33.10.22 Lakeshore Heights Municipal Water Company

LHMWC1

PUBLIC COMMENT CARD

Name: Paul Smith Organization: LHMWC

Address: 20322 Lakeview Dr Lakehead CA 96051

Email: pslake1@gmail.com

LHMWC1-1 Comment: I represent Lakeshore Heights mutual water company. we have 66 home plus Lakeshore inn & RV and the Forest Service on our water system. If this passes we will loose approximately 20% of our owners. this also means we will become insolvent. We have a 40 year USDA loan with 35 years left. this means the remaining homes will be without water. Without water the Rest of the homes have no value. there are multiple water districts in Lakehead that will also be affected. You have not taken this into account when identifying the loss to this town. Affectively the town will be gone. Currently this Study Has had detrimental affect on the value of property. this community has mostly Retired people the loss ~~of~~ of their Homes will devistate their Lives.

LHMWC1-2

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Responses to Comments from Lakeshore Heights Municipal Water Company

LHMWC1-1: Thank you for your comment on the DEIS for the SLWRI, we appreciate your time in commenting on the document. Reclamation acknowledges that the Lakeshore Inn & RV and Forest Service Station will be inundated and no longer require water service in this location. According to Reclamations real estate analysis, which was the basis of the DEIS Real Estate Appendix, about eight parcels west of the railroad tracks will be taken out of service. A sensitivity analysis performed in 2012 by Reclamation, which included structural surveys showed that the number of affected parcels could be less than eight.

Please refer to Master Comment Response UR-1, "Effects to Water and Wastewater Infrastructure around Shasta Lake."

LHMWC1-2: Please refer to Master Comment Response PLAR-1, "Effects to Private Residences and Businesses."

33.10.23 Lakeshore Heights Municipal Water Company

LHMWC2

LAKESHORE HEIGHTS MUTUAL WATER COMPANY

P.O. Box 313 • Lakehead, CA 96051

BOARD OF DIRECTORS

Dennis Flynn, President (530) 238-8616 | Paul Smith 238-8833 | Les Due 704-462-5132 | Vic Voss 238-8821

Sandy Drake 238-8150 | Doyle Martin 238-8831 | Lee Cobb 238-2424 | Mike Sid 916-599-9134

STAFF: Ray Smith, Jr., Plant Operator 238-9627 | Maureen Sechrengost, Secretary/Treasurer 238-8838 | Ernie Goff, Certified Water Systems Operator

SEP 30 2013

September 27, 2013

Bureau of Reclamation
Attn: Katrina Chow
2800 Cottage Way, MP-700
Sacramento, CA 95825
bor-mpr-slwri@usbr.gov

B Duncan
18 Oct 13
to: K Chow

These are comments we wish to be included as part of the 90-day public review and comment period for the Shasta Lake Water Resources Investigation (SLWRI) Draft Environmental Impact Statement (EIS).

LHMWC2-1 We are a private mutual water company that serves a community in an identified potentially-affected location near the shore of Shasta Lake. (Please see the attached map showing our water service area.) Individual property owners in our subdivision have been notified of their possible condemnation due to either water level, road or railroad relocation necessity, or that their private septic system may be impacted by raising the level of the lake waters.

LHMWC2-2 In 2006, we obtained a grant and 40-year loan package from the USDA Rural Development for several system improvements, including a government-mandated filtration plant. Our annual interest and principle payments for this loan are approximately $19,800, which is divided equally by our 92 shareholders. We have 33 years remaining on the loan, with a current balance due of approximately $346,000.

We do not know how much of our system would be affected by higher lake levels, but even if just 25% of our property-owners lose their properties to this project, it will create a hardship to the remaining residents in their commitment to repay this government loan.

LHMWC2-3 Additionally, there would be new costs incurred to accommodate any required infrastructure changes to our system. If road relocations were to be necessary, it is conceivable that our entire system of water main lines would need relocation.

LHMWC2-4 We want to make sure that projects such as this are given proper consideration in review of cost estimates for the proposed project.

LHMWC2-5 Individually, many of our residents object to the project on many different points, including the right to enjoyment of private property, but as a mutual water company, we want to submit the facts included here, as we do not believe this type of financial impact has yet been considered by the Bureau.

Thank you,

Dennis Flynn

Dennis Flynn
President of the Board

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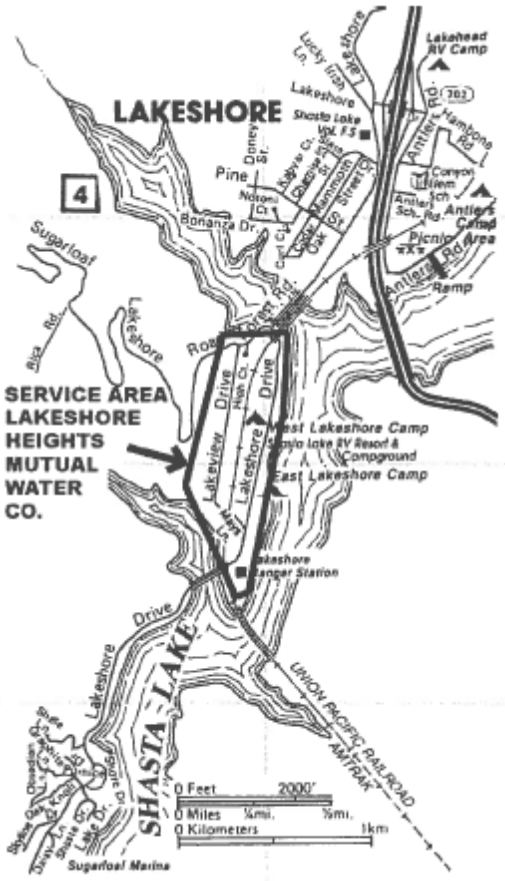


Responses to Comments from Lakeshore Heights Municipal Water Company

LHMWC2-1: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

LHMWC2-2: The number of landowners within each water service area that would be affected varies by the action alternative. Based on preliminary real estate analysis it is estimated that approximately 10% of the current property owners that comprise the customer base would be affected by inundation. It is not anticipated that facility relocations would affect the number of customers served. As discussed above Reclamation will relocate affected water services to maintain service to non-inundated structures at no cost to landowners as Reclamation will fund these relocation actions. These actions will prevent loss of customers that remain after lake enlargement, however, a net loss of water service area landowners may occur due to inundation which could affect the financial ability of water service providers to repay loans. Reclamation has not performed an evaluation to determine whether changes due to the implementation of the action alternatives would make a substantial change in local water service provider's budgets to the extent of potential insolvency. However, in addition to replacing water

distribution facilities as part of each alternative, Reclamation will also be providing new wastewater treatment facilities. As development of vacant lands can be limited in this area due to appropriate soil conditions for septic systems and required setbacks from the reservoir shoreline, new wastewater facilities could provide for potential expansion for the customer base in this area. Reclamation would consider providing additional wastewater connections in this area to maintain the customer base.

Please also refer to Master Comment Response UR-1, "Effects to Water and Wastewater Infrastructure around Shasta Lake."

LHMWC2-3: Please refer to Master Comment Response UR-1, "Effects to Water and Wastewater Infrastructure around Shasta Lake."

LHMWC2-4: Please refer to Master Comment Response COSTEST-1, "Development of Cost Estimates."

LHMWC2-5: Please refer to Master Comment Response UR-1, "Effects to Water and Wastewater Infrastructure around Shasta Lake."

33.10.24 Northern California Power Agency

NCPA

Katrina Chow
Project Manager, SLWRI
U. S Bureau of Reclamation, Planning Division
2800 Cottage Way
Sacramento, CA 95825

Reclamation issued a Draft Environmental Impact Statement (DEIS) for the Shasta Lake Water Resource Investigation on June 28, 2013 and requested written comments by September 30, 2013. The Northern California Power Agency (NCPA) offers the following comments on the power portions of the DEIS.

NCPA-1 The hydropower section on page 8 of the Executive Summary states that over the next 10 years California's peak demand is expected to increase 30 percent, from about 50,000 megawatts to about 65,000 megawatts. The 50,000 megawatt peak demand is correct for the part of California operated by the California Independent System Operator but does not include the other control area demand in California, such as Imperial Irrigation District, Los Angeles Department of Water and Power, and the Balancing Authority of Northern California. In total, California's current peak demand exceeds 60,000 megawatts. In addition, the California Energy Commission projects California's peak demand will increase by approximately 1.3 percent per year. The language in the hydropower section on page 16 of chapter 1 should also be changed to reflect these corrections.

NCPA-2 This generation data for potential benefits that is shown in Table 4-4 of the Plan Formulation Appendix conflicts with the potential generation benefits shown for the five comprehensive plans (CP) starting on page 2-38 in Chapter 2 and in the Plan Formulation Appendix.

NCPA-3 It appears data contained in Tables 23-3 though 23-7 of Chapter 23, Power and Energy, was used to develop the generation impact for the five CP's by adding the generation data in Impact Hydro – 2 - Decrease in CVP System Energy Generation with the data in Impact Hydro – 3 – Decrease in SWP System Energy Generation. That computation, however, overstates the additional generation developed by the CP alternatives. The data contained in Impact Hydro – 6 – Decrease in Pit 7 Powerplant Energy Generation needs to be subtracted from the additional generation derived from Hydro 2 and 3 to obtain the true generation impact for each CP. In addition, the report needs to clearly state how the generation data for each CP is developed.

NCPA-4 The Impact Hydro – 1- Decrease in Shasta Powerplant Energy Generation category should be eliminated in all the tables in Chapter 23 since Shasta generation is included in Impact Hydro 2. Including the same Shasta energy generation in both categories is duplicative and leads to confusion regarding the total generation increase for each CP. Impact Hydro 4 and 5 should be extracted from the current tables and placed in separate tables so generation impacts are shown in one table and pumping impacts in another.

NCPA-5 Since some of the generation benefit accrues to the State Water Project (SWP), the report should clearly state that the proportional project cost associated with SWP power benefits will be allocated to SWP for repayment. The DEIS should state that a long term contract will need to be negotiated with the SWP to ensure the repayment of the allocated cost associated with the SWP benefits.

NCPA-6 Chapter 23, Section 23.1 should be corrected to state that power is marketed by the Western Area Power Administration, not the Western Power Authority.

NCPA-7 Chapter 23, Section 23.2, omits an important proposed regulation by the State Water Resources Control Board (SWRCB) that could have a significant effect on each CP. The SWRCB has proposed implementation of unimpaired flow criteria for both the San Joaquin and Sacramento rivers. If that flow criteria is placed into effect, the calculated benefits for each CP will be greatly altered. In addition, Reclamation has recently made water releases for fishery that reduces reservoir storage (i.e. Trinity River), or bypasses generation (i.e. Folsom Dam) to meet other regulatory requirements. The affect of implementing these potential regulation requirements on Shasta Lake needs to be addressed in the DEIS.

Thank you for your consideration of these comments.

Jerry Toenyes
Consultant, NCPA

Responses to Comments from Northern California Power Agency

NCPA-1: The editorial recommendations submitted by the comment author have been incorporated into Chapter 1, "Introduction," and Section 1.2.2, "Project Need-Hydropower."

NCPA-2: Table 4-4 of the Plan Formulation Appendix was developed using operational modeling performed with regulatory assumptions appropriate for that time. During the plan formulation and DEIS development changes in the regulatory environment led to updates in the CalSim-II operational modeling and subsequent analysis, including power generation, for use in both the Plan Formulation Report and the DEIS. These changes are documented in the Plan Formulation Report, Chapter 5 Comprehensive Plans, Section "Refinement of Comprehensive Plans for the DEIS." Table 5-10 of the PFA includes the results of this updated modeling and matches the numbers reported in the DEIS.

NCPA-3: As defined and used in the DEIS in Chapter 23, "Power and Energy," Impact Hydro-2, "Decrease in CVP System Energy Generation," and Impact Hydro-3, "Decrease in SWP System Energy Generation," are each evaluated independently and are not added for any purpose. Impact Hydro-6, "Decrease in Pit 7 Powerplant Energy," is evaluated independently and is not combined with any other impact for any purpose. As described in the DEIS Chapter 23, "Power and Energy,"

Sections 23.3.2, “Methods and Assumptions,” CVP and SWP hydropower generation was simulated using the Benchmark Study Team (BST) power modeling tool LTGen, Version 1.18, and SWPPower, BST April 2010 Version, for CVP and SWP facilities, respectively, the Pit 7 Powerplant was evaluated using a custom designed power processing tool. Further details on these tools and more detailed results are included in the Modeling Appendix, Chapter 8, “Hydropower Modeling.”

NCPA-4: DEIS Chapter 23, "Power and Energy," Section 23.3.2, "Criteria for Determining Significance of Effects," defines the metrics that were developed for evaluating project impacts on hydropower generation and use. Impact Hydro-1 “Decrease in Shasta Powerplant Energy Generation," and Impact Hydro-2 “Decrease in CVP System Energy Generation," categories included in the referenced tables specifically to provide data to support corresponding impact evaluations. Text has been revised in the Final EIS to clarify why Shasta was including both individually and in the CVP system total and the appropriate use of each value. The generation and pumping were presented in the same table to group the results by the impacted power system, the CVP and the SWP. Efforts were made to simplify the document as much as feasible while disclosing environmental effects to the extent required to meet current legal requirements for full disclosure.

