2 Page #: 12-8 Section #: 12.2.1, footnote Comment: Results should be updated. Footnote indicates that concurrence on National Register of Historic Places (NRHP) recommendations by the State Historic Preservation Officer (SHPO) to be received by the end of 2012.	of the chapter, therefore, it was not changed.
1163	164	[From ATT1:] Comment #: C12:3 Page #: 12-9 Section #: 12.2.2 Comment: More recent studies have recorded additional resources. Suggest updating the research results.	Please see response to comment 1163-162.
1163	165	[From ATT1:] Comment #: C12:4 Page #: 12-27, 12-29, 12-31 Section #: 12.4.3 Reservoirs Comment: "Extremely low potential to cause a substantial adverse change in . . . the resources" should be reviewed, especially for New Melones Reservoir under LSJR Alternatives 2, 3, and 4. Impacts may still be less than significant through management by respective plans.	Potential impacts to cultural resources near New Melones are evaluated included Chapter 12, Cultural Resources, and are captured in the discussions for Impact - CUL 1, Impact CUL 2, and Impact CUL 3. This analysis identifies the extremely low potential to cause a substantial adverse change in the characteristics that convey the historical significance of the resources is attributed to the fact that existing cultural resources currently experience fluctuations in water levels at the reservoirs and experience variation in their physical environment due to changes in water level or siltation. In other words, the characteristics that convey significance are currently being affected by fluctuating reservoir elevations and by siltation and as such the characteristics have not changed. This also incorporates and references the management plans because they are implemented to protect cultural resource. Consequently, impacts on significant cultural resources with or without adaptive implementation would be less than significant.
1163	166	[From ATT1:] Comment #: C13:1 Page #: 13-52, 3rd paragraph; 13-64, 3rd paragraph Section #: 13.4.2; 13.4.3 Comment: The depth to groundwater (Table 13-3b) refers to depth to the top of the aquifer" The depth to groundwater should be the actual depth to groundwater, not the top of the aquifer. Groundwater levels can be above, at, or below the top of the aquifer, and as such, have a different meaning. The top of the aquifer is important to determine the aquifer thickness, but it is not the same as the depth to groundwater. Using the top of the aquifer as depth to groundwater may very likely overestimate the actual groundwater elevation and volume of water in the aquifer. An example where use of "depth to groundwater" may produce flawed results is: "For	The numbers shown in Table 13-3b in the column named “Range of Depths to Groundwater” in Chapter 13, Service Providers, are the actual depth to groundwater in Fall 2015. Footnote 7 in Chapter 13 text was revised. The revision does not change any conclusions in Chapter 13..

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		example, Le Grand CSD serves a population of 1,700 with three active wells (Table 13-3b), and the range of difference between well depths and depths to groundwater for those three wells is 91–536 feet . . . . If groundwater reductions were to continue for multiple years, especially in combination with drought conditions, these wells may be at risk of running dry." If the actual depths to groundwater are deeper than the top of the aquifer, the wells are likely at more risk of running dry, and increasing with the greater difference between the two values.	
1163	167	[From ATT1:] Comment #: C13:2 Page #: 13-65, 2nd paragraph Comment: The SED should address the potential adverse impacts from pumping additional groundwater to replace reduced surface water deliveries and the extent of those impacts. The SED assumes the surface water can be replaced with groundwater pumping and acknowledges that may require deepening of existing wells or drilling new wells in some areas. However, the adverse impacts from pumping additional groundwater to implement the unimpaired flows targets, such as land subsidence and reduced water quality are not addressed in terms of quantitative amounts and specific locations. The significant adverse impacts should be better addressed in the SED because land subsidence and reduced water quality are sustainability indicators under SGMA. For example, page 13-65 states, "[s]imilar to the reductions in surface water supply, the reduction in groundwater supply to service providers in the Extended Merced Subbasin identified in Table 13-3a would likely require these entities to construct new and expanded water treatment facilities or water supply infrastructure (e.g., additional wells) to replace groundwater supplies." However, it does not address other potential adverse impacts.	As discussed in Chapter 9, Groundwater Resources, the plan amendments would potentially reduce the amount of surface water available for diversion. Impacts on groundwater quality, as well as the potential for causing subsidence, due to increased pumping as a response to reduced surface water supplies in response to implementation of the plan amendment are addressed in SED Chapter 9. As discussed in that chapter, specifically determining the changes to groundwater quality would be speculative as those potential changes would be dependent on many factors including, but not limited to, the location of groundwater pumping, the amount of groundwater pumped, the frequency at which pumping would occur, location of contaminants, the type of contaminants (e.g., water soluble or not), proximity of contamination to aquifers, hydrogeological characteristics of the aquifer, individual well construction, well depth, groundwater levels, and localized conditions, such as proximity to unused or abandoned wells. For the evaluation of subsidence, the related impact was considered significant if substantial groundwater depletion were expected to occur (i.e., if Impact GW-1 were determined to be significant) in an area of previous subsidence. The main area of existing subsidence in the groundwater study area is in the southern portion of the Extended Merced groundwater subbasin. As described in Master Response 3.6, Service Providers, the SED analyzes the potential increase in groundwater pumping in the plan area based on past responses to reductions in surface water (SED Chapter 9; Chapter 13; Chapter 22). However, the plan amendments do not require or mandate an increase in groundwater pumping and nothing in the SED requires groundwater pumping to be the response. Refer to Master Response 3.6 regarding compliance with SGMA and the plan amendments. Please refer to Master Response 1.1, General Comments, regarding the purpose of the plan amendments and the programmatic nature of the SED.
1163	168	[From ATT1:] Comment #: C14:1 Page #: 14-3 Section #: Table 14-1, Impact EG-2 Comment: Assumes groundwater pumping is inherently efficient without substantial evidence or citation. In general, groundwater pumping is commonly considered to be inefficient, so this may rise to the level of a significant impact.	Chapter 14, Energy and Greenhouse Gases, acknowledges that a conservative estimate of energy consumption associated with potential increases in groundwater pumping from the LSJR alternatives would increase energy consumption by less than 1% in response to implementation of all LSJR alternatives for the plan area. Groundwater pumps operate at a wide range of efficiencies. The analyses do not, and cannot, identify the type of pumps that agencies, entities, or individuals could or would use. Furthermore, the discussion under Impact EG-2 (Section 14.4.3, Impacts and Mitigation Measures), focuses on the fact that the water would be used to meet a potentially reduced water supply irrigation demand and the analysis provide conservative estimates used to project energy consumption to support the conclusions that are summarized in Table 14-1.
1163	169	[From ATT1:] Comment #: C14:2	Please see Master Response 1.1, General Comments, regarding the overall approach to the analyses contained in the SED and the programmatic nature of the document. Additionally, please see response to comment 1163-8. Chapter 14, Energy and Greenhouse Gases, did not identify the reviews and updates to the Bay-Delta Water Quality Control plan as “mitigation”. These reviews and updates are required by law

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Page #: 14-5 Section #: Table 14-1, Impact EG-5 Comment: The required reviews and updates of the WQCP may be insufficient to mitigate the impact of climate change to less than significant, if those updates are not timely, adequately funded, or appropriately completed. For example, the last update of the WQCP was more than a decade ago, and flow objectives for the SJR have not been updated for over two decades; during this time, our understanding about climate change impacts has improved substantially. Hydrology from the first half of the 20th century will dampen the impact of the increased hydrologic variability experienced in the last half of the 20th century, and the markedly increased warming experienced over the last 50 years, and more particularly since the turn of century. The October 2016 Phase 2 Scientific Basis Report notes the hydrology of the past will "likely be very different" from the hydrology of the future.	(e.g., Clean Water Act and Porter Cologne) and are inherent to the water quality control planning process. They would occur regardless of the approval of the plan amendments and are not needed to mitigate climate change effects. Furthermore, planning documents that are continually updated within differing intervals of time (e.g., a decade, as identified by the comment) for resources affected by climate change accounts for the longer timeframe of the potential effects of climate change and is not too long. The SED identifies climate-change related information presented from applicable local and regional planning documents in Table 14-8, Agricultural Water Management Plans and Climate Change, and Table 14-9, Urban Water Management Plans and Climate Change, which have sections that discuss the expected effects of climate change on water supply and demand within their service areas and identify planning recommendation or actions to mitigate the effects of climate change.
1163	170	[From ATT1:] Comment #: C14:3 Page #: 14-16 Section #: 14.3.2 Comment: The California Climate Adaptation Strategy was updated in 2014 with the publication of the Safeguarding California Plan.	The change regarding the year of the update to the California Climate Adaptation Strategy was made in Chapter 14, Energy and Greenhouse Gases. The content contained in the updated document is consistent with the content in Chapter 14. The change does not change any conclusions identified in Chapter 14.
1163	171	[From ATT1:] Comment #: C14:4 Page #: 14-36 Section #: Table 14-14 Comment: The citation for the CO2 factor for TID is eight years old; a more current reference should be used.	The CO2 emission factor listed in Table 14-14 (Chapter 14, Energy and Greenhouse Gases) for TID is consistent with the emission factor from the California Emission Estimator Model (CalEEMod) emissions model developed by the California Air Pollution Control Officer's Association (California Air Pollution Control Officer's Association 2017). CalEEMod is the recommended model for preparing GHG CEQA analyses. The citation has been updated in Table 14-14. The citation update does not change any conclusions identified in Chapter 14.
1163	172	[From ATT1:] Comment #: C14:5 Page #: 14-37, 1st paragraph Comment: The discussion of agriculture and Greenhouse Gas (GHG) emissions does not include the role of crops in sequestering carbon; specifically, a decrease in croplands may reduce carbon sequestration and affect net GHG emissions.	Please see Master Response 1.1, General Comments, regarding the overall approach to the analyses contained in the SED and the programmatic nature of the document. The effects of the plan amendments to carbon storage and sequestration by crops is speculative. In particular, key variables, including carbon cycling, methane production, and nitrogen cycling vary by land use type, season, and site-specific chemical and biological characteristics. Depending on these conditions, any land use change may result in a net increase or decrease in GHG emissions. Additional information related to acreage by land use type, site-specific land characteristics (e.g., salinity, pH, age of trees, type of grass, carbon content of soils), and fuel consumption data would be required to estimate the net difference in emissions between the removal and addition of GHGs into the atmosphere (i.e., GHG flux). Without local sampling and monitoring data, these values are unknown. An analysis of potential GHG emissions from land use change is not possible and not required; therefore, it is not provided in the SED.
1163	173	[From ATT1:]	Please refer to Master Response 1.1, General Comments, regarding the programmatic nature of the analysis

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Comment #: C14:6 Page #: 14-44, 1st paragraph Comment: The discussion of water use efficiency in the agricultural sector fails to note that increased efficiency in agricultural water use can come at the expense of increased energy usage and therefore potentially increased GHG emissions (e.g., drip irrigation).	in the SED. Chapter 14, Energy and Greenhouse Gases, discusses irrigation efficiency; however, it is speculative to attempt to quantify or qualitatively evaluate potential emissions associated with changes in energy usage and associated potential GHG emissions resulting from increased efficiency with agricultural use. There is a wide degree of other factors and variables (e.g., it is unknown how these changes would occur, how much change would occur, where they would occur, who would implement) that influence how water use efficiency and increased energy are related. These other factors and variables include, but are not limited to, the details of the irrigation district and individual farming system (gravity fed vs. pumped); the size of the farm and type of crop; the current irrigation practices vs. the type of irrigation efficiency measure employed). Furthermore, as presented in Chapter 14 under Impact EG-3, increased GHG emissions in response to implementation of LSJR Alternatives 3 and 4 would exceed the threshold used in the analysis and would therefore result in a significant and unavoidable impact.
1163	174	[From ATT1:] Comment #: C14:7 Page #: 14-51, 3rd paragraph Comment: Per the National Research Council study of sea level rise along the US West Coast (2012), upon which the CO-CAT guidance is based, one foot of sea level rise is expected by 2050, not 2030.	Section 14.4.3, Impacts and Mitigation Measures, Impact EG-5, of Chapter 14, Energy and Greenhouse Gases, was revised to correct the typo. The revision correcting the typo does not change the conclusions in Chapter 14.
1163	175	[From ATT1:] Comment #: C14:8 Page #: 14-53 Section #: 14.4.4, 2nd paragraph Comment: It is unclear that bypassed junior water would reduce the amount of water that downstream users would pump from groundwater; for instance, such users may choose to use both sources of water.	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues. In general, surface water is used preferentially over groundwater and water users that have surface water rights use them because they want to use surface water. If the right is curtailed, a water user might use groundwater or reduce surface water use. If the surface water right is restored, the water user generally would go back to using surface water, rather than continuing to use groundwater.
1163	176	[From ATT1:] Comment #: C15:1 Section #: General comment Comment: The 2006 Bay-Delta Plan, Table 2, Water Quality Objectives for Agricultural Beneficial Uses requires that Reclamation meet the Vernalis Objectives at Station C-10 of a maximum 30-day running average of mean daily EC equal to 0.7 mmhos/cm for April through August and 1.0 mmhos/cm for September through March. (Table 2 in Appendix K appears to incorrectly require Reclamation to meet 1.0 mmhos/cm EC year-round rather than September through March, but the SED correctly describes the requirement.) Chapter 15 states that meeting the objectives at the remaining three compliance monitoring stations, C-6, C-8, and P12 are the obligation of Reclamation and DWR. The SED should reflect current understanding of salinity in the South Delta, including consideration of the	See response to comment 1163-244. Additionally, the State Water Board is aware that DWR has no facilities on the San Joaquin River from which to release dilution flows and that there are other sources of salinity downstream of Vernalis. These facts are reflected in the modeling. The regression analysis described in Appendix F.1, Hydrologic and Water Quality Modeling, Section F.1.5, Salinity Modeling, shows increases in salinity downstream of Vernalis at interior stations, with the greatest increases at Tracy Blvd. Bridge (station P-12). Furthermore, in WSE modeling, dilution flows to control EC entering the southern Delta were only released from New Melones reservoir, which is operated by USBR. Please refer to Master Response 3.3 for discussion of DWR and USBR's responsibilities.

