- The Draft EIS at p. 9B-132 also states, "*Therefore, it is now thought that the Delta Smelt population decline has occurred for two basic reasons….*" There is no scientific citation for this statement. The prevailing view is that declines in species abundance are for multiple reasons, there is no agreement as to the two cited. SWC 52 continued

- The Draft EIS rejects without explanation multiple life-cycle models, all of which did not find that fall X2 is important to species abundance. Draft EIS, at p. 9-115. There is no scientific support for ignoring the weight of the evidence that does not support the 2008 FWS biological opinion's RPAs. The Draft EIS identifies Reed *et al.* (2014) as a life-cycle model, which it is not (it is the Delta Science Program's panel report on outflow and other stressors). SWC 53

- The Draft EIS states without supporting scientific citation that: "Several interrelated factors affect Coho Salmon abundance and distribution in the Trinity River. These factors include water temperature, water flow, habitat suitability, habitat availability, hatcheries, predation, competition, disease, ocean conditions, and harvest." Draft EIS, at p. 9-28. SWC 54

- The Draft EIS states without supporting scientific citation that: "Pulse flows that occur during precipitation events tend to stimulate downstream movement along the Sacramento River." Draft EIS, at p. 9-28. SWC 55

- The Draft EIS states without supporting scientific citation or data that: "Warm water temperatures stress juvenile steelhead rearing in the American River, particularly during summer and early fall." Draft EIS, at p. 9-50. SWC 56

- The Draft EIS states that: "Cunningham *et al.* (2015) found a negative influence of the export/inflow ratio on the survival of fall-run Chinook populations and a negative influence of increased total Delta exports on the survival of spring-run Chinook populations." Draft EIS, at p. 9-77. Cunningham *et al.* (2015) is missing from the reference list so this conclusion could not be verified. Moreover, the stated conclusion is in contrast to Zeug and Cavallo (2014) who analyzed 10 years of tag recoveries and showed little to no evidence that large scale exports and inflows affect ocean recoveries. SWC 57

- The Draft EIS states at pp. 9-137 to 9-138: "Historical data suggests that high San Joaquin River flows in the spring result in higher survival of out-migrating Chinook salmon smolts and greater returns of adults. The data also suggest that when the ratio between spring flows and exports increase, Chinook salmon production increases." More recent data suggests that no direct relationship between inflow and survival exists. Hydrodynamics are more complicated than suggested in the Draft EIS due to the number of covariates and high correlation between in-flow and export rate. SWC 58

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**6. The Draft EIS selectively updates the science that was contained in the BiOps finalized approximately 7 years ago, and as a result, the Draft EIS' conclusions are not based the best available science.**

SWC 59

The Draft EIS generally relies on studies that are at least 6-7 years old, often older. There are a limited number of locations where the Draft EIS cites a newer study and then it is not consistently applied.

CEQ regulations require an EIS to contain "high quality" information. Daniel R. Mandelker §10.33.20 NEPA Law and Litigation (2013 Ed.). The federal agency must "insure the professional integrity, including scientific integrity, of the discussion and analyses in environmental impact statements." 40 C.F.R. § 1502.24. "An EIS must contain an adequate compilation of relevant data and information, and must present accurate and complete information to decisionmakers to allow informed decisions." Daniel R. Mandelker, NEPA Law and Litigation, (2013 Ed.), §10.33.20, collecting cases. The CEQ regulations require "a summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment." 40 C.F.R. § 1502.22.

The failure to consider up-to-date data and highly relevant literature undermines the rational basis for the Draft EIS' conclusions. The collective scientific understanding of the species and potential project-related impacts has matured since the biological opinions, and this understanding should have been reflected in the analysis and conclusions of the Draft EIS. The specific explanation for how this newer literature would change the Draft EIS' analysis is contained in the paragraphs, above, and in the proposed operational alternative, attached. Examples[40] of recent literature that the Draft EIS should have considered includes:

Acuna *et al*., Delta Science Conference, 2014.

Bennett, W.A., Burau, J.R. 2014. Riders on the storm: selective tidal movements facilitate the spawning and migration of threatened Delta Smelt in the San Francisco Estuary. *Estuaries and Coasts*. pub. online. DOI 10.1007/s12237-014-9877-3.

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Buchanan, R. 2015. OCAP 2012 Steelhead Tagging Study: Statistical Methods and Results. Prepared for Bureau of Reclamation, Bay Delta Office, Sacramento CA. December 18, 2014. 114 p.

Buchanan, R., P. Brandes, M. Marshall, J. S. Foott, J. Ingram, D. LaPlante, T. Liedtke, and J. Israel. 2015. 2012 South Delta Chinook Salmon Survival Study: Draft report to USFWS. Ed. by P. Brandes. 139 pages.

[40] Copies of the referenced studies are provided on a CD.

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SWC 59
continued

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Clark, K., M. Bowen, R. Mayfield, K. Zehfuss, J. Taplin, and C. Hanson. 2009. Quantification of Pre-Screen Loss of Juvenile Steelhead in Clifton Court Forebay. State of California.

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Gordon, E., and B. Greimann. 2015. San Joaquin River Spawning Habitat Suitability Study. Pages 1415-1426 *in* Proceedings of the 3rd Joint Federal Interagency Conference on Sedimentation and Hydrologic Modeling, April 19-23, 2015, Reno, Nevada.

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Hutton, P.H. Rath, J.S., Chen, L., Ungs, M.J., Roy, S.B. (*In Review*) Nine Decades of Salinity Observations in the San Francisco Bay and Delta: Modeling and Trend Evaluation. *ASCE Journal of Water Resources Planning and Management.*

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## III. THE CUMULATIVE EFFECTS ANALYSIS IS INADEQUATE

SWC 60

As the Draft EIS correctly states that a cumulative impact "is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. "Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (40 C.F.R. § 1508.7.) CEQ guidance on the subject explains that "cumulative effects may arise from single or multiple actions and may result in additive or interactive effects." CEQ, *Considering Cumulative Effects under the National Environmental Policy Act*, at p. 9 (1997). The CEQ guidance goes on to state that in the discussion of environmental consequences of an action, the relevant agency should implement a multi-step approach beginning with cause-and-effect relationships between stresses and environmental resources. *Id.* The agency should then assess how the resource responds to the environmental change, including by evaluating the magnitude of the effect. *Id.* Importantly, cumulative actions must be evaluated in combination because of the potential for synergistic effects of multiple actions. 40 C.F.R. § 1508.25 subd. (a)(2). The Ninth Circuit has held that all reasonably foreseeable actions that have potential impacts must be addressed. *See, e.g., Oregon Natural Resources Council Fund v. Goodman*, 505 F.3d 384 (9th Cir. 2007); *Blue Mountains Biodiversity Project v. Blackwood*, 161 F.3d 1208 (9th Cir. 1998).

Reclamation is obligated to go beyond simply identifying factors that impact environmental resources in the Daft EIS. As the CEQ guidance states:

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> Analysts must tease from complex networks of possible interactions those that substantially affect the resources. Then, they must describe the response of the resource to this environmental change using modeling, trends analysis, and scenario building when uncertainties are great.

SWC 60 continued

The cumulative effects analyses in the Draft EIS are so cursory as to be of no use to the public and agency decision-makers. The Ninth Circuit has made clear that general statements about possible effects in a cumulative effects analysis are insufficient and that the agencies are obliged, where possible, to include quantified or detailed information. *Klamath-Siskiyou Wildlands Center v. Bureau of Land Management*, 387 F.3d 989 (9th Cir. 2004).

**A. The Cumulative Effects Discussion in the Draft EIS Fails to Account for Reasonably Foreseeable Water Supply Projects.**

As noted in Chapter 5, Section III, the Draft EIS explains that under the No Action Alternative and Second Basis of Comparison, it is assumed that, on a regional scale, water demands would be met on a long-term basis and in dry and critical dry years using a combination of conservation, CVP and SWP water supplies, other imported water supplies, groundwater, recycled water, infrastructure improvements, desalination water treatment, and water transfers and exchanges. The same assumptions apply for the comparison of the No Action Alternative and Alternative 1, but there is no adequate impacts analysis of utilizing other imported supplies, groundwater pumping, additional infrastructure projects, desalination, or other means of satisfying demands. Generally, the inclusion of the projects listed in the cumulative impacts section, coupled with the assumption that these projects can reduce impacts from supply reductions, highlights the issues with the use of the 2030 projected study period, as well as the problems created by selecting an improper No Action alternative and baseline that includes the implementation of the action under review. It is difficult to discern how these projects can be assumed to be creating or ameliorating impacts of the proposed action when many of them are still in the planning and development stages. The assumption is supported only by the 2030 projected study period, but this does not excuse a failure to evaluate the cumulative effects of the actions. A discussion of the impacts of cumulative projects should be provided.

SWC 61

**B. The Cumulative Effects Discussion in the Draft EIS Fails to Account for Known Aquatic Species Stressors.**

The Draft EIS fails to identify important, known factors that impact environmental resources. For example, with respect to aquatic resources, even though ocean harvest is a known cause of mortality of the several runs of Chinook salmon described in chapter 9 of the Draft EIS, the cumulative effects analysis in Chapter 9 does not mention ocean harvest. Ocean harvest impacts to Chinook salmon are shown in information in Chapter 9, but not analyzed (*see, e.g.*, Table 9.2, p. 9-118). Furthermore, the National Marine Fisheries Service, in its *California Central Valley Salmon & Steelhead Recovery Plan* (2014), identified ocean harvest as one of the highest category of stressors on winter-run Chinook salmon.

SWC 62

The Draft EIS cumulative effects analysis also fails to identify continued enforcement of sport-fishing regulations by the California Department of Fish and Wildlife, which protect non-native black bass and striped bass, as a factor that impacts Chinook salmon. The National Marine

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Fisheries Service has submitted a written request to the State of California to eliminate those regulations due to their deleterious effects to salmonid populations in the Central Valley, yet it was not analyzed here. The fact that predation by non-native species harms Chinook salmon populations is established in the *California Central Valley Salmon & Steelhead Recovery Plan* (2014); *see also* S.T. Lindley and M. S. Mohr, Modeling the effect of striped bass (*Morone saxatilis*) on the population viability of Sacramento River Winter-run Chinook salmon (*Oncorhynchus tshawytscha*), *Fisheries Bulletin* 101:321-331 (2003). SWC 62 continued

The U.S. Army Corps of Engineers estimates its future dredging will result in entrainment in the dredging equipment of 394 to 3,694 Delta smelt each year. U.S. Army Corps of Engineers, *Draft Environmental Assessment/Environmental Impact Report for the Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay, Fiscal Years 2015-2024* (2014). Here too, Reclamation is required to, but has not, described the response of Delta smelt to the losses. Reclamation is obligated to use readily available analytical tools together with best available data to conduct the cumulative effects analysis. Therefore, not only is the agency required to identify Army Corps dredging in the Bay-Delta as a factor that affects Delta smelt, Reclamation must make a good faith effort to use available data and tools to assess the magnitude of the effect on the species. The requisite analysis is cumulative, taking into consideration the additive or synergistic effects of multiple stresses on the species.

As stated in the CEQ guidance, Reclamation is required to describe the response of Delta smelt to this level of population loss using prevailing tools such as modeling and trend analysis. The agency has not fulfilled its responsibility in SWC 80 . The problems with the cumulative effects analyses extend beyond the aquatic resourc f the Draft EIS, as we indicated in our prior comments. The cumulative effects analyses respecting agricultural resources, groundwater resources, terrestrial species resources, and other environmental resources are similarly cursory and facially deficient.

## IV. THE DRAFT EIS DISCUSSION OF THE REGULATORY ENVIRONMENT IS INACCURATE.

The Draft EIS does not include an accurate discussion of the regulatory environment. Appendix 3A pages 3-5 through 3-7 describe the Agreement between the United States of America and the State of California for coordinated operation of the Central Valley Project and the SWP (COA). This description is general in its nature and does not appear to accurately reflect relevant portions of the COA. SWC 63

For example, the document lists as a change since 1986 new Delta standards. However, the new Delta standards do not constitute a changed condition with respect to the implementation of the COA. Article 11 provides that if new Delta standards are established and the United States determines that operation of the CVP is in conformity with the new standards is not inconsistent with Congressional directives, then Exhibit A to the COA should be amended to conform with new Delta standards. Thus, the COA anticipated and provided for the new Delta standards.

The Draft EIS also makes reference to 195,000 acre feet of SWP capacity used for exporting CVP water supply ("replacement pumping"). The document seems to incorrectly characterize this provision. The COA provides that the State will transport up to 195,000 acre feet of CVP water

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"at times that diversions do not reduce State Water Project yield." (See COA Article 10 (b)). This replacement pumping was included in the COA as a compromise between SWP and CVP because at the time the CVP argued that it did not need to comply with SWRCB standards, like the striped bass regulations in D-1485. This compromise allowed the CVP to comply with the standard without impacts. Since that time, the CVP now acknowledges that it does need to comply with SWRCB standards. Additionally, since the COA was signed, the striped bass regulations are no longer in effect and there are new regulations related to other fish and wildlife in D-1641. The document should correctly characterize the background and COA provisions. Reclamation should correct the above inaccuracies. SWC 63 continued

## V. THE DRAFT EIS FAILED TO RIGOROUSLY EXPLORE AND OBJECTIVELY EVALUATE ALL REASONABLE ALTERNATIVES AND MITIGATION MEASURES THAT COULD REDUCE THE SIGNIFICANT IMPACTS OF THE RPAS.

The Draft EIS failed to rigorously explore and objectively evaluate all reasonable alternatives that could mitigate the effects of the RPAs. SWC 64

The alternatives analysis is the heart of an EIS. 40 C.F.R. §1502.14. Consistent with CEQ regulations, Reclamation must "[r]igorously explore and objectively evaluate all reasonable alternatives . . . ." *Id.* at 1502.14 subd. (a). The alternatives analyzed must cover "the full spectrum of alternatives." CEQ, *Forty Most Asked Questions,* 46 Fed. Reg. 18,026 (March 23, 1981). The Draft EIS falls short of this obligation. There are other reasonable alternatives that could be adopted that could both avoid jeopardy and minimize water supply impacts to the CVP and SWP water contractors. Examples of possible alternative operations are provided in Attachment 2. These proposed alternative operations could provide mitigation for the significant water supply, groundwater, and agricultural impacts associated with the RPAs. (40 C.F.R §1502.16(h) and §1502.14(f) [EIS shall include a discussion of means to mitigate adverse environmental impacts.] and [The EIS shall include a discussion of mitigation measures not already included in the proposed action or alternatives.].) The proposed alternative operation actions could be considered as a single stand-alone alternative or as a menu mitigation options that could be adopted to mitigate the negative environmental impacts of the RPAs.