NCPA-5: As indicated in Chapter 23, “Power and Energy,” of the DEIS, changes in net generation within SWP facilities due to a potential Shasta Dam enlargement would be negative for all alternatives. In addition, this comment appears to be related to the preliminary cost allocation analysis completed for the Draft Feasibility Report, which was released to the public in February 2012. Please see Master Comment Response COST/BEN-5, “Potential Project Financing.”

NCPA-6: Text has been revised in Final EIS.

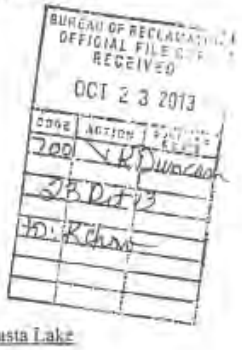
NCPA-7: Reclamation does not include all proposed regulations in NEPA document project impact analysis as they are in flux until adopted. Any reasonably foreseeable actions are included in the cumulative impact analysis. The State Water Board proposed implementation of new flow standards was not evaluated as a reasonably foreseeable action.

33.10.25 Natural Resources Defense Council

NRDC1

NRDC

NATURAL RESOURCES DEFENSE COUNCIL



September 30, 2013

Ms. Katrina Chow
United States Department of the Interior
Bureau of Reclamation, Mid-Pacific Region
2800 Cottage Way, MP-700
Sacramento, CA 95825

SENT VIA EMAIL TO KChow@usbr.gov AND VIA U.S. MAIL

Re: Comments on the Draft Environmental Impact Statement for the Shasta Lake Water Resources Investigation

Dear Ms. Chow:

NRDC1-1 On behalf of the Natural Resources Defense Council ("NRDC"), which has more than 1.3 million members and activists, 250,000 of whom are Californians, we are writing to provide comments on the inadequacy of the draft Environmental Impact Statement ("DEIS") for the Shasta Lake Water Resources Investigation ("SLWRI").[1] The DEIS evaluates the potential ← NRDC1-7

[1] The DEIS states that "[t]his document has also been prepared in accordance with the California Environmental Quality Act (CEQA)." DEIS at ES-1. However, the document is clearly not CEQA compliant. First, there is no state lead agency, and no state agency is listed as a "cooperating agency" in the DEIS. *Id.*; *see* Cal. Pub. Res. Code § 21082.1 (EIR "shall be prepared directly by, or under contract to, a public agency"); tit. 14 Cal. Code Regs. § 15379 ("'public agency'" "does not include agencies of the federal government").

NRDC1-2 Further, the DEIS fails to identify an environmentally superior alternative, *see* tit. 14 Cal. Code Regs. §15126.6(e)(2), and improperly defers mitigation measures to the future. *See id.* § 15126.4(a)(1)(B); *City of Long Beach v. Los Angeles Unified Sch. Dist.*, 176 Cal. App. 4th 889, 915-16 (2009) ("Impermissible deferral of mitigation measures occurs when an EIR puts off analysis or orders a report without either setting standards or demonstrating how the impact can be mitigated in the manner described in the EIR."); *see, e.g.*, DEIS at 25-39 (with respect to impacts to McCloud River, stating "[n]o specific mitigation measures are proposed at this point in the planning process" and referencing "Comprehensive Mitigation Strategy"); *id.* at 2-27 to 2-28 (brief discussion showing Comprehensive Mitigation Strategy devoid of details and standards).

NRDC1-3 The DEIS also fails to even determine whether impacted tribal archaeological sites qualify as historical resources, as required by tit. 14 Cal. Code Regs. § 15064.5(c), and does not address California's stringent requirements for mitigating impacts to historic resources, *see id.* § 15126.4(b). *See* DEIS at 14-12 to 14-18, 14-23. The DEIS also notes that, "formal CEQA scoping has not been initiated," despite the fact that scoping begins the CEQA process. DEIS at

NRDC1-4

NRDC1-5

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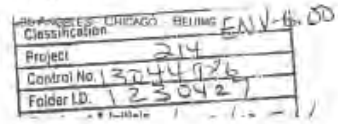

NRDC1-7 CONTD

environmental effects of five alternative plans to enlarge Shasta Dam and Reservoir, each of which purportedly has the primary purposes of (1) increasing anadromous fish survival in the Sacramento River, primarily upstream from Red Bluff Pumping Plant, and (2) increasing water supply and water supply reliability for agricultural, M&I, and environmental purposes, to help meet current and future water demands, with a focus on enlarging Shasta Dam and Reservoir. DEIS at ES-6.

NRDC1-8

Unfortunately, the DEIS is fundamentally flawed. First, the DEIS fails to analyze an adequate range of alternatives. None of the alternatives achieve the "coequal" primary purpose of increasing anadromous fish survival, and the Bureau of Reclamation ("Bureau") unlawfully rejected federal agency recommendations to consider additional alternatives that would help achieve that primary purpose.

NRDC1-9

Second, the project purposes are unlawfully narrow; the purposes fail to reference the Bureau's legal obligations to achieve anadromous fish doubling under the Central Valley Project Improvement Act ("CVPIA"), and the narrow purpose inappropriately excluded alternatives that would not involve expanding the dam but could benefit anadromous fish, provide water supply flexibility and improvements in water supply.

NRDC1-10

Third, the DEIS fails to adequately analyze the impacts of those alternatives, including impacts on anadromous fish survival, tribal resources, and cumulative impacts.

NRDC1-11

The analysis presents biased results, presents conclusions that are not supported by substantial evidence, and ignores contrary analysis provided by state and federal agencies.

NRDC1-12

The proposed project is also fatally flawed because the DEIS demonstrates that all of the alternatives would cause significant, unmitigated impacts on tribal resources

NRDC1-13

and would unlawfully impair the legally protected trout fishery

NRDC1-14

and wild and scenic values of the McCloud River (California Public Resources Code section 5093.542).

NRDC1-15

This project, and the millions of dollars spent on related studies and this environmental analysis, represents an unacceptable waste of millions of taxpayer dollars. Accordingly, we recommend that the Bureau withdraw the DEIS and terminate the SLWRI study.

NRDC1-16

Should the Bureau decide to continue consideration of the SLWRI, the Bureau must prepare and recirculate a legally adequate feasibility study and EIS/EIR, consistent with NEPA and CEQA.

On the pages that follow, we discuss these issues in greater detail.

NRDC1-5 CONTD

ES-36.

NRDC1-6

Finally, the DEIS is deficient under CEQA for the same reasons the document fails to comply with NEPA, including, *inter alia*, its failure to analyze a reasonable range of alternatives, its unlawfully narrow project objectives, its failure to accurately analyze the effects of alternatives, and its failure to adequately analyze cumulative impacts. An adequate analysis of alternatives and impacts is required, consistent with CEQA.

I. The DEIS Fails to Consider a Reasonable Range of Alternatives

NRDC1-17 Pursuant to the National Environmental Policy Act ("NEPA"), an environmental impact statement must consider a reasonable range of alternatives. 42 U.S.C. § 4332; 40 C.F.R. §§ 1502.14, 1508.25(b). "The existence of a viable but unexamined alternative renders an environmental impact statement inadequate." *Natural Res. Def. Council v. U.S. Forest Serv.*, 421 F.3d 797, 813 (9th Cir. 2005) (quotation marks and citation omitted).

NRDC1-18 The DEIS clearly fails to include a reasonable range of alternatives because although water supply and increased anadromous fish survival are of "coequal priority," DEIS at ES-6, as discussed in detail *infra*, none of the alternatives are likely to substantially increase anadromous fish survival.

NRDC1-19 One of the DEIS's most glaring deficiencies is its failure to consider an alternative that meets both primary objectives, and does not include raising Shasta Dam. In June 2008, the U.S. Fish and Wildlife Service ("FWS") prepared a report pursuant to the Fish and Wildlife Coordination Act in which it recommended that "Reclamation should include a SLWRI alternative that evaluates the capability of increasing anadromous fish survival and water supply reliability without raising Shasta Dam." U.S. Fish and Wildlife Service, *Draft Fish and Wildlife Coordination Act Report for the Shasta Lake Water Resources Investigation* vii (June 2008) (hereinafter "FWS Report").[2] The report detailed the components of such an alternative, including modifying Shasta Dam's temperature control device, increasing water use efficiency, and making operational changes to Shasta Dam to increase cold water storage and increase minimum flows. *Id.* at 16-17, 22-23.

NRDC1-20 There are dozens of similar measures that could have been considered in a no-dam-raise alternative, including conjunctive management and water recycling. Analysis of an alternative with components like these likely would have shown that it is possible to improve water supply and anadromous fish survival at a lower cost than spending billions of dollars raising Shasta Dam.

NRDC1-21 The Bureau, however, failed to include a single alternative that did not involve raising the Dam. Had it done so, it would have been able to avoid some of the most substantial impacts that plague each of the proposed action alternatives, including violating Section 5093.542 of the California Public Resources Code by impairing flows on the McCloud River and harming its trout fishery, and permanently impairing culturally significant tribal resources.

NRDC1-22 In addition to a no-dam-raise alternative, the Bureau failed to consider other alternatives that combined dam expansion with measures that could provide substantial increases in anadromous fish survival. Notably, the FWS explicitly recommended several such measures that should be analyzed as part of one or more alternatives.

NRDC1-23 For example, the FWS Report recommended analyzing an alternative that included increasing minimum flows in the upper Sacramento from

NRDC1-19 CONTD [2] The FWS Report is available online at: www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=14138 and is hereby incorporated by reference.

the current 3,250 cfs to 4,000 cfs from October 1 through April 30, if end-of-September storage is 2.4 MAF or greater. FWS Report at vi. This could have resulted in expanded spawning habitat, reduced redd dewatering, improved migratory survival, and other benefits to anadromous fish survival. FWS Report at 16-17; *see, e.g.*, National Marine Fisheries Service, *Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and State Water Project* (2009) (hereinafter "NMFS 2009 BO").[3] The DEIS failed to analyze increased minimum flows in any of the action alternatives. *See* DEIS at 2-18 (dismissing need for such analysis). FWS also recommended modifications to Shasta's storage and release operations to provide pulse flows to improve the quality of aquatic habitat. FWS Report at 22. These actions could improve migratory survival of juvenile anadromous fish, provide geomorphic flows to improve habitat, and provide other benefits. *See, e.g.*, DEIS at 11-269. The DEIS, however, failed to analyze any alternative that included modifications to Shasta's storage and release operations. While CP4 purports to include dedicated storage for the cold water pool,[4] it does not increase carryover storage requirements for Shasta reservoir; an alternative that increased carryover storage requirements would have helped to ensure adequate cold-water reserves in the reservoir to improve downstream temperatures and thus anadromous fish survival. *See, e.g.*, NMFS 2009 BO. Yet the DEIS failed to analyze any alternative that increased the carryover storage requirement.[5]

The DEIS also fails to consider a reasonable range of alternatives because all of the alternatives would violate state and federal law by unlawfully degrading the wild and scenic characteristics of the McCloud River and its protected trout fishery. As discussed *infra*, the DEIS appropriately concludes that each action alternative would violate California law (and thus violate federal law) by impairing the McCloud's trout fishery and free-flowing condition. *See* DEIS at ES-30 (listing as a significant and unavoidable impact the "Effect on McCloud River's eligibility for listing as a Federal Wild and Scenic River and conflicts with the California Public Resources Code, Section 5093.542 (all action alternatives)"); *see* DEIS at ES-122 to ES-123. Yet the DEIS failed to analyze a single alternative that would avoid these impacts and thus comply with state and

NRDC1-23 CONTD

NRDC1-24

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NRDC1-28

NRDC1-29

[3] The 2009 BO is available online at: http://swr.nmfs.noaa.gov/ocap/NMFS_Biological_and_Conference_Opinion_on_the_Long-Term_Operations_of_the_CVP_and_SWP.pdf and is hereby incorporated by reference.

[4] The DEIS also fails to adequately explain whether and how the benefits of increased storage for anadromous fish would be reasonably certain to occur, without increasing existing carryover storage requirements or other regulatory standards.

[5] The eight management measures common to every alternative do not meaningfully improve conditions for anadromous fish survival; instead, at best they simply maintain status quo conditions in light of modifications to the dam. DEIS at ES-12. In addition, alternatives CP4 and CP5 include minimal spawning gravel augmentation and habitat restoration. DEIS at ES-19 to ES-21. However, these measures appear to only "partially offset" the impacts of the loss of geomorphic flows on downstream habitat. *See* DEIS at 11-270.

NRDC1-23 CONTD

NRDC1-26

NRDC1-27

NRDC1-29 CONTD federal law. Because each proposed alterative violates state and federal law and none of the alternatives lawfully may be implemented, the range of alternatives is clearly unreasonable.

NRDC1-30 In order to analyze a reasonable range of alternatives, the DEIS must include one or more alternatives that do not expand the reservoir but still improve water supply and anadromous fish survival, one or more alternatives that meaningfully improve anadromous fish survival, and one or more alternatives that do not violate state and federal law.