Ltr#	Cmt#	Comment	Response
		following: 1. DWR does not have any facilities to vary flows or water quality of the San Joaquin River. 2. Historical water quality measurements have shown degradation along the San Joaquin River downstream of Vernalis (C-10). According to the 2007 DWR report, Sources of Salinity in the Sacramento-San Joaquin Delta, agricultural returns, municipal waste water treatment, urban runoff, and groundwater effluence caused such degradation. a. Approximately 74 discharge sites are situated along waterways immediately upstream from the state and federal export sites in the south Delta. These discharges are relatively saline and appear to be raising the salinity of water flowing from Vernalis on the San Joaquin River to the export sites via Old River (upstream of the exports) and Grant Line Canal. [footnote 11: Twenty-two discharges are located on the 17-mile reach of the San Joaquin River between Vernalis and the head of Old River (James et al. 1989, DWR 1995, National Pollutant Discharge Elimination System [NPDES] permits). Approximately 52 discharge sites were located along Tom Paine Slough, Paradise Cut, and Sugar Cut (DWR 1995, Stantec 2003, NPDES permits). Point-source discharges include, but are not limited to, municipal wastewater from the cities of Manteca/Lathrop, municipal and industrial wastewater from the City of Tracy and Deuel Vocational Institute, and pit drainage from an historic sand excavation company. Non-point sources include, but are not limited to agricultural discharges and groundwater accretions conveyed to Old River in urban/agricultural drainage channels. Discharge volumes from all point-sources average between 0.6 and 5.7 million gallons per day with conductivity averages ranging between 1.1 and 1.8 mmhos/cm (NPDES permits).] b. Historical salinity measurements at stations C-10 (Vernalis) and P-12 (Old River) were compared. In general, conductivity at P-12 was consistently higher than it was at C-10. Differences in conductivity between these two stations were the greatest between April and November, ranging from 0.1 mmhos/cm to 0.2 mmhos/cm higher than C-10. The higher salinity measurements at P-12 indicate the influence of saline inputs from Tom Paine Slough, Paradise Cut, and groundwater accretions. (See South Delta Salinity Report.)	
1163	177	[From ATT1:] Comment #: C16:1 Section #: 16.2.2 General Comment Comment: Table 16.7 - Potential environmental effects of Substitution of Surface Water with Groundwater does not discuss potential adverse effects such as lowering water levels, subsidence, and possible water quality degradation.	The impacts discussed in Chapter 16, Evaluation of Other Indirect and Additional Actions, Table 16-7, Potential Environmental Effects of Substituting Surface Water with Groundwater, are impacts resulting from construction and operation of individual new wells. The long-term potential impacts resulting from replacing the reduced surface water with groundwater would be similar or the same to those analyzed and presented in Chapter 9, Groundwater Resources, Section 9.4, Impact Analysis.
1163	178	[From ATT1:] Comment #: C16:2 Section #: 16.2.5 Comment: Alternative 4 would result in reduced diversions that may require a new in-Delta diversion by the San Francisco Public Utilities Commission (SFPUC) or for it to purchase water from the CVP or the SWP (16.2.5). This in turn would change Delta flows/salinity and	Delta diversions are governed by state and federal regulations; therefore, environmental effects of increased diversions would be restricted by these regulations. As described in the Program of Implementation, increases in flows from the Stanislaus, Tuolumne, and Merced Rivers that result from the LSJR Alternatives cannot be diverted upstream of Vernalis. Further, as noted in Chapter 16, Evaluation of Other Indirect and Additional Actions, the precise location, size, timing of construction, and details of a Delta diversion project cannot be known at this time. The actual environmental effects of an in-Delta diversion facility, if one is implemented, will depend on the decisions made by the regulated entities. Any potential environmental impacts depend upon the action, and mitigation selected by or required of the entities implementing site-

Table 4-1. Responses to Comments			
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		OMR. Suggest including analysis showing the impact of a potential new intake upstream of Vernalis.	specific projects. State CEQA Guidelines may require a project-level analysis when actions are undertaken or approved.
1163	179	[From ATT1:] Comment #: C16:3 Page #: 16-204 Section #: 16.3.10 Comment: The cost evaluation section should be updated. This section reports the total cost of the Division of Boating and Waterways (DBW, State Parks) Aquatic Weed Control program for both Water Hyacinth and Egeria densa as a maximum of $7.9M. This figure comes from 2007. The acreage treated by the program has grown substantially since 2007, and is also much more expensive.	This comment does not make a general comment regarding the plan amendments or raise significant environmental issues.
1163	180	[From ATT1:] Comment #: C16:4 Page #: 16-204 Section #: 16.3.10 Comment: The document states that aquatic vegetation treatments will occur between June 1 and October 15. However, DBW begins the treatment season in March. Thus, there is some possibility that treatment will co- occur with salmonid presence. This error also occurs on page 16-208, bullet three under "Biological Resources."	USDA and DBW (2012a; 2012b) describe the timing of aquatic vegetation treatments as typically occurring between March and November, depending on water temperature and presence of special status fish species (as determined by fish surveys conducted by USFWS, CDFW, DWR and USBR, and FishBIO) in order to avoid and/or minimize impacts on special status fishes. NMFS concluded that the USDA and DBW's proposed action of the Egeria densa Control Program was not likely to adversely affect Central Valley winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, or designated critical habitat (NMFS 2013a). NMFS also concluded that the proposed action of the Water Hyacinth Control Program may affect, but was not likely to adversely affect these species or designated critical habitat (NMFS 2013b). In 2017, Eurasian watermilfoil, coontail, and Carolina fanwort were also added to the proposed action of the Egeria densa Control Program for treatment (NMFS 2017b). Although the time range of the aquatic vegetation treatments may overlap with salmonid life history stages, the treatment actions would not be conducted in the presence of salmonids; thus, the conclusion in Chapter 16, Evaluation of Other Indirect and Additional Actions, Section 16.3.10, Invasive Aquatic Vegetation Control, that impacts would likely be mitigated to less than significant levels by the lead agencies, remains the same and no change was made.
1163	181	[From ATT1:] Comment #: C16:5 Section #: 16.4.1 General Comment Comment: Developing new source of water is very rare. Most of the Water flowing through California's streams and rivers are asked for and have appropriate water rights holders. If an entity decides to use or purchase somebody else's rights, it is a transfer of rights, as allowed by the Water Board, and may not be called new source of water.	Both developing new source water supplies, and transfer/sale of surface water are discussed in Chapter 16, Evaluation of Other Indirect and Additional Actions, in two different contexts. The transfer and sale of surface water is an "indirect action" discussed in the context of a potential action in response to reduced water supply as a result of implementation of an LSJR alternative. Whereas, developing new source water supplies is considered as a reasonably foreseeable method of compliance to reduce salinity discharges to the southern Delta to achieve compliance with the numeric SDWQ objectives identified in the SDWQ alternatives. The plan amendments do not mandate or require any action evaluated in Chapter 16 be implemented. Although agencies may elect not to pursue certain methods of compliance under particular circumstances, it is reasonable to include them in a portfolio of possible actions because they were considered in the past and may be appropriate for further consideration depending on how circumstances change.
1163	182	[From ATT1:] Comment #: C16:6 Section #: 16.4.5 General Comment	Please see response to comment 1163-5. The costs presented by the commenter are in Section 16.4.5, Southern Delta Temporary Barriers. This section also describes when installation of the barriers started and the times in which the barriers are installed, which is generally consistent with information presented by the commenter. Information from California Department of Water Resources Temporary Barriers South Delta Branch Bay-Delta Office, Temporary Barriers Project Information (DWR 2015c) is used in this section to

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Comment: The Temporary Barriers are installed to maintain water levels suitable for agricultural diversions within south Delta channels. The barriers are not intended to improve and have not shown improvement to the water quality within the channels. There is no consensus concerning the benefits to fish by installing the HOR. DWR has been installing and operating the barriers under a 1990 settlement agreement with the South Delta Water Agency (SDWA). DWR's estimated cost for constructing and removing the barriers for the 3-year period (2016-2018) was approximately $11.8 million. This cost estimate includes labor, materials, equipment for construction and removal of the temporary rock barriers at MR, ORT, and GLC.	characterize the use of and benefits of the barriers.
1163	183	[From ATT1:] Comment #: C16:7 Section #: 16.4.6 Comment: During the 2006 WQCP proceedings, SDWA proposed that low-lift pumps should be operated at the barriers. The proposal was to place small pumps on barges and operate them as needed to re-circulate channels' water to improve water quality. In 2011 at the request of the Board, DWR performed a feasibility study of these pumps and presented its findings in a report entitled: Low Head Pump Salinity Control Study Prepared to Meet Requirements of the State of California State Water Resources Control Board Water Rights Order WR 2010-0002, Condition A.7. See comment ES:4. DWR proposed placing permanent pumping stations at each barrier with capacities varying between 250 and 1,000 CFS with a choice of single or double pump stations. The initial cost of constructing such pump stations depended on the number of pumps and also if the screen design was temporary or permanent. Initial construction costs would vary between $5.5 and $540 million with an annual cost of between $1.3 and $62.7 million. Considering the uncertainty of what actually may be achieved from constructing such pump stations, and because of economical and funding considerations, construction of such stations may not be feasible. Other actions may be considered in lieu of low-lift pump stations.	Please see response to comment 1163-27.
1163	184	[From ATT1:] Comment #: C17:1 Page #: 17-13 Section #: Hab.Rest. Comment: Suite of habitat restoration projects listed (p. 17-12) will also have cumulative impacts on "Recreation resources and aesthetics" (as it is for preceding FERC Relicensing and other projects).	The comment is not specific regarding which cumulative impacts on recreation resources and aesthetics would result from the suite of habitat restoration projects; regardless, the SED does include a full discussion of cumulative impacts of similar projects with comparable impact mechanisms and fully discloses all of the potential cumulative effects to recreational resources and aesthetics. Therefore, no changes have been made to the document.
1163	185	[From ATT1:] Comment #: C17:2	Please refer to Master Response 6.1, Cumulative Analysis, regarding the adequacy of the cumulative analysis and the cumulative project list. The additional material referenced by the commenter does not contradict the information contained in Chapter 10, Recreational Resources and Aesthetics, and would not change the impact determinations made in Chapter 10. Therefore, no change has been made.