Additionally, the Draft EIS fails to consider alternatives previously proposed by the Coalition for a Sustainable Delta (Coalition), even though those alternatives are within the full spectrum of reasonable alternatives. Reclamation has adopted an analytical approach that masks benefits associated with the Coalition's alternatives, for example, the benefit to salmonids that would result from implementation of a trap and haul program. Reclamation is required to analyze and disclose the environmental impacts of a full range of alternatives, which should include alternatives with differing operational criteria to address the Action's impacts on listed fish as well as differing non-operational criteria to accomplish the same goal. SWC 65

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**VI. CONCLUSION**

SWC thanks Reclamation for the opportunity to review and submit comments on the Draft EIS.

Sincerely,

Stefanie Morris
Acting General Manager

Attachments

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# ATTACHMENT 1.
# PRELIMINARY COMMENTS.

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July 13, 2015

*Delivered Via E-Mail: SFry@usbr.gov, paaron@usbr.gov, bcnelson@usbr.gov*

Ms. Sue Fry
Bureau of Reclamation
Mid-Pacific Region
801 I Street, Suite 140
Sacramento, CA 95814

Subject: State Water Contractors' Comments on the Administrative Draft Environmental Impact Statement for the Biological Opinions on the Coordinated Long-Term Operations of the Central Valley Project and State Water Project

Dear Ms. Fry:

This letter is submitted on behalf of the State Water Contractors (SWC)[1] and its individual member agencies regarding the Administrative Draft Environmental Impact Statement for the Biological Opinions on the Coordinated Long-Term Operations of the Central Valley Project and the State Water Project (EIS). The following comments are preliminary and are intended to identify general areas of concern. The SWC will supplement these comments when the Draft EIS is made available for public review.

SWC 66

## I. THE LIST OF COOPERATING AGENCIES IN THE EIS IS INCOMPLETE

Reclamation invited qualifying non-Federal agencies to participate in the NEPA process as cooperating agencies, within the meaning of 40 C.F.R. § 1501.6, and requested that these entities enter into a Memorandum of Understanding with Reclamation (MOU). EIS at 1-13. The SWC signed the MOU. Accordingly, we request that Reclamation update the list of cooperating agencies to include the SWC prior to releasing the EIS for public review.

SWC 67

It is important to note that, despite signing the MOU, there has been little opportunity for meaningful cooperating agency participation in the NEPA process, because many of the meetings were only general updates from Reclamation. Indeed, this is the first opportunity for cooperating agencies to review Reclamation's alternatives and to see how impacts are being analyzed in the EIS.

[1] The SWC is a nonprofit mutual benefit cooperation that represents the common interests of its 27 public agency members in protecting the vital water supplies provided by California's State Water Project (SWP).

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Moreover, Reclamation has only made this EIS available for eight business days, and it has stated that it will circulate a draft for public comment on July 31, 2015. This short time-frame not only precludes cooperating agencies from providing meaningful detailed feedback, but also makes it unlikely that Reclamation will have time to address even generalized concerns before it circulates a draft for public comment. Consequently, Reclamation is likely to forego the opportunity to receive and address feedback from agencies with considerable practical, scientific, and legal expertise, which would assist Reclamation in developing the most legally adequate EIS to ensure it makes a fully informed decision. SWC 68

## II. THE STATEMENT OF PURPOSE AND NEED IS UNDULY NARROW AND UNSUPPORTED

The EIS defines the Purpose of the Action to include operations of the Central Valley Project (CVP) in coordination with the operation of the SWP in a manner that "is similar to historic [sic] operational parameters with certain modifications." EIS at 2-1. This is unduly narrow because it appears to limit the alternatives range, and precludes considering potentially feasible operations that differ from the existing biological opinions. Indeed, such operational alternatives could meet Endangered Species Act (ESA) requirements while reducing adverse impacts on sensitive species, water quality, water supplies, and related indirect environmental impacts. SWC 69

## III. THE ALTERNATIVES ANALYSIS IS INADEQUATE

It was improper for Reclamation to include the 2008 and 2009 reasonable and prudent alternatives (RPAs) in the No Action Alternative. See *Pit River Tribe v. U.S. Forest Service*, 469 F. 3d. 769 (9th Cir. 2006). SWC 70

The inclusion of the RPAs in the No Action Alternative inherently biases the alternatives analysis. Currently, the impact of each alternative—including Alternative 1 (the Second Basis for Comparison)—is measured against the No Action Alternative, which includes the RPAs. Reclamation used the RPAs as the analytical metric by which changes in the environment are assessed. The result is that deviations from the RPAs are identified as adverse environmental effects. That is, when existing RPAs are the benchmark against which other operational changes are measured, the operational changes are intrinsically disadvantaged. This is problematic for several reasons, not the least of which is that it biases the decision making process and significantly undermines Reclamation's obligation to take a "hard look" at the environmental effects of the Action. *Washington Crab Producers, Inc. v. Mosbacher,* 924 F.2d 1438, 1441 (9th Cir.1990).

While Reclamation may contend that inclusion of the Second Basis for Comparison remedies the issues described above, it does not. The impacts analyses' focal point is on the difference between each alternative and the No Action Alternative as described above. It is also the case because the Second Basis for Comparison purportedly excludes the RPAs, but in fact includes certain components of the RPAs, namely, Component 4 of the U.S. Fish and Wildlife Service RPA and Action I.6.1 of the National Marine Fisheries Service RPA. As a consequence, the EIS includes no analysis of the alternatives as compared to a true no action baseline that excludes implementing the RPAs. SWC 71

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## IV. THE ANALYSIS OF THE ACTION'S EFFECTS ON AQUATIC SPECIES IS INADEQUATE

SWC 72

The EIS fails to include published scientific literature that has been finalized since the biological opinions. Selective reliance on analyses that have been qualified or superseded by more recent studies and the information cited in support of now nearly seven-year-old biological opinions, rather than more recent research, cannot satisfy NEPA, and could lead Reclamation to adopt an alternative that thwarts the underlying project purpose.

For example, the EIS describes Delta Smelt migrating upstream during the winter and references Sommer et al. (2011).[2] EIS at 9-65. But the EIS fails to reference or describe the implications of Murphy and Hamilton (2013), which calls into question the conclusions presented in Sommer et al. (2011). Murphy and Hamilton conducted an analysis of Delta Smelt movement across seasons and found that inter-seasonal dispersal is more circumscribed than has been previously reported. Likewise, the EIS includes extensive discussions of Delta Smelt habitat and relies on an index of such habitat developed by Feyrer et al. (2011). EIS at 9-319, 9-371, 9G-2. The EIS fails to reference or describe the implications of Manly et al. (2015), which identified significant statistical errors in Feyrer et al. 2011. When the statistical errors are corrected, it is clear that salinity (X2) alone is not a useful indicator of Delta Smelt habitat, only explaining 2.8% of the species presence. While the EIS and biological opinion are premised on the notion that the location of X2 is a defensible proxy for Delta Smelt habitat, e.g., EIS at 9-121, numerous studies (for example, Merz et al. (2011)) demonstrate that Delta Smelt occupy water with a range of salinity concentrations. Further, the EIS relies heavily on Kimmerer 2008, a modeling exercise intended to estimate entrainment that incorporated a series of assumptions, many of which were demonstrated to be upwardly bias by Miller (2011) and by Kimmerer himself in Kimmerer 2011.

Two multivariate studies of Delta Smelt and Longfin Smelt that should inform many assertions were not referenced (Maunder and Deriso 2011 and 2014). The EIS also excluded consideration of recent Longfin Smelt field studies (Parker et al, IEP poster, 2015; Grimaldo, Delta Science Conference Presentation, 2014[3]) and the Delta Smelt effective population size analysis (Cramer, IEP Science Conference, 2014). The annual independent science reviews of the implementation of the biological opinions were excluded as well. (Anderson et al. 2010, 2011, 2012, 2013, 2014.) These reviews include much pertinent information, concluding, for example:

- Five years into implementation of the RPA actions, it is not possible to determine whether the actions have been effective. *See* Anderson et al. (2011) at 22; Anderson et al. (2013) at 3; Anderson et al. (2014) at 11, 42.
- The use of particle tracking to model adult delta smelt behavior is improper. Anderson et al. (2010) at 15; Anderson et al. (2013) at 19.
- Historical levels of salvage related to Old and Middle River flows may not provide an adequate basis for setting take levels. Anderson et al. (2011) at 21.
- There is a lack of evidence for, and it is counter-intuitive that, delta smelt depend on the first flush to trigger migration. Anderson et al. (2013) at 20.

[2] Please see Exhibit 1 (attached hereto) for a References List.
[3] Study partially funded by Reclamation.

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- The "assumed" relationship between the fall midwater trawl abundance index and the delta smelt population is "questionable at best." Anderson et al. (2013) at 26

SWC 72 continued

The EIS also fails to report confidence intervals associated with its results or describe the extent of uncertainty that accompanies them. e.g., EIS at App. 9G. This is of consequence because certain quantitative impacts attributable to alternatives are sufficiently small that they may be within the error bars associated with modeling results. For example, the change in proportional entrainment of adult Delta Smelt attributed to Alternative 3 as compared to the No Action Alternative is reported as 0.3 percent in Chapter 9 and 0.25 percent in Appendix 9G. This is reported as an adverse effect on Delta Smelt, EIS at 9-319, but a 0.3 change in proportional entrainment may equate to no effect because of the associated error bars. It is also important to report confidence intervals because it informs the certainty of the EIS' conclusions. See e.g., Reed et al. 2014.

SWC 73

The precision with which certain results are reported, such as those in Appendix 9G, contrasts the assessment – both qualitatively or quantitatively – of non-Project actions. For example, the authors state it is not possible to assess the outcomes of a predator control program. e.g., EIS at 9-323. In addition, while the authors acknowledge that a trap and haul program would benefit fall-run Chinook salmon and steelhead smolts, EIS at 9-339, they provide no qualitative or quantitative assessment of the magnitude of the benefits.

The EIS fails to provide a description of its analyses that can be easily interpreted. It is consistently difficult to comprehend Reclamation's analysis. By way of example, section 9.4.4.4 analyzes Alternative 3 relative to the No Action Alternative and Alternative 1. It appears impact assessment occurs region-by-region and then is broken out into sequential species-specific analyses. But even within regions, there appear to be multiple sections that address the same species. Furthermore, the discrete species-specific sections appear to be conflated. For example, the analysis of steelhead in the Sacramento River region begins at page 9-305. But beginning on page 9-307, the EIS refers to impacts to late fall-run Chinook rather than steelhead. Then on page 9-308 the analysis reverts to steelhead.

SWC 74

There is no explanation for how quantitative modeling results were translated into conclusions, and there is no ability to determine the biological significance of the comparative analysis. For example, the summary of effects on steelhead, presented on page 9-314, indicates that Alternative 3 would have "somewhat greater adverse effects" on the species than the No Action Alternative. It is difficult to understand what "somewhat greater" means and whether the species would perceive any difference.

The existence of numerous summaries of effects for each species makes it impossible to compare impacts associated with the alternatives. Moreover, the alternatives analysis does not address each alternative in the same level of detail, and in places it is difficult to determine if statements are describing the existing environment, one of the environmental baselines, or an alternative. These deficiencies are contrary to the NEPA mandate that EISs "be written in plain language . . . so that decision makers and the public can understand them." 40 C.F.R. § 1502.8. Thus, the relevant sections should be revised for clarity to ensure that the average layperson can readily understand Reclamation's conclusions. One critical, necessary step is to synthesize the discrete summaries of effects in order to allow for comparison among alternatives. When this is done, the syntheses should be accompanied by explanation of the relative degree of uncertainty associated with the impact assessment.

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## V. THE ANALYSIS OF THE ACTION'S EFFECTS ON SURFACE WATER, WATER SUPPLIES, AND AGRICULTURAL RESOURCES IS INADEQUATE

SWC 75

The EIS includes analysis of the impacts of various alternatives on surface water, water supplies, and agricultural resources that is based on false assumptions. For example, Chapter 5 states:

> The No Action Alternative assumes that groundwater would continue to be used even if groundwater overdraft conditions continue or become worse. It is recognized that in September 2014, the Sustainable Groundwater Management Act (SGMA) was enacted. The SGMA provides for the establishment of Groundwater Sustainability Agencies (GSAs) to prepare Groundwater Sustainability Plans (GSPs) that will include best management practices for sustainable groundwater management. . . . The SGMA requires the formation of GSPs in groundwater basins or subbasins that DWR designates as medium or high priority based upon groundwater conditions identified using the CAGESM results by 2022. Sustainable groundwater operations must be achieved within 20 years following completion of the GSPs. In some areas with adjudicated groundwater basins, sustainable groundwater management could be achieved and/or maintained by 2030. However, to achieve sustainable conditions in many areas, measures could require several years to design and construct water supply facilities to replace groundwater, such as seawater desalination. Therefore, it does not appear to be reasonable and foreseeable that sustainable groundwater management would be achieved by 2030; and it is assumed that groundwater pumping will continue to be used to meet water demands not fulfilled with surface water supplies or other alternative water supplies in 2030.

EIS at 5-73-75 (emphasis added). Similarly, Chapter 12 states:

> The analysis only reduces groundwater withdrawals based upon an optimization of agricultural production costs. The analysis does not restrict groundwater withdrawals based upon groundwater overdraft or groundwater quality conditions. As described in Chapter 7, Groundwater Resources and Groundwater Quality, The Sustainable Groundwater Management Act requires preparation of Groundwater Sustainability Plans (GSPs) by 2020 or 2022 for most of the groundwater basins in the Central Valley Region. The GSPs will identify methods to implement measures that will achieve sustainable groundwater operations by 2040 or 2042. The analysis in this chapter is focused on conditions that would occur in 2030. If local agencies fully implement GSPs prior to the regulatory deadline, increasing groundwater use would be less of an option for agricultural water users. However, to achieve sustainable conditions, some measures could require several years to design and construct new water supply facilities, and sustainable groundwater conditions are not required until the 2040s. Therefore, it was assumed that Central Valley agriculture water users would not reduce groundwater use by 2030, and that groundwater use would increase in response to reduced CVP and SWP water supplies.