II. The DEIS Utilizes an Unlawfully Narrow Project Purpose and Objectives

NRDC1-31 The DEIS also fails to comply with NEPA because it defined the project's objectives in unreasonably narrow terms. *See Nat'l Parks & Conservation Ass'n v. Bureau of Land Mgmt.*, 606 F.3d 1058, 1070 (9th Cir. 2010) ("An agency may not define the objectives of its action in terms so unreasonably narrow that only one alternative from among the environmentally benign ones in the agency's power would accomplish the goals of the agency's action, and the EIS would become a foreordained formality." (quotation marks and citation omitted)).

NRDC1-32 First, the Bureau's water-supply focused objective is narrowly defined to require the raising of Shasta Dam. DEIS at ES-6 (water supply goal includes "a focus on enlarging Shasta Dam and Reservoir"). This definition is inappropriate because it unreasonably forecloses the possibility that both the water supply and anadromous fish survival objectives could feasibly be achieved without increasing the Reservoir's capacity.

NRDC1-33 Second, the fish-focused primary objective is narrowly drawn to ignore the CVPIA's salmon-doubling requirement. *See* P.L.102-575, § 3406(b)(1) (CVPIA § 3406(b)(1)). Because the Bureau's operation of Shasta Dam must comply with the CVPIA, the statute's command that the Secretary of Interior make "all reasonable efforts" to ensure that "natural production of anadromous fish in Central Valley rivers and streams will be sustainable, on a long-term basis, at levels not less than twice the average levels attained during the period of 1967–1991" must have been explicitly incorporated into the DEIS's fish-focused objective and progress towards that objective evaluated in the DEIS. *Id*.[6]

NRDC1-36 By narrowly defining project objectives that fail to reference the Bureau's mandatory obligations under the CVPIA and which apparently preclude alternatives that would not expand the Dam but

[6] The DEIS acknowledges the CVPIA's salmon-doubling goal, but states that it will only be included in a qualitative cumulative impacts assessment. DEIS at 3-23 to 3-24. This is inadequate in light of the Bureau's legal obligations under the CVPIA, the terms and conditions of the Bureau's water rights, and state law. It is also inaccurate, as nowhere in Chapter 11 does the DEIS analyze the cumulative effects of the project in meeting the Bureau's obligations under section 3406(b)(1) of the CVPIA.

NRDC1-34 In addition, as discussed *infra*, modeling tools exist to

NRDC1-35 quantitatively analyze the impacts on anadromous fish abundance and achievement of the salmon-doubling goal under CVPIA.

NRDC1-36 CONTD

would otherwise achieve improved water supply and anadromous fish survival, the DEIS's project purpose and objectives violate NEPA.

III. None of the Alternatives is Likely to Achieve the DEIS's Coequal Primary Objective of Increasing Anadromous Fish Survival

The alternatives analyzed in the DEIS were clearly unreasonable because none meets the primary project objective of increasing anadromous fish survival in the upper Sacramento River. Commenting on the SLWRI Plan Formulation Report, the FWS highlighted the minimal benefits provided to anadromous fish:

> Only one alternative (CP4) provides *any* measurable benefit to anadromous fish survival, and even under that alternative, in the vast majority of years the enlarged cold water pool results in either negligible or slightly negative impacts to Chinook salmon survival. In about 90 percent of the years, there would be no benefit to anadromous fish survival. Even in CP4, the benefits of an enlarged cold water pool for each of the four runs of Chinook salmon are limited to a few critical and dry water years representing 6 – 16 percent of the water years, based on the 1922 – 2002 period of simulation.

NRDC1-37

FWS Report at v (emphasis in original). Similarly, commenting on the SLWRI Feasibility Report, the California Department of Fish and Wildlife ("CDFW") stated that "[o]nly in one alternative (CP4) does enlarging the cold water pool provide benefits to anadromous fish survival. However, it appears that the benefits to anadromous fish are limited to a few critical and dry water years representing 5% to 10% of the 1922-2003 period of simulation." Cal. Dept. of Fish and Wildlife, *SLWRI Comments on the Public Draft of the Feasibility Report, and Selected Attachments, January 2013* (February 8, 2013) at 5 ("CDFW, Attachment 1").

NRDC1-38

In spite of these agencies criticisms, the alternatives analyzed in the DEIS are similar to those presented in the Plan Formulation and Feasibility Reports, and analysis of the DEIS's alternatives continues to show insubstantial benefits to anadromous fish survival. The DEIS's flawed analysis makes clear that even alternative CP4, which is the most "fish friendly" alternative analyzed in the DEIS, will fail to increase anadromous fish survival in the vast majority of years.[7]

NRDC1-38 CONTD

[7] Our comments focus on alternative CP4 because it purports to provide the greatest benefits to anadromous fish, and the DEIS's flawed methodology demonstrates that other alternatives provide even worse outcomes for anadromous fish survival. *See, e.g.*, DEIS at 11-93 to 11-110 (showing decreased winter run and late fall run production under CP1, and no significant increase in production of other runs); DEIS at 11-98 (showing that alternatives CP1, CP2, and CP5 result in increased mortality of winter run); DEIS at 11-209 to 11-217 (showing that on

NRDC1-39

For example, in most years, CP4 will actually result in *decreased* production for winter-run Chinook salmon. In particular, the DEIS's modeling shows that, compared to existing conditions and the no action alternative, winter-run production will decrease in dry, below normal, above normal, and wet years. DEIS at 11-255. Only in critical years, which represent just 16% of modeled years, will there be any increase in production. *Id.* Thus, in 84% of modeled years, the most fish friendly alternative will have a negative impact on winter-run Chinook salmon, and even the DEIS concludes that, "[w]inter-run Chinook salmon would have an *overall insignificant* increase in production" under CP4. DEIS at 11-256 (emphasis added).

NRDC1-40

The DEIS shows that CP4 will have a similar impact on fall-run Chinook salmon. Compared to existing conditions and the no action alternative, the DEIS concludes that CP4 will cause production to *decrease* in below normal, above normal, and wet years. DEIS at 11-261. Only in critical and dry years, which represent just 30% of modeled years, is fall-run production predicted to improve. *Id.* As a result, in the vast majority of modeled years, the most fish-friendly alternative will result in negative impacts to survival of fall-run Chinook salmon, and the DEIS concludes that overall, CP4 will have an "*insignificant increase in overall production*" of fall-run Chinook salmon. DEIS at 11-262 (emphasis added).

NRDC1-41

Further, as discussed *infra*, the substantial flaws in the DEIS's modeling results cast doubt on even the modest benefits to anadromous fish survival that the DEIS claims. Because the DEIS's flawed analysis shows that no alternative will provide substantial benefits to anadromous fish, the range of alternatives that the DEIS analyzes is clearly inadequate.

IV. The DEIS Fails to Adequately Assess the Impacts of Proposed Alternatives on the Environment, and Fails to Adequately Analyze Cumulative Impacts

NRDC1-42

One of NEPA's primary purposes is "to guarantee relevant information is available to the public." *N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1072 (9th Cir. 2011). The DEIS is deficient because it fails to provide the public with adequate, accurate information that it can use to make an informed comparison of the alternatives that the Bureau did evaluate. *See Natural Res. Def. Council*, 421 F.3d at 811 ("Where the information in the initial EIS was so incomplete or misleading that the decisionmaker and the public could not make an informed comparison of the alternatives, revision of an EIS may be necessary to provide a reasonable, good faith, and objective presentation of the subjects required by NEPA." (quotation marks and citation omitted)).

NRDC1-38 CONTD

average, alternative CP3 results in negative production of endangered winter-run Chinook salmon, threatened spring-run Chinook salmon, and late-fall run Chinook salmon). We also note that the flaws with the analysis of impacts pertain to all of the alternatives in the DEIS.

A. The DEIS Fails to Adequately Analyze Impacts on Anadromous Fish Survival

NRDC1-43 The DEIS relies exclusively on the SALMOD model to quantitatively analyze potential impacts of alternatives on anadromous fish survival. However, given the extensive flaws and limitations of the SALMOD model (*see infra*), and the fact that other modeling tools are available to the Bureau to quantitatively analyze potential impacts, the DEIS fails to adequately analyze the alternatives' impacts on anadromous fish survival.

NRDC1-44 For instance, several other life cycle models are available to the Bureau to quantitatively analyze the impacts of alternatives on survival of winter-run Chinook salmon. The OBAN model[8] is one such model which the Bureau and other federal agencies have utilized as a tool to assess impacts on winter-run Chinook salmon. One of the key advantages of using the OBAN model to analyze impacts is that OBAN can analyze impacts to population abundance over time, whereas SALMOD is limited to analyzing impacts in a single year; in other words, the SALMOD model does not account for the effects of alternatives to previous generations of fish, assuming a constant number of spawning salmon, thus inaccurately describing (and likely understating) the negative impacts of the alternatives to the survival of anadromous fish over multiple generations.

NRDC1-45 The CDFW has likewise identified additional modeling tools that should have been utilized in the DEIS to analyze impacts on anadromous fish survival. *See* CDFW, Attachment 1 at 5-6.

NRDC1-46 The Bureau's failure to analyze impacts with other existing models, including the OBAN model, is inexplicable and violates the agency's obligations to adequately analyze impacts under NEPA.

NRDC1-47 Even the modest benefits to salmon that the DEIS suggests will occur in some years may be offset by negative impacts that each action alternative will cause, and the DEIS fails to adequately analyze these negative impacts.

NRDC1-48 For instance, the DEIS concludes that CP4 and the other action alternatives will reduce the frequency and magnitude of intermediate to high flows, causing a reduction in ecologically important geomorphic processes in the upper Sacramento River. *See* DEIS at 11-269. "[I]ntermediate to large flows [are] necessary for channel forming and maintenance, meander migration, and creation of seasonally inundated floodplains." *Id.*

[8] A description of the OBAN model is available online at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=69587 and is hereby incorporated by reference. It concludes that reduced water temperatures in spawning reaches, increased flows during outmigration, and reduced water exports are the factors most likely to increase abundance of winter-run Chinook salmon. *Id.* The OBAN model is one of several modeling tools utilized by the Bureau and other federal agencies in the administrative draft of the environmental impact report for the Bay-Delta Conservation Plan. *See* http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/BDCP_Effects_Analysis_-_Appendix_5_G_-_Fish_Life_Cycle_Models_3-27-13.sflb.ashx, hereby incorporated by reference. However, we note that there are also scientific concerns with the adequacy and accuracy of the OBAN model, and nothing herein constitutes a waiver of claims regarding the adequacy and accuracy of that model or of the environmental analysis in BDCP.

NRDC1-44 CONTD

NRDC1-48 CONTD

These processes, in turn, are ecologically important for maintaining essential habitat functions and values for anadromous fish. *Id.* Thus, while salmon and other anadromous fish may benefit from slightly decreased water temperatures, each action alternative would reduce the quality of their spawning habitat.[9]

NRDC1-49

Because the impact of this habitat impairment was not included in the Bureau's quantitative modeling under SALMOD, and because the qualitative conclusions regarding impacts do not account for these flow-related impacts, the analysis is inadequate.

NRDC1-50

At a minimum, the DEIS must adequately explain how these impacts can reduce or eliminate the temperature-related benefits.[10] *See N. Alaska Envtl. Ctr. v. Kempthorne*, 457 F.3d 969, 975 (9th Cir. 2006) (NEPA's "'hard look' should involve a discussion of adverse impacts that does not improperly minimize negative side effects.").

NRDC1-51

The DEIS's reliance on CalSim II is also problematic. As the FWS Report pointed out, because CalSim II provides hydrological data in monthly time steps, and flooding and temperature conditions operate on a finer time scale—from hours to weeks—the model is unable to adequately simulate the impacts of each alternative on flooding and temperature conditions. FWS Report at 105. The model's failure to incorporate a finer time scale casts doubt on the accuracy of many of the DEIS's conclusions regarding the hydrologic impacts of the proposed alternatives.

i. The DEIS's reliance on the flawed SALMOD created a misleading overstatement of project benefits to salmon

NRDC1-52

The DEIS's analysis of impacts to salmon relies on the flawed SALMOD model, even though more accurate models are available. The Bureau's failure to utilize the best available science to evaluate and describe the proposed alternatives' impacts on anadromous fish leaves the public with a distorted perception of the project's impacts and benefits, and makes it difficult to meaningfully understand and comment on the alternatives.

NRDC1-53

In its 2008 Fish and Wildlife Coordination Act Report for the SLWRI, FWS described many of the problems with the Bureau's reliance on the SALMOD model. FWS explained that SALMOD is not able to simulate the effects of resource competition and predation among different size classes of the four runs of Chinook salmon and steelhead, and noted that such competition and predation "are thought to be an important source of mortality for salmonids in

NRDC1-48 CONTD

[9] While the DEIS contends that CP4 will provide the greatest benefits for anadromous fish because of the increased cold-water pool, it also concludes that CP3, CP4, and CP5 would cause a more substantial impact to important geomorphic processes than CP1 or CP2 because the larger reservoir size would cause a greater reduction in the frequency and magnitude of intermediate and high flow events. *See* DEIS at 11-224.