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		Page #: 17-15 Section #: Rec. Mgmt. Comment: The "Central Valley Vision" is listed here. It should also be mentioned in Chapter 10 (see comment C10:7 above); DPR's "Recreation Proposal for SAC-SJ Delta and Suisun Marsh," which has recommendations on the SJR and Old River, should also be listed here.	
1163	186	[From ATT1:] Comment #: C17:3 Page #: 17-41 Section #: Recreation Resources Comment: As suggested for Chapter 10, the safety impacts to swimmers (existing popular activity) should be mentioned among the significant site-suitability impacts.	Chapter 17, Cumulative Impacts, Growth-Inducing Effects, and Irreversible Commitment of Resources, mentions in the Cumulative Impact Analysis of Recreational Resources and Aesthetics that: "Because many recreation activities are limited to a range of flows (e.g., swimming, use of boat put-ins, access to picnic areas and campgrounds), a substantial increase in flows during the recreation season (May-September) could result in recreationists being unable to use the river for certain types of in-water and on-bank activities." This statement acknowledges that there would be safety issues for swimmers and swimming may not be able to occur during those timeframes. No change has been made.
1163	187	[From ATT1:] Comment #: C17:4 Page #: 17-43 Section #: Recreation Resources Comment: Flows greater than 2500 cfs in May and June are also a safety issue, as recreationists conditioned to being able to use the rivers/facilities at that popular time of year are likely to attempt to continue to do so.	Please refer to response 1163-186.
1163	188	[From ATT1:] Comment #: C18:1 Section #: General Comment Comment: The program of implementation for various alternatives relies heavily on the unimpaired flow concept. The reliability of the available unimpaired flow data should be further reviewed and discussed. Unimpaired flow data are post processed and therefore are not available for real-time operation. The program of implementation for flow alternatives 2, 3 and 4 could result in increased groundwater pumping that could greatly reduce long-term reliable groundwater supply. There could be adverse effects on groundwater resources such as: lower water levels and subsidence. Flow alternatives would also have adverse effects on agricultural resources.	Please see Master Response 2.1, Amendments to the Water Quality Control Plan, for a description of the plan amendments and Master Response 3.2, Surface Water Analyses and Modeling, for the modeled representation of the plan amendments. Please see Master Response 3.4, Groundwater and the Sustainable Groundwater Management Act, regarding impacts to groundwater resources. Please see Master Response 3.5, Agricultural Resources, regarding impacts to agricultural resources.
1163	189	[From ATT1:] Comment #: C19:2 Comment: There appears to be no discussion of proposed changes on harmful algal blooms in the LSJR delta. DWR recommends adding some evaluation of the proposed alternatives effects given that flow, temperature, and salinity are factors that can affect harmful algal	Please see Master Response 1.1, General Comments, regarding the programmatic scope of the SED and information regarding harmful algal blooms. As described in Appendix C, Technical Report on the Scientific Basis for Alternative San Joaquin River Flow and Southern Delta Salinity Objectives, Section 3.7.6, Effects on Water Quality, the State Water Board acknowledges that a more natural flow regime would benefit the ecosystem through its effects on water quality. Due to the direct relationships and interaction between flow, temperature, and dissolved oxygen, a

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		blooms in the estuary. A decrease in water temperatures as a result of LSJR alternatives 2-4 can increase the toxicity or pyrethroid pesticides to invertebrate organisms. A) This may be one of the few negative effects of decreased water temperatures in the LSJR. However, the benefits of decreased water temperatures may outweigh this potential negative effect. B) The decrease in water temperature is related to increased freshwater flow. The increase in freshwater flow may dilute the concentration of contaminants, thereby reducing the potential increase in toxicity response from pyrethroid exposure.	more natural flow regime is anticipated to reduce the negative effects from temperature and dissolved oxygen. An indirect effect is dilution of other water quality constituents. In Appendix F.2, Evaluation of Historical Flow and Salinity Measurements of the Lower San Joaquin River and Southern Delta, measured flow and salinity patterns are examined along the LSJR to better understand the relationships between flow and salinity in the LSJR. Please also see Master Response 3.1, Fish Protection, for discussions regarding benefits to temperatures from the plan amendments that propagate downstream. Please also refer to Master Response 2.1, Amendments to the Water Quality Control Plan, regarding the importance of flow connectivity and the protection of flows downstream of the LSJR.
1163	190	[From ATT1:] Comment #: C19:3 Page #: 19-1 Section #: Footnote Comment: "... unimpaired flow is the flow that occurs at a specific location under the current configuration of channels, levees, floodplain, wetlands, deforestation and urbanization." DWR disagrees with this definition of unimpaired flow, or that the flow computed in this SED as unimpaired flows can be considered streamflow at a certain location for any location downstream of rim reservoirs. See Comment C5:2.	Please refer to Master Response 3.2, Surface Water Analyses and Modeling, for detailed information regarding the adequacy of the hydrologic modeling and a description of the calculation of unimpaired flow. Please also refer to Master Response 2.1, Amendments to the Water Quality Control Plan, regarding the calculation of unimpaired flow and a description of plan amendments. Please refer to Master Response 3.1, Fish Protection, regarding the unimpaired flow approach and the use of unimpaired flow to reasonably protect fish.
1163	191	[From ATT1:] Comment #: C20:1 Page #: 20-4, 20-19, 20-32, 20-34 Section #: 20.2, 20.3 Comment: It is assumed in the study (Tables 20.2-1, 20.3.2-3, 20.3.3-6) that additional groundwater will be substituted for some of the lost surface water and as such the impact on irrigated acre/cropping revenue supplies will be less. This is perhaps true in the short-run but in the long-run and with the implementation of SGMA, it cannot be assumed that the overdraft can be continued in the future.	Please see Master Response 3.4, Groundwater and the Sustainable Groundwater Management Act, for discussion of SGMA implementation.
1163	192	[From ATT1:] Comment #: C20:2 Page #: 20-5 Section #: 20.2 Comment: Study assumes that local agencies (SFPUC service area) can come up with additional water supply to compensate for the loss of surface water (Table 20.2-2). Suggest analyzing and including in the table: the source of this additional water supply; whether this	The purpose of Table 20.2.2 is a summary table, titled Summary of Average Annual Cost and Beneficial Effects of LSJR Alternatives 2, 3, and 4, Relative to Baseline Conditions: Municipal and Industrial Water Supply and Related Economics. It is intended to summarize the potential economic effects of the LSJR alternatives evaluated in Ch. 20. Adding the information requested by the commenter would be contrary to the purpose of this table. Details regarding the SFPUC analysis are contained in Section 20.3.3. For additional details, please see Master Response 8.5, Assessment of Potential Effects on the San Francisco Bay Area Regional Water System. Please also see Master Response 8.5 regarding regional growth and development in SFPUC service area. Please see Master Response 8.0, Economic Analyses Framework and Assessment Tools, regarding measurement and reporting practices specifically Table 8.0-1. Consumer Price Index Values—All

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		a reliable source in the long-run; the basis of the assumption that the loss of surface water for SFPUC service area will reduce the regional output and have negative impacts on regional jobs (Table 20.2-2); whether the recent drought resulted in less regional output and loss of jobs in the SFPUC service area; if the dollar estimates are in real dollars; and which year they are indexed to.	Urban Consumers which provides 2000-2017 monetary values converted into Consumer Price Index values.
1163	193	[From ATT1:] Comment #: C20:3 Page #: 20-8 Section #: 20.2 Comment: The SED's analysis of impacts of different alternatives on fisheries is vague. Statements such as "effects cannot be quantified but would be expected to be beneficial" (Tables 20.2-4 and 20.2-5) are not scientific conclusions. Also, for LSJR Alternatives 3 and 4, the claim is the benefits would be similar but more probable to occur, but should indicate the relative probability of occurrence and whether it can be quantified.	The statements in Tables 20.2-4 and 20.2-5 regarding the quantification of benefits to fish are consistent with the fisheries analysis, which was qualitative and based on changes in key habitat metrics (rather than fish population responses) to evaluate the potential effects (largely beneficial) of LSJR Alternatives 2, 3, and 4. Please refer to Master Response 8.4, Non-Agricultural Economic Considerations, for additional discussion on ecosystem services and benefits and the difficulty of quantification of these services.
1163	194	[From ATT1:] Comment #: C20:4 Page #: 20-10; 20-11 Section #: 20.2 Comment: Dollar estimates mentioned here need to be indexed if they are not already.	Please see Master Response, 8.0, Economic Analyses Framework and Assessment Tools, for a discussion of indexing, the use of constant year monetary values in the analysis, and the dollar values used in the Recirculated SED.
1163	195	[From ATT1:] Comment #: C20:5 Page #: 20-12, 20-50 Section #: 20.3 Comment: In some tables (such as Table 20.3.2-2), results are expressed in 2008 Dollars while in others (such as Tables 20.3.2-6 and 20.3.2-7) they are reported in 2010 Dollars and in others (such as Table 20.3.5-1) 2014 Dollars are used. On page 20-12, the SED states that 2008 Dollars are used everywhere except Section 20.3.3. The same base year for reporting real Dollars should be used throughout the study and suggest indexing all the numbers to 2016.	Please see the response to comment 1163-194 regarding dollar values used in Chapter 20, Economic Analyses.
1163	196	[From ATT1:] Comment #: C20:6 Page #: 20-15 Section #: 20.3.2	Please see Master Response 8.2, Regional Agricultural Economic Effects, for discussion of the potential economic effects on dairies. Please see Master Response 1.1, General Comments, for general information regarding the economic analysis.

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		Comment: While quantifying the impacts of loss of surface water on cropping pattern and acreage, it is assumed that the so called "low value" crops such as pasture, alfalfa, corn and other field crops will account for most of the reductions in acreage (Table 20.3.2-1). These crops are not "final products" since they are used to feed the dairy herd. As such, the Statewide Agriculture Production model (SWAP) imposes a minimum silage requirement constraint, which is consistent the dairy herd feeding requirements.	
1163	197	[From ATT1:] Comment #: C20:7 Page #: 20-19 Section #: 20.3.2 Comment: The SED assumes that additional groundwater pumping will have positive (induced) regional economic and employment impacts (Table 20.3.2-3). This is true if additional wells are drilled or existing wells are deepened to allow for additional groundwater pumping. But these are considered "fixed costs," and one cannot assume that they will happen every year throughout the analysis period. The increase in pumping costs (energy) is considered a "variable cost" and will not have significant regional impacts.	Table 20.3.2-3 (and table G.4-11) displayed the induced economic and employment effects as positive; however, these effects actually represent the loss in revenue and jobs for the regional economy because the increased cost of pumping more groundwater would reduce proprietary income for the pumpers. The tables were revised by making the change in the induced economic and employment effects negative in response to implementation of each of the LSJR alternatives. These values do not consider economic effect of deepening wells or drilling additional wells. This revision does not change the conclusions in Chapter 20, Economic Analyses.
1163	198	[From ATT1:] Comment #: C20:8 Page #: 20-23 Section #: 20.3.2 Comment: The SED suggests that public transportation and road systems could be forced to operate with smaller budgets due to less tax revenue, but it is unclear whether usage would stay the same with reduced economic activity.	Chapter 20, Section 20.3.2, Agricultural Production and Related Effects on Economic and Local Fiscal Conditions, presents the analysis of agricultural-related effects on economic and local fiscal conditions. Table 20.3.2-9 summarizes the effect of the LSJR alternatives on local governments and how it compares to the total annual text revenue (Table 20.3.2.-6). As discussed in this section, the impact of the LSJR Alternatives on tax revenues for local governments in San Joaquin, Stanislaus, and Merced Counties is small compared to the total annual tax revenues. Although Chapter 20, Economic Analyses, analyzes fiscal considerations with respect to local governments, the actual usage of public transportation and road systems is outside of the scope of the plan amendments.
1163	199	[From ATT1:] Comment #: C20:9 Page #: 20-27 Section #: 20.3.3 Comment: The financial impacts of various alternatives on M&I water suppliers should be analyzed and quantified. Quantifying the impact of the alternatives would give a better idea of the benefits and costs in any comparison. Reduction in quantity of water delivered to customers may have negative impacts on these utilities (especially if their rates do not reflect fixed costs), since Proposition 218 may limit their ability to raise rates. On page 20-27, the SED states "Implementation of LSJR Alternatives 2, 3, and 4 could result in surface and groundwater water supply reductions to municipal and industrial (M&I) service providers in the plan area." The plan also assumes that "Over the long term, most districts would be expected to recover most, if not all, capital costs through rate	Please see the response to comment 1163-203 regarding cost benefit analysis. Please see Master Response 1.2, Water Quality Control Planning Process, regarding State Water Board authorities related to the water quality control planning process, including discussion of Water Code section 13050 requirements. Please see Master Response 8.4, Non-Agricultural Economic Considerations, for discussion of municipal economic effects, including growth and economic development. Proposition 218 is a voter-passed measure that requires voter approval of almost all local taxes, including the assessments relied upon by water service providers. Court decisions have clarified that providers must demonstrate that charges reflect actual cost of service, and “local water agencies must carefully construct and document their rate structures to comply with constitutional limitations from Proposition 218” (CSAC, 2015; SWB, 2018). Proposition 218 does not prohibit rate adjustments, but does require local water agencies to provide more proof for the actual cost of service to increase the rates.