EIS at 12-25 (emphasis added).

The California Legislature passed historic groundwater legislation that requires groundwater managers to adopt groundwater sustainability plans that manage a groundwater basin so there are not undesirable results. Cal. Water Code § 10735.2. Undesirable results include "significant and

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unreasonable land subsidence that substantially interferes with surface land uses" and prevents basins from operating in overdraft. Cal. Water Code § 10721(w)(5). The assumption built into the EIS that any water demands not met as a consequence of restrictions imposed on operation of the CVP and SWP will be met by drawing on groundwater resources is incorrect. It allows Reclamation to mask multiple adverse impacts, including but not limited to economic impacts, associated with such restrictions. In sum, it is incorrect to assume that groundwater pumping will occur regardless of the proposed Action.

SWC 75 continued

## VI. THE EIS FAILS TO ADEQUATELY DISCLOSE THE ACTION'S EFFECTS ON CLIMATE CHANGE

The EIS appears to include only a qualitative analysis of climate change, EIS at 1-12, although elsewhere the EIS suggests that a limited quantitative analysis was performed. EIS at 16-25. If the EIS does in fact quantify the Action's GHG emissions, that information is not presented clearly in the EIS. *See, generally,* EIS, Chapter 16. Since Reclamation has done global climate change modeling of project operations in other planning processes, a different approach in this document would be difficult to justify.

SWC 76

## VII. THE CUMULATIVE EFFECTS ANALYSES ARE IMPERMISSIBLY GENERAL

The discussion of the cumulative impacts in the EIS is entirely cursory. For example, the EIS provides that Alternative 5 may result in decreased water storage under certain conditions, but fails to identify the extent of this impact. EIS at 5-169. Similarly, with respect to cumulative effects on groundwater resources, the EIS fails to identify the extent of impacts to groundwater levels, groundwater use and quality and subsidence, nor does it quantify such potential adverse effects. EIS at 7-171. The analysis in the EIS of cumulative effects for other resources areas suffers from the same error. *See, e.g.,* EIS Section 9.4.4.8 (Fish and Aquatic Resources); EIS Section 10.4.4.8 (Terrestrial Biological Resources); and EIS Section 12.4.4.8 (Agricultural Resources).

SWC 77

## VIII. CONCLUSION

The SWC thanks Reclamation for the opportunity to review and submit comments on the EIS and look forward to continuing to work with Reclamation in further refining the EIS.

Sincerely,

Stefanie Morris

Stefanie D. Morris
Acting General Manager and General Counsel

Attachment

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**Exhibit 1**

References List

Anderson, J.J., R.T. Kneib, S.A. Luthy & P.E. Smith. *Report of the 2010 Independent Review Panel (IRP) on the Reasonable and Prudent Alternative (RPA) Actions Affecting the Operations Criteria and Plan (OCAP) for State/Federal Water Operations,* Delta Stewardship Council, Delta Science Program (2010).

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## ATTACHMENT 2.
## PROPOSED ACTIONS

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**ATTACHMENT 2**

## OPERATIONS CRITERIA AND PLAN ("OCAP")
## ENVIRONMENTAL IMPACT STATEMENT ON BIOLOGICAL OPINION RPAS
## PROPOSED OPERATION ALTERNATIVES

There are feasible alternative RPAs that could be adopted that would both avoid jeopardy and minimize water supply impacts to the Central Valley Project and State Water Project ("CVP-SWP"). These alternative RPAs could provide some level of mitigation for the significant water supply impacts associated with the 2008 Delta Smelt biological opinion and the 2009 salmonid biological opinion. These alternative RPAs could be considered as a single stand-alone alternative or as a menu of mitigation options.

### DELTA SMELT TURBIDITY TRIGGER (EARLY WARNING SURVEY)

**Proposed Operation**: The proposed operation is similar to what was done in water-year 2014-2015 as far as managing OMR based on turbidity and species presence. The modifications to the prior study effort include locating early warning monitoring stations in areas mostly south of those identified in 2014-2015, and allowing a wider range of OMR operations.

The proposed early warning monitoring stations are Bacon Island at Old River (BAC), Middle River at Holt (HLT), and Prisoner's Point (PPT). These stations are located along the route that turbidity and Delta Smelt would likely follow if they were moving toward the south Delta pumping facilities from the Sacramento River and western Delta. In most cases, these stations are also closer to the water projects than the stations used in 2014-2015, thereby providing a more meaningful indication of changing conditions in the south Delta and the risk of potential Delta Smelt entrainment. These stations also avoid concerns associated with the stations used in 2014-2015, like Holland Cut, which is heavily influenced by turbidity from Frank's Tract, rather than turbidity moving through the system from the Sacramento River; and Jersey Point which is too far removed from the water projects to be a good indicator of potential Delta Smelt entrainment.

The proposed levels of concern associated with changing conditions, and resulting potential OMR operational range, are as follows:

1.) Low concern (low turbidity and no Delta Smelt): When turbidity is below 12 NTU at all three monitoring stations (BAC, HLT, PPT) and adult Delta Smelt are not present, OMR could be between -7,500 and -5,000 based on a 14-day running average. Delta Smelt monitoring should be at PPT and at a location near Old and Middle River, possibly BAC, if feasible;

2.) Medium concern (turbidity bridge may be forming but no Delta Smelt present): Turbidity bridge may be forming as evidenced by turbidity 12 NTU or higher at two of the three monitoring stations, and Delta Smelt are not present at PPT nor a location near BAC, OMR could be between -3,000 and -5,000 based on a 14-day running average.

3.) High concern (turbidity bridge may be forming and Delta Smelt present): Turbidity bridge may be forming as evidenced by turbidity 12 NTU or higher at all three monitoring stations, and Delta Smelt are present at both PPT and a location near BAC,

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**ATTACHMENT 2**

if feasible, and/or Delta Smelt have been identified in salvage, OMR could be between -3,000 and -2,000 based on a 14-day running average.

Each operation triggered by heightened concern would remain in effect for 10-days before conditions are reevaluated. The 10-day operational implementation period is based on the experience in 2014-2015 when turbidity after a rain event appeared to linger for about 10-days before dissipating.

This operation would apply from December through June. This operation replaces all OMR action contained in the current 2008 Delta Smelt biological opinion. The incidental-take levels identified in the 2008 Delta Smelt biological opinion would apply. Reclamation and DWR may voluntarily operate more restrictively at certain times to avoid exceeding the incidental take threshold.

**Background:** In 2014, Reclamation and the USFWS coordinated for several months to develop early warning surveys to provide information on adult Delta Smelt distribution to inform water-year 2015 operations. The over-all intent for the early warning surveys was to inform the agencies regarding whether, during freshets, substantial numbers of adult Delta Smelt are moving, or being moved, into areas potentially subject to entrainment. This information has helped to inform export operational decisions and allowed for flexibility in maximizing export opportunities early this year.

This action proposes that restrictions on reverse flows through the Old and Middle River (OMR) corridor be determined based on turbidity and the presence of adult Delta Smelt at Delta monitoring stations. In 2014, the four monitoring stations were Prisoner's Point, Jersey Point, Little Holland Tract, and Victoria Canal, although data from other stations may also have been considered. In general, pumping restrictions were contemplated when adult Delta Smelt were present at these locations and turbidity was at least 12 NTU and increasing. The monitoring stations could be modified to remove locations at Little Holland Tract, Jersey Point, and Victoria Island and to add new monitoring locations generally closer to the CVP-SWP pumping facilities, at Bacon Island at Old River and Middle River at Holt. The goal of the action is to avoid the creation of a turbidity bridge to the south Delta to prevent adult Delta Smelt from moving to the CVP-SWP pumping facilities. It is anticipated that this action would also result in lower larvae and juvenile salvage later in the season as turbidity is being managed to avoid drawing adult Delta Smelt into the south Delta prior to spawning.

The proposed alternative operation is based on Deriso (unpub.) 2011. See Figure 1, below. The Deriso analysis indicates that OMR could go as high as -10,000 cfs OMR when turbidity at Clifton Court is low (below 12 NTU). This proposal takes a more conservative approach the Deriso's analysis indicates is necessary by triggering changes in operation before turbidity reaches Clifton Court and also considers species distribution.

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**ATTACHMENT 2**

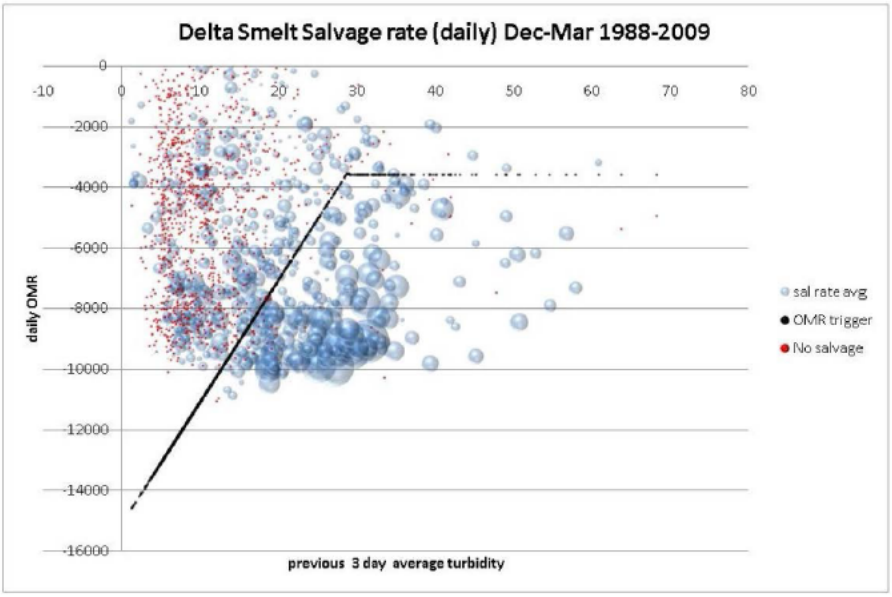


Figure 1. Delta smelt salvage rate (daily) December to March, 1988-2009. The y-axis is daily OMR flow. The x-axis is previous average turbidity of three days. The size of the bubble indicates the size of the salvage event. The red bubbles indicate no salvage event.

This operation would not be expected to jeopardize the species as the existing 2008 Delta Smelt biological opinion incidental take statement would apply. It is uncertain that entrainment, even historically, had a population level effect on Delta Smelt, except perhaps episodically. There have been multiple statistical analyses evaluating the effect of salvage on Delta Smelt abundance and the results have been disparate. The 2008 Delta Smelt biological opinion at p. 210 stated:

> The population-level effects of delta smelt entrainment vary; delta smelt entrainment can best be characterized as sporadically significant influence on populations dynamics…currently published analyses of long-term associations between delta smelt salvage and subsequent abundance do not support the hypothesis that entrainment is driving population dynamics year in and year out (Bennett 2005; Manly and Chotkowski 2006; Kimmerer 2008).

This operation would be designed to avoid sporadic entrainment events.

**DELTA SMELT FALL X2 TRIGGER**

**Proposed Operation**: This action would implement only the November Fall X2 Action as described in the 2008 FWS biological opinion as follows at p. 283,

> During any November when the preceding water year was wet or above normal as defined by the Sacramento Basin 40-30-30 index, all inflow into CVP/SWP reservoirs in the



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**ATTACHMENT 2**

Sacramento Basin shall be added to reservoir releases in November to provide an additional increment of outflow from the Delta to augment Delta outflow up to the fall X2 of 74 km for Wet WY's or 81 km for Above Normal WYs, respectively. In the event there is an increase in storage during any November this action applies, the increase in reservoir storage shall be released in December to augment the December outflow requirements in SWRCB D-1641.

**Background**: First, a comparison of the pre-project and post-project time periods informs the question of project related effects on outflow. The data do not support the conclusion that project operations have significantly moved X2 more easterly in September and October compared to historical conditions. When the full hydrological record is considered (water years 1922-2012), Hutton *et al.* (in review), demonstrate a statistically significant trend toward a more westerly (*i.e.* fresher) X2 location in September and no statistically significant trend in October. Hutton *et al.* further explains that the full record does reveal a statistically significant trend toward a more easterly (*i.e.* saltier) X2 location in November. However, there is no statistically significant difference between pre-project (water years 1922-1967) and post-project (water years 1968-2012) November X2 position in wet and above normal water years (the water year categories targeted under the current RPA). Even though there is a statistically significant easterly trend in November X2 location using the full period of record, the cause of the trend is uncertain because there are multiple diverters in the Bay-Delta watershed of a total magnitude comparable to that of the CVP-SWP. Unless Delta Smelt response to X2 position or salinity has changed since historical conditions, then Delta Smelt should not be impacted by project operations in September and October, and only potentially impacted in November.

There is also no evidence suggesting that Delta Smelt are more sensitive to the location of X2 in the fall than they were historically (pre-project). The 2008 Delta Smelt biological opinion links X2 to the amount suitable abiotic habitat for Delta Smelt (2008 Delta Smelt biological opinion, p. 234). However, Feyrer *et al.* (2011) does not support the view that the position of X2, or the volume of the low salinity zone, is a meaningful predictor of Delta Smelt presence-absence. If salinity (X2) is not a good predictor and Delta Smelt presence-absence; then salinity (X2) is not a meaningful descriptor of Delta Smelt habitat.

Even if the volume of the low salinity zone in the spring and fall was a meaningful descriptor of Delta Smelt habitat, changes in the location of X2 are not directly linked to changes in species abundance. Kimmerer *et al.* (2013) at p.13 explains that X2, or the volume of low salinity zone, in the spring and fall are not drivers of Delta Smelt abundance and "[g]iven the difficulty in determining the controls on the delta smelt population, it is not surprising that such a simple descriptor of habitat is inadequate for this species."