NRDC1-50 CONTD

[10] The impact from reductions in the frequency and magnitude of intermediate and high flow events would only be partially offset by the habitat restoration efforts that are included in CP4 and CP5. DEIS at 11-270.

NRDC1-53 CONTD

the Sacramento River." FWS Report at 9. FWS also emphasized that SALMOD is not able to simulate juvenile mortality in the Sacramento River downstream from Red Bluff Diversion Dam.

NRDC1-54

Id. FWS concluded that these flaws cause SALMOD to underestimate mortality to all four salmon runs. *Id.* at 83, 88. It also pointed out that the SALMOD "modeling results in the SLWRI overstate the benefits that the SLWRI would provide for spring-run Chinook salmon"

NRDC1-55

because SALMOD overestimates the number of spring-run spawners returning to the mainstem Sacramento River. *Id.* at 178.

NRDC1-56

The CDFW has raised similarly serious concerns regarding the Bureau's use of SALMOD to analyze the SLWRI. *See* CDFW, Attachment 1; Cal. Dept. of Fish and Wildlife, Shasta Lake Water Resources Investigation, Comments on the Administrative Draft of the Environmental Impact Statement and Environmental Impact Report, Feasibility Report, and Appendices (November 7, 2008) ("CDFW, Attachment 2"). In these comments, CDFW raises significant concerns regarding "overdependence on the SALMOD model in the ADEIS/DEIR and unsubstantiated assumptions driving the model," asserts that "SALMOD has not been accepted by the Department for use in the Central Valley," and identifies other modeling tools and approaches that should be utilized to analyze impacts. *Id.*

NRDC1-57

Even the Bureau has acknowledged the shortcomings of the SALMOD model: The 2008 Biological Assessment for the CVP/SWP Operations Criteria and Plan ("2008 OCAP BA"), for which the Bureau was the lead federal agency, stated that SALMOD has never been peer reviewed, that it cannot account for the impacts of changes in geomorphology, and that the model may be inappropriate where the number of spawners is small (i.e. fewer than 500).[11]

NRDC1-59

In addition to the criticisms raised by the agencies, the SALMOD model fails to account for daily fluctuations in temperature, which can have a profound impact on salmon mortality. SALMOD derived its flow data from CalSim-II, and that data had to be disaggregated from monthly to weekly data. DEIS at 11-59. The DEIS acknowledges that this disaggregation was a potential source of error, *id.*, but does not further acknowledge that using weekly data may mask lethal daily temperature spikes. SALMOD's failure to account for daily temperatures likely causes it to underestimate salmonid mortality. The National Marine Fisheries Service has

[11] *See* Bureau of Reclamation, *Biological Assessment on the Continued Long-Term Operations of the CVP and SWP* (August 2008), App. P at 7-8, available online at: http://www.usbr.gov/mp/cvo/OCAP/sep08_docs/Appendix_P.pdf and hereby incorporated by reference.

NRDC1-57 CONTD

The DEIS acknowledges that the number of spring-run spawners used in their SALMOD modeling (132) was too low to obtain an accurate result. DEIS at 11-55. Yet the DEIS also claims, based on the modeling results, that "[s]pring-run Chinook salmon would have significantly reduced flow- and water temperature-related mortality under CP4" and that "they would experience a significant increase in production during almost all critical water years." *Id.* at 11-259.

NRDC1-58

The Bureau's reliance on the inaccurate modeling results to show benefits to spring-run Chinook salmon is misleading.

NRDC1-59 CONTD

previously expressed concern with the adequacy of the Sacramento River temperature modeling in SALMOD, warning that there is "a great deal of uncertainty in the temperature model results" and that the model fails to accurately account for adaptive management operations. *See* NMFS 2009 BO at 257.

NRDC1-60

SALMOD also inaccurately assesses project versus non-project mortality, asserting that mortality from such factors as disease and predation are completely unrelated to project operations, *see* DEIS at 11-265 (analyzing CP4 and concluding that for winter-, spring-, fall-, and late fall-run Chinook salmon, non-operations factors will cause 89%, 89%, 66%, and 79% of total mortality, respectively), while substantial scientific evidence shows that project operations cause and contribute to these and other stressors. *See, e.g.*, NMFS 2009 BO. SALMOD's assessment of the causes of mortality and drivers of production is inconsistent with more recent modeling and scientific studies, including the OBAN model referenced *supra*.

NRDC1-61

In spite of these numerous criticisms and flaws, and in spite of their knowledge of the existence of other, superior models, the Bureau proceeded to use SALMOD as their only model for assessing impacts to anadromous fish.

NRDC1-62

The sole reliance on the SALMOD model is inadequate to assess the impacts of alternatives on anadromous fish survival, and the lack of adequate analysis of these impacts constitutes a violation of NEPA.

B. The DEIS Fails to Adequately Analyze Impacts on Tribal Resources

NRDC1-63

The DEIS's analysis of impacts to tribal resources is also inadequate. While the DEIS acknowledges that each action alternative will result in significant impacts to tribal resources that cannot be mitigated, it fails to provide an accurate picture of the extent of these impacts. For example, with respect to archeological and historic-era structural resources, the DEIS states that "the frequency and distribution of recorded sites within the project study area only give a limited and incomplete picture of the actual number of resources. This is because only a very small percentage of the project area has been systematically inventoried for cultural resources." DEIS at 14-16. In fact, systematic surveys have only occurred in five percent of the Shasta study area, and in fifteen percent of the upper Sacramento River. *Id.* The DEIS therefore acknowledges that "there are undoubtedly many more cultural resources that have not been identified or formally recorded." *Id.* In light of the lack of available survey data, the DEIS conducted a sensitivity analysis to estimate the number of resources that would be impacted by each alternative. Considering the sensitive, irreplaceable nature of the tribal resources that would be affected, this cursory analysis is inadequate to fully inform the public about each alternative's impacts.[12]

NRDC1-64

[12] As discussed in footnote 1, *supra*, the DEIS's failure to determine whether tribal archeological sites qualify as historical resources, and its failure to address stringent state-law mitigation requirements for impacts to historical resources makes clear that the DEIS does not comply with CEQA. *See* tit. 14 Cal. Code Regs. §§ 15064.5(c), 15126.4(b).

C. In Several Additional Ways, the DEIS Failed to Provide Accurate, Adequate Information for the Public to Assess the Proposed Alternatives

NRDC1-65 There are several other ways in which the DEIS failed to provide the public with sufficient information to assess the impacts of the proposed alternatives. Most generally, the DEIS substantially misleads the public by claiming that certain alternatives benefit anadromous fish when they do not. For example, the DEIS concludes that CP4 will be beneficial for winter-, spring-, and fall-run Chinook salmon. As discussed above, however, these benefits are largely illusory.

NRDC1-66 The inaccurate information that the DEIS provides makes it difficult for members of the public to assess the potential costs and benefits of the proposed projects.

NRDC1-67 The Bureau also failed to explain how the DEIS integrated the RPA actions from the 2008 and 2009 BOs, and it inaccurately modeled implementation of the RPA actions, rendering the modeling inaccurate and misleading. The DEIS states that "the No-Action/No-Project Alternative is based on CVP and SWP operational conditions described in the 2008 *Biological Assessment on the Continued Long-Term Operations of the CVP and SWP* (2008 OCAP BA), and the BOs issued by USFWS and NMFS in 2008 and 2009, respectively." DEIS at 2-20. But the DEIS fails to provide details regarding how the 2008 and 2009 BOs' requirements were included in the DEIS's baseline conditions.

NRDC1-68 For example, the DEIS's modeling appendix fails to clarify how the complicated, sometimes flexible requirements of the RPAs were included in the models. Instead, it merely states, in a conclusory fashion, that particular RPA actions were included in the modeling for existing and future conditions. *See, e.g.*, DEIS Modeling Appx. at 2-5 (Shasta Lake end-of-September storage based on NMFS BO Action 1.2.2); *id.* at 2-6 (Delta flow and salinity based on 2008 BO Action 4); *id.* at 2-6 (combined flow in OMR based on 2008 BO Action 1, 2, 3 and 2009 BO Action IV.2.3). The modeling appendix elaborates that, "[i]n cooperation with NMFS, USFWS, and CDFW, the Reclamation and DWR have developed assumptions for implementation of the USFWS BO (December 15, 2008) and NMFS BO (June 4, 2009) in CalSim-II." *Id.* at 2-9 n.10. But the DEIS does not describe the agencies' assumptions. For RPA actions that include adaptive management provisions, such as OMR flow requirements, this lack of clarity makes it impossible to assess whether the requirements were properly integrated into the Bureau's modeling.

NRDC1-69 In addition, the modeling shows noncompliance with the RPA actions in certain months and years, and presents other results that appear highly anomalous and inaccurate. For instance, the modeling shows that Delta outflow in the month of September in wet and above normal years would substantially exceed the Fall X2 RPA action requirements (the CVP and SWP would release water from the reservoirs and/or reduce Delta exports in excess of the Fall X2

NRDC1-69 CONTD

requirement), which is inconsistent with operational practices; in contrast, Delta outflow in the month of October in wet and above normal years would not achieve the minimum outflow requirements under the Fall X2 RPA action. *See* DEIS, Fisheries and Aquatic Ecosystems Technical Report, Attachment 1, Assessment of Fisheries Impacts within the Sacramento – San Joaquin Delta, at 2-9 to 2-10, 2-43 to 2-44, 2-47 to 2-48. The 2008 delta smelt biological opinion requires that the Fall X2 requirement be separately achieved in the months of September and October, and as such, the modeling is inconsistent with implementation of the biological opinion.

NRDC1-70

The modeling also appears to fail to account for the "first flush" action of the Delta smelt RPA actions, as Old and Middle River flows are highly negative in wet years during the month of December. *See id.* at 2-61. These modeling flaws cast significant uncertainty on the reliability of all of the modeling results that are used to assess impacts.

NRDC1-71

Several alternatives in the DEIS also result in impacts on delta hydrology, including reductions in delta outflow. *See, e.g.*, DEIS at 11-126 11-129 (CP1). The DEIS claims that the effect would be less than significant, but it does not provide any analysis to support this conclusion. In contrast, there is substantial scientific information that reductions in Delta outflow in the winter and spring months has significant effects on the abundance and survival of listed species in the Delta, including green sturgeon, longfin smelt, and Chinook salmon. *See, e.g.*, SWRCB 2010, Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem (August 3, 2010).[13] The DEIS fails to analyze the effects on abundance and survival of these species as a result of reductions in outflow, and the DEIS's conclusion that these effects are less than significant are not supported by substantial evidence.

NRDC1-72

The DEIS also fails to provide certain information by water-year type, making it difficult for the public to accurately compare the impacts of various alternatives. For example, the DEIS presents figures showing changes in mean monthly water temperature at modeled locations in the Sacramento River. *See, e.g.*, DEIS Figures 11-34 and 11-35 at 11-267 to 11-268. These averages fail to show the dangerously high temperatures that can occur in dry and critical water years, making it difficult to assess the true impacts of each alternative.

NRDC1-73

Moreover, the monthly averages mask daily temperature changes, which can result in substantial mortality or sublethal effects that reduce survival.

NRDC1-74

Further, the no-action alternative is misleading because it improperly includes the Vernalis Adaptive Management Plan ("VAMP") as part of its 2030 baseline. *See* DEIS at 3-16, 3-18 to 3-19. As the DEIS acknowledges, VAMP expired in 2011. *Id.* at 3-19. Yet the DEIS justifies its inclusion of VAMP in the no-action alternative by stating that the Bureau "intends to continue implementing actions similar to the VAMP for the foreseeable future, or until the SWRCB

NRDC1-71 CONTD

[13] This report is available online at: http://www.swrcb.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/final_rpt080310.pdf and is hereby incorporated by reference.

adopts new, permanent objectives for San Joaquin River flows that replace the current program." *Id.* As the State Water Resources Control Board has explained, with the expiration of VAMP the Bureau is obliged to meet the pulse flows required under the Bay-Delta Water Quality Control Plan and Decision 1641. This requires additional flows in certain water year types, and the exclusion of these flows from the modeling creates inaccurate results that may understate impacts.

NRDC1-74 CONTD

The DEIS also inaccurately assesses impacts on other special status species. For instance, the DEIS asserts that the project will increase entrainment of Delta smelt, but the methodology used estimates that on average, 41,937 Delta smelt are entrained, whereas the take limit for salvage of Delta smelt under the current biological opinion is in the hundreds of fish at current abundance levels. *See* DEIS, Fisheries and Aquatic Ecosystems Technical Report, Attachment 1, Assessment of Fisheries Impacts within the Sacramento – San Joaquin Delta, at 2-88 (Table 2-170). The entrainment methodology utilized in the DEIS is unreliable, and fails to accurately assess entrainment impacts to Delta smelt. With respect to other special status species, the DEIS concludes that the project will result in significant and unavoidable impacts to numerous botanical and biological resources, including species listed under the California Endangered Species Act. DEIS at ES-66 to ES-67, ES-77 to ES-86; CDFW, Attachment 1.

NRDC1-75

However, the DEIS improperly defers analysis of impacts to California Red-Legged Frog to a future date and fails to analyze the impacts to this species in this document. DEIS at ES-86.