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		adjustments (page 20-32)." During the recent drought, Proposition 218 curtailed the ability of some utilities to increase rates and fees to recover the higher fixed costs of supplying water.	
1163	200	[From ATT1:] Comment #: C20:10 Page #: 20-28:20-31 Section #: 20.3.3 Comment: Assuming that the dollar figures mentioned in this section are in 2008 Dollars as mentioned on page 20-12, the tables (20.3.3-2, 20.3.3-3, 20.3.3-5, 20.3.3-9a, and 20.3.3-9b) need to indicate if the prices are real and to which year they are indexed.	The dollar figures in table 20.3.3-2 are for SSJID's 2016 water rate structure. The dollar figures in table 20.3.3-3 are for SEWD's 2015 rate structure for water. The dollar figures in table 20.3.3-5 are for MID's 2015 water rate structure. The dollar figures in table 20.3.3-9a are annual averages for the period of 1987-1992. The dollar figures in table 20.3.3-9b are annual averages for the period of 1983-2003.
1163	201	[From ATT1:] Comment #: C20:11 Page #: 20-57 Section #: 20.3.4 Comment: It is possible that users will find other means to offset demand. They could reduce demand or use renewable energy sources for electricity. These options should be listed.	In general, conservation of energy and renewable energy sources for electricity are commonly used options available to energy consumers. However, the conclusions of the hydropower economic analysis identified in Section 20.3.4, Effects on Hydropower Generation, Revenues and the Regional Economy, are that the "impacts… are relatively small and would not likely affect ratepayers in any substantial way." In essence, no specific response by consumers is necessary or forecasted beyond general trends.
1163	202	[From ATT1:] Comment #: C20:12 Page #: 20-65 Section #: 20.3.5 Comment: It is not clear if subsistence fishing information is included in this table. Suggest estimating and adding this.	Chapter 20, Economic Analyses, states that information on subsistence fishing by tribal members in California is captured within the broader scope of sport fishing data. Accordingly, the data presented in Table 20.3.5-2 include subsistence fishing.
1163	203	[From ATT1:] Comment #: C20:13 Page #: 20-76, 20-81:20-84, 20-86:20-87, 20-89:20-90 Section #: 20.3.6, 20.3.7, 20.4.1, 20.4.1 Comment: Dollar amounts mentioned throughout this chapter refer to different year dollar values rather than real/constant, inflation-adjusted dollars. Dollar amounts for costs and benefits need to be consistent for any comparison to be meaningful. The whole chapter uses dollars from different years and it should be relatively simple to inflation-adjust those dollars to one single year closer to the current year.	Please see Chapter 20, Economic Analyses, Section 20.1, Introduction, for a discussion of the purpose of the economic analyses contained in the Recirculated SED, which is described as: "The purposes of and the analytical framework for these analyses are (1) to compare potential changes in surface water diversion-related economic effects of the LSJR alternatives, and (2) to describe the potential costs of compliance with updated water quality objectives for the southern Delta. Although the analyses conducted to address these two purposes are presented together in this chapter, this should not be interpreted as an attempt to compare relevant costs and benefits of the LSJR alternatives or of the SDWQ alternatives. While the topic-specific analyses include certain analytical components common to each discussion (e.g., evaluation of potential effects on the regional economy), the reader is strongly discouraged from trying to draw conclusions across topics concerning the overall net benefits of a particular alternative." As such, the information is not intended to inform a cost benefit analysis. Please see response to comment 1163-194. There is no Table 20.4.4-1 in Chapter 20. Costs in Table 20.4.1-3

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		Values are in 2007 dollars. Dollar amounts mentioned in this section and tables do not appear to be inflation-adjusted. All costs are in 2010 dollars in Table 20.4.4-1. Unclear about following text? Not clear what the year value of dollar amounts mentioned in Table 20.4.1-3 and following text are.	and the following text are from the Central Valley Regional Water Quality Control Board 2004 Final Staff Report on the Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Salt and Boron Discharges into the Lower San Joaquin River.
1163	204	[From ATT1:] Comment #: C20:14 Page #: 20-91 Section #: 20.4.2 Comment: There are three options mentioned that wastewater treatment agencies can take to meet salinity objectives. It is also mentioned that it is not possible to estimate compliance costs without knowing which option the agency will choose. Consider analyzing a range based on the cost of these options.	Chapter 20, Economic Analyses, and Chapter 16, Evaluation of Other Indirect and Additional Actions, present a range of estimated costs associated with each of the options that individual entities could take depending on their circumstances. These ranges are included in Sections 16.4.1, New Source Water Supplies, 16.4.2, Salinity Pre-Treatment Programs, 16.4.3, Desalination, 16.4.4, Agricultural Return Flow Salinity Control, 16.4.5, South Delta Temporary Barriers, and 16.4.6, Low Lift Pumping Stations. While the State Water Board can present ranges within each option, and has done so, the State Water Board does not know the different configurations of options entities might choose to employ and therefore cannot speculate the range of costs between options.
1163	205	[From ATT1:] Comment #: C21:1 Page #: 21-1 Section #: 21.1 Comment: The SED states "the runoff and water supply effects during the recent period of 2004-2015 are not inconsistent (i.e., more extreme) than drought conditions during the prior historical record..." Analyses by Maurice Roos, DWR's Chief Hydrologist, presented at the California Water and Environmental Modeling Forum (CWEMF) annual meeting in 2016 offers a very different assessment regarding the most recent drought (2012-2016): "The 4 year runoff, WY 2012-15, for the 8 river system will be the driest 4 year set of record, exceeding slightly the previous record of 1931-34. However, on the southern group, the San Joaquin River system, the past 4 years were by far the worst 4 year period in a 114 year record, and about 20 percent drier than any 4 years in a reconstructed record of over 1000 years estimated from tree rings." http://www.cwemf.org/AnnualMeeting/2016AnnualMeetingProceedings.pdf - Session 25 The first sentence refers to the "current drought." This can make the document out of date this year -- suggest referencing the specific years or saying "recent drought." On the last bullet "carry-over storage," the second to last sentence states that reservoir storage is typically reduced during dry years to provide "normal full" water supply deliveries. In this context, the term "normal full" is inappropriate. During a dry year, water supply	Please see Master Response 1.1, General Comments, for information on general methods and modeling. The State Water Board acknowledges that there is more than one way to approach modeling and analysis and there are many data sources available. Please see Master Response 3.2, Surface Water Analyses and Modeling, for discussion on the intended use of modeling for evaluation and impact analyses. Chapter 21, Drought Evaluation, acknowledges the challenges associated with the recent drought, and describes the extraordinary actions taken by the State Water Board in response to the drought. This comment illustrates the complexity of evaluating the severity of drought conditions and the variety of metrics that could be considered. Scale and duration are both important considerations. Chapter 21 analyses the tributaries on an individual scale, because the effects of dry years on water supply were different for each tributary. The frequency and severity of dry years are analyzed using the annual (WY) percent of average runoff as the metric for identifying (and normalizing for conditions, including changes in facilities, demands, operating rules for flow releases, etc.) the sequence of runoff for the past 94 years. The WSE model captures several 3-year, 4-year, and 5-year droughts in the 1922-2003 analysis period. Figure 21-1 shows the 4-year cumulative runoff deficit for the Stanislaus River for 2012-2015 was similar to 1987-1990. Figures 21-2 and 21-23 show the 4-year cumulative runoff deficit for the Tuolumne and Merced Rivers were slight higher than 1987-1990, but similar. The SED reasonably concludes that the water supply effects of drought conditions were accurately calculated and evaluated within the WSE model, and that the runoff and water supply effects during 2004-2015 are not inconsistent (i.e., more extreme than) with drought conditions captured by the 1922-2003 analysis period. The commenter is correct that Chapter 21, focuses primarily on supply and demand in the three LSJR tributaries and does not consider SWP/CVP supply issues in the most recent drought. Text was clarified in Chapter 21, Drought Evaluation, to refer to the recent drought. These revisions do not change any conclusions in Chapter 21. The discussion under the carryover storage definition in Chapter 21, Drought Evaluation, Section 21.1, Introduction, goes on to say that “Multiple dry years may result in a cumulative runoff deficit severe enough to reduce carryover storage such that there is also a water supply diversion deficit.” This sentence is

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		deliveries are usually not full. Conclusion #2 that "the runoff and water supply effects during the recent period of 2004-2015 are not inconsistent (i.e., more extreme) than drought conditions during the prior historical record" belies the fact that SWP/CVP exports were significantly impacted by the drought. These supplies are derived, in part, from the SJR and its tributaries. Yet SWP/CVP supply effects are not included in the analysis presented in Chapter 21. Conclusion #3 that "there are reductions in water supply diversions in many years under the different LSJR alternatives compared to baseline, particularly during dry years" does not include an analysis of SWP/CVP supply reductions. "These analyses show that: (1) water supply effects during drought conditions are adequately characterized by the WSE model during the 1922-2003 analysis period, (2) the runoff and water supply effects during the recent period of 2004-2015 are not inconsistent (i.e., more extreme) than drought conditions during the prior historical record." 1. Water supply should include both surface water diversion and pumping. Because pumping is missing from the analyses, the analyses do not show adequately water supply effects during the drought conditions. 2. Since the groundwater is missing from the analyses and groundwater aquifer conditions in the basin have changed significantly since 1922, it is misleading to state that "the runoff and water supply effects during the recent period of 2004-2015 are not inconsistent (i.e., more extreme) than drought conditions during the prior historical record." "A water supply diversion deficit is the difference between the normal full water supply diversions and the available water supply diversions during the water year . . . ." "Water supply diversion deficit" reflects only a partial picture of drought conditions when groundwater is available. "A drought year or drought period is defined as one or more years with less-than-normal full diversions for water supply, reflecting a dry year or dry year period that is severe enough to cause a water supply deficit of a specified magnitude (e.g., <80 percent of full diversions)." This is an incomplete definition since water supplied by groundwater is not considered.	intended to recognize that carryover storage may not be able to provide normal full water supply deliveries during a dry year. Chapter 9, Groundwater Resources, analyzes the historical local response to increase groundwater pumping during dry periods when surface water availability is reduced. Chapter 20, Economic Analyses and Appendix G, Agricultural Economic Effects of the Lower San Joaquin River Flow Alternatives: Methodology and Modeling Results, evaluates the possible economic effects of increased groundwater pumping. Chapter 11, Agricultural Resources, presents impacts to agricultural resources based on past levels of groundwater pumping. Please see Master Response 3.4, Groundwater and the Sustainable Groundwater Management Act, for information on the groundwater impact analysis and the Sustainable Groundwater Management Act.
1163	206	[From ATT1:] Comment #: C21:2 Page #: 21-1, 21-24 Section #: 21.1, 21.9.1 Comment: The definition of water supply diversion is unclear until later in the chapter (p. 21-24). It is important to distinguish between diversion and diversion demand. On page 21-1, a definition of diversion deficit is presented: "A water supply diversion deficit is the difference between the normal full water supply	The language used throughout Chapter 21, Drought Evaluation, distinguishes between modeled diversions and historical demands. Chapter 21 also refers to Appendix F.1, Hydrologic and Water Quality Modeling, for more information on the WSE model. Appendix F.1 explains that the WSE model is a monthly spreadsheet model that calculates the monthly flows, reservoir storage levels, and water supply diversions for each eastside tributary. Chapter 21 explains that the drought evaluation assesses the severity of water supply effects during recent drought conditions compared to the severity of water supply effects during the 1922–2003 analysis period using WSE model simulations. For clarification of surface water demands in the Water Supply Effects model, please see Master Response 3.2, Surface Water Analyses and Modeling.

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		diversions and the available water supply diversions during the water year (WY)." On page 21-24, model full diversion is defined: "The baseline diversions fluctuated with the WSE-model full diversions (full water supply demands), generally between 550 TAF and 750 TAF." Suggest using diversion demand in place of diversion to clearly distinguish it from modeled diversion.	
1163	207	[From ATT1:] Comment #: C21:3 Page #: 21-2 Comment: Since the WSE model is based on CalSim, it is assumed that the hydrology is based on the years listed but the model simulates some specified level of development. That is not made clear in the introduction, and it could be misinterpreted that the analysis is for historical conditions, not for hydrology based on historical conditions with a specified water supply operation for the modern developed water system. The "dry year" definition does not use the standard Water Supply Index definitions (5 water year types: wet, above normal, below normal, dry, and critical). Since these definitions are used in other Delta water quality regulations, using consistent definitions would reduce confusion and possible misinterpretations. The time period for the "average runoff" calculation is not specified. It is assumed to be 1922-2015. The value of this average runoff is used as a datum throughout this analysis, yet this is a datum that will change as each new water year is added to the average. Diversion deficit is defined relative to "normal full water supply diversions," yet the term "normal full water supply diversions" is not clearly defined. Since California's hydrology is highly variable, using averages or referring to "normal" conditions represents conditions that are rarely experienced. If these are used as reference points, they need to be more clearly defined. The drought year definition is also ambiguous, especially because the magnitude of what constitutes a deficit is not specified. Instead, only an example is given: "one or more years with less-than-normal full diversions for water supply, reflecting a dry year or dry year period that is severe enough to cause a water supply deficit of a specified magnitude (e.g., <80 percent of full diversions)." This definition mixes drought as a natural phenomenon (low precipitation, low soil moisture, low runoff) and management decisions (diversions). Perhaps it would be more clear to change the term from "drought" to "drought-related diversion deficit" or something similar.	Chapter 21, Drought Evaluation, begins with the definition of terms, in order to reduce confusion and increase understanding of the subsequent analysis. Basic modeling assumptions, such as the level of development, are identified in Chapter 5, Surface Hydrology and Water Quality, and Appendix F.1, Hydrologic and Water Quality Modeling. The standard Water Supply Index for the SJR uses the sum of the runoff from the three tributaries and the runoff from SJR at Friant Dam, plus a fraction of the runoff from the previous year. Chapter 21 does not use this classification, because each year of runoff (WY) is evaluated in comparison to the average runoff for each individual tributary. Text was added to clarify that the average runoff was calculated for the WY 1922-2015 time period. These revisions do not change any conclusions in Chapter 21. “Normal full water supply diversion” in Chapter 21 refers to the quantity needed to meet total surface water demand at the point of diversion, which varies from year to year in the WSE model. Table 21-3 shows the ranges of diversion for which 100 percent is supplied in the baseline scenario. For clarification of surface water demands in the WSE model, please see Master Response 3.2, Surface Water Analyses and Modeling. Chapter 21 specifies that a “drought year” is a year with substantial diversion deficits. The magnitude of those deficits may vary, and the example of “less than 80 percent of full diversions” illustrates one way to identify drought years and evaluate drought effects. The severity of a drought is based on both the amount of runoff and water management planning and responses.
1163	208	[From ATT1:] Comment #: C21:4	Please see response to comment 1163-205 regarding the reasonableness of the drought evaluation. Chapter 21, Drought Evaluation, Section 21.2, Tributary Runoff and Droughts, describes the data sources used for the 2004-2015 extended period. Figures 21-4, 21-5, and 21-6 show runoff with historical WSE baseline diversions, diversion deficits, and carryover storage drawdowns for each of the tributaries. This comment