Finally, Manly *et al.* (2014) reviewed Feyrer *et al.* (2011) and concluded that geography and salinity are cross-correlated and it is therefore not possible to determine which factor is most relevant to species distribution. In other words, Delta Smelt might inhabit the low salinity zone due to its proximity to productive wetland areas, or some other geographically oriented factor, irrespective of the location of the X2 isohaline, which suggests that it is highly uncertain that manipulating salinity (X2) would change species distribution or change the volume of available habitat. Manly *et al.* were not the only ones to observe that geography and salinity are highly correlated; Latour (2015) observed the same relationship and therefore only used geography in his analysis.



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**ATTACHMENT 2**

**DELTA FLOW STANDARDS FOR SALMONIDS**

The 2009 NMFS BiOp established two separate but closely related flow standards intended to be protective of juvenile salmonids in the Delta: the I:E ratio and OMR. Both of these flow metrics are predicated upon the assumption that water project operations (South Delta exports and river inflows) alter Delta hydrodynamics in ways consequential to juvenile salmonids. However, independent peer review has concluded that instantaneous velocities (not tidally averaged flows) is the key metric affecting juvenile salmondid behavior (Monismith *et al*. 2014). Yet, in most of the Delta (downstream of Stockton, San Joaquin River and downstream of Rio Vista, Sacramento River) instantaneous velocities are driven predominantly by tides, and are not appreciably influenced by water project operations (Monismith *et al*. 2014; Anderson *et al*. 2014; Cavallo *et al*. 2014, Cavallo *et al*. 2012). Instantaneous velocities are certainly altered at locations closer to the South Delta export facilities (*e.g.* south of Hwy 4), but this represents a dramatically smaller hydrodynamic footprint than was hypothesized by NMFS in their rationale for more stringent OMR and I:E flow standards specified in the 2009 salmonid biological opinion.

Some have argued the very presence of Sacramento Basin juvenile salmonids demonstrates export-altered hydrodynamics have pulled fish to the South Delta. This view is based upon the assumption that juvenile salmonids always move downstream and toward the ocean under natural conditions. In fact, juvenile salmonids are known to migrate substantial distances laterally (into off-channel habitats) or even upstream into tributaries other than those they originate from (Maslin *et al*., undated). This non-natal rearing is a strategy for juvenile salmonids seeking habitat to support further growth before reaching the ocean. Hearn *et al*. (2014), for example, studied late-fall Chinook movements in San Pablo Bay and consistently observed fish moving upstream into the Petaluma and Napa Rivers. Thus, it is not at all surprising that juvenile salmonids can be present in the South Delta regardless of export or OMR conditions.

**I:E RATIO**

**Proposed operation:** From April 1 through May 31, the Vernalis flow (cfs): CVP/SWP combined export ratio is 1:1 in all water year types. This action would adopt the critical water year operation from the 2009 salmonid biological opinion for all water-year types.

**Background**: As described previously, exports have little effect on instantaneous velocities in the Delta except at locations relatively close to the south Delta export facilities. As such, there is little scientific basis and no identified biological mechanism by which reduced exports as specified in the 2009 NMFS biological opinion I:E ratio could reasonably be expected to benefit juvenile salmonids in the Delta generally. The lack of a physical linkage between exports and altered Delta velocities is consistent with empirical studies looking for an effect of exports on juvenile salmonid survival. In the best available studies, researchers have not identified a negative relationship between CVP-SWP exports and out-migrating salmonid survival.[1] Newman and Brandes (2010) investigated the effect of exports on winter-run Chinook salmon surrogates using a Bayesian modeling approach and their model performed equally well regardless of whether exports were

[1] The I:E ratio in the 2009 salmonid biological opinion was intended to protect Chinook salmon as well as steelhead. As there is limited information available to address steelhead directly, the biological opinion used Chinook salmon as a surrogate species. While it has not been determined that Chinook salmon are a good surrogate species for steelhead, this discussion adopts the same approach regarding surrogates as the biological opinion.



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included in their statistical model. Newman (2008) analyzed the VAMP experimental data for San Joaquin River fall-run Chinook salmon and found a weak but positive relationship between exports and survival suggesting that CVP-SWP exports may improve survival. This outcome seems counter-intuitive but it could be explained by the recent tagging studies reported by Buchanan *et al.* (2013) which found survival was better for salmon salvaged at the CVP as compared to any other through-Delta routes, which suggests survival is not measurably improved by keeping salmonids in the San Joaquin River.

Previously identified relationships between flow and out-migrating San Joaquin River fall-run Chinook salmon survival are problematic for two reasons. First, most of these analyses have not identified where the flow-survival benefit is occurring. Given the hydrodynamic information described previously, a positive flow-survival relationship is most likely to occur in portions of the San Joaquin River where increased river flows influence instantaneous velocities. As such flow-survival benefits, if they occur, will happen upstream of the Delta or in the tidal transition zone (Head of Old River to Stockton) and outside the potential influence of export rates. There is no mechanistic basis CVP-SWP export operations (within the range of historic operations) to appreciably alter instantaneous velocities in the tidal Delta (points west of Stockton). The second problem with San Joaquin River flow and fall-run Chinook survival is that the relationship appears to have broken down in recent years. Recent tagging studies have not shown a positive relationship between San Joaquin River flow and salmonid survival in the Delta (wet years of 2006 and 2011, for example). See Figure A, below.

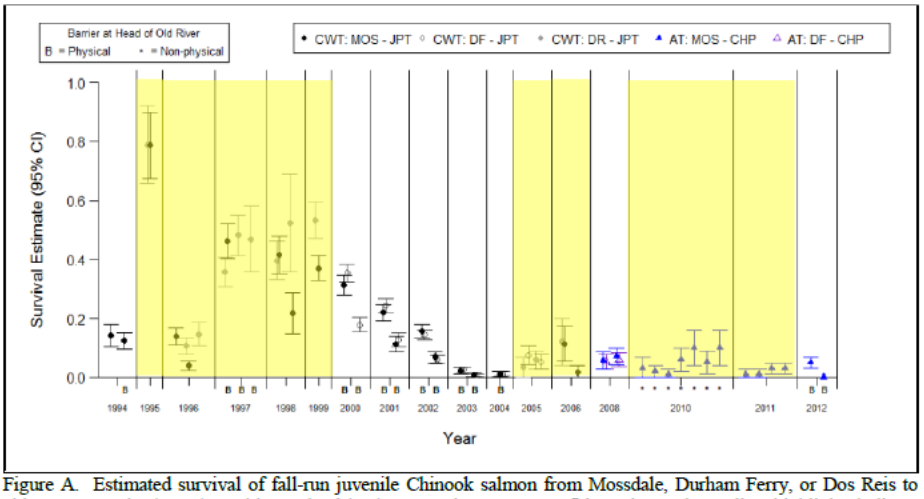


Figure A. Estimated survival of fall-run juvenile Chinook salmon from Mossdale, Durham Ferry, or Dos Reis to either Jersey Point (CWT) or Chipps Island (AT). Intervals are 95% confidence intervals. Yellow highlights indicate years with spring Vernalis flows greater than 5,000 cfs. Increased survival has not been observed with high flow events since 2000. Source: SJRGA 2013. USFWS 2014.

**SALMONID OMR (JANUARY-JUNE):**

**Proposed Sub. Alternative A**: In this alternative, Reclamation manages project operations in real-time to avoid exceeding annual incidental take thresholds for salmonids. This operation replaces



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all formal OMR actions and triggers in the current 2009 NMFS biological opinion. Reclamation would manage Delta Smelt OMR as described above and take any additional actions it deems necessary on a real-time basis to avoid exceeding the incidental take thresholds described in the 2009 salmonid biological opinion. Genetic testing of salvaged salmonids would be undertaken to verify race.

**Proposed Sub. Alternative B**: In this alternative, the proposed OMR operation would be based on identifying when ESA listed salmonids (or their surrogates) are approaching the south Delta where they are potentially vulnerable to entrainment. OMR actions would be taken when monitoring programs indicate a trigger level of juvenile salmonids are approaching the south Delta.

The early warning monitoring stations would be located in Old and Middle River corridors at two locations: 1) the north end of Bacon Island, and 2) the north end of Woodward Island. These stations would host real-time acoustic receivers capable of detecting acoustic tags in-use for studies of fish originating in the Sacramento River basin. When at least1-2% of acoustically tagged fish released at or upstream of Freeport reached the northern real-time detection arrays (i.e. Bacon Island), OMR would be reduced to approximately -5,000 cfs, on a 14-day running average. When at least 1-2% of the same release groups reached the southern real-time detection arrays (i.e. Woodward Island), OMR would be reduced to approximately -3,500 cfs, on a 14-day running average. Each OMR restriction triggered by exceedence of the 1-2% detection threshold would remain in effect for 10-days after which conditions would be re-evaluated. The 10-day trigger is based on the approximate average time period for salmonids to move through the system and is intended to facilitate juvenile salmonids exiting from the south Delta. The 1-2% of tagged fish detection threshold is intended to be conservative as salmonids identified at the proposed monitoring stations may never turn toward the CVP-SWP pumping facilities regardless of export rate.

This operation would apply from January through June (or until daily average water temperatures exceed 68°F). A minimum of 100 acoustically tagged Chinook salmon or steelhead will be present (or estimated to be present) downstream of Freeport in each of these months. When acoustically tagged fish from other studies are not available, up to 100 additional acoustically tagged fish (ESA surrogates) will be released at the beginning of each month.

Juvenile salmonids originating from the San Joaquin Basin will not be represented in this real-time monitoring effort because these fish can be expected to reach the south Delta regardless of export or OMR conditions. Thus, a meaningful pre-salvage trigger for San Joaquin Basin juvenile salmonids is not feasible. However, San Joaquin Basin fish will presumably benefit from actions triggered by acoustically tagged Sacramento Basin fish and by other management actions.

This operation replaces all OMR action contained in the current 2009 salmonid biological opinion. The annual incidental-take levels identified in the 2009 salmonid biological opinion would still apply. Reclamation and DWR may voluntarily operate more restrictively at certain times to avoid exceeding the incidental take threshold. Genetic testing of salvaged salmonids would be undertaken to verify race.

**Background**: As described previously, OMR is based upon tidally-averaged flows which expert review has concluded are not biologically important to juvenile salmonids. Altered instantaneous velocities which could adversely affect juvenile salmonids, could be indexed by OMR, but no such



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analysis supports existing OMR standards. In addition to there being no established linkage between OMR flows and altered instantaneous velocities, analysis of tagging data indicates OMR is not a good indicator of entrainment risk to juvenile salmonids (Zeug and Cavallo 2014). Zeug and Cavallo (2014) also demonstrate that proportional entrainment loss for winter Chinook and spring Chinook surrogates (late fall Chinook) almost never exceed 2% except when exports are greater than approximately 7,000 cf/s (200 $m^3/s$) [Figure B].

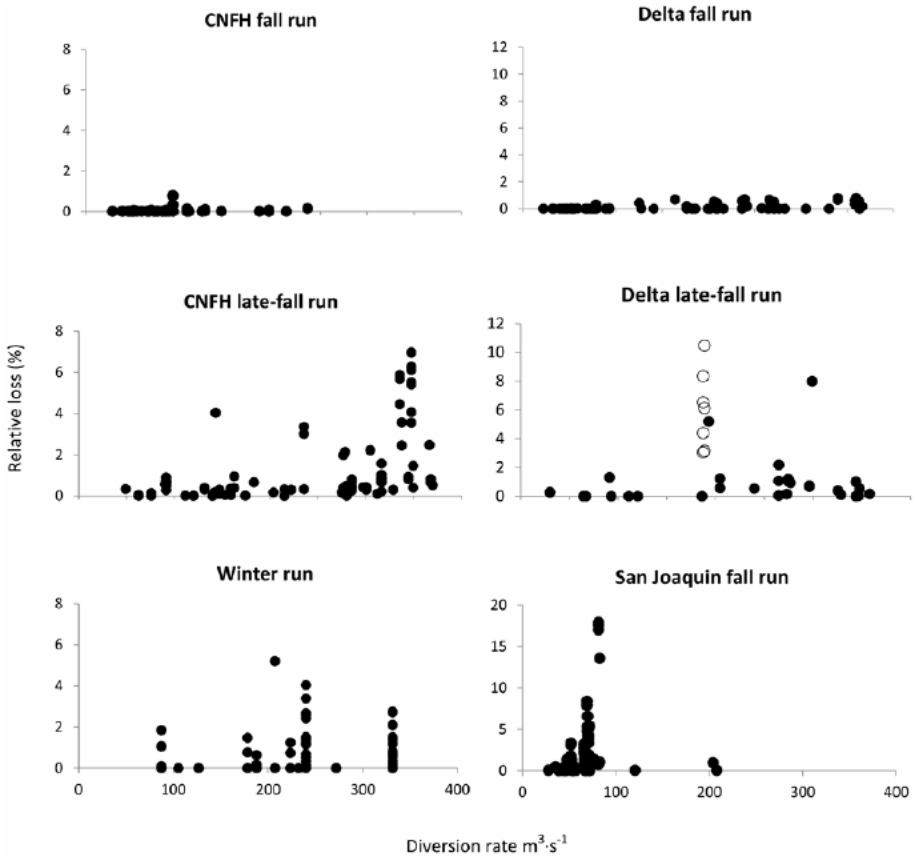


Figure B. Plot of the percentage of migration mortality accounted for by loss at the two diversions (relative loss) as a function of diversion rate for three runs of Chinook salmon released from the Coleman National Fish Hatchery (CNFH) or directly into the Delta. Open circles in the Delta late-fall run plot represent a set of releases that occurred within days of each other in 2007 and experienced unusually high loss. Note that the range of the y-axis changes among release locations. Source: Zeug and Cavallo (2014)

Despite the completion of numerous tagging studies, no evidence has been presented that suggests OMR standards are related to juvenile salmonid survival. The lack of empirical evidence for an OMR-juvenile salmonid survival relationship is the expected outcome given the absence of a clear physical linkage between OMR standards and altered Delta velocities. In addition to providing



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real-time protections to juvenile salmonids, this proposed operation would provide new data on the incidence, frequency and duration of Sacramento River basin juvenile salmonids approaching the south Delta in relation to OMR.