NRDC1-76

And as noted in footnote 1, the DEIS improperly defers mitigation measures for these impacts under CEQA.

NRDC1-77

Finally, the DEIS utilizes multiple baselines for comparison (e.g., existing condition and no action), which leads to substantial confusion for the reader and undermines NEPA and CEQA's goal of informed decision-making.

NRDC1-78

D. The Draft SLWRI Feasibility Report Must be Revised to Provide the Public and Decision Makers With Adequate Information on the Costs and Benefits of the Alternatives

Prior to releasing the DEIS, the Bureau released a draft SLWRI feasibility report, which is incorporated into the DEIS. *See* DEIS at ES-1, ES-35 to ES-36, 1-26. As noted in NRDC's comments on the draft feasibility report, the Bureau's initial analysis failed to account for changes to CVP and SWP operations caused by the 2008 and 2009 BOs. *See* NRDC comments on SLWRI feasibility report, attached hereto as Attachment 3. Based on these and other comments, the modeling assumptions used in the DEIS have changed substantially from those analyzed in the feasibility report, and the feasibility report no longer presents an accurate picture of the alternatives' costs and benefits (FWS's report indicates that the feasibility report dramatically overstated project benefits to anadromous species). *See also* DEIS at 1-1 to 1-2 (noting that water operations modeling was significantly revised as compared to that utilized in

NRDC1-79

the feasibility report). However, the DEIS also makes clear that the DEIS and feasibility report both play an important role in providing the public and decisionmakers with information on the costs, benefits, and impacts of the alternatives, in order to make an informed decision. DEIS at ES-1, ES-35, 1-26. As a result, the DEIS's reliance on the November 2011 draft SLWRI feasibility report to inform the public about the costs and benefits of the proposed alternatives is misleading, and the Bureau must revise the project's feasibility report in order to comply with NEPA and the Bureau's other legal obligations.

NRDC1-79 CONTD

NRDC1-80

E. The DEIS Fails to Adequately Account for Climate Change Impacts and Analyze the Effects of the Alternatives and Climate Change

The DEIS's climate change modeling appendix reviews global climate change forecasts and discusses some of the implications of climate change for California's water resources.[14] It also presents a quantitative analysis of climate change's impacts on various resources, using models to compare climate-change influenced CP4 and CP5 to a climate-change influenced no-action alternative. Thus, the Bureau has acknowledged the important role that climate change will play in California's water future, and showed that it is capable of modeling future scenarios in a way that accounts for climate change impacts. Yet in its analysis of alternatives in the DEIS, the Bureau failed to include climate change impacts in its modeling for any of the alternatives. Instead, it merely briefly discussed climate change in its cumulative impacts analysis for each analyzed resource area. *See* DEIS at 3-10; *see also, e.g., id.* at 11-335 to 11-341. The Bureau's brief, qualitative analysis of climate change in the cumulative impacts sections of the DEIS fails to provide sufficient detail for the public to meaningfully analyze the proposed alternatives, and NRDC recommends that the Bureau include climate change in the modeling of all future scenarios.

NRDC1-81

NRDC1-83

NRDC1-84

Moreover, even when the DEIS did account for climate change impacts in the climate change modeling appendix, it assumed that the CVP and SWP would operate as they do today. *See* DEIS Climate Change Modeling Appx. at 4-4 (indicating system operations were modeled using the SLWRI 2012 Benchmark Version CalSim-II model). This is unacceptable because a failure to adapt project operations to account for climate change impacts likely will result in jeopardy to several threatened and endangered species, *see* NMFS 2009 BO, and the Bureau must acknowledge that simply maintaining the status quo in a warmer future is unacceptable. *See also National Wildlife Federation v. NMFS*, 524 F.3d 917, 929-931 (9th Cir. 2008) (jeopardy analysis under the ESA must consider the effects of the action in light of "present and future human and

NRDC1-85

[14] The Bureau's analysis should be updated to include a discussion of the climate change impacts described in the California Environmental Protection Agency's recent publication, *Indicators of Climate Change in California*, August 2013. The document is available at: http://oehha.ca.gov/multimedia/epic/pdf/ClimateChangeIndicatorsReport2013.pdf and is hereby incorporated by reference.

NRDC1-82

NRDC1-85 CONTD

natural contexts." (quotation and citation omitted)). NRDC recommends that the Bureau's modeling of all future scenarios account for modifications to CVP and SWP operations that will have to occur to avoid jeopardy to threatened and endangered species.

NRDC1-86

F. The DEIS Fails to Adequately Analyze Cumulative Impacts of the Alternatives

NRDC1-87

"The cumulative impact analysis must be more than perfunctory; it must provide a 'useful analysis of the cumulative impacts of past, present, and future projects.'" *Kern v. U.S. Bureau of Land Mgmt.*, 284 F.3d 1062, 1075 (9th Cir. 2002) (quoting *Muckleshoot Indian Tribe v. U.S. Forest Serv.*, 177 F.3d 800, 810 (9th Cir. 1999)). Moreover, "[t]o be useful to decision makers and the public, the cumulative impact analysis must include some quantified or detailed information; . . . general statements about possible effects and some risk do not constitute a hard look absent a justification regarding why more definitive information could not be provided." *N. Plains Res. Council*, 668 F.3d at 1076 (quotation marks and citations omitted). Nonetheless, for several projects that are in advanced planning stages and that will have substantial impacts on resources in the DEIS's study area, the DEIS fails to provide anything more than vague, general statements regarding cumulative impacts of the projects and the action alternatives.

NRDC1-88

For example, the DEIS improperly fails to provide any detailed analysis of the cumulative impacts that BDCP will have on resources within the study area, even though BDCP will have a profound effect on many of the same resources that would be impacted by each of the proposed action alternatives. Among other impacts, both BDCP and the proposed alternatives would affect OMR flows, Delta salinity and outflow, and fish entrainment. Moreover, BDCP will have a substantial impact on the SLWRI's primary objectives—water supply reliability and anadromous fish survival. The DEIS, however, concludes that "[i]t would be speculative to consider [BDCP] at any more than a conceptual level because [its] effects are not defined in sufficient detail to allow meaningful analysis." DEIS at 3-22 to 3-23. This makes little sense because the administrative draft of the EIR/EIS for BDCP was released *before* the SLWRI DEIS was issued. In fact, the DEIS discussed details regarding BDCP, including the draft plan's twenty conservation measures. DEIS at 11-32; *see also id.* at 3-27 to 3-28. Because the SLWRI and BDCP will impact the same resources, and because details regarding BDCP were available during the DEIS's development and are currently available (including quantitative analysis of the effects of BDCP on upstream reservoir storage, Sacramento River inflows, Delta outflows, and Old & Middle River flows), the Bureau should have provided a quantitative analysis of the cumulative effects of BDCP and expansion of Shasta Dam.

NRDC1-89

NRDC1-90

The same problems exist for the DEIS's assessment of cumulative impacts from other surface storage projects being contemplated by the Bureau, including Sites Reservoir and Temperance Flats Reservoir projects. As it did for BDCP, the DEIS concludes that it would be speculative to

consider these projects at anything more than a conceptual level. DEIS at 3-22 to 3-23. Yet it notes that the notice of intent/notice of preparation for the Sites Reservoir project was issued in November 2001, that a complete plan formulation report was published in September 2008, and that the final EIS/EIR/Feasibility Report is scheduled to be complete in 2013. *Id.* at 3-32. The DEIS also acknowledges that the plan formulation report for the Temperance Flats Reservoir project was released in October 2008. *Id.* at 3-38. Though sufficient information was available, the DEIS fails to analyze the cumulative impact of implementation of these reservoir projects and the SLWRI on water quality (including outflow, X2 location, turbidity, and water temperatures), flows, anadromous fisheries, and other environmental resources. Even assuming that the impacts of a single reservoir project are less than significant, the reduced flows resulting from additional storage in 3 new upstream reservoirs could result in impacts that are cumulatively significant.[15]

NRDC1-90 CONTD

The DEIS also fails to analyze the effects of the SLWRI on implementation of existing RPA actions to allow winter-run Chinook salmon to spawn upstream of Shasta Dam. *See* NMFS 2009 at 659-671. The alternatives in the DEIS could impede implementation of this action, for instance by inundating additional upstream spawning habitat, reducing survival while salmon migrate through the reservoir, or increasing abundance of non-native and warm-water species that could predate on salmon. Although the DEIS mentions impacts on adfluvial salmonids (salmon that do not migrate to the ocean), the DEIS wholly fails to analyze the potential impacts of the alternatives on implementation of the RPA action to allow winter-run Chinook salmon to spawn upstream of Shasta Dam.

NRDC1-93

V. The Bureau Should Withdraw the DEIS and Terminate the SLWRI Because All of the Alternatives would Violate State Law and Irreparably Harm Tribal Resources

[15] In the executive summary, the DEIS admits that all action alternatives could result in significant and unavoidable cumulative impacts on Delta outflow and X2. *See* DEIS at ES-30 to ES-31. However, Chapter 11 of the DEIS fails to quantify or even qualitatively describe the magnitude of these cumulative impacts on Sacramento River flows, Delta outflow, or X2, and it does not find that it would result in these significant and unavoidable cumulative impacts. None of the surface storage projects being evaluated by the Bureau are referenced or included in the cumulative impacts analysis. Reductions in Delta outflow in the winter and spring months could cause significant impacts on state and federally listed endangered species that live in or migrate through the Delta, including longfin smelt, green sturgeon, winter run Chinook salmon, and Delta smelt. The DEIS wholly fails to analyze these cumulative impacts on listed species in the Delta. Because the DEIS admits that there are significant impacts, the failure to identify mitigation measures violates CEQA. *See* Footnote 1, *supra*. Feasible mitigation measures could include restrictions on when water can be stored in upstream reservoirs, in order to prevent downstream impacts on river flows, X2, and delta outflow, and thereby on biological resources, including listed fish species.

NRDC1-91

NRDC1-92

A. All of the Alternatives Unreasonably Harm Tribal Resources

NRDC1-94 In addition to failing to analyze any alternatives that would substantially benefit anadromous fish, the Bureau failed to analyze a single action alternative that would avoid causing irreparable harm to important tribal resources. As discussed above, the Bureau could have, but chose not to, analyze an alternative that would meet its water supply and anadromous fish survival objectives without raising Shasta Dam. As a result, each action alternative will inundate additional land surrounding Shasta Reservoir, further harming tribal resources that surround the lake.

NRDC1-95 Several culturally important tribal resources exist in the areas immediately surrounding Shasta Lake. The Pit River Madesi Band has indicated that twenty-two ethnographic villages and associated burial grounds are located within existing reservoir and proposed reservoir areas, DEIS at 14-10, and the Winnemem Wintu identified important localities within the study area where ceremonies are regularly conducted, such as Puberty Rock and the doctoring pools near Nawtawaket Creek. With respect to the Winnemem Wintu's identified locations, the DEIS concluded that "ongoing use of many archeological and religious sites is fundamental to the well-being of their culture, particularly the education of their youth." *Id.* at 14-10 to 14-11. Because the Winnemem Wintu believe that the location of these important sites is preordained, they cannot be relocated. *Id.* at 14-23.

NRDC1-96 The Winnemem Wintu Tribe has prepared detailed comments regarding these impacts to cultural and tribal resources, which we support.

NRDC1-97 The DEIS concludes that even CP1, which would inundate less land than CP2, CP3, CP4, or CP5, would have a direct, significant adverse impact on these and other tribal resources. *Id.* at 14-22. For example, CP1 would impact Puberty Rock and the doctoring pools near Nawtawaket Creek, and would place approximately 212 prehistoric sites and 355 historic-era archival localities in the inundation zone, and many more sites in the fluctuation zone and quarter-mile buffer zone. *Id.* at14-22 to 14-23. The other action alternatives would place many more cultural resources in the inundation zone. Accordingly, the DEIS concluded that "it is clear that raising Shasta Dam would result in cumulative effect on historic properties." *Id.* at 14-33. Yet the Bureau chose not to analyze any alternative that would avoid these impacts by meeting the project's objectives without raising Shasta Dam and flooding the lands surrounding the reservoir.

B. All of the Alternatives Violate State and Federal Law by Negatively Impacting the McCloud River's Free-Flowing Conditions and its Trout Fishery

NRDC1-98 In 1989, the Legislature passed an amendment to the California Wild and Scenic Rivers Act to protect the McCloud River's free-flowing conditions and the fishery below McCloud Dam, adding Section 5093.542 to the California Public Resources Code. The Legislature found and declared "that the McCloud River possesses extraordinary resources in that it supports one of the

finest wild trout fisheries in the state." Cal. Pub. Res. Code § 5093.542. The statute states that "[t]he continued management of river resources in their existing natural condition represent the best way to protect the unique fishery of the McCloud River" and that "maintaining the McCloud River in its free-flowing condition to protect its fishery is the highest and most beneficial use of the waters of the McCloud River." *Id*

NRDC1-98 CONTD

The DEIS, however, concluded that each action alternative will cause impacts to the McCloud's free-flowing conditions and to its trout fishery, and would therefore conflict with Section 5093.542. DEIS at 25-30 to 25-31, 25-34, 25-38 to 25-39. In particular, by raising Shasta Dam, each proposal would increase the size of Shasta Reservoir so that it inundates portions of the McCloud River in violation of state law. The DEIS concludes that CP1 would impair the free-flowing conditions in 1,470 feet of the McCloud River, *id.* at 25-26, that CP2 would impair 2,740 feet, *id.* at 25-31, and that CP3, CP4, and CP5 would impair 3,550 feet, *id.* at 25-35. Each alternative would also adversely affect spawning habitat for trout in the lower McCloud River. *See, e.g., id.* at 25-28 to 25-29. The DEIS concludes that no mitigation is currently available for these impacts. *Id.* at 25-39.