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Page #: 21-2 Section #: 21.1 Comment: The statement in the last portion of the second paragraph that "the 2012-2015 dry year period was similar to other 4-year dry year periods in the historical record" is inconsistent with the descriptions of this period of extreme drought from the Governor's Office, DWR, and the Board, and in documents such as the Governor's declaration of emergency, the series of Board executive orders, the granting of the Temporary Urgency Change Petitions, and the unprecedented low runoff and high temperatures recorded during that period. "To better understand the effects for the more recent time period (from 2004–2015), the WSE model was extended using the historical reservoir inflows and estimated monthly data for downstream local inflows, return flows, and water supply diversions, using CALSIM inputs from years with similar hydrology." Suggest presenting more detail on data extension, i.e., which year was found comparable to which year and the basis for that determination. If this is presented elsewhere in the SED, suggest referring the reader to the appropriate SED chapter/section.	does not make a general comment regarding the plan amendment or raise significant environmental issues.
1163	209	[From ATT1:] Comment #: C21:5 Page #: 21-4, 2nd paragraph Section #: 21.2 Comment: Third line: "runoff in 10 percent of the years was less than 45" should read ". . . less than 40" There are similar errors in the next two paragraphs. These numbers should match those on Table 21-2. Sixth line: "The WSE model showed average full water supply diversion . . . ." The meaning of average full water supply diversion is not clear. If it means modeled diversion, using the qualifier "full" makes it sound like diversion demand rather than modeled diversion. The following two paragraphs on the Tuolumne and Merced Rivers are written similarly.	The typographical errors were corrected in Chapter 21, Drought Evaluation, Section 21.2, Tributary Runoff and Droughts. These revisions do not change any conclusions in Chapter 21. Please see response to comment 1163-206 for information regarding full water supply diversion.
1163	210	[From ATT1:] Comment #: C21:6 Page #: 21-6 Section #: 21.3.1 Comment: Regarding the statement in the middle of the first paragraph that, "the runoff in 2014 (370 TAF) and 2015 (330 TAF) were both less than half of average, but runoff has been lower in a few previous years." Previous drought years that were similarly dry occurred in times where the demands on the system were far lower. In the 70's and 80's the SWB had	Chapter 21, Drought Evaluation, provides an analysis of the frequency and severity of dry years, using the annual (WY) percent of average runoff as the metric for identifying (and normalizing for conditions, including changes in facilities, demands, operating rules for flow releases, etc.) the sequence of runoff for the past 94 years. For clarification, the WSE model incorporates outflow standards in the baseline for the entire analysis period 1922-2003 for an appropriate comparison to the LSJR alternatives.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		yet to establish the outflow standards that are in place today and upstream development was lower.	
1163	211	[From ATT1:] Comment #: C21:7 Page #: 21-7 Section #: 21.3.2 Comment: ". . . the WSE model showed average full water supply diversions of 651 TAF (59 percent of average runoff) can be maintained for several years during dry periods (Table 21-2)." This is only relevant for the historical condition. Under the LSJR alternatives, the situation can change significantly. The second sentence of the first paragraph references Table 21-2 on page 21-5. SWP/CVP supplies are not included in this calculation and therefore the conclusions are inappropriately broad and optimistic. Similar problems exist in the drought discussions for sections 21.4 and 21.5, which all reference the number in Table 21-2.	Chapter 21, Drought Evaluation, Section 21.10, LSJR Alternatives and Water Supply Operations, indicates that implementing the LSJR alternatives would increase the frequency and severity of water supply deficits for each tributary. Please see response to comment 1163-205 for information regarding SWP/CVP supplies.
1163	212	[From ATT1:] Comment #: C21:8 Page #: 21-8, 1st paragraph Section #: 21.3.2 Comment: It is unclear whether data presented in this paragraph are modeled data or historical (observed) data.	The opening sentence of the paragraph states, "The recent drought (2012-2015) provides evidence of the importance of carryover storage…" This is intended to indicate that the data presented in this paragraph are describing historical conditions for WY 2012-2015.
1163	213	[From ATT1:] Comment #: C21:9 Page #: 21-8, 21-12, 21-14 Section #: 21.3.3, 21.4.3, 21.5.3 Comment: The SED sections on Drought Water Management describe existing Agricultural Water Management Plans (AWMPs) for water districts within each tributary. However, no consideration is given to the fact that the LSJR alternatives would increase the frequency and severity of water shortages. The SED seems to imply that because there are drought water management plans already in place, the water districts will be able to absorb additional water supply shortages resulting from the LSJR alternatives.	Please see Master Response 3.2, Surface Water Analyses and Modeling, for a discussion on water supply reliability. Chapter 21, Drought Evaluation, demonstrates that in response to implementation of the LSJR alternatives there would be greater reductions in water supplies during dry year sequences. The SED does not conclude or imply that existing AWMPs measures would be sufficient for future conditions; the SED reflects how irrigation districts have managed water supply reductions historically.
1163	214	[From ATT1:] Comment #: C21:10	Please see Response 1163-205. Groundwater supplies are identified in Chapter 9, Groundwater Resources.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Page #: 21-9 Section #: 21.3.3 Comment: In addition to Table 21-3, another table should be added to show groundwater supply. It is better to combine both diversion and pumping in order to show the whole water supply condition.	
1163	215	[From ATT1:] Comment #: C21:11 Page #: 21-16 Comment: Perhaps the text below explaining WSE baseline versus historical should be moved earlier in the write-up to help readers who are not familiar with this type of modeling to better understand that the model results are not for historical conditions, but are for modern operations with historically based runoff. "The monthly WSE baseline results for 1922-2003 provide estimates of the reservoir operations for the historical runoff with the existing reservoir releases for water supply diversions, required flows for fish habitat, downstream riparian diversions, and flood control. The WSE extended baseline results (1922-2015) provide a longer period for drought evaluation, with the existing water supply diversions and fish habitat flows calculated up to 2015. The WSE baseline results are expected to more closely match the historical reservoir operations in the most recent years, when the required release flows and water supply diversions were similar to those specified in the WSE model."	Text describing the WSE baseline results and reservoir operations was added to Chapter 21, Drought Evaluation, Section 21.1, Introduction, for clarification. These revisions do not change any conclusions in Chapter 21.
1163	216	[From ATT1:] Comment #: C21:12 Page #: 21-16 Section #: 21.6 Comment: Are the land uses in the WSE baseline fixed while historical land uses changes each year? If yes, we should not expect the WSE baseline results to closely match the historical reservoir operations.	Because historical diversions change from year to year due to multiple variables, including land use changes, the WSE model would not be expected to precisely match each year's historical diversions with calculated results. Review of the historical annual diversions compared to modeled diversions (Figures 21-4 to 21-6) indicates that average diversions over the 1970-2015 period have fluctuated within a relatively narrow band (e.g., ±10%). The modeled full diversions each year were generally similar, but slightly higher than the historical diversions.
1163	217	[From ATT1:] Comment #: C21:13 Page #: 21-16, 21-17 Section #: 21.7.2 Comment: On page 21-16, the SED states: "The full contract diversions were increased from 600 TAF to 755 TAF in 1997 (as a result of SEWD and CSJWCD receiving water)." On page 21-17, WSE Baseline diversions "were often higher than historical diversions	Modeling water supply conditions for the Stanislaus River incorporates a large number of variables, including 1) the formula for allocation based on runoff (when less than 600 TAF), which is incorporated in the SSJID and OID contracts with USBR; 2) allowances for carryover storage in New Melones Reservoir; 3) deliveries to SEWD and CSJWCD based on the New Melones Index (NMI); 4) releases for VAMP; and 5) NMFS Biological Opinion flow schedules (since 2009). Nevertheless, the carryover storage for the 1987-1992 and 2012-2015 droughts did match the historical drawdown pattern closely. Please see Master Response 3.2, Surface Water Analyses and Modeling, for clarification of surface water demands in the WSE model.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		because the full contract diversions of 755 TAF were included in the WSE baseline." This statement makes sense for the earlier years of simulation, prior to 1997, but modeled diversions should match historical diversions better after 1997. Because modeled diversions were consistently higher than historical diversions, carryover storage was consistently lower, with considerable differences 1995-2010. The agreement between historical and WSE baseline is only similar in 2011-2015, when modeled baseline diversions are comparable to historical diversions. The conclusion that "[g]enerally, the WSE baseline provides a very accurate calculation of drought conditions for the Stanislaus River . . . ." cannot be reached from data presented in this section.	
1163	218	[From ATT1:] Comment #: C21:14 Page #: 21-9 Section #: 21.3.3 Comment: In addition to Table 21-3, another table should be added to show groundwater supply. It is better to combine both diversion and pumping in order to show the whole water supply condition.	Please See response to comment 1163-214.
1163	219	[From ATT1:] Comment #: C22:1 Page #: 22-2, 1st paragraph, 22-3, 3rd paragraph Comment: Additional groundwater pumping to replace surface water deliveries will put an additional burden on Groundwater Sustainability Agencies (GSAs) to manage groundwater sustainably, but the SED does not quantify the additional impacts for each alternative if implemented. SGMA requires GSAs to manage to groundwater levels from 2015, the effective date of the law. The SED should quantify the impacts from the additional groundwater pumping for specific quantity and locations because conditions vary in the groundwater basins. Here are several examples where the impact of groundwater pumping is described but not in a quantifiable manner that can be used to evaluate the alternatives and severity of the impacts on the groundwater levels and quantity and other potential adverse impacts: SED text states on page 22-2: The impacts of the LSJR alternatives on groundwater resources cannot be determined with certainty because groundwater conditions vary within each aquifer subbasin and water users would have varied responses to reduced surface water deliveries and any decrease in groundwater elevations. Page 22-3: Groundwater pumping in the region continues to increase in response to growing demand and reduced surface water deliveries. Additional pumping in any of these subbasins could	Please see response to comment 1163-23.

Table 4-1. Responses to Comments			
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		reduce the average groundwater level (i.e., drawdown) with a noticeable effect on groundwater levels over a number of years.	
1163	220	[From ATT1:] Comment #: 22:2 Page #: 22-12, 2nd paragraph Section #: 22.4.1 Comment: The SED uses the term "equivalent of 1 inch" and "1-inch threshold," which does not provide quantitative information that can be used to evaluate the extent and severity of the impact. (See previous comments about the use of 1 inch instead of volume, change in storage, or change in groundwater elevations.) For example, ...under LSJR Alternatives 3 and 4, the average annual groundwater balance is expected to be reduced by more than the equivalent of 1 inch in three subbasins (Modesto, Turlock, and Extended Merced) and all four subbasins, respectively. Exceeding the 1-inch threshold would eventually result in a measurable decrease in groundwater elevations in the basins. Therefore, it is expected that LSJR Alternatives 3 and 4 would result in a substantial depletion of groundwater supplies or substantial interference with groundwater recharge.	Please see response to Comment 1163-23.
1163	221	[From ATT1:] Comment #: C23:1 Page #: 23-8 Section #: 23.5.1 Comment: In the second full paragraph, the SED states: "Salinity conditions were further altered by the completion of the state, federal, and local water projects, which together have reduced flow entering the Delta at Vernalis." The SWP does not reduce flow entering the Delta at Vernalis.	The sentence modified for clarity. These revisions do not change any conclusions in Chapter 23.
1163	222	[From ATT1:] Comment #: C23:2 Page #: 23-9, 3rd paragraph Section #: 23.5.1 Comment: "The standards at the interior south Delta stations are more difficult to achieve because of high salinity runoff from agricultural land downstream of Vernalis. There are also additional sources of salinity between Vernalis and the other locations, as well as diversions and other hydrodynamic factors that may increase salinity concentrations at the interior locations compared to Vernalis." The SED acknowledges that interior Delta standards are difficult to achieve because of agricultural runoff, among other factors. DWR is not responsible for and lacks control over	Please refer to Master Response 3.3, Southern Delta Water Quality, for discussion of the roles of DWR and USBR in meeting the standards as these locations.