As both of the proposed sub. alternatives maintain the existing incidental take levels, these proposed sub. alternatives would be unlikely to cause jeopardy. The take limits in the existing 2009 NMFs biological opinion are 1-2% of the juvenile spring-run and winter-run entering the Delta annually; 3,000 unclipped steelhead; and 110 green sturgeon. At take levels which could occur under the proposed operation, it is unlikely the exports could appreciably influence viability or recovery. The limited reviews of the existing 2009 salmonid biological opinion supports this determination. As the recent Delta Science Program LOBO panel concluded, for example, even if the 2014 winter-run salmon JPE overestimated the total population by a factor of three, the actual take was only 4% of the annual take limit so winter-run is not likely endangered by water export operations. (Anderson *et al.* 2014.)

**HEAD OF OLD RIVER BARRIER:**

**Proposed Operation:** This action would not install the head of Old River barrier.

**Background:** It is uncertain whether the Head of Old River barrier ("HORB") provides protection for out-migrating salmonids. Moreover, the Fish and Wildlife Service took the position in its 2008 Delta Smelt biological opinion that the HORB was harmful to Delta Smelt. On balance, the uncertain salmonid benefit and the potential detrimental impact on Delta Smelt suggests that the HORB should not be installed.

The Delta Science Program's 2012 ("LOBO") review of the performance of the RPAs considered HORB operations. They concluded that the relative survival of smolts in Old and Middle River versus the San Joaquin River flow is about the same, supporting a conclusion that the HORB is ineffective at increasing survival. The LOBO Panel at pp. 30-31 identified several reasons why the effects of the HORB may be detrimental to smolt survival:

> There are several reasons one could reasonably speculate that the effects of the HORB were detrimental to survival of smolts. Given that the VAMP acoustic tag study results have indicated that Chinook smolt survival through the Delta is substantially greater when smolts are transported to Chipps Island from the CVP holding tank, routing smolts via the shortest river segments to the holding tank would seem the best option for protecting out-migrating salmonid smolts.
>
> The HORB inhibits passage along one of the shortest routes to the holding tanks from the upper San Joaquin watershed. Also, the HORB increases negative Old and Middle River flows and potential opportunities for smolts to become entrained along routes in the southern Delta, where survival in considerably lower.
>
> Also, it has simply been assumed that the HORB does not result in enhanced predation mortality on smolts as was shown to occur with the non-physical barrier tested in previous years. All of the calculations and recalculations of route-specific mortality on acoustic tagged smolts that resulted in increasing the number of entrained smolts required to trigger real-time decisions for adjusting water operations were all based on the assumption that the

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HORB was not associated with increased mortality from predators and other factors. Lacking evidence to the contrary, it is difficult to conclude that the HORB provided equal or greater protection for smolts.

**DELTA CROSS CHANNEL GATE:**

**Proposed Operation (October-June):** This action would operate the DCC on a daily basis. The timing of the opening of the DCC would be determined on a daily basis to coincide as closely as possible with the peak flood tide. The proposed operation would provide for a four hour gate opening to occur between the hours of 9am and 3pm. The start of the opening would be timed to maximize the peak flood tide period to the extent possible, with the mid. point of the four-hour gate opening determined each day based on forecasted tides. For example, if the peak flood tide is forecasted to occur at 12 noon, the gates would be opened from 10 am to 2 pm. If the peak flood tide is forecasted to occur at 3pm, then the gates would be opened from 11 am to 3pm.

**Background**: Day-night operations of the DCC gates have the potential to decrease Delta salinity and to increase water supplies south of the Delta while at the same time providing significant benefits to the Mokelumne River juvenile salmonids and protection of Sacramento River juvenile salmonids over fully open conditions. Recent acoustic telemetry studies (Plumb, *et.al. in review*; Blake and Burau, *in review*) have revealed that a majority of the acoustically tagged salmon outmigrants arrive at the DCC at night. This suggests that the gates could be closed at night when a majority of salmonids are susceptible to entrainment in the DCC and open during the day to increase the flow of Sacramento River water into the central Delta where it can be used to increase exports. The "nighttime" closures would include crepuscular periods (dawn and dusk) when fish are generally known to be more active. Thus, during this proposed experimental operation the gates would be closed at least 1 hour *before* sunset (at about 4 pm) and opened 1 hour *after* sunrise (at about 8 am). The gates would therefore be closed for at least ~16 hours each "night" out of a 24 hour day (or about 70% of the time) due to the shorter days in the winter in higher latitudes (~38 deg) in the northern hemisphere.

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### *1D.1.15.1 Responses to Comments from State Water Contractors*

**SWC 1:** Responses to comments included in the referenced the July 10, 2015 letter are provided below in the responses to Comments SWC 66 to SWC 77.

**SWC 2:** Please see responses to the remaining comments.

**SWC 3:** On October 9, 2015, the District Court granted a very short time extension to address comments received during the public review period, and requires Reclamation to issue a Record of Decision on or before January 12, 2016. This current court ordered schedule does not provide sufficient time for Reclamation to include additional alternatives, which would require recirculation of an additional Draft EIS for public review and comment, nor does Reclamation believe additional analysis is required to constitute a sufficient EIS. Reclamation is committed to continue working toward improvements to the USFWS and NMFS RPA actions through either the adaptive management process, Collaborative Science and Adaptive Management Program (CSAMP) with the Collaborative Adaptive Management Team (CAMT), or other similar ongoing or future efforts.

**SWC 4:** As described in Section 3.3, Reclamation had provisionally accepted the provisions of the 2008 USFWS BO and 2009 NMFS BO, and was implementing the BOs at the time of publication of the Notice of Intent in March 2012. Under the definition of the No Action Alternative in the National Environmental Policy Act regulations (43 CFR 46.30), Reclamation's NEPA Handbook (Section 8.6), and Question 3 of the Council of Environmental Quality's Forty Most Asked Questions, the No Action Alternative could represent a future condition with "no change" from current management direction or level of management intensity, or a future "no action" conditions without implementation of the actions being evaluated in the EIS. The No Action Alternative in this EIS is consistent with the definition of "no change" from current management direction or level of management. Therefore, the RPAs were included in the No Action Alternative as Reclamation had been implementing the BOs and RPA actions, except where enjoined, as part of CVP operations for approximately three years at the time the Notice of Intent was issued (2008 USFWS BO implemented for three years and three months, 2009 NMFS BO implemented for two years and nine months).

As described in Section 3.3, Reclamation included the Second Basis of Comparison to identify changes that would occur due to actions that would not have been implemented without Reclamation's provisional acceptance of the BOs, as required by the District Court order. However, the Second Basis of Comparison is not consistent with the definition of the No Action Alternative used to develop the No Action Alternative for this EIS. Therefore, mitigation measures have not been considered for changes of alternatives as compared to the Second Basis of Comparison.

**SWC 5:** As described in Section 3.3.1.2 of Chapter 3, Description of Alternatives, several actions included in the 2008 USFWS BO and 2009 NMFS BO address items that were underway prior to issuance of the BOs, as summarized below.

- 2008 USFWS BO RPA Component 4, Habitat Restoration.
  - In 1987, Reclamation, DWR, CDFW, and the Suisun Resource Conservation District (SRCD) signed the Suisun Marsh Preservation Agreement (SMPA), which contains provisions for Reclamation and DWR to mitigate the adverse effects on Suisun Marsh channel water salinity from the CVP and SWP operations and other upstream diversions. The SMPA required Reclamation and DWR to prepare a timeline for implementing the Plan of Protection for the Suisun Marsh and delineate monitoring and mitigation requirements. In 2001, Reclamation, DWR, USFWS, NMFS, CDFW, SRCD, and CALFED directed the formation of a charter group to develop a plan for Suisun Marsh that would balance the needs of CALFED, the SMPA, and other plans by protecting and enhancing existing land uses, existing waterfowl and wildlife values including those associated with the Pacific Flyway, endangered species, and CVP and SWP water project supply quality. In 2014, Reclamation, CDFW, and USFWS adopted and initiated implementation of the Suisun Marsh Habitat Management, Preservation, and Restoration Plan (Suisun Marsh Management Plan). The USFWS and NMFS have issued biological opinions for the Suisun Marsh Management Plan.
  - The No Action Alternative, Second Basis of Comparison, and Alternatives 1 through 5 assumes that the Suisun Marsh Management Plan will provide up to 7,000 acres of intertidal and associated subtidal habitat in the Delta and Suisun Marsh with or without implementation of the 2008 USFWS BO. This would represent up to 87 percent (7,000 of 8,000 acres of this habitat type referenced in the 2008 USFWS BO under the No Action Alternative and Alternative 5.
- 2009 NMFS BO RPA Action I.1.3, Clear Creek Spawning Gravel Augmentation.
  - This effort was initiated in 1996 under the CVPIA Section 3406(b)(12). The Clear Creek fisheries habitat restoration program is being implemented by USFWS and Reclamation in accordance with CVPIA (Reclamation 2011a). By the year 2020 the overall goal is to provide 347,288 square feet of usable spawning habitat from Whiskeytown Dam downstream to the former McCormick-Saeltzer Dam, which is the amount that existed before construction of Whiskeytown Dam. Between 1996 and 2009, a total of approximately 130,925 tons of spawning gravel was added to the creek. The interim annual spawning gravel addition target is 25,000 tons per year, but due to a lack of funding, only an average of 9,358 tons has been placed annually since 1996 (Reclamation 2013a).
  - The No Action Alternative, Second Basis of Comparison, and Alternatives 1 through 5 assume that the CVPIA program will continue through 2030.

- 2009 NMFS BO RPA Action I.1.4, Spring Creek Temperature Control Curtain Replacement.
  - In accordance with SWRCB Order 91-0, temperature control actions were initiated in the 1990s, including construction of the Spring Creek Temperature Control Curtain in 1993. The curtain was damaged and replaced as part of maintenance activities for the CVP facilities in 2011.
  - This action was completed prior to publication of the Notice of Intent for this EIS; therefore, this action is included in No Action Alternative, Second Basis of Comparison, and Alternatives 1 through 5.
- 2009 NMFS BO RPA Action I.2.6, Restore Battle Creek for Winter-Run, Spring-Run, and Central Valley Steelhead.
  - The Battle Creek Salmon and Steelhead Restoration Project was initiated in the 1999 in accordance with the CVPIA Anadromous Fish Restoration Program. An Agreement in Principle was signed by Reclamation, NMFS, USFWS, CDFW, and Pacific Gas & Electric Company to pursue a restoration project for Battle Creek. A formal Memorandum of Understanding was signed in 1999 to provide funding for the program.
  - The program is consistent with provisions in the California State Salmon, Steelhead Trout, and Anadromous Fisheries Program Act (California Senate Bill 2261, 1990), CALFED Bay-Delta Ecosystem Restoration Program Plan, Upper Sacramento River Fisheries and Riparian Habitat Management Plan (developed in accordance with California Senate Bill 1086, 1989), 1990 CDFW Central Valley Salmon and Steelhead Restoration and Enhancement Plan, 1990 CDFW Steelhead Restoration Plan and Management Plan for California, 1993 CDFW Restoring Central Valley Streams: A Plan for Action, NOAA 1997 Proposed Recovery Plan for Sacramento River Winter-Run Chinook Salmon, and 1996 CDFW Actions to Restore Central Valley Spring-Run Chinook Salmon.
  - The Final EIS and the Record of Decision for the Battle Creek Salmon and Steelhead Restoration Project were completed in July 2005 and January 2009, respectively.
  - Construction was completed on the first phase in 2010. Construction will be completed prior to 2030 to reestablish approximately 42 miles of salmon and steelhead habitat on Battle Creek and an additional 6 miles of habitat on tributaries. The project includes removal of five dams, installation of new fish screens and fish ladders, provisions for increased instream flows in Battle Creek, improved access roads and trails, and decommissioned power plant canals that conveyed water between tributaries.
  - The Record of Decision and the funding agreements were completed prior to issuance of the 2009 NMFS BO. Construction was initiated prior to publication of the Notice of Intent for this EIS, and is anticipated to be

complete before 2030. Therefore, this action is included in No Action Alternative, Second Basis of Comparison, and Alternatives 1 through 5.

- 2009 NMFS BO RPA Action I.3.1, Operate Red Bluff Diversion Dam with Gates Out.
  - The Final EIS and Record of Decision were completed in May 2008 for the Tehama-Colusa Canal Authority for the Tehama-Colusa Canal Fish Passage Improvement Project which included construction of the new intake at the Red Bluff Diversion Dam site and removal of the dam gates from the Sacramento River water. This action was initiated following the issuance of the 1993 NMFS BO that reduced the time that water could be diverted from the Sacramento River using the Diversion Dam gates.
  - Construction was initiated in March 2010 and funded by the 2009 American Recovery and Reinvestment Act. The new Red Bluff Pumping Plant began operation in 2012, and the gates no longer block the flow of water in the Sacramento River.
  - These existing facilities are included in No Action Alternative, Second Basis of Comparison, and Alternatives 1 through 5.
- 2009 NMFS BO RPA Action I.5, Funding for CVPIA Anadromous Fish Screen Program.
  - This effort was initiated over 20 years ago under the CVPIA Section 3406(b)(21).
  - The No Action Alternative, Second Basis of Comparison, and Alternatives 1 through 5 assume continued implementation of the program until the CVPIA program objectives are met which may or may not occur prior to 2030.
- 2009 NMFS BO RPA Action I.6.1, Restoration of Floodplain Habitat; and Action I.6.2, Near-Term Actions at Liberty Island/Lower Cache Slough and Lower Yolo Bypass; Action I.6.3, Lower Putah Creek Enhancements; Action I.6.4, Improvements to Lisbon Weir; and Action I.7, Reduce Migratory Delays and Loss of Salmon, Steelhead, and Sturgeon at Fremont Weir and Other Structures in the Yolo Bypass.
  - These actions are addressed in the ongoing Yolo Bypass Salmonid Habitat Restoration and Fish Passage Implementation Plan (Implementation Plan) that has been initiated by Reclamation and DWR.
  - The No Action Alternative, Second Basis of Comparison, and Alternatives 1 through 5 assume completion of this Implementation Plan by 2030 with or without implementation of the 2009 NMFS BO.
  - In response to this comment, a sensitivity analysis was included in the Final EIS (Appendix 5E), that presents the results of CalSim II model runs with and without implementation of the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Implementation Plan.