NRDC1-99

Because each action alternative conflicts with Section 5093.542, each alternative also violates the CVPIA. *See* P.L. 102-575, § 3406(b) (CVPIA § 3406(b)) (Secretary of the Interior "shall operate the Central Valley Project to meet all obligations under State and Federal law"). Accordingly, all five of the action alternatives would violate both state and federal law if implemented.

NRDC1-100

The DEIS also notes that some segments of the McCloud river are eligible for listing under the federal Wild and Scenic Rivers Act. DEIS at 25-6. Because free-flowing conditions are a fundamental requirement for Wild and Scenic River Act eligibility, the impaired reaches of the McCloud River would become ineligible for federal listing. *Id.* at 25-26. Water-level fluctuations would also reduce water quality in impaired sections of the McCloud, rendering them further ineligible for listing under the federal Wild and Scenic Rivers Act. *Id.* at 25-27.

NRDC1-101

Because none of the alternatives can be implemented consistent with state and federal law, the Bureau should withdraw the DEIS and terminate the SLWRI.

NRDC1-102

VI. Conclusion

As demonstrated above, the DEIS fails to comply with NEPA and CEQA, and all of the alternatives would violate state law, would significantly harm the tribal resources of the Winnemem Wintu Tribe, and would cause negative impacts (or provide insignificant benefits) to anadromous fish and other biological resources. As a result, the Bureau should withdraw the DEIS and draft feasibility study, and terminate the SLWRI. Should the Bureau decide to

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continue with the SLWRI, it must prepare and recirculate a revised DEIS/EIR and draft feasibility study that address the substantial flaws identified in these and other agencies' comments.

Thank you for consideration of our views. Please feel free to contact us at your convenience if you have any questions or concerns.

Sincerely,

Rachel Zwillinger
Altshuler Berzon

Doug Obegi
Natural Resources Defense Council

Attachments:

1. Cal. Dept. of Fish and Wildlife, SLWRI Comments on the Public Draft of the Feasibility Report, and Selected Attachments, January 2013 (February 8, 2013)
2. Cal. Dept. of Fish and Wildlife, Shasta Lake Water Resources Investigation, Comments on the Administrative Draft of the Environmental Impact Statement and Environmental Impact Report, Feasibility Report, and Appendices (November 7, 2008)
3. NRDC comments on SLWRI feasibility report

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February 8, 2013

Ms. Katrina Chow, Project Manager/Civil Engineer
Mid-Pacific Regional Office, Bureau of Reclamation
Federal Office Building
2800 Cottage Way, MP-720
Sacramento, CA 95825-1893

Subject: Shasta Lake Water Resources Investigation, Comments on the Public Draft of the Feasibility Report, and Selected Attachments, January 2013

Dear Ms. Chow:

The California Department of Fish and Wildlife (Department) appreciates the opportunity to provide comments on the Shasta Lake Water Resources Investigation (SLWRI) Public Draft of the Feasibility Report and selected Technical Reports/Attachments for the Shasta Dam enlargement project (Project).

The scope of these comments reflects the Department's statutory authority as trustee agency for the conservation of California's fish, wildlife, and botanical resources, and the habitats on which they depend. The following issues and comments are not in order of priority.

The Department's review was focused to SLWRI alternative CP4 because it was identified previously as the preferred alternative, but other alternatives were also assessed. In addition to this narrative, we have offered comments on the Excel spreadsheet template (Attachments) provided by the Bureau of Reclamation (Reclamation).

The Department reviewed and provides comments on the following documents:

- The SLWRI Feasibility Report
- Hydrology, Hydraulics, and Water Management Technical Report
- Hydrology, Hydraulics, and Water Management Technical Report Attachment A: CalSim-II Output
- Hydrology, Hydraulics, and Water Management Technical Report Attachment B: DSM2 Output – Water Levels
- Modeling Appendix
- Water Quality Technical Report
- Geologic Technical Report

- Geologic Technical Report Attachment 1: Shoreline Erosion Technical memorandum
- Fisheries and Aquatic Ecosystems Technical Report
- Wildlife Resources Technical Report
- Wildlife Resources Technical Report Attachment 1: Special-Status Wildlife Species Potentially Occurring in the Shasta Reservoir and Vicinity Portion of the Primary Study Area
- Botanical Resources and Wetlands Technical Report
- Botanical Resources and Wetlands Technical Report Attachment: Lists of All Special-Status Plant Species Known from or Potentially Present in the Primary and Extended Study Area

The Potential for Species Listing and Compliance with the Multi-Species Conservation Strategy

The U.S. Fish and Wildlife Service (Service), as per the July 2008 draft Coordination Act Report (Service 2008a), believes that the Project will result in adverse affects to special-status species within the vicinity of Shasta Reservoir, riparian habitat along the Sacramento River, and aquatic habitat in the Sacramento-San Joaquin Delta. The Department concurs with this conclusion. The raising of Shasta Reservoir would inundate the limited habitat of three rare species: Shasta snow-wreath (*Neviusia cliftonii*), Shasta chaparral snail (*Trilobopsis roperi*), and Shasta hesperian snail (*Vespericola shasta*) of which all are endemic to restricted limestone substrate in the vicinity of Shasta Reservoir.

Four of the terrestrial mollusks that could be impacted by enlarging Shasta Reservoir are currently petitioned for federal listing under the Endangered Species Act (ESA): Shasta sideband snail (*Monadenia troglodytes troglodytes)*, Wintu sideband snail (*Monadenia troglodytes wintu)*, Shasta chaparral snail, and Shasta hesperian snail. All four of these terrestrial mollusks are also species endemic to the vicinity of Shasta Reservoir. Reclamation should analyze the range and population of these species and estimate what percentage of each species' habitat would be impacted by the Project.

The Botanical and Wetlands Technical Report should be updated to reflect the status of a potentially new rare plant species, commonly referred to as Shasta huckleberry (*Vaccinium* sp.), that would be affected by enlarging Shasta Reservoir. If confirmed as a distinct species, Shasta huckleberry would likely meet the criteria for listing under the California Endangered Species Act due to its rarity and identified threats to the species. Shasta huckleberry is known from only three locations, all of which are in the vicinity of Shasta Reservoir. At least nine individual Shasta huckleberry shrubs in the Little Backbone Creek drainage would be lost within the inundation zone. The occurrence of Shasta huckleberry near Bully Hill Mine is currently threatened by non-project related activities associated with soil remediation. Additional genetic analyses are needed to clarify the taxonomic issues for these plants. Given current known information about their rarity, occurrences of these rare plant species could be treated as a rare species.

Secondly, the CALFED Final Programmatic EIS/EIR requires CALFED to avoid all actions that could result in the mortality of any species identified within Table 4-5 of the Multi-Species Conservation Strategy (CALFED 2000a). This includes Shasta snow-wreath which is found among a list of "...evaluated species for which direct mortality as a result of implementing CALFED actions is prohibited as a condition of the Multi-Species Conservation Strategy (MSCS)..." This conservation measure was developed because these species are extremely rare. For many of the plants identified, fewer than a dozen known populations exist. The Feasibility Report and Technical Reports/Attachments do not adequately identify how this requirement is being addressed given the SLWRI is a CALFED project.

Incomplete Information

The Habitat Evaluation and Procedure analysis, which was being prepared by the Service, and the reservoir tributary study are two examples of information that was not provided in the Feasibility Report or the Technical Reports/Attachments. Also, details regarding management of the dedicated pool within the alternatives, and the impacts of that element of the alternative were not provided or assessed. The Department believes this information is essential and needs to be included in the Feasibility Report and Draft Environmental Impact Statement/Environmental Impact Report preparation.

Use of the 2004 and 2005 OCAP BOs

The Feasibility Report uses the National Marine Fisheries Service (NMFS) 2004 Biological Opinion (BO) for the Long-Term Central Valley Project and State Water Project Operations Criteria and Plan, and the Service's 2005 BO for the Coordinated Operations of the Central Valley Project (CVP) and State Water Project (SWP) (2004 and 2005 OCAP BOs). Use of the more current OCAP BOs (the 2008 Service OCAP BO and the 2009 NMFS OCAP BO) (Service 2008b) (NMFS 2009a) would provide a more relevant analysis.

Clarification on the Dedicated Pool, Alternative CP4

Cold water is essential for listed anadromous fish needs. The analysis within the Feasibility Report or Technical Reports/Attachments that specifically identified the quantifiable increase in volume of the cold water pool as a result of a dam raise was incomplete. Understanding the amount of additional cold water available as a result of this Project will help the Department better evaluate the (potential) positive benefits to anadromous fish.

The older requirement of 1.9 million acre-feet (MAF) of total storage in September was necessary in critically dry years to preserve enough cold water (1.3 MAF) for the following season (NMFS 2004). The 2009 NMFS OCAP BO requires a higher end of September storage (2.2 MAF) in order to avoid temperature impacts. The Department

assumes that all action alternatives will provide additional volume to the cold water pool above the 2.2 MAF requirement (NMFS 2009a). That volume should also be quantitatively disclosed.

In 2008, the Service provided a Planning Aid Memorandum (PAM) on Adaptive Management of the Dedicated Environmental Water in the Shasta Reservoir Water Resources Investigation Project (2008 PAM) (Service 2008c). The 2008 PAM identified an earlier recommendation from the Service, the Department, and NMFS for "dedicated environmental water" to be included in a SLWRI alternative (378,000 acre-feet is identified in Alternative CP4). This water was to be adaptively managed and used at the discretion of the federal and State fisheries resource agencies and would also be allocated in addition to and beyond any actions identified and/or required as mitigation for this Project or in the Central Valley Project Improvement Act (CVPIA), CALFED, and any existing biological opinions. The Department's interpretation of the 378,000 acre-feet of water continues to be consistent with what was included in the 2008 PAM. However, the Feasibility Report implies that this water could be added to the existing cold water pool and not treated as a separate source of water to be used for natural resource purposes. The Feasibility Report states this water be managed in coordination with the Sacramento River Temperature Task Force, which has never been discussed with the Department, the Service, and NMFS. The Department requests resurrecting the 2008 PAM and continuing these discussions on the dedicated pool found in Alternative CP4 with the affected resource agencies.

Habitat Conditions within the Sacramento River below Keswick Dam

The Feasibility Report and/or Technical Reports/Attachments do not provide a clear picture or analysis of fish habitat conditions within the Sacramento River below Keswick Dam. We encourage Reclamation to evaluate those parameters which are deemed important to anadromous fish, which includes both instream conditions and adjacent terrestrial habitats. One source for this assessment is to look at the federal definition of Critical Habitat for listed anadromous fish, such as winter-run Chinook salmon *(Oncorhynchus tshawytscha*). We also encourage assessing those conditions within the range of the species affected, and not just in the area immediately downstream of Shasta dam. For example, Critical Habitat designation for winter-run Chinook, as identified in the 2009 NMFS OCAP BO (NMFS 2009a) identifies those physical and biological features of the habitat that are essential to the conservation of the species and that may require special management consideration and protection. Within the Sacramento River, this includes the river water, river bottom (including those areas and associated gravel used by winter-run Chinook salmon as spawning substrate), and adjacent riparian zones used by fry and juveniles for rearing. In the areas west of Chipps Island, including San Francisco Bay to the Golden Gate Bridge, this designation includes the estuarine water column and essential foraging habitat and food resources utilized by winter-run Chinook salmon as part of their juvenile outmigration or adult spawning migrations. An analysis of the effect on every primary constituent element of Critical Habitat, as per ESA, should be completed.

Impacts to the Fishery in Shasta Reservoir

The Feasibility Report analysis of the loss of perennial and intermittent stream habitat, its associated riparian habitat, and the effect on reservoir fisheries values as a result of the Project is incomplete. The Department believes the loss of tributary habitat would have significant effects on riverine aquatic species and requests a more complete analysis. More specific information on the affected stream miles, habitat types they contain, and current barriers to upstream fish passage from the reservoir that will be inundated is needed.

Impacts on the Fishery and Habitat below Shasta Dam

The primary resource management measures within the Feasibility Report which address the objective of Anadromous Fish Survival are enlarging the cold water pool and modifying the Temperature Control Device in Shasta Reservoir. These elements would be used to maintain cooler temperatures for anadromous fish spawning and rearing habitat in the Sacramento River between Keswick Dam and the Red Bluff Diversion Dam (RBDD). Only in one alternative (CP4) does enlarging the cold water pool provide benefits to anadromous fish survival. However, it appears that the benefits to anadromous fish are limited to a few critical and dry water years representing 5% to 10% of the 1922-2003 period of simulation.