Table 4-1. Responses to Comments			
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		south Delta salinity conditions, and it is therefore not reasonable to impose responsibilities on DWR for meeting those standards. Despite this acknowledgement, however, CVP and SWP are still held responsible to meet the standards at these locations.	
1163	223	[From ATT1:] Comment #: C23:3 Page #: 23-15 Section #: 23.5.1, Table 23-2 & subsequent paragraph Comment: Table 23-2 shows the annual average EC at the four compliance locations under the Baseline and 5 scenarios of differing percent of unimpaired inflow. Question the use of annual average in this case. Since these scenarios all have additional water coming from higher quality sources (because of curtailments to diversions from these rivers necessary to meet the percent unimpaired flow from each tributary), on average, the water quality will be better. However, the salinity standards are based on a 30-day running average. An annual average does not greatly inform a 30-day running average instead, monthly detail is needed.	Please see response to comment 1163-222 regarding salinity and the southern Delta.
1163	224	[From ATT1:] Comment #: C23:4 Page #: 23-15 to 23-18 Section #: 23.5.1, Figures 23-5, 23-6, 23-7 Comment: Figures 23-5 through 23-7 depict the exceedance of change in EC at Vernalis, SJR at Brandt Bridge, Old River near Middle River, and Old River at Tracy Boulevard Bridge. These charts indicate that decreases in monthly EC occur more often than increases. The timing of the occurrence of change in EC and baseline value of EC are both important in determining whether there is an impact to water quality. If an improvement occurs when EC is already low, not much gain. If, however, degradation occurs when baseline EC is high, the consequences can be severe.	Please see Master Response 3.3, Southern Delta Water Quality, for discussion of the LSJR alternatives and southern Delta salinity.
1163	225	[From ATT1:] Comment #: C23:5 Page #: 23-20 to 23-21 Section #: 23.5.1, Figures 23-9, 23-10 Comment: Figure 23-9 shows that most of the improvements in EC at SJR Brandt Bridge and Old River near Middle River occur when EC is already low. For values of EC above 0.7 dS/m, the exceedances for alternatives (20% UF-60% UF) are practically indistinguishable. Most of the improvements occur when EC is already low. Figure 23-10 shows a slightly greater spread between alternatives for EC values above 0.7 dS/m, with the greatest difference in exceedance for EC above 0.7 dS/m from about 29% for 60%UF to approximately 35% of the	Please see response to comment 1163-224.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		time for the 20%UF. Again, most of the gains occur when EC is already low.	
1163	226	[From ATT1:] Comment #: C23:6 Page #: 23-27 Section #: 23.5.3 Comment: There appears to be a typo in the first full paragraph: ". . . the time period from 197-2003."	The typographical error has been corrected. The correction does not result in a change to any conclusion in Appendix C.
1163	227	[From ATT1:] Comment #: C:1 Page #: C.2-1, 1st paragraph Section #: 2 Comment: "[U]nimpaired flows are estimated on a monthly basis for water years 1922 to 2003 by DWR, and for the purpose of this analysis, are considered to adequately portray the natural flow regime" (2012 Technical Report, Appendix C). For the purposes of impacts to aquatic resources, daily and even hourly fluctuations in river stage, temperature, and velocities can impact aquatic resources.	Please see Master Response 1.1, General Comments, for responses to comments that do not raise significant environmental issues or make a general comment regarding the plan amendments. Please also see Master Response 3.1, Fish Protection, for information about comments that do not conflict with, or contradict, the key scientific information used to support the impact determinations or benefit assessments in the SED. Please also refer to Master Response 3.1 for a discussion on the use of a monthly flow model to evaluate potential impacts to aquatic resources.
1163	228	[From ATT1:] Comment #: C:2 Page #: C.2-6 Section #: C2.2.2 Comment: From definitions of unimpaired flow given in this section, it is not clear whether unimpaired flow estimation includes the impact of river bed infiltration to groundwater aquifer and river riparian evapotranspiration, which can be significant in the valley floor.	Refer to Master Response 3.2, Surface Water Analyses and Modeling, regarding hydrological modeling methodology and assumptions and unimpaired flow calculations. Please see Master Response 2.1, Amendments to the Water Quality Control Plan, for the definition of unimpaired flow and for information regarding the San Joaquin Valley unimpaired total outflow. Please see Master Response 1.1, General Comments, for responses to comments that do not raise significant environmental issues or make a general comment regarding the plan amendments. The purpose of Appendix C is to provide the scientific basis for establishing the objectives to reasonably protect fish and wildlife. The evaluations and information contained in Appendix C support the approach of using unimpaired flow to reasonably protect fish and wildlife. A certain percentage of unimpaired flow provides the ability to more closely mimic the natural hydrograph in spring (see Master Response 2.2, Adaptive Implementation). The LSJR alternatives, including LSJR Alternative 3 with adaptive implementation, evaluated in the SED propose a percentage of unimpaired flow and not full unimpaired flow.
1163	229	[From ATT1:] Comment #: C:3 Page #: C.2-6 Section #: C2.2.2 Comment: Suggest providing a more detailed analysis of annual variation of the valley floor unimpaired flow components to justify its assumption that "the monthly unimpaired flow estimates at the tributary rim dams provide an adequate portrayal of the natural flow	Please see response to comment 1163-228.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		regime for comparison against observed flows at the mouths of the tributaries." It is not adequate to just mention that "the valley floor component makes up only roughly 3% of the average annual unimpaired flow on the LSJR tributaries (DWR 2007a)." The valley floor contribution to unimpaired flow in the LSJR tributaries may be very different in critical, dry, and wet years. It is possible that the valley floor has a huge negative contribution to unimpaired flow due to loss to groundwater in critical and dry years.	
1163	230	[From ATT1:] Comment #: C:4 Page #: C.2-7 Section #: 2.2.2 Comment: See Comment C5:3. DWR's UF at Vernalis is not streamflow at Vernalis. The runoff of the SJ Valley floor is a small percentage compared to cumulative upper watershed outflows (i.e., runoff).	Please see response to comment 1163-228.
1163	231	[From ATT1:] Comment #: C:5 Page #: C.2-8 Section #: 2.2.2 Comment: The SED states that four components are not included in DWR's UF report, including stream-aquifer interactions (seepage) and consumptive use under undeveloped conditions. While this is okay for the UF report (since it only deals with cumulative runoffs), for the Board's work, these components are very important. Suggest using data from C2VSIM or CVHM.	Please see response to comment 1163-228.
1163	232	[From ATT1:] Comment #: F1:1 Page #: F.1-3, 2nd paragraph Section #: F.1.2 Comment: The word "equivalent" should be changed to "similar" in the following statement: "The WSE model is considered an equivalent tool to CALSIM II for the purposes of this comparative water balance analysis."	For the purposes of evaluating changes in streamflow and diversions, and in the comparative manner it is used for the SED analysis for the lower San Joaquin River eastside tributaries, the WSE model is considered an equivalent tool, since it uses the same global water balance only with slightly different allocation algorithms, and in a spreadsheet format designed for evaluating the proposed flow objectives.
1163	233	[From ATT1:] Comment #: F1:2 Page #: F.1-12, 2nd dark bullet	For information regarding accretions and depletions, see Master Response 3.2, Surface Water Analyses and Modeling.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		Section #: F.1.2.2 Comment: WSE model still uses "…downstream accretions and depletions, and demands, and other inputs as developed by USBR for the CALSIM model." The "downstream accretions and depletions" terms need to be updated when Consumptive Use of Applied Water (CUAW) is adjusted by an adjustment factor.	
1163	234	[From ATT1:] Comment #: F1:3 Page #: F.1-13 Section #: F1.2.3 Comment: Regarding the statement: "based on information from DWR (DWR 2007), the entire Central Valley floor component of unimpaired flow (i.e., downstream of the major reservoirs) is roughly 3 percent of the unimpaired flows of the three eastside tributaries; thus, the component of unimpaired flow that would otherwise be associated with accretions and other inputs downstream of the major reservoirs is not expected to significantly alter the amount or timing of these flows." Impacts of the tributary reaches in the valley floor between the major reservoirs and the LSJR on the unimpaired inflow at the tributary mouth can be significant. Stream loss to groundwater in critical and dry years can be significant. Flooding spill over river banks in wet years can be significant. The amount or timing of unimpaired flow at tributary mouths can be very different from the unimpaired flow downstream of the major reservoirs. The WSE model should not use the "estimates of unimpaired flows upstream of the major reservoirs . . . as unimpaired flow indices for the entirety of each eastside tributary" to calculate the monthly flow targets at tributary confluences. DWR has produced a draft report entitled Estimates of Natural and Unimpaired Flows for the Central Valley of California: Water Years 1922-2014, published in March 2016 that could be of assistance.	Please see response to comment 1163-45. In addition, please see Master Response 3.2, Surface Water Analyses and Modeling, regarding the application of unimpaired flow as an index for determining the LSJR flow objectives.
1163	235	[From ATT1:] Comment #: F1:4 Page #: F.1-19 Section #: F.1.2.4 Comment: The SED defines a Percolation Factor, DF, as DF=CUAW/Deep Percolation. The SED also uses data for CUAW and Deep Percolation for a single year from the Ag Water Management Plan reports, and then applies the factor to the time series of CUAW calculated from the Consumptive Use Model. The proposed DF is unconventional. Accepted definitions are that deep percolation relates Total Applied Water to Deep Percolation. CUAW is only part of the Total Applied Water. By the Board's definition, if one doubles the applied water for the same crop grown (same CUAW), deep percolation is the same. Suggest using data from the C2VSIM or CVHM model.	The definition of Deep Percolation Factor in Appendix F.1 is based on the determination of this factor as a water balance fraction and metric of efficiency based on reported AWMP district water balance data. Once this fraction is determined, it is then considered as a fraction of total applied water, as commenter suggests, but that is also based on the monthly variation of CUAW in the WSE model. It is not clear how model data from C2VSIM or CVHM would be incorporated. For more information regarding use of AWMP data, please see Master Response 3.2, Surface Water Analyses and Modeling.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
1163	236	[From ATT1:] Comment #: F1:5 Page #: F.1-20, F.1-25, F.1-26 Section #: F.1.2.4 Comment: Water demands, deep percolation, and distribution losses are all related to "CUAW" which was estimated based on the DWR consumptive use model (USBR 2005). "CUAW represents the portion of applied water consumed by crops." The SED should provide a detailed description of the DWR consumptive use (CU) model since all the surface water demands are derived from the DWR CU model. Parameters used in the DWR CU model should also be updated in order to reflect current conditions.	Please refer to Master Response 3.2, Surface Water Analyses and Modeling, for a clarifying description describing how CUAW is used in the WSE model. Conditions are characterized by total water diverted, as well as distribution and irrigation efficiencies from AWMPs.
1163	237	[From ATT1:] Comment #: F2:1 Page #: F.2-80 Section #: Fig F.2.9b Comment: For 2003, EC values for Old River at Tracy Boulevard Bridge are similar to those for Mossdale. For the years 2000-2002, EC at Tracy were higher, while Vernalis, Mossdale, Brandt ECs seem to roughly follow 2000- 2002 patterns (i.e., relationship among these stations). The text does not explain the reason for this in contrast to Tracy EC in 2003.	The information contained in Appendix F.2 describes that flow in Old River at Tracy Boulevard is generally low, which makes the water quality at Tracy Boulevard responsive to local conditions. This comment does not make a general comment regarding the plan amendments or raise significant environmental issues.
1163	238	[From ATT1:] Comment #: F2:2 Page #: F.2-83 and F.1-177 Comment: The historical relationship using Vernalis EC and flow to determine water quality levels is limited in its usefulness. - In Appendix F.2 and in Chapter 5, a regression is developed from historical data to determine the degradation in salinity between Vernalis and other south Delta water quality locations. The regression is a relationship between EC and Flow and shows a scatter of data (figures F.1.5-2a and F.1.5-2b). The resulting regression equation shows the average increase in salinity. Due to the scatter, there are times when the degradation exceeds the average. At those times, the objectives could be exceeded. The analysis should include maximum impacts. - The regressions look at a relationship between flow and salinity at the current objective locations. The alternatives propose not just select locations but whole channel reaches. These relationships are then extrapolated for the Middle River and Old River reaches. Increases of flow into Old and Middle River are not proportional to increases in flows at Vernalis so it is unlikely that this relationship will hold up for the reaches. DWR showed flow/salinity relationships in a previous workshop: http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/sds_srjf/sjr	Please see response to comment 1163-16. The commenter expresses concern that the scatter indicated in the graphs in F.1.5-2a and F.1.5-2b could indicate that the EC objectives could be exceeded even if the EC value calculated for Vernalis plus the calculated increment would estimate otherwise. Scatter in the EC-flow relationship could mean that the EC objectives may sometimes be exceeded, as sometimes occurs under baseline conditions, particularly in Old River at Tracy Boulevard. The scatter indicates that there are factors other than flow that affect EC. These other factors would be present under both baseline and plan amendment conditions. The purpose of the regressions is to assess the general effect of changes in flow on EC. The LSJR alternatives would generally result in reductions in EC due to increases in flow. If exceedances occur due to non-flow effects, such as an intermittent local high salinity accretion, the exceedances would likely be more frequent for baseline than the LSJR alternatives.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
		/docs/dwr_flo ws_salinity010611.pdf	
1163	239	[From ATT1:] Comment #: G:2 Page #:G-24 to G-27 Section #: G.2.4 Comment: A series of graphs are displayed to show the breakdown of applied surface water and additional groundwater under the three alternatives. All graphs end at 2002, yet data is cited in the text for up to 2014. Suggest graphing the results up to 2014.	The graphs end in 2003 because the Water Supply Effects model provides a modeled representation of hydrology from 1922 to 2003, which is the modeling period for CALSIM II. This timeframe provides enough representation of the hydrologic period to provide a comparative analysis between baseline and LSJR alternatives. The "2014" data mentioned in the text of Appendix G, Agricultural Economic Effects of the Lower San Joaquin River Flow Alternatives: Methodology and Modeling Results, is the annual irrigation district groundwater pumping capacities. These capacities were applied to the 1922 to 2003 timeframe to analyze how a higher groundwater pumping capacity would affect groundwater supplies over the period of record. Groundwater use was not actually modeled to 2014.
1163	240	[From ATT1:] Comment #: G:3 Page #: G-30 Section #: G.3.1 Comment: The second paragraph starts with "A groundwater subbasin can be used sustainably as a water source if the average annual water balance is not negative." This is followed by Table G.3-5, which shows negative water balances for all subbasins and all alternatives, except for the Eastern San Joaquin under Alternative 2. These negative water balance numbers will only get higher over time and will be further complicated with implementation of SGMA.	Table G.3-5 shows the change from baseline in the district groundwater balance (groundwater pumping minus groundwater recharge) in response to implementation of the LSJR alternatives. The actual groundwater balance in response to implementation of any of the LSJR alternatives would be the change plus the baseline value (also shown in the table). Adding the baseline value for the groundwater balance and the change in response to implementation of the LSJR alternatives shows that the only subbasins with a negative district groundwater balance are the Eastern San Joaquin and the Extended Merced in response to implementation of LSJR Alternative 4.
1163	241	[From ATT1:] Comment #: G:4 Page #: G-35 Section #: G.3.3 Comment: This paragraph states the assumption that a number of factors that influence whether a subbasin is overdrafted are constant. However, this is not substantiated. Over time, these factors likely will even out, but under a flow regime called for under the three alternatives, the loss of surface water will cause an increase in groundwater pumping over time that will result in changes that are not constant, but increasing.	Please see Master Response 3.4, Groundwater and the Sustainable Groundwater Management Act, for information regarding the groundwater resource analysis and assumptions related to groundwater pumping. Appendix G states that "These factors are not included in this discussion because they can be assumed to be constant for each LSJR alternative." Appendix G is modified to explain these factors were not included in the post processing of modeling results because the effect of changes in these factors would be relatively small compared to the changes in groundwater recharge and increased pumping evaluated in Appendix G. Two of the other factors identified in Appendix G in the groundwater budget that could change and that are not quantified are lateral flow between subbasins and percolation from the rivers. However, as qualitatively addressed in Section G.3.1, to the extent that water moves between subbasins, some of the groundwater impacts could have slight effects on adjoining subbasins, which would reduce the effects within the subbasins of concern. Similarly, increased percolation from the rivers could also slightly reduce groundwater effects. The potential effect of increased river seepage on surface water flows is discussed in Master Response 3.2, Surface Water Analyses and Modeling.
1163	242	[From ATT1:] Comment #: G:5 Page #: G-55 Section #: G.4.1.1	The SWAP model takes into account water supply costs including pumping costs. At a regional scale, deeper wells may increase pumping costs but these were found to be non-dominant compared to other production costs including labor, land rental and supplies. Depending on the location and infrastructure, there is an increase of about one dollar per acre foot from pumping three feet deeper. Policies to reduce future overdraft are intended to reduce the likelihood of increased pumping costs. Please see Master Response 8.1, Local Agricultural Economic Effects and the SWAP Model, regarding the scope of the economic analysis and groundwater pumping costs.