- 2009 NMFS BO RPA Action II.1, Lower American River Flow Management.
  - In 2006, Reclamation began operating in accordance with the American River Flow Management Standard (FMS), as described in Appendix 3A, No Action Alternative: Central Valley Project and State Water Project Operations. The FMS operations were initiated to enhance the protections provided by SWRCB D-893 in accordance with an agreement between Reclamation, USFWS, NMFS, and CDFW.
  - The No Action Alternative, Second Basis of Comparison, and Alternatives 1 through 5 assume continued operations under the FMS in 2030.

**SWC 6:** The EIS analyzed the alternatives at 2030 to consider full implementation of the provisions in each of the alternatives, such as completion of predation control plans in Alternatives 3 and 4 or fish passage programs in Alternative 5 and the No Action Alternative.

If the analyses were conducted at the present time, the existing conditions would include implementation of the operational provisions of the 2008 USFWS BO RPA and the 2009 NMFS BO RPA which had been provisionally accepted by Reclamation prior to the publication of the Notice of Intent in 2012.

**SWC 7:** Reclamation does not believe that conditions have been met for recirculation of the Draft EIS. Please see response to comment SWC 3. As described in response to Comment SWC 4, the No Action Alternative must include implementation of the 2008 USFWS BO and 2009 NMFS BO in accordance with the definition under NEPA of No Action Alternative.

**SWC 8:** Comment noted. Please see responses to Comments SWC 9 through SWC 59.

**SWC 9:** Changes in CVP and SWP water deliveries under Alternatives 1 through 5 are compared to the No Action Alternative, and changes under the No Action Alternative and Alternatives 1 through 5 are compared to the Second Basis of Comparison in Chapter 5, Surface Water Resources and Water Supplies, of the EIS. In Chapter 7, Groundwater Resources and Groundwater Quality, changes in groundwater elevations were analyzed for agricultural users related to changes in CVP and SWP water deliveries. In Chapter 12, the SWAP model was used to determine if the changes in groundwater elevations would result in land fallowing based upon economic reasons. In Chapter 19, the CWEST model was used to determine if alternative water supplies identified in urban water management plans developed by communities served by CVP and SWP water would be economical related to changes in CVP and SWP water deliveries. The alternative water supplies have been historically used during periods of reduced CVP and SWP water deliveries or have undergone analyses by communities, as described in Appendix 5D, Municipal and Industrial Water Demands and Supplies.

It should be noted that Figures 7.15 through 7.60 in Chapter 7, Groundwater Resources and Groundwater Quality, have been modified in the Final EIS to correct an error that increased the changes in groundwater elevation by a factor of 3.25. This miscalculation was due to an error in a model post-processor that

generates the figures related to changing the values from CVHM Model output from meters to feet. Therefore, the results in these figures and the related text in Chapter 7 are less than reported in the Draft EIS. The figures and the text have been revised in the Final EIS. No changes are required to the CVHM model.

The revised results in the figures and the text in Chapter 7 are consistent with the findings of the SWAP model results presented in Chapter 12.

**SWC 10:** Projecting water transfer conditions is difficult, as described in the EIS. To analyze water transfers in detail, specific information is required to be defined by month and by water year type, including volume of transferred water, locations of the water to be transferred, locations of the delivery points for the transferred water, ability to store the transferred water in upstream reservoirs, flow limitations in the streams between the reservoirs and the Delta, timing to transfer water across the Delta (including the need to provide additional transferred water to meet water quality standards), and conveyance capacity in the Delta facilities and the downstream CVP and SWP conveyance facilities. The conveyance limitations for the CVP and SWP Delta facilities would change each month by water year and by the specific hydrologic and salinity conditions for that month in each alternative. Due to the complex nature of the CVP and SWP operations criteria in each alternative, it is not possible to only link the feasibility of water transfers to the available physical capacity in the CVP and SWP Delta facilities. Therefore, specific transfer actions were not defined or analyzed in the EIS.

The No Action Alternative in the EIS does include the current limitations for water transfers that were defined by Reclamation in the *Biological Assessment on the Continued Long-Term Operations of the Central Valley Project and the State Water Project* August 2008 document. These limitations were included in the 2008 USFWS BO and 2009 NMFS BO as the Proposed Action from the Biological Assessment. Water transfers are only undertaken with excess capacity and are not to have effects on CVP project operations. Reclamation based its proposal to limit water transfer conveyance to three months based on the general season of excess capacity, potential for demand for the transferred water, and biological and ecological factors.

**SWC 11:** The additional water demand in the Sacramento Valley has been identified in approved general plans and is included in the adopted urban water management plans of these communities. The increased demand are projected to be met through existing water rights in El Dorado, Nevada, Placer, and Sacramento counties and full use of CVP water contracts in Sacramento County. The water rights are senior to water rights held by Reclamation and DWR, and would need to be fulfilled in the future. Therefore, the additional water demands are included in the No Action Alternative, Second Basis of Comparison, and Alternatives 1 through 5.

**SWC 12:** As described in Section 3.3, Reclamation had provisionally accepted the provisions of the 2008 USFWS BO and 2009 NMFS BO, and was implementing the BOs at the time of publication of the Notice of Intent in March 2012. Under the definition of the No Action Alternative in the National

Environmental Policy Act regulations (43 CFR 46.30), Reclamation's NEPA Handbook (Section 8.6), and Question 3 of the Council of Environmental Quality's Forty Most Asked Questions, the No Action Alternative could represent a future condition with "no change" from current management direction or level of management intensity, or a future "no action" conditions without implementation of the actions being evaluated in the EIS. The No Action Alternative in this EIS is consistent with the definition of "no change" from current management direction or level of management. Therefore, the RPAs were included in the No Action Alternative as Reclamation had been implementing the BOs and RPA actions, except where enjoined, as part of CVP operations for approximately three years at the time the Notice of Intent was issued (2008 USFWS BO implemented for three years and three months, 2009 NMFS BO implemented for two years and nine months).

As described in Section 3.3, Reclamation included the Second Basis of Comparison to identify changes that would occur due to actions that would not have been implemented without Reclamation's provisional acceptance of the BOs, as required by the District Court order. However, the Second Basis of Comparison is not consistent with the definition of the No Action Alternative used to develop the No Action Alternative for this EIS. Therefore, mitigation measures have not been considered for changes of alternatives as compared to the Second Basis of Comparison.

**SWC 13:** As discussed in the response to Comment SWC 9, Figures 7.15 through 7.60 in Chapter 7, Groundwater Resources and Groundwater Quality, have been modified in the Final EIS to correct an error that increased the changes in groundwater elevation by a factor of 3.25. This miscalculation was due to an error in a model post-processor that generates the figures related to changing the values from CVHM Model output from meters to feet. Therefore, the results in these figures and the related text in Chapter 7 are less than reported in the Draft EIS. The figures and the text have been revised in the Final EIS. No changes are required to the CVHM model. The revised results in the figures and the text in Chapter 7 are consistent with the findings of the SWAP model results presented in Chapter 12, Agricultural Resources.

As described in Chapter 7, the potential for and degradation of groundwater quality and land subsidence would increase with reduced groundwater elevations caused by reduced CVP and SWP water deliveries.

**SWC 14:** The CVHM groundwater model and SWAP agricultural economics model are regional models used in the EIS to analyze changes in Central Valley groundwater conditions and related agricultural production. Due to the regional nature of these models, specific impacts to individual farms or small locations cannot be discerned. As discussed in the EIS, it is likely that individual farms would make decisions that are different than the SWAP model projections which are based on economic optimization factors. Therefore, changes in individual farms may occur by 2030. However, regional groundwater use may change to maintain agricultural production as CVP and SWP water supplies change, as has occurred during the recent drought.

As described in Chapter 7, the potential for and degradation of groundwater quality would increase with reduced groundwater elevations caused by reduced CVP and SWP water deliveries. However, it is not anticipated that over the long-term groundwater use would change due to changes in groundwater quality by 2030.

**SWC 15:** Groundwater Sustainability Agencies will respond differently in the development and implementation of each Groundwater Sustainability Plan (GSP). Different regions of California will have different levels of progress depending upon ongoing programs and facilities. Depending upon the GSP, full implementation of groundwater sustainable actions may not be possible until facilities are constructed to provide replacement water supplies for current groundwater use. Construction of those facilities, following review of the GSP by DWR, could require several years for environmental review, design, permitting, and construction. Therefore, it would be speculative to assume that the GSP objectives can be fully met prior to 2030 when the GSPs have not been completed; and the implementation actions may require a timeframe longer than 2030. It is acknowledged that following full implementation of the GSPs, continued long-term overdrafting of the groundwater would not be allowed.

**SWC 16:** Please see response to Comment SWC 15 related to continued use of groundwater by 2030.

The EIS includes the prioritized list of groundwater basins issued by DWR in 2014. A draft revised list is currently being reviewed by DWR following the close of public comments in September 2015. Therefore, the proposed changes have not been incorporated into the Final EIS.

**SWC 17:** As shown in Table 19.78 and similar tables (see Tables 19.102 and 19.106), only a small share of a reduction in water supply availability is accommodated with infrastructure projects. In Table 19.106, for example, only 28,000 acre-feet out of 153,000 acre-feet reduction is new long-term supply investment. Most of the reduction in water supply is met with more groundwater pumping, water conservation, and, where local storage is available, changes in local water storage operations at the Year 2030. The costs in the tables are representative and appropriate measurements of the types and amounts of cost changes in Year 2030. These cost changes are generally very small and would not result in substantial changes.

Regarding comments related to Section 19.4.3.9.1, it is not the purpose of the EIS to analyze the costs and impacts of future water management projects included in the cumulative effects discussion. If they are developed, then they may help to reduce the economic costs and impacts of reductions in future water supplies.

**SWC 18:** Please see response to Comment SWC 17.

**SWC 19:** The SWAP model output is calculated based upon the output of several other models. The EIS impact analysis starts with use of the monthly CalSim II model to project CVP and SWP water deliveries. Results from the CalSim II model are further processed by the monthly CVHM model to project groundwater

elevations. Results from the CVHM model are then used in the annual SWAP model. Because these models are using large time steps and regional geographic coverage, it was determined that changes in these models of 5 percent or less were related to the uncertainties in the model processing. Therefore, reductions of 5 percent or less in this comparative analysis are considered to be not substantially different, or "similar."

**SWC 20:** As described in responses to Comments SWC 13, 14, 15, and 19, increased use of groundwater is assumed to occur in 2030 if CVP and SWP water supplies are reduced. The increased cost of using additional groundwater is included in the SWAP analysis, and was determined to not result in substantial fallowing. The actual reductions in groundwater elevations considered in the SWAP model was consistent with the CVHM model output, and was less than shown in Figures 7.15 through 7.60 in Chapter 7, Groundwater Resources and Groundwater Quality, because the post-processing error was related to the preparation of the figures and not the CVHM model. As is noted in the comment, the EIS acknowledges that impacts to individual farmers may be more severe than for a region. However, the EIS is analyzing the alternatives at a regional basis. The results of the regional analysis was used to determine that there would not be any regional changes in dust generation (as described in Chapter 16, Air Quality and Greenhouse Gas Emissions) or agricultural employment (Chapter 12, Agricultural Resources).

More details have been included in Section 5.3.3 of Chapter 5, Surface Water Resources and Water Supplies, in the Final EIS to describe historical responses by CVP and SWP to recent drought conditions and associated SWRCB requirements, including reductions in recent deliveries of CVP and SWP water.

**SWC 21:** The analysis in Chapter 9 of the Draft EIS did not use the RPAs as metrics for comparing alternatives, although it is acknowledged that many of the same relationships in the relevant scientific literature that were used in the development of the RPAs also apply to the analysis in the DEIS such as the relationship between X2 and the abiotic habitat index for Delta smelt and the relationship between OMR flows and entrainment.

See response to Comment SWC-72 for additional discussion of Feyrer et al. (2011).

**SWC 22:** Text was added to Sections 9.4.1., 9.4.1.6, and 9.4.1.7 of the Draft EIS to clarify the methods used to evaluate Fish Passage, Predator Control Programs, and Ocean Salmon Harvest Restrictions, respectively.

**SWC 23:** The EIS includes the comparison of Alternatives 1 through 5 to the No Action Alternative enabling decision makers to compare the magnitude of environmental effects of the alternatives as compared to the No Action Alternative benchmark (in accordance with Question 3 of the CEQ Forty Most Asked Questions). The EIS analysis does not include a determination of significance thresholds or comparison of the results of impact assessment to the significance thresholds.

Text on page 108 and 110 of the Draft EIS was modified to reflect the basis for use of 5 percent change in flow and 0.5F$^{o}$ for temperature for identifying a change in flows and temperatures that may have an effect.

The aquatic resources models use output from the monthly CalSim II model. Because the CalSim II model uses monthly time steps and regional geographic coverage, it was determined that changes in the model output of 5 percent or less were related to the uncertainties in the model processing. Therefore, reductions of 5 percent or less in this comparative analysis are considered to be not substantially different, or "similar."

For comparison of differences within and among alternatives, qualitative descriptors were used to help put into perspective the magnitude of change for the reader. These descriptors were not intended to imply the significance of the effect. In most circumstances, these terms were followed by the actual numerical change. In making conclusions, these terms were used to describe the relative likelihood of a meaningful difference between alternatives based on the collective interpretation of multiple modeling outputs. For the NEPA analysis in the DEIS, these descriptors were not intended to be used in the ESA Section 7 context where the terms "no effect" and "likely to adversely affect" have defined meanings.

**SWC 24:** Please see response to Comment SWC-23. The analytical conclusions, along with the qualitative descriptors used in the analysis, were included in the summary table in Section 9.4 of Chapter 9, Fish and Aquatic Resources, for the purpose of providing a general and brief indication of the differences among alternatives. The summary table was not intended to present the logic behind the conclusions which are described within Section 9.4 subsections.