The 2008 SLWRI Administrative Draft documents identified a significant (negative) effect on Sacramento-San Joaquin Delta smelt (*Hypomesus transpacificus*), Sacramento splittail (*Pogonichthys macrolepidotus*), and striped bass (*Morone saxatilis*) (Reclamation 2008). This is due to increased reverse flows in Old and Middle Rivers, and also due to increased risk of entrainment or salvage of species at CVP and SWP facilities caused by changes in CVP and SWP exports. We recommend this be addressed in the Feasibility Report or the Technical Reports/Attachments.

Alternative CP4, as per the Feasibility Report, currently includes a limited amount of gravel augmentation, while other enhancement elements that could improve anadromous fish habitat, such as riparian restoration and removal of bank armoring, were placed into another alternative (CP5). The Department encourages Reclamation to revisit the CP4 Alternative and include restoration elements beyond what is currently identified (i.e. gravel augmentation, the details of which are not provided).

Use of SALMOD and Concerns about Correct Representation of Data

The Department's previous comments on modifying SALMOD, as well as our concerns about using it as an analysis tool, have not been addressed fully (Department correspondence to Reclamation in February 2006, Attachment 8). The analysis on impacts to salmonids in the Sacramento River below Keswick Dam is largely restricted to the SALMOD model results and does not include any other analysis efforts, such as habitat typing data, or The Nature Conservancy (Nature Conservancy) State of the Sacramento River Report (Nature Conservancy 2008). Analysis of the effects of flow

management on potential redd dewatering, or assessing how to balance the annual management of flow on the species and/or runs of salmonids, is also not included. SALMOD has not been accepted by the Department for use in the Central Valley, and the documents should clearly reflect this fact (See Attachment 8). Model assumptions and parameters applied should be clearly stated in the document. In addition, there should be a statement that this is a preliminary analysis used by Reclamation and should not be interpreted as the final tool to analyze fish impacts from the various alternatives under consideration.

The CVPIA Anadromous Fish Restoration Program (AFRP) goal needs to be clearly defined within the context of the SALMOD analysis. If the document is referring to the doubling goals, that needs to be identified, as opposed to a goal which may have to do with an AFRP target in the Final Restoration Plan on the Sacramento River. The AFRP definition of production needs to be clarified because it may not differ with the SALMOD definition of production. In one location, a population figure is given, which further confuses the entire fisheries analysis. There may also be a discrepancy in discussing AFRP goals with any other goal for production because other agencies may not be using the same databases as the Department or AFRP. Some agencies use Chinook Prod, and others use Grandtab, which are different databases. When referring to production, the document also needs to specify if it includes all fish, or wild versus hatchery fish. AFRP fish production targets are focused on the natural production of fish from each watershed. In summary, due to potential discrepancies between the premises that SALMOD, AFRP, and other restoration programs are based upon, the Feasibility Report's predictions, particularly in the AFRP context, may be inaccurate and/or misrepresented.

Spring-run Chinook Salmon (*Oncorhynchus tshawytscha*)

The 1998 spring-run Chinook Status Review (Department 1998) says, "A small population of spring-run salmon may persist in the upper Sacramento River above RBDD, although there is question as to the genetic integrity of these fish." Essentially, the extent of spring-run Chinook salmon spawning in the mainstem of the upper Sacramento River is unclear. Due to geographic overlap of Evolutionary Significant Units and resultant hybridization since the construction of Shasta Dam, Chinook salmon that spawn in the mainstem Sacramento River during September are more likely to be identified as early fall-run Chinook (*Oncorhynchus tshawytscha*) rather than spring-run Chinook salmon. The 2009 Public Draft Recovery Plan for the Evolutionary Significant Units of Sacramento River winter-run Chinook and the Central Valley spring-run Chinook, and the Distinct Population segment of Central Valley Steelhead (NMFS 2009b), states that upper Sacramento River may support a small spring-run Chinook salmon population, but the degree of hybridization with fall-run Chinook salmon is likely high. It also states that construction of Shasta and Keswick Dams on the Sacramento River has eliminated the spatial separation between spawning fall-run and spring-run

Chinook salmon. Additionally, no more than 10% and likely less than 5% of the Sacramento River spring-run Chinook population occurs upstream of RBDD.

The plan for spring-run Chinook recovery (NMFS 2009b) may or may not affect the inclusion of that species in the SLWRI analysis. That may subsequently require a change in the cost-benefit projections in the SLWRI and affect flow management in the mainstem Sacramento River, should the Project occur.

Condition of Gravel below Dam and Requirements for Management

The Feasibility Report identifies inriver gravel augmentation in some of the alternatives (e.g. alternatives CP4 and CP5), but detail is lacking on the degree to which this augmentation would benefit anadromous fish, i.e. quantity and location of augmentation is not provided. Based upon previous and ongoing studies of the need for gravel in the Sacramento River below Keswick Reservoir (Buer et al. 1989, Nature Conservancy 2008, Stillwater Sciences 2007, Service 2001), the amount proposed for augmentation (5,000 to 10,000 tons per year for 10 years) is substantially low. This amount does not appear to address the need for gravel and mitigating the potential impacts of the new flow regime proposed within the SLWRI Feasibility Report.

The diversion and storage of natural flows by dams and diversion structures on Central Valley waterways have depleted stream flows and altered the natural cycles by which juvenile and adult salmonids base their migrations. Depleted flows have contributed to higher temperatures, lower dissolved oxygen levels, and decreased recruitment of gravel and large woody debris. Furthermore, more uniform flows year-round have resulted in diminished natural channel formation, altered foodweb processes, and slower regeneration of riparian vegetation. These stable flow patterns have reduced bedload movement (Stillwater Sciences 2007), caused spawning gravels to become embedded and reduced channel widths, which has decreased the available spawning and rearing habitat below dams.

The Sacramento River has received gravel augmentation in most years, although the identified CVPIA targets have not been met in any one year. In the Sacramento River upstream of Highway 44, the percentage of total redds has increased from 6.9% pre-CVPIA to 15.6% post-CVPIA. The agencies' progress, measured by the quantity of gravel placed each year, is meeting, on average, 28% (13,885 cubic yards, or approximately 22,216 tons) of the Sacramento River target.

The Department encourages Reclamation to clearly identify these obligations within the Feasibility Report, Technical Reports/Attachments, and future environmental documents and identify steps to implement them, if they have not been completed and/or initiated. The Department also encourages Reclamation to clearly articulate the difference between its legal obligations, per CVPIA, to provide gravel as compared to its gravel augmentation proposal in the SWLRI, which is being presented as a restoration

measure. Reclamation also needs to identify the need to provide gravel to address mitigation, as opposed to a restoration measure.

Analysis of Botanical Resources

The documents do not appear to consider the impacts of the permanent loss of an undetermined number of acres of vegetation and general wildlife habitat within the Shasta Reservoir area under the various dam-raising scenarios (Alternatives CP1-CP5). These impacts and their level of significance should be described and include the impacts of this permanent loss of vegetation/habitat, what mitigation measures are necessary to offset this permanent loss, and the location of mitigation sites.

The general mitigation strategy proposed for the direct loss of sensitive plant[1] occurrences is relocation. The Department generally does not support the relocation of sensitive plants as an effective mitigation measure. It is rarely effective to re-establish the population somewhere else and does little to offset the permanent loss of suitable habitat. No provisions are provided for off-site mitigation (preservation of suitable/occupied habitat which is currently not protected, enhancement of existing populations, etc.). It is unclear how the proposed measures would mitigate impacts to a "less than significant" level. The following detail is needed within subsequent drafts of the SLWRI environmental documents:

- Where, specifically, will these plants be relocated;
- The amount of available "growing space" within areas of suitable habitat to which these plants can be moved (habitat not already occupied by other individuals of the species in question);
- Evidence that relocation will be effective;
- Monitoring of these relocated populations to verify that relocation efforts have been successful; and
- A definition of what would constitute success (identify performance standards), who would conduct the monitoring, and alternatives if the relocation failed or was found to be failing.

Analysis of Effects on Fish, Wildlife, and Botanical Resources, and Biologist Qualifications

The following wildlife species, in particular, were not adequately analyzed within the Feasibility Report and Wildlife Technical Report. Please see the comment spreadsheet (Attachments 1 and 4) for more specific comments:

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[1] Multi-Species Conservation Strategy, U.S. Forest Service Sensitive, California Rare Plant Rank

- Shasta Salamander (*Hydromantes shastae*)
- Peregrine falcon (*Falco peregrinus*)
- Bald eagle (*Haliaeetus leucocephalus*)
- Purple Martin (*Progne subis)*
- Special-Status Raptors, Bats, and Ringtails (*Bassariscus astutus*)
- Bank Swallow (*Riparia riparia*)

"Out of kind" mitigation, such as enhancement of nearby non-limestone habitat for Shasta salamander, is listed as a potential option to address impacts to certain species. However, it is unclear if such mitigation will actually occur, what specifically would habitat "enhancement" consist of, and will enhancement activities convert unsuitable habitat to suitable habitat. The ratio of acres of suitable habitat inundated to acres of unsuitable habitat "enhanced" should be clearly stated. Similarly, mitigation measures and the significance level of potential impacts have not yet been developed for several species: Northern spotted owl (*Strix occidentalis caurina*), fisher (*Martes pennanti*), etc. The Department may submit additional comments on later drafts which include a complete analysis of the Project's impacts.

For several species addressed, the Feasibility Report and Technical Reports/Attachments indicate "qualified biologists" will decide on appropriate construction buffers if nest sites are discovered within or adjacent to the Project's construction boundary during pre-construction surveys. The minimum qualifications of these biologists should be identified.

The Feasibility Report clearly does not reflect the results of a comprehensive analysis of effects to species and habitats over the entire project footprint, which includes the primary and extended Project area. The documents, for example, assess impacts to adfluvial salmonids in Shasta Reservoir but not adfluvial salmonids that are in the Sacramento River. It assesses impacts to warmwater species in Shasta Reservoir but not in the Sacramento River, and should include an analysis of changes in warmwater species' response to flow changes. This is an important element due to the predation pressure warmwater species places upon anadromous salmonids and other special status species, such as northwestern pond turtle (*Actinemys marmorata marmorata*). Other species, such as bald eagle, are found both on the Shasta Reservoir and along the Sacramento River, yet the document does not address this species comprehensively. An analysis of the direct, indirect, and cumulative effects to this species, both at the individual and population scale, is needed. Similarly, analysis of anadromous salmonids is fragmented into sections (Sacramento River below Keswick, middle/lower Sacramento River, and Bay/Sacramento-San Joaquin Delta) so that the overall impact to various runs and/or species is not provided, which leads to an inability to assess the overall effects of the Project.

Analysis areas which are suitably "sized" for species with large home ranges were also lacking. For example, restricting the analysis area to the inundation zone for assessing impacts to northern spotted owls is not adequate due to the large home ranges of this species and does not capture the potential for both direct and indirect effects. Since 2000

the Department requested sufficient analysis areas which could extend, depending on the species, beyond the inundation zone.

There are many wildlife resources that are not evaluated at all. For example, impacts to deer *(Odocoileus hemionus columbianus)* habitat and populations are not assessed. In 1984 the Trinity River Basin Fish and Wildlife Management Act (PL 98-541) was signed, authorizing the Secretary of the Interior to develop and implement a management program to restore the fish and wildlife populations in the Trinity River Basin to levels which existed prior to construction of the Trinity and Lewiston dams. The initial phase of the Trinity River Restoration Program included development of a series of action plans. These action plans included five main program goals, one of which addressed the need to compensate for impacts to deer and other wildlife from flooding of habitat and reduced streamflow resulting from diversions to the CVP.

Role and Importance of Tributaries to Sacramento River Health and Dynamic Ecological Processes

The Department has previously requested an adequate assessment of the interrelationship of the Sacramento River to its tributaries, given the potential for flow changes to affect this relationship. The health of the Sacramento River is directly tied to its relationship with its tributaries. Tributaries below Shasta Dam provide water, spawning gravel, sediment, and large woody debris to the Sacramento River in order for it to continue to provide habitat to anadromous fish and other aquatic and riparian-obligate species. Tributaries also can provide a location where anadromous juveniles can rear (Maslin et al. 1999, Snider 2001). Likewise, the Sacramento River provides a conduit through which fish travel in order to reach their natal streams. During high flow conditions, the Sacramento River inundates the lower portions of its tributaries, which affects tributaries' riparian habitats, geomorphological condition, and substrate condition. Because of this relationship, it is crucial to evaluate the role of the tributaries and to more completely explore the condition of tributary watersheds and restoration opportunities in order to maintain these relationships, particularly if management of the Sacramento River changes due to the Project.