Table 4-1. Responses to Comments			
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		Comment: This section describes the decrease in average annual crop area under the three alternatives. What do not appear to have been considered are the cumulative effects of increased pumping to make up shortages of surface water. This can likely be sustained for a few years; however there will be falling water tables that will lead to wells going dry. Pumping will either stop for these wells or new wells will have to be drilled. These variables cannot be adequately modeled and will have effects on energy costs due to deeper wells, land going out of production at times, water coming from other subbasins, and increased economic effects. All of these have occurred in the west side of the San Joaquin Valley with surface water delivery cutbacks down to zero allocations by Reclamation, including land subsidence.	
1163	243	[From ATT1:] Comment #: G:6 Page #: G-60 Section #: G.4.4 Comment: Groundwater pumping costs are determined by the pumping energy using an average depth to groundwater. This calculation is missing taking into account the motor efficiency. Also, increased pumping will lead to falling water tables that will result in higher pumping costs over time.	The "Pump Efficiency" term actually represents the overall well efficiency, including the efficiency of the motor. Please see Master Response 8.1, Local Agricultural Economic Effects and the SWAP Model, regarding the scope of the economic analysis and groundwater pumping costs.
1163	244	[From ATT1:] Comment #: K:1 Page #: 15 Section #: Table 2 Comment: Table 2 incorrectly indicates the Vernalis objective is 1.0 in all months instead of 0.7 ED (April-August) and 1.0 ED (September-March). Inconsistent with description on Page 42, Para. 1.i.	The year round salinity objective at Vernalis of 1.0 dS/m presented in Table 2 (Appendix K, Revised Water Quality Control Plan) is correct. However, USBR's water rights will remain conditioned to require meeting the current 0.7 dS/m objective at Vernalis to provide assimilative capacity for salt loading downstream of Vernalis. Please also see responses to comment 1163-26.
1163	245	[From ATT1:] Comment #: K:2 Page #: 15 Section #: Table 2 Comment: Because degradation occurs downstream of Vernalis, the winter objective at Vernalis of 1.0 EC should either have a corresponding objective for the interior south Delta objectives of 1.3 to 1.4 EC, not 1.0 EC, or require local agricultural diverters and drainage dischargers in the Delta to institute a control program for salt discharges as described in the next comment. Having identical objectives at all four locations would likely result at times in exceedances of the 1.0 EC objectives at interior locations, particularly given that in the winter, agricultural operations are leaching fields to remove salt in the soils and discharging	Please see response to comment 1163-246.

Table 4-1. Responses to Comments			
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		the salt into south Delta channels.	
1163	246	[From ATT1:] Comment #: K:3 Page #: 15 Section #: Table 2 Comment: The purpose of the July 1989 Central Valley Regional Water Quality Control Board (CVRWQCB) report entitled "Quality of Agricultural Drainage Water Discharging to the San Joaquin River from the Western portion of the San Joaquin County, California" was to collect data in the development and evaluation of the need for an agricultural drainage reduction program. The Board monitored drainage flows within 3 regions in the south Delta for 2 years at 39 sites. The Table 2 summary reported that the average median concentration of all zones was 2,600 umhos/cm with minimum of 410 and a maximum of 9,400. The report presented clear evidence that agricultural drainage discharges at these 39 sites degrade water quality in the San Joaquin River and in the south Delta channels downstream Vernalis. If the winter objective at Vernalis of 1.0 EC has a corresponding objective for the interior south Delta objectives of 1.0 EC, it will be impossible at times for the downstream station locations to be in compliance when the EC at Vernalis is at or near 1.0 EC. Increasing the objective at the interior south Delta stations would allow these drainage dischargers to move salts out of the systems. At these stations, the objectives can increase to a reasonable level if the Board implements a similar program proposed by the Lower San Joaquin River Committee upstream of Vernalis through Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS), a collaborative basin planning effort aimed at developing and implementing a comprehensive salinity and nitrate management program. In particular, the draft language for the San Joaquin Basin Water Quality Control Plan amendment proposes new upstream salinity objectives in the San Joaquin River at Crows Landing. The proposed objectives include a 30-day running average EC of 1,550 uS/cm with relaxation of objectives during extended dry periods to protect agricultural water use in the Lower San Joaquin River reaches below Crows Landing and upstream of Vernalis. The EC limits were determined to be protective of agriculture based on the same Hoffman methodology used to determine the objectives in the Delta. In order to comply with these regulations, San Joaquin River Stakeholders will participate in a Real Time Management Program (RTMP), which is a regional salinity management program that generates assimilative capacity forecasts on the San Joaquin River based on real time data from a network of monitoring stations within the basin. The forecast involves participation of reservoir operators and irrigation district personnel. The information allows stakeholders to modify the timing of salt export into the San Joaquin River to meet salinity objectives. To complement the program, stakeholders have been implementing water reuse projects involving both tailwater and tilewater recovery and recycling. These water conservation projects have the additional potential to limit and control salt load export to the San Joaquin River. DWR suggests that the South Delta farmers contribute to meet salinity objectives by implementing agricultural drainage reduction and management programs like their upstream counterparts. One possible method of salinity control would be for the Regional Water Quality Control Board to determine an appropriate water quality standard at the interior South Delta	It is the responsibility of DWR and USBR (based on Water Rights Decision 1641) to maintain the salinity objectives in the interior southern Delta. The operations, management strategies, and monitoring procedures required to meet these objectives will be determined as part of the Comprehensive Operations Plan described in the Program of Implementation of Appendix K, Revised Water Quality Control Plan. Please refer to Master Response 3.3, Southern Delta Water Quality, for discussion of the Comprehensive Operations Plan and the responsibilities of DWR and USBR. Increasing the EC objective at interior Delta stations above 1.0 dS/m during winter months has not been established as protective of agricultural beneficial uses. The winter salinity objective is set to protect salt sensitive crops grown over the winter in the southern Delta, such as alfalfa and almonds. Results in Figures 5.17 and 5.18 in Appendix E, Salt Tolerance of Crops in the Southern Sacramento-San Joaquin Delta, indicate that almond yields begin to decline at an ECi of 1.0 dS/m. A higher objective, such as 1.4 dS/m, would have even greater yield losses and may not be protective of the beneficial use. The Program of Implementation in Appendix K assigns the Central Valley Regional Water Board with responsibility to regulate in-Delta discharges of salt.

Table 4-1. Responses to Comments			
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		stations and require all agricultural drainage dischargers in the Delta to institute a control program for salt discharges into the Delta. This program would have the same elements that the discharges in the lower San Joaquin River are required to follow: waste discharge requirements or waivers. The waste discharge requirements would impose salt limits on the discharges, while the waiver could be secured if a discharger participates in a Board-approved real-time management program to regulate salinity discharges in accordance with assimilative capacity in the Delta channels. In such cases, there could be an increase in the objective at the interior south Delta stations to allow these drainage dischargers to move salts out of the systems.	
1163	247	[From ATT1:] Comment #: K:4 Page #: 36, 1st paragraph Section #: Annual Reporting Comment: The SED requires an annual report with a December 31 due date. The temporary barriers are in place and operating until November 30 of each year. Analyzing the past year's operation of the barriers and SWP/CVP export operations and completing a report to the Board would need much more than 30 days after the barriers' operations season ends. DWR recommends that, if this reporting requirement is retained, the report be due by March 1 the following year.	The annual report due on December 31 is intended to inform the coming year's operations and other activities required to implement the February through June flow objectives (including adaptive implementation and flow shifting). As the flow requirements start February 1, the report cannot be submitted later and still be useful for the coming year. The report can and should be updated after December 31 with any pertinent information that becomes available as the water year proceeds.
1163	248	[From ATT1:] Comment #: K:5 Page #: 42 Section #: State Regulatory Actions Section ii Comment: The Revised WQCP states that "[a]s part of implementing the salinity water quality objective for the interior southern Delta, DWR and USBR shall be required to comply with the 1.0 dS/m water quality objective year- round as a condition of their water rights." Imposing conditions on water right holders should be done in Phase 3 of the WQCP update, not Phase 1.	Please see response to comment 1163-29 regarding the program of implementation and implementing the SDWQ objective.
1163	249	[From ATT1:] Comment #: K:6 Page #: 43 Section #: State Regulatory Actions, Section ii, 2nd paragraph, lines 5-7 Comment: Existing SWP and CVP export operations and the installation and operation of the temporary barriers can continue to provide suitable water levels, flows, and circulation as they have historically. These operations have been extensively and fully described and presented to the Board and staff in previous WQCP hearings and workshops. DWR and	Please refer to Master Response 3.3, Southern Delta Water Quality, for discussion of the Comprehensive Operations Plan and Additional Monitoring Studies.