**SWC 25:** The box plots in Appendix 9J have the following explanation "The plus symbol indicates median, box represents the interquartile range, and the whiskers represent the minimum and maximum values." A similar explanation regarding the box-whisker plots has been added to the appropriate Appendices 9K, 9L, and 9M. No evaluation of the statistical significance of the differences in predicted metrics was conducted: however, text has been added to Section 9.4.1.3.3 and 9.4.1.3.4 regarding interpretation of the box-whisker plots presented in Appendices 9K, 9L, and 9M and used in the impacts analysis for comparison between alternatives. The interpretations of the graphs in the analysis sections of Chapter 9 have been modified for consistency.

**SWC 26:** The text in Chapter 9 has been modified to address the limitations and uncertainties in the references related to Delta Smelt, including references used in the development of the analytical tools used to evaluate conditions for Delta Smelt.

**SWC 27:** The text in Chapter 9 has been modified to address the limitations and uncertainties in the references, including references used in the development of the analytical tools.

**SWC 28:** The information provided in this comment suggests there is uncertainty associated with project operation and the position of fall X2 (Hutton et al.). Text

in the Draft EIS (page 9-73) was revised to provide this clarification and add a reference to Hutton et al. (in press).

**SWC 29:** Text has been added to Appendix 9G and Chapter 9 to acknowledge the uncertainty in (1) the relationship between X2 and abundance, and (2) biological mechanisms contributing to this correlation. However, the impact analysis is unchanged because the Draft EIS is simply evaluating the potential effects on the longfin abundance using a published X2–longfin smelt relative abundance relationships developed based on the empirically observed relationships between Delta outflow and survival. The Draft EIS is not suggesting that the size and location of the winter-spring low salinity zone (LSZ) is the biological mechanism underlying the fall mid-water trawl (FMWT): January- June X2 correlation by acknowledging the uncertainties

**SWC 30:** Please refer to response to Comment SWC 29.

**SWC 31:** Please refer to response to Comment SWC 29.

**SWC 32:** Please refer to response to Comment SWC 29.

**SWC 33:** The text on page 9-67 in the Draft EIS has been modified to acknowledge the differences between the FMWT surveys and the Bay Study fish surveys.

**SWC 34:** The list of citations referred to in this comment were reviewed, and where appropriate, the text in the Final EIS has been modified. Additional details are provided in the response to Comment SWC 59.

**SWC 35:** This comment includes six specific sub-comments, but related comments on the Delta Passage Model (DPM). Each of the sub-comments are addressed individually below.

- The source documents used to develop the biological functionality of the model are too limited and result in a simplistic depiction of Delta hydrodynamics and fish biology that does not reflect current conditions. Key critical documents that address Delta hydrodynamics, fish entrainment and survival are missing including: Perry et al. 2015,[24] Cavallo et al. 2015,[25] Buchanan et al. 2015,[26] Delaney et al. 2014,[27] Zeug and Cavallo2013,[28] SJRGA 2013,[29] Buchanan et al. 2013.[30]
  - All of the documents cited in this comment have been previously examined for the potential inclusion in the DPM either within the interagency workgroup that has been evaluating the DPM or by Cramer Fish Sciences that developed the model. The paper by Perry et al. 2015 is a publication of data and relationships that appear in the dissertation by Perry (2010). The routing relationship at Georgiana Slough used in the DPM is based on the relationship that appears in Perry (2010). Thus, the Perry et al. 2015 paper contains the same information used to parameterize the DPM rather than newer information.

  - The publication by Cavallo et al. 2015 uses previous acoustic studies to develop a general model of routing at Delta junctions. However for this model to be applied in the DPM to estimate survival, there would need to be survival estimates from each junction to the exit of the Delta. Those data currently do not exist for most junctions (only Georgiana Slough, Steamboat and Sutter Slough and Head of Old River, all of which are included in the DPM).
  - Three of the referenced studies are on San Joaquin River-origin fish which were not modeled in the DPM (Buchanan et al. 2013; Buchanan et al. 2015; Delaney et al. 2014). The studies by Buchanan estimated survival of San Joaquin River-origin fall run without the inclusion of environmental covariates. These estimates are not useful for evaluating different operational scenarios because there is no quantitative linkage with flow, temperature or other parameter that could be affected by operations. The report by Delaney et al. (2014) was focused on steelhead and the DPM is a model of Chinook salmon. It is unknown to what extent steelhead and Chinook Salmon behavior are comparable. The report by the San Joaquin River Group Authority referenced in the comment (SJRGA 2013) contains the same data reported in Buchanan et al. 2013.
  - The study referenced as Zeug and Cavallo (2013) is actually Zeug and Cavallo (2014) according to the reference in the footnote. This study modeled the probability of salvage of coded wire tagged Chinook Salmon as a function of different hydrologic, physical and biological predictors. A statistical model is produced by this study as well as an estimate of the proportion of migration mortality accounted for by loss at the export facilities. However, the survival estimates used in the model already encompass this source of mortality, even though it is not specified explicitly. Thus, this proportion could be specified by the model but the value of survival would not change.
  - Although the information in Zeug and Cavallo (2014) and Cavallo et al. (2015) could not be directly integrated into the DPM, the data from these papers were used in the EIS to evaluate how routing at Delta junctions and salvage at the facilities would be affected by changed in operational scenarios. Thus, these data were integrated into the EIS.

- The DPM operates on a daily average time step using daily average flows even though this level of analysis is too course to capture flow conditions that fish experience at junctions. Cavallo et al. (2013)[31] suggest that the DSM2 model run at a spatial-temporal resolution of every 15 minutes is more consistent with the probability of flow and fish entrainment patterns.
  - The report by Cavallo et al (2013) focuses on an alternative to the Particle Tracking Method (PTM) approach of averaging hydrodynamics over a month or more to determine the fate of fish. It is likely that fish respond to instantaneous flow conditions; however, survival is not measured at those intervals which is why Cavallo et al. (2013) provided the caveated

statement "…sub-daily flow conditions are more likely to be important for fishes with directed swimming behavior." A 24-hour roll up metric is used in the Cavallo et al. (2013) report and was the predictor of junction entrainment in Cavallo et al (2015). Thus, until survival data is available at finer time scales, the daily time step is sufficient to estimate survival and routing in a simulation framework.

- The DPM treats the Interior Delta region as a single model reach. Recent studies with acoustic tagged fish have shown significant differences in reach and junction specific hydrodynamics (Cavallo et al. 2015) as well as fish entrainment and survival (Delaney et al. 2014, Buchanan et al. 2013, SJRGA 2013). In addition, data from tagging studies in the downstream Delta reaches suggest that steelhead smolts are not simply moving with flows but may be utilizing selective tidal stream transport (Delaney et al. 2014). These data provide biological information that could be used to refine the model for the Interior Delta to incorporate separate reaches or, as an alternative, conduct a sensitivity analysis of the model to evaluate its ability to predict reach-specific entrainment and survival within the Interior Delta.
  - The studies referenced in this point cannot inform the DPM to split the interior Delta into finer scale reaches although we agree that those data would be useful to include in the model if and when they are available. The Buchanan et al. (2013) paper and SJRGA (2013) report contains the same data that found survival was different (but not statistically so) for San Joaquin origin fish entering head of Old River vs. fish remaining in the San Joaquin River at that junction. However, San Joaquin River-origin fish are not being modeled in the EIS with the DPM. Thus, although these data are important for understanding how the system functions, especially for San Joaquin River-origin Chinook salmon, they are not relevant to the current model framework. The study by Cavallo et al. (2015) reports a statistical model that describes the entrainment of acoustically tagged fish into the interior Delta as a function of the proportion of flow entering that junction. Although this information is important to understand the environmental influences on entrainment, there is no data on the survival of fish after they are entrained into individual routes. It would be possible to estimate the number of fish entering each junction but not the resulting survival. Thus, there would be no change in the value of survival calculated for each operational scenario with the DPM.
- Model documentation indicates that migration speed is modeled as a function of reach specific flow for three reaches (Sac 1, Sac 2, and GEO/DCC). No information is provided as to what data informs the migration speed for the other model reaches.
  - Only the reaches listed (Sac 1, Sac 2 and GEO/DCC) had a significant relationship between flow and migration rate. In all other reaches, migration rate is a random variable resampled every day from a

distribution informed by the mean and standard deviation of observed migration rates in each reach.

- The model uses flow to inform fish behavior at junctions and assumes proportional flow for each route except for Junction C (DCC/GEO) where a non-proportional relationship, based on acoustic data, was used. No citation is provided to facilitate an evaluation of the relationship provided at Junction C nor to understand why this is the only location where a non-proportional flow relationship is used. Cavallo et al. (2015) suggest that fish are less likely to enter a distributary channel than would be expected based on the proportion of flow entrained there. This is consistent with the other literature that suggest that fish movement patterns are influenced by other factors including diurnal fish behavior (Delaney et al. 2014), tidal cycle (Perry et al. 2015, Cavallo et al. 2015, Delaney et al. 2014, Zeug and Cavallo 2014), velocity (Perry et al. 2015, SJRGA 2013, Michel et al. 2015)32, and turbidity (Michel et al. 2015). Furthermore, Cavallo et al. (2015) lists seven junctions within the Interior Delta where the tidal cycle mediates any effects of inflows and exports on route selection. It seems prudent to suggest that the DPM should consider these data and the potential effects on route selection and if the model cannot be refined to incorporate some of the more recent relationships (e.g., Cavallo et al. 2013), then some analysis of the models sensitivity to diversion from a 1:1 fish to flow relationship is needed to evaluate the utility of the model for comparative analysis.
  - At Junction C (Georgiana Slough) the relationship between flow entering the interior delta and fish entering the interior delta was taken directly from Perry (2010). This is the only junction where formal statistical modeling has been performed to link hydrodynamics and entrainment of Chinook salmon at the scale of individual fish and conditions at the time that individual arrived at the junction. These are the same data that appear in Perry et al. (2015). The data in Michel et al. 2015 do not address junction entrainment. Delaney et al. (2014) is a study of steelhead rather than Chinook and it is unknown to what extent the behavior of these two species is similar. The paper by Zeug and Cavallo 2014 does not address junction entrainment but entrainment of coded wire tagged fish at the export facilities. The paper by Cavallo et al. (2015) indicates that inflow and exports are less important at tidally dominated junctions relative to junctions primarily under riverine influence. However, the junctions in the DPM are all riverine dominated including: Yolo Bypass and Sacramento River, Sutter-Steamboat and Sacramento River and Georgiana Slough/DCC and the Sacramento River. Within a comparative framework, the relative difference between scenarios would be the same because the same relationship would be applied under both scenarios. However, the estimate value of entrainment and through delta survival would vary.
- Model documentation indicates that reach specific survival is predicted using daily flow for seven reaches (Sac 1, 2, 3, 4, SS, Interior Delta via SJR, Interior

Delta via OR) and exports for one reach (Interior Delta via GEO/DCC). Only the GEO/DCC and Yolo reaches are informed by means and standard deviations from survival studies. Yet, some authors have reviewed years of data and failed to demonstrate a relationship between hydrodynamics and survival (Zeug and Cavallo 2014)33, or exports and survival (Delaney et al. 2014) and have suggested that there is no one hydrodynamic metric that can characterizes all patterns in the Delta. These researchers (Zeug and Cavallo 2014) as well as Michel (2010) have demonstrated that other environmental factors, independent of inflow and exports, affect salmonid survival to the ocean including select water quality parameters, temperature, and fish size.

- There remains considerable uncertainty in the relationship between hydrodynamics and survival in the Delta. However, the flow-survival relationships in the DPM are based on rigorous statistical analyses of acoustically tagged Chinook salmon smolts performed by Perry (2010) and the export-survival relationship is based on a peer-reviewed study by Newman and Brandes (2010). Both of these relationships contain variation that is characterized in the model and included through the Monte Carlo resampling. As more information is produced on these relationships, the model will need to be updated. However, the referenced studies are not able to inform the model in its current form. The study by Zeug and Cavallo (2014) did not address survival of Chinook Salmon through the Delta but rather the correlates of salvage at the export facilities and estimated loss of CWT release groups. The Michel (2010) study examined survival through the entire Sacramento River from Coleman National Fish Hatchery to the Golden Gate. Therefore, the EIS did not specifically evaluate flow-survival relationships in the Delta.

**SWC 36:** In response to this comment, additional information on the differences between Kimmerer (2008, 2011) and Miller (2011) was added to Appendix 9G.

With respect to the biases identified by Miller (2011) in Kimmerer (2008), Kimmerer (2011) only adjusted one of his assumptions slightly in response to Miller (2011) in his modeling exercise for proportional entrainment. This adjustment did not change the conclusions from his earlier paper.

**SWC 37:** This appears to be a comment on an earlier draft of the EIS. The referenced quote was not in the Draft EIS. Additional text has been added to pages 194 and 247 in the Draft EIS in the Final EIS to clarify the conclusions of Feyrer et al. (2010).

**SWC 38:** The text referred to in this comment has been modified in the Final EIS to delete the Moyle (2002) reference to salinity and to include distribution information as in Merz et al. (2011).

**SWC 39:** Although Feyrer et al. (2007) found that higher values of the habitat index (i.e., X2 west of confluence) were associated with greater relative abundance of juvenile Delta smelt, Kimmerer et al. (2013) found that there was no consistent relationship between salinity-based habitat area and abundance.

**SWC 40:** The text referred to in this comment incorrectly attributed the information to Kimmerer (2011), and has been deleted from the Final EIS.

**SWC 41:** The text referred to in this comment is intended as a broad statement regarding the factors that have contributed to a decline in the ability of the Delta to support Delta Smelt. The statement suggests that the cause is related to changes in multiple physical and biological factors. This broad statement inherently conveys uncertainty and the references are intended to provide examples of some of the factors that may contribute to the decline. The text in Appendix 9B was revised to reflect the uncertainty.

**SWC 42:** The text referred to in this comment on pages 9-64 and 9-115 has been modified in the Final EIS.

**SWC 43:** The text on page 137 of the Draft EIS was revised in the Final EIS to clarify scientific uncertainty.

**SWC 44:** The text on page 137 of the Draft EIS was revised in the Final EIS to clarify scientific uncertainty.

**SWC 45:** The text on page 137 of the Draft EIS was revised in the Final EIS to clarify scientific uncertainty.

**SWC 46:** A summary of Perry et al. (2015) has been added to the Final EIS on page 9-77 and incorporated as appropriate into Appendix 9B. The Cavallo et al. (2015) paper does not evaluate Delta Cross Channel gate operations; therefore, it is used in this context.

**SWC 47:** The Final EIS has been modified by adding a summary of Perry et al. (2015) within the text on page 9-77 of the Draft EIS and in Appendix 9B. The Cavallo et al. (2015) paper does not evaluate Delta Cross Channel gate operations.

**SWC 48:** The text on page 150 of the Draft EIS was revised in the Final EIS to clarify scientific uncertainty.

**SWC 49:** The junction analysis is only applicable to Chinook Salmon and should not have been used in the analysis of effects on steelhead. Therefore, this analysis was removed from the appropriate sections of Chapter 9.

Delaney et al. (2014) suggested that the DSM2 Hydro Particle Tracking Model (PTM) was not able to predict the movement of steelhead tags. The PTM was not used for the junction analysis.

**SWC 50:** The paper by Cavallo et al. (2015) indicates that inflow and exports are less important at tidally dominated junctions relative to junctions primarily under riverine influence. However, the junctions in the DPM (Appendix 9J) are all riverine dominated including: Yolo Bypass and Sacramento River, Sutter-Steamboat and Sacramento River and Georgiana Slough/DCC and the Sacramento River. Within a comparative framework, the relative difference between scenarios would be the same because the same relationship would be applied under both scenarios. However, the estimate value of entrainment and through delta survival would vary.

**SWC 51:** The 5 percent difference criterion used in the EIS is consistent with the uncertainty considerations in the CalSim II model which provides the input values to the Weighted Useable Area (WUA) model. The text on pages 9-108 and 9-109 of the Draft EIS has been modified to remove the reference to "biologically meaningful" and more rightly attribute the use of a 5 percent difference as the minimum difference that can be reasonably differentiated given the resolution of the CalSim II model and the subsequent calculation of WUA.

Even though WUA represents a "rough approximation of the available habitat" its use as a metric for describing potential differences in habitat availability between alternatives is appropriate because the magnitude of the WUA estimate is irrelevant when looking at relative differences. It is true that the magnitude of the WUA estimates is substantial (more than 2 million square feet); however, use of WUA and the 5 percent criterion for describing relative differences between alternatives is appropriate. No attempt is made to relate WUA to actual fish abundance.

The similarity (5 percent or less) in WUA amounts have been determined for all species and life stages across all alternatives, as noted in the comment. This is largely due to the small differences in flow predicted between alternatives. While WUA is related to flow, the form of the WUA relationship is such that even small changes in flow may result in large changes in WUA. Therefore, WUA was selected as a more appropriate metric for describing potential changes in habitat than flow changes. The text on page 9-176 has been modified.

The relationships presented in the WUA-Flow tables in Appendix 9E have been modified. Tables 9E.B.8, 9E.B.9, 9E.B.10, and 9E.B.11 have been revised to reflect the relationships in the appropriate source documents. The WUA analysis used the correct WUA relationships, and no changes to the analysis are required.

**SWC 52:** Although the conceptual models identified in California Resources Agency (2007 sic) and Baxter et al. (2008) are untested, they are based on numerous scientific investigations and field data. However, a discussion of entrainment is not appropriate in the life history discussion presented in Appendix 9B and this paragraph has been removed. The text on page 9B-132 of the Draft EIS identified in the comment has now been correctly attributed to USFWS (2012). Support for this conclusion is provided in the paragraphs following the statement.

**SWC 53:** The reference to Reed et al (2014) was included as a supportive reference to support not using a life cycle model, as noted on page 9-115 of the Draft EIS. The text has been modified to avoid confusion.

**SWC 54:** The list of factors affecting SONCC Coho Salmon on page 9-13 of the Draft EIS has been updated and expanded in the Final EIS with a citation to the 2014 Recovery Plan for the ESU.

**SWC 55:** The text on page 9-28 in the Draft EIS regarding movement has been revised in the Final EIS to include data on movement from Snider and Titus

(1998, 2000b, c, d); Vincik et al. (2006); and (Roberts 2007). The sentence on pulse flows has been removed from the Final EIS.

**SWC 56:** Citations supporting the statement on page 9-50 of the Draft EIS referred to in this comment have been added to the Final EIS.

**SWC-57:** The text on page 9-78 of the Draft EIS was modified in the Final EIS to describe methods used to quantify effects on exports on salmonid survival through the inclusion of Cunningham et al. (2015). A reference to Zeug and Cavallo (2012) also was included in the Final EIS to discuss the contrasting approaches and results.

**SWC-58:** The text has been modified in the Final EIS to include a discussion of recent evidence that suggests that there is a relationship between survival and exports and inflows (Cunningham et al. (2015). A reference to Zeug and Cavallo (2012) also was included in the Final EIS to discuss the contrasting approaches and results.

**SWC 59:** The references included in this comment have been reviewed, and where appropriate, the text in Section 9.3 of Chapter 9, Fish and Aquatic Resources, has been modified in the Final EIS.

**SWC 60:** Please see responses to Comments SWC 61 and 62 for response to this comment.

**SWC 61:** The cumulative effects analysis in Chapters 5 through 21 have been modified in the Final EIS to provide more clarity.

**SWC 62:** Text has been added to the cumulative effects discussion in Chapter 9, Fish and Aquatic Resources, to provide more clarity related to stressors on aquatic resources.

Please see response to Comment SWC 61.

**SWC 63:** The Coordinated Operation Agreement (COA) between the United States and the State of California was authorized by Congress in Public Law 99-546 and signed in 1986. Reclamation has reviewed the sections of the document discussing the COA and has modified the text where appropriate. However, as a general matter, Reclamation does not believe that the characterization of the provisions of the COA is inaccurate.

**SWC 64:** On October 9, 2015, the District Court granted a very short time extension to address comments received during the public review period, and requires Reclamation to issue a Record of Decision on or before January 12, 2016. This current court ordered schedule does not provide sufficient time for Reclamation to include additional alternatives, which would require recirculation of an additional Draft EIS for public review and comment, nor does Reclamation believe additional analysis is required to constitute a sufficient EIS. Reclamation is committed to continue working toward improvements to the USFWS and NMFS RPA actions through either the adaptive management process, Collaborative Science and Adaptive Management Program

(CSAMP) with the Collaborative Adaptive Management Team (CAMT), or other similar ongoing or future efforts.

**SWC 65:** As described in Section 3.4.2 of Chapter 3, Description of Alternatives, of the EIS, actions suggested by the Coalition for a Sustainable Delta were included in Alternatives 3 and 4. Two suggested actions were not included in Alternatives 3 or 4 for the following reasons.

- Accelerate the timing of upgrades at the Sacramento Regional Wastewater Treatment Plant from 2020 to 2017: This action is currently under construction to be fully completed prior to 2030. Therefore, these upgrades would be completed by 2030 under the No Action Alternative, Second Basis of Comparison, and Alternatives 1 through 5. Because the EIS analysis is conducted at 2030, accelerating the completion of these actions would not change conditions at 2030.
- The limited water supply available to Reclamation on the Stanislaus River through water rights associated with the New Melones Reservoir are fully committed to multiple beneficial uses, including those on the Stanislaus River. The Vernalis Adaptive Management Program allowed for additional sources of water, other than available water within New Melones Reservoir to be used to maintain flow in the San Joaquin River. After the completion of this program, Reclamation does not have sufficient supply available in New Melones Reservoir to meet inflow targets suggested by CSD. Therefore, the I:E ratio can only be met through export limitations, and not through releases from New Melones Reservoir.

**SWC 66:** Comment noted.

**SWC 67:** The text in Section 23.4 of Chapter 23, Consultation and Coordination, of the Draft EIS included a discussion of the inclusion of the State Water Contractors and several other interest groups in the preparation of the EIS. However, these entities were not considered to be NEPA Cooperating Agencies because they are not public agencies, as required by NEPA (see 40 CFR 1508.5).

**SWC 68:** At the time of the review of the Administrative Draft EIS, the Amended Judgement dated September 30, 2014 issued by the United States District Court for the Eastern District of California (District Court) in the *Consolidated Delta Smelt Cases* required Reclamation to issue a Record of Decision by no later than December 1, 2015. Due to this requirement, Reclamation did not have sufficient time to extend the review period.

**SWC 69:** Reclamation was directed by the District Court to remedy its failure to conduct a NEPA analysis when it accepted and implemented the 2008 USFWS BO RPA and the 2009 NMFS BO RPA pursuant to the Federal Endangered Species Act of 1973 (ESA) as amended (United States Code [U.S.C.] 1531 et. seq.). In order to satisfy the Court's directive, Reclamation has analyzed operation of the CVP, in coordination with the operation of the SWP, consistent with the BOs, as well as alternatives which represent potential modifications to the continued long-term operation of the CVP in coordination with the SWP.

The purpose of the action, as described in Chapter 2, Purpose and Need, considers the purposes for which the CVP was authorized, as amended by CVPIA, as well as the regulatory limitations on CVP operations, including applicable state and federal laws and water rights. This purpose statement does not limit the analysis of the range of alternatives which includes alternatives with CVP and SWP operational assumptions substantially different than historic operational parameters.

**SWC 70:** As described in Section 3.3, Reclamation had provisionally accepted the provisions of the 2008 USFWS BO and 2009 NMFS BO, and was implementing the BOs at the time of publication of the Notice of Intent in March 2012. Under the definition of the No Action Alternative in the National Environmental Policy Act regulations (43 CFR 46.30), Reclamation's NEPA Handbook (Section 8.6), and Question 3 of the Council of Environmental Quality's Forty Most Asked Questions, the No Action Alternative could represent a future condition with "no change" from current management direction or level of management intensity, or a future "no action" conditions without implementation of the actions being evaluated in the EIS. The No Action Alternative in this EIS is consistent with the definition of "no change" from current management direction or level of management. Therefore, the RPAs were included in the No Action Alternative as Reclamation had been implementing the BOs and RPA actions, except where enjoined, as part of CVP operations for approximately three years at the time the Notice of Intent was issued (2008 USFWS BO implemented for three years and three months, 2009 NMFS BO implemented for two years and nine months).

As described in Section 3.3, Reclamation included the Second Basis of Comparison to identify changes that would occur due to actions that would not have been implemented without Reclamation's provisional acceptance of the BOs, as required by the District Court order. However, the Second Basis of Comparison is not consistent with the definition of the No Action Alternative used to develop the No Action Alternative for this EIS. Therefore, mitigation measures have not been considered for changes of alternatives as compared to the Second Basis of Comparison.

**SWC 71:** Please see response to Comment SWC 5.

**SWC 72:** In response to criticism of Feyrer et al. (2011) in Manly et al. (2015), Feyrer et al. (2015) agree that conductivity and secchi depth alone could not match observed proportions of delta smelt in certain regions as well as those variable and the 13 regional indicator variables constructed in Manly's paper could. However, they point out that dividing the Delta into 13 arbitrarily determined regions does not provide any insight into what other factors that affect Delta Smelt proportional abundance might be, and without support from a particular hypothesis, lead to mechanistically uninterpretable results that provide no insight for how climate change or other ecological processes might affect Delta Smelt distribution and abundance. While Delta Smelt can tolerate a range of salinities, there is a general consensus that the centroid of the population tends to be associated with the low salinity zone (Sommer et al. 2011). Murphy and

Hamilton (2013) do not convincingly refute the eastward migration of Delta Smelt pre-spawn movements. Their maps (Figures 3-6) lack resolution because they only contrast stations that collectively represent 90 percent of the catch to stations that collectively represent 9 percent of the catch. Thus, it is impossible to see proportional shifts in the population from their analysis. With respect to the biases identified by Miller (2011) in Kimmerer (2008), Kimmerer (2011) only adjusted one of his assumptions slightly in response to Miller (2011) in his modeling exercise for proportional entrainment. This adjustment did not change the conclusions from his earlier paper.

It is not clear from the comment which assertions should have been referencing Maunder and Deriso (2011 and 2014). And it is also not clear in what context the longfin smelt studies identified in poster and oral conference presentations should be mentioned. The effective population size analysis for Delta Smelt had wide confidence intervals and is undergoing further investigation by its authors.

The relevance of the independent science reviews of the RPA actions was considered. The findings are noted as information that indicates the uncertainties of the ongoing science and the need for continuation of the adaptive management process, and the Collaborative Science and Adaptive Management Program (CSAMP) with the Collaborative Adaptive Management Team (CAMT).

**SWC 73:** This was a comment on the Administrative Draft EIS, but has relevance to review of the Draft EIS when specific comments were not fully addressed by the changes made in the Draft EIS.

A change of greater than 5 percent in entrainment was considered substantial. It was concluded in Chapter 9, Fish and Aquatic Resources, that entrainment under Alternative 3 and the No Action Alternative would be similar.

The tables in Appendix 9G did not include rounded numbers as intended, and has been updated in the Final EIS.

Background information on the trap and haul program associated with Alternatives 3 and 4 was added to the Final EIS as Appendix 9O. This information was used in the qualitative assessment of the trap and haul program in preparation of the Draft EIS.

The species effect summaries under Alternatives 3 and 4 in the Final EIS were revised to include a qualitative assessment of the effects of the proposed trap and haul program for salmonids.

The discussion and analysis of the predator control program was substantially changed from the Administrative Draft EIS in the Draft EIS in response to this comment and similar comments.

**SWC 74:** More details have been included in Section 9.4.3 of Chapter 9, Fish and Aquatic Resources, in the Final EIS to qualitatively respond to RPA actions not included in the CalSim II model in the No Action Alternative and Alternatives 2 and 5.

**SWC 75:** Please see response to Comment SWC 15.

**SWC 76:** The quantitative effects of climate change with the implementation of the No Action Alternative, the Second Basis of Comparison, and Alternatives 1 through 5 are presented throughout the EIS. The effects of increased use of groundwater pumps driven by diesel engines on greenhouse gas emissions are discussed in Chapter 16, Air Quality and Greenhouse Gas Emissions. Because land use is not anticipated to substantially change under the alternatives, greenhouse gas emissions associated with agricultural production, industrial production, and water and wastewater treatment are not anticipated to change in the CVP and SWP water service areas.

**SWC 77:** Please see response to Comment SWC 61.

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