Table 4-1. Responses to Comments			
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		Reclamation currently coordinate export and barrier operations with South Delta Water Agency, Board staff, and stakeholders in monthly coordination meetings. These meetings discuss current operations, barrier status and configuration (flap gate open/closed), water quality, water levels, and any local agricultural diversion problems. Actions resulting from these meetings may include re-operation of barrier flap gates, weir closing or raising (Grant Line Canal and Middle River), modeling studies, and more. It is not clear to DWR what the benefit of the new requirements proposed by the Board (Comprehensive Operations Plan, Monitoring Special Studies, and Monitoring and Reporting Plan) would be and how they would provide any additional information or could improve upon coordination, operations, and actions that are already in place and working well.	
1163	250	[From ATT1:] Comment #: K:7 Page #: 43 Section #: State Regulatory Actions, Section iii, 1st paragraph, 3rd bullet Comment: "Performance goals" such as water levels and flows when applied to the temporary rock barriers would be very difficult to apply because the barriers are not designed to be operable in real time as would permanent operable gates that are envisioned under the South Delta Improvements Program. The barriers can generally maintain water levels at least 2.5 feet NAVD on all three channels above the barriers when all the culverts are fully tidally operated (not tied open). This target water level has long been acceptable to SDWA as adequate for agricultural diversions, and is considerably better than would be present absent the barriers and SWP/CVP exports. However, the barriers were designed to maintain a unidirectional net flow pattern that maintains good circulation equivalent to or better than what would occur absent the barriers and export pumping and were not designed to maintain any particular flow volume. Flow in any particular channel depends on inflows into the south Delta, consumptive use by agricultural and municipal diversions/discharges, strength of the tidal flux, and SWP and CVP exports. Flows will vary throughout the day and cannot be "maintained" by any operation of the rock barriers or operation of the SWP or CVP.	If the Temporary Rock Barriers are identified as one of the facilities relied upon in the Comprehensive Operations Plan, but water levels or flows are not useable as performance goals, then some other similar measure will need to be determined. Please refer Master Response 3.3, Southern Delta Water Quality, for discussion of the Comprehensive Operations Plan and identification of performance goals.
1163	251	[From ATT1:] Comment #: K:8 Page #: 43 Section #: State Regulatory Actions, Section iii, 1st bullet Comment: Assimilative capacity is not related to water levels but to water depth or more specifically, the volume of water in a channel. Water levels in Middle River and Grant Line Canal for example, can be at the same level such as 1.0 feet MSL, but the assimilative capacity is dramatically different because Middle River is much shallower and carries much less flow than Grant Line Canal. Water level objectives are only meaningful for south Delta agriculture for diverting water on low tides, but are not a meaningful surrogate for water quality.	If water levels will not work as performance goals, then either flow conditions or some other similar measure will need to be developed in the Comprehensive Operations Plan as performance goals for addressing the impacts of the SWP and CVP export operations. Please refer Master Response 3.3, Southern Delta Water Quality, for discussion of the Comprehensive Operations Plan and identification of performance goals.

Table 4-1. Responses to Comments			
Ltr#	**Cmt#**	**Comment**	**Response**
1163	252	[From ATT1:] Comment #: K:9 Page #: 44 Section #: State Regulatory Actions, Section iii, 3rd paragraph, lines 3-6 Comment: A requirement to provide a report to the Board by October 31 of each year would be impractical. The temporary barriers are in place and operating until November 30 of each year. Analyzing the past year's operation of the barriers and SWP/CVP export operations and completing a report to the Board would need to be initiated after the barriers operations season ends. DWR recommends if this reporting requirement is retained, that the report for the past year's operations season be due by March 30 the following year.	Please refer to Master Response 2.1, Amendments to the Water Quality Control Plan, for additional discussion of changes made to the plan amendments in response to comments. The annual report is intended to review and update the Comprehensive Operations Plan. Appendix K, Revised Water Quality Control Plan, has been changed to set the due date for the annual report reviewing the Comprehensive Operations Plan to February 1. This provides time after November 30 (when the temporary barriers are removed) to analyze the previous year's barrier operations and SWP and CVP export operations, but still provides enough time to make any adjustments to operations before the temporary barriers are installed again. The report can and should be updated after February 1 with any pertinent information that becomes available as the water year proceeds.
1163	253	[From ATT1:] Comment #: K:10 Page #: 44 Section #: State Regulatory Actions, Section iv, para. a., lines 1-7 Comment: A "special study" essentially accomplishing the requirements of this section was recently completed by Dr. Russ Brown of ICF for DWR regarding salinity sources and hydrodynamic effects of the Temporary Barriers Program barriers and Project operations. This study and the report entitled "Evaluation of Salinity Sources and Effects of Tidal Flows and Temporary Barriers in South Delta Channels," (available at: http://baydeltaoffice.water.ca.gov/sdb/tbp/web_pg/pub_doc/salinity_report/South%20Delta%20Salinity%20Fi nal%20Sept%202016%20kc%2012.21.16.pdf) was accomplished over several years and coordinated with the South Delta Water Agency and the Board Delta Watermaster. This study was completed in September 2016, and the report was published in January 2017.	Please refer to Master Response 3.3, Southern Delta Water Quality, for discussion of the responsibilities of DWR and USBR and of the Special Monitoring Studies.
1163	254	[From ATT1:] Comment #: K:11 Page #: 44 Section #: State Regulatory Actions, Section iv Comment: As already mentioned, additional regulatory studies, monitoring, and reporting are not necessary to continue the SWP and CVP export operations and the temporary barriers operations, which already have been operated in coordination with SDWA and the Board staff through regular monthly meetings and intermediate meetings and phone calls. As stated elsewhere in the text of the SED, the Board acknowledges that existing south Delta salinity is adequate for agricultural purposes; consequently DWR sees no reason for	Please see response to comment 1163-253.

Table 4-1. Responses to Comments			
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		additional regulatory requirements.	
1163	255	[From ATT1:] Comment #: K:12 Page #: 44-45 Section #: State Regulatory Actions, Section iv Comment: "Special Studies, Modeling and Monitoring and Reporting" indicates the Board will require DWR and Reclamation to complete a Monitoring Special Study, Modeling, and Monitoring and Reporting. Considering the analysis and conclusions in the September 2016 report by ICF entitled, "Evaluation of Salinity Patterns and Effects of Tidal Flows and Temporary Barriers in South Delta Channels," it appears inappropriate to include conditions such as these in DWR's water rights. Also, imposing conditions on water right holders should be done in Phase 3 of the WQCP update, not Phase 1.	Please refer Master Response 3.3, Southern Delta Water Quality, for discussion of the responsibilities of DWR and USBR and for discussion of the Comprehensive Operations Plan and Additional Monitoring Studies. See response to comment 1163-29 regarding responsibilities of DWR and USBR.
1163	256	[From ATT1:] Comment #: K:13 Page #: 45 Section #: State Regulatory Actions, Section v Comment: "DWR's and USBR's water rights shall be conditioned to require continued operations of the agricultural barriers at Grant Line Canal, Middle River, and Old River at Tracy, or other reasonable measures, to address the impacts of SWP and CVP export operations on water levels and flow conditions that might affect southern Delta salinity conditions, including the assimilative capacity for local sources of salinity in the southern Delta." Considering the analysis and conclusions in the September 2016 report by ICF entitled, "Evaluation of Salinity Patterns and Effects of Tidal Flows and Temporary Barriers in South Delta Channels," it appears inappropriate to include conditions such as these in DWR's water rights. Also, imposing conditions on water right holders should be done in Phase 3 of the WQCP update, not Phase 1. The Temporary Barriers are installed to maintain water levels suitable for agricultural diversions within south Delta channels. The barriers are not intended to improve and have not shown improvement to the water quality within the channels, and DWR has been installing and operating the barriers under a 1990 settlement agreement with SDWA. Operation of the agricultural barriers should not be included in the conditions on DWR's and Reclamation's water rights, because they do not impact water quality and DWR agreed to install them voluntarily.	The Program of Implementation requires DWR and USBR to address the impacts of the SWP and CVP on salinity conditions. The facilities and operations (whether they involve the temporary barriers or not) needed to address these impacts will be determined in the Comprehensive Operations Plan. See response to comment 1163-29 regarding responsibilities of DWR and USBR.
1163	257	[From ATT1:] Comment #: K:14 Page #: 45	Please see responses to comments 1163-29 and 1163-250. The Program of Implementation assigns the Central Valley Regional Water Board with responsibility to regulate in-Delta discharges of salt.

Table 4-1. Responses to Comments			
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		Section #: State Regulatory Actions, Section v, lines 1-7 Comment: DWR will continue to install and operate the temporary barriers to mitigate for the SWP and CVP impacts to water levels in the south Delta, and to maintain and improve circulation to benefit agricultural diversions. However, the Board should not require the temporary barriers as a water right permit condition as part of the WQCP update because DWR has consistently demonstrated that the barriers are not responsible for water quality problems in the south Delta, nor can they be reliably configured to improve water quality conditions that might be present. Additionally, it is not clear to DWR why the Board is proposing to make DWR and Reclamation responsible for assimilative capacity for local sources of salinity in the south Delta. It seems that the Board is suggesting that DWR and Reclamation are responsible for diluting local agricultural and municipal discharges of high-salinity water, instead of regulating these dischargers to ensure their discharges do not increase the background salinity of the receiving waters. DWR has long recognized that major sources of high-salinity water flowing into Old River and adversely impacting water quality at the Old River near Tracy Road Bridge compliance station are Paradise Cut and Sugar Cut. The South Delta Salinity study and report reinforces this understanding. Both cuts are dead-end channels that receive discharges from agricultural operations and municipal and State correctional facilities. Due to poor circulation in these channels, salinity builds up to extremely high levels that eventually flow out to Old River under specific hydrodynamic conditions. DWR and Reclamation have no ability to control these discharges and the circulation in these channels. Recent data during high flows on the San Joaquin River (SJR) indicate that even high flows of low salinity water down Old River from the SJR cannot assure that spikes that exceed the salinity objective at the Old River near Tracy Road Bridge compliance station will not occur.	
1163	258	[From ATT1:] Comment #: K:15 Page #: 47 Section #: State Regulatory Actions, Section iii and iv Comment: DWR recommends that the Central Valley Regional Water Quality Control Board use the NPDES and Irrigated Lands Regulatory programs to aggressively address the problem with high-salinity discharges into poor-circulation water bodies, such as Paradise Cut and Sugar Cut. The high-salinity content of the discharges is not adequately diluted by the receiving waters and concentrates within these channels to extremely high levels. Eventually, under specific hydrodynamic conditions, the high-salinity water in one or both of the cuts makes its way to Old River just upstream of the Old River at Tracy Road Bridge compliance station, often causing a spike in EC and possibly an exceedance of the EC objective. Flow objectives on the San Joaquin River with low salinity water will not always improve conditions in Old River near Paradise Cut and the Old River at Tracy Road Bridge compliance station as was observed during high flows in spring 2011 (DWR oral testimony, March 20, 2011). Project export and barrier operations cannot change conditions in Paradise Cut that would change this situation. The South Delta Salinity Report confirms these findings. The Board's plan for implementing the standards for salinity in the south Delta should include Delta diverters with agricultural drainage in the requirements for achieving the salinity standards in the reaches downstream of Vernalis.	Please see response to comment 1163-29, 1163-250, and 1163-257. Please also see Master Response 2.4, Alternatives to the Water Quality Control Plan Amendments, for a discussion regarding agricultural diverters.

Table 4-1. Responses to Comments			
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1163	259	[From ATT1:] Comment #: K:16 Page #: 62 Section #: San Joaquin River Non-Flow Actions, Section viii Comment: This conditioning on water rights limits the adaptive measures that DWR can utilize for Delta Smelt protections, and it was the OCAP Final Interim Relief Court Order on 12-14-07 that called for DWR to not install the Head of Old River (HOR) Barrier until after the Vernalis Adaptive Management Plan (VAMP) was completed. Under the heading Improve Fish and Water Barrier Programs, it is stated that "USBR, DWR, DFW, USFWS, and NMFS should develop and implement improvements to fish and water barrier programs," including research, monitoring, and reporting of barriers and development and evaluation of barrier design to maximize benefits on native fish and wildlife and their habitat. There could be potential discrepancies between the WQCP and the NMFS and USFWS Delta BiOps. For example, the SED states that DWR's water rights will be conditioned on continuing to operate the barriers. However, the NMFS 2009 BiOp, on page 205 regarding critical habitat for Green sturgeon, states that "the installation of the barriers under the South Delta Temporary Barriers Program (TBP) enhances the potential to delay movement and migratory behavior in the channels of the South Delta." This issue also applies to the call for construction of pump stations and operable barriers in the south Delta to replace the temporary barriers that are used now. Reclamation, in coordination with DWR, has recently reinitiated consultation on the Delta BiOps and these issues could potentially be topics of the consultation.	The Program of Implementation requires DWR and USBR to address the impacts of the SWP and CVP on salinity conditions. The facilities and operations needed to address these impacts will be determined in the Comprehensive Operations Plan. If it is determined that there is a discrepancy between an operation to address SWP and CVP impacts and other requirements, then DWR and/or USBR can consider other operations to address the impacts. Please refer to Master Response 3.3, Southern Delta Water Quality, for discussion of the responsibilities of DWR and USBR and additional discussion of the Comprehensive Operations Plan.
1163	260	[ATT:2: March 29, 2013 Comments on the Draft Substitute Environmental Document for Phase 1 of the San Francisco Bay/Sacramento-San Joaquin Delta Estuary Water Quality Control Plan Update.]	This attachment is a set of comments on the 2012 Draft SED. A lead agency need only respond to those comments submitted in response to a recirculated revised environmental document and is not required to respond to comments previously received during the earlier circulation period on a previous draft. In its September 15, 2016 notice of filing, recirculation, and opportunity for public comment on the revised SED, the State Water Board made clear that since, “the SED is being recirculated in its entirety, new oral and/or written comments must be made and submitted for the SED. Previous comments to the 2012 Draft SED will be part of the administrative record, but do not require a written response. The State Water Board will only respond to those timely comments made and submitted in response to the recirculated SED.” Therefore, this attachment is already part of the administrative record and will not receive a written response.
1163	261	ATT:3: Evaluation of Salinity Patterns and Effects of Tidal Flows and Temporary Barriers in South Delta Channels Prepared for: California Department of Water Resources Prepared by: ICF September 2016	The commenter provided this attachment for reference purposes in support of their comments. Those comments are addressed in these responses to comments; therefore, no additional response is required.