It should be more effectively acknowledged in the Feasibility Report and Technical Reports/Attachments that the tributaries supply materials, such as large woody debris and gravel, to the Sacramento River and have, at some level, offset the effects of Shasta Dam on instream habitat quality and quantity. This contribution should be quantified. An evaluation of the dam raise on instream habitat quality and quantity should take into account not only the potential effects of flow changes but also the potential changes in tributary contributions, given their dynamic nature. Watershed ecological processes are not static; if tributaries are deteriorating and/or their contributions to the Sacramento River lessen at some level, it could affect instream habitat of the river itself, which could be exacerbated by the dam raise and subsequent flow changes. Some watersheds are in a degraded condition due to historical and present management, such as Thomes, Cottonwood, Cow, and Battle Creeks.

Because of this, the Department strongly encourages inclusion of restoration efforts to improve tributary contributions and condition.

Control of non-native species such as arundo (*Arundo donax*) and tamarix (*Tamarix chinensis*) along the Sacramento River is another issue in which tributary assessment is important. These species' negative impacts on native plant displacement, effects on bank stability, and channel configuration are well documented in the literature. In order to most effectively manage non-native plant and animal species that use water flow as a means of dispersal, effective management includes finding uppermost areas of infestation and working in a downstream fashion. These two plant species are found on many of the watersheds in the upper Sacramento River. The Feasibility Report should address impacts of the Project on these non-native species.

Analysis of Geologic and Geomorphic Impacts

The Geologic Technical Report needs to be modified to show it meets the standards of practice for geologic reports. This includes identifying a licensed geologist as the preparer of the Geologic Technical Report. This report relies on model results and provides opinions regarding slope stability, future erosion, and potential impacts associated with the proposed Project. Similarly, the Feasibility Report itself does not appear to provide a complete recognition and characterization of the existing geologic conditions and issues, and any costs associated with the issues and needs revolving around geology and geomorphology. Such interpretations and opinions fall under the professional responsibilities of a State-licensed geologist or geotechnical engineer. Such errors render the conclusions and recommendations within the Geologic Technical Report and Feasibility Report suspect.

The Geologic Technical Report does not appear to include an analysis of the volume of sediment that has accumulated behind Shasta Dam since its original construction. Because any dam's effective design life is affected by the rate of sediment accumulation in the reservoir, knowledge of how fast the reservoir is filling is an important parameter with which to evaluate the overall Project. Without an analysis of the volume of accumulated sediment, an important aspect of the proposed Project's long-term effectiveness and environmental impact cannot be fully evaluated. Similarly, the Geologic Technical Report does not appear to include an analysis of the existing environmental impacts that have occurred on the Sacramento River and its primary tributaries since the original construction of the dam. Such impacts appear to include scouring of tributary channels down to bedrock thereby limiting spawning habitat in those tributaries. Additional impacts are described more fully by Buer and others (Buer et. al. 1989). This analysis and description provide a baseline from which to assess impacts of a dam raise on the Sacramento River and its tributaries, particularly those above RBDD. Without an analysis/understanding of the existing and ongoing downstream effects of Shasta Dam on the Sacramento River and its Sacramento-San Joaquin Delta, it is not possible to fully evaluate the potential impacts associated with the proposed Project.

The Geologic Technical Report does not appear to include an analysis of sediment aggradation in the primary tributaries that drain into Shasta Reservoir. In general, the primary reference to sedimentation is with regard to that created by construction activities. Channel aggradation is an important in-stream limiting factor for fish and without such an analysis, the existing and future environmental impacts of the proposed Project cannot be fully evaluated.

Analysis of Impacts to Water Quality and Addressing Abandoned Mines

The Feasibility Report does not adequately address impacts to water quality from abandoned mines, lake shore erosion, and recent wildfires. There is only a minimal discussion of these issues, and mitigation measures are not explored. There are several abandoned mines in and around the Shasta Reservoir area which discharge highly dissolved metals and/or have acid-mine drainage issues. These sites may be in various stages of reclamation. Consequently, it appears that the Feasibility Report is remiss in analyzing the costs of addressing the impacts associated with the abandoned mines and future reclamation efforts.

The Water Quality Technical Report should also discuss and analyze the Total Maximum Daily Load (TMDL) for metals in the Sacramento River below Keswick and should include an analysis of the effects of the Project and any flow management changes on management of the TMDL.

Obligations to the CVPIA and AFRP

The Feasibility Report does not fully acknowledge obligations for restoration as identified within the CVPIA, which was signed into law in October 1992, and AFRP (Service 2001), a program under CVPIA. For example, Page 17 of CVPIA Section 3406(b)(13) states (in part):

> "...Develop and implement a continuing program for the purpose of restoring and replenishing, as needed, spawning gravel lost due to the construction and operation of Central Valley Project dams, bank protection projects, and other actions that have reduced the availability of spawning gravel and rearing habitat in the Upper Sacramento River from Keswick Dam to Red Bluff Diversion Dam in the American and Stanislaus Rivers downstream from the Nimbus and Goodwin Dams, respectively. The program shall include preventive measures, such as re-establishment of meander belts and limitations on future bank protection activities, in order to avoid further losses of instream and riparian habitat..."

The CVPIA redefined the purposes of the CVP to include the protection, restoration, and enhancement of fish and wildlife and associated habitats. The CVPIA identified numerous specific measures and programs to meet the new project purpose and also directed the Secretary of the Interior to operate the CVP consistent with these purposes. There are several AFRP goals and evaluations for the Sacramento River itself which address limiting factors, but this was not articulated within the Feasibility Report or

Technical Reports/Attachments. As a component of the CVPIA, the Feasibility Report should address these actions and evaluations.

We encourage Reclamation to move back to the step of identifying limiting factors for anadromous fish on the Sacramento River (Keswick Dam to the Delta). This has been done in several contexts: CVPIA AFRP Final Restoration Plan; CALFED Record of Decision and associated documents (CALFED 2000b); Sacramento River ecological flows tools effort, developed by the Nature Conservancy (Nature Conservancy et.al. 2008); and the new effort by Reclamation, the Service, its partners, and CVPIA stakeholders to develop a coordinated plan for CVPIA programs. These analyses/tools should be used to better develop a list of actions required to address anadromous fish survival, particularly the elements needed by fish other than flow and spawning gravel.

Relationship to Other CALFED and Water Management Programs

The purpose of the CALFED Program is to develop and implement a long-term comprehensive plan that will restore ecological health and improve water management for beneficial uses of the Bay-Sacramento-San Joaquin Delta system (CALFED 2000b). To practicably achieve this program purpose, CALFED will concurrently and comprehensively address problems of the Bay-Sacramento-San Joaquin Delta system within each of four resource categories: ecosystem quality, water quality, water supply reliability, and levee system integrity. Important physical, ecological, and socioeconomic linkages exist between the problems and possible solutions in each of these categories. Accordingly, a solution to problems in one resource category cannot be pursued without addressing problems in the other resource categories.

The CALFED Bay-Sacramento-San Joaquin Delta Program recognized early on that its plan must include the means for fully integrating California's water supply system to provide more reliable water supplies and to meet competing needs. As per the Memorandum of Understanding (MOU) on Sites Reservoir (CALFED 2000a), Section 1.6, Integrated Water Development and Management, the parties to this MOU, in addition to proceeding with the planning and environmental review of Sites Reservoir, jointly or separately sought to pursue a broader integrated water supply management and water development program. However, the SLWRI barely mentions Sites Reservoir.

All aspects of the CALFED Program are interrelated and interdependent. More specifically, many of the elements are complementary or directly related to storage. The California Department of Water Resources and Reclamation, in coordination with the Bay-Sacramento-San Joaquin Delta Authority, initiated the Common Assumptions process to develop consistency and improve efficiency among the surface storage investigations. While each of these investigations addresses a unique purpose to meet different combinations of water supply reliability, water quality, and environmental needs, all of the investigations share some common requirements that include completing planning reports and feasibility studies and associated alternatives analyses to comply with CEQA, NEPA, and Clean Water Act Section 404 requirements.

There are also other major existing water resources projects that influence Sites Reservoir and SLWRI planning and its potential capabilities. These projects include Reclamation's CVP, SWP, and the United States Army Corps of Engineers' Sacramento River Flood Control Project. In addition, two ongoing programs in the Central Valley significantly influence the Sites Reservoir Investigation: the CVPIA and the Bay-Sacramento-San Joaquin Delta Program, which is responsible for implementing the CALFED Bay-Sacramento-San Joaquin Delta PEIS/EIR and Record of Decision. Both of these programs also substantially affect the SLWRI and its environmental document preparation and analyses.

Other Plans

The principles and goals of plans pertain to the conservation of natural resources in the Sacramento River valley, including anadromous fish and associated stream and riparian habitats that could be affected by the Project, should be discussed in the Feasibility Report. These plans are directed at restoring, enhancing, and recovering these resources, which have been adversely affected by water supply development and other human activities, and include:

- Central Valley Salmon and Steelhead Restoration and Enhancement Plan (Reynolds et al., 1990);
- 2009 Public Draft Recovery Plan for the Evolutionary Significant Units of Sacramento River winter-run Chinook and the Central Valley spring-run Chinook, and the Distinct Population segment of Central Valley Steelhead (NMFS, 2009b);
- Restoring Central Valley Streams: A Plan for Action (Reynolds et al., 1993);
- Status of Actions to Restore Central Valley Spring-Run Chinook Salmon (Mills and Ward, 1996); and
- Steelhead Restoration and Management Plan for California (McEwan and Jackson, 1996)

We appreciate the opportunity to review the Feasibility Report and the Attachments. If you have further questions regarding our comments, please contact Staff Environmental Scientist Patricia Bratcher at Patricia.Bratcher@wildlife.ca.gov or (530) 225-3845.

Sincerely,

NEIL MANJI
Regional Manager

Attachments

ec: Page 15

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Attachment 1: Shasta Lake Water Resources Investigation Feasibility Report Comment Form, Version December 2013

Reviewer Name: CA Dept. of Fish and Wildlife, Region 1 and Water Branch

Reviewer Email: See Reviewer cells below

Reviewer Agency: CA Dept. of Fish and Wildlife

Reviewer Mailing Address: 601 Locust St., Redding, CA 96001

Date: 1/11/13

Comments on Draft Feasibility Report

ITEM	REVIEWER	CHAPTER TITLE	CHAPTER NUMBER	PAGE NUMBER	LINE NUMBER	TEXT	COMMENT
1	Vorpagel: Jane.Vorpagel@wildlife.ca.gov	Executive Summary	ES	ES-3	4th paragraph	The RBDD facilities are directly adjacent to the Red Bluff Pumping Plant (RBPP), which is currently under construction.	The Red Bluff Diversion Dam Project is nearly completed, and the gates are in a permanent "gates up" position. Please update the document where this is mentioned.
2	Vorpagel	Executive Summary	ES	ES-6	2nd paragraph	One of the most significant factors contributing to the declines is unsuitable water temperature in the upper Sacramento River, especially in dry and critically dry years.	One of the most significant factors contributing to the declines of fisheries is the building of the Shasta Dam which blocked passage up stream to sources of cooler water. This needs to be included as well.
3	Vorpagel	Executive Summary	ES	ES-7	last paragraph	California Department of Fish and Game (DFG)	Global Name change to California Department of Fish and Wildlife (CDFW)
4	Bratcher: Patricia.Bratcher @wildlife.ca.gov	Planning Objectives, Constraints, and Considerations	N/A	ES-10	N/A	Re. use of 2004 and 2005 OCAP BO	The 2008 and 2009 OCAP BO should be used on the SLWRI EIS and FR. It has come to our attention that BOR is using the 2009 OCAP flow requirements in a new round of modeling on the SLWRI EIS. This section should be updated to reflect use of the new BO's.
5	Bratcher	Formulation of Alternative Plans	N/A	ES-15	N/A	Reference to the 2007 Plan Formulation Report	CDFW made comments on the first version of the PFR; we were not allowed to see the third and final version, despite a request to do so. BOR should identify the comments and concerns with the first PFR which were not addressed in the Final (third) PFR.
6	Vorpagel	Executive Summary	ES	ES-18	last paragraph	Of the increased reservoir storage space, about 378,000 acre-feet would be dedicated...for anadromous fish.	Elaborate on how the cold water pool would be used.
7	Bratcher	Formulation of Alternative Plans	N/A	ES-19	N/A	Figure ES-5 and use of SALMOD Model	SALMOD appears to be heavily, if not solely, relied upon to reflect benefits or drawbacks to the various alternatives with respect to anadromous fish response. DFW has made repeated comments about use of SALMOD, which do not appear to have been addressed. DFW requests BOR to proactively address our comments on SALMOD.
8	Bratcher	Formulation of Alternative Plans	N/A	ES-20	N/A	Table ES-2, spawning gravel augmentation	10,000 tons is a paltry amount of spawning gravel. The document should note that BOR is already obligated to inject spawning gravel into upper Sacramento River, as per CVPIA 3406(b)(13), and the gravel augmentation target is never met. The additional 10,000 tons of gravel will do little to address the long-term need for spawning gravel; the amount should be independent of and addition to the CVPIA gravel injection requirement. BOR should consider doing an analysis of the change in flow operations due to additional water, how that may affect gravel routing processes and availability, and then develop a gravel quantity accordingly for a longer period of time.
9	Chad.Dibble@wildlife.ca.gov	Executive Summary	Executive Summary	ES21	Table ES-2 line 8	see comment	The listed increase in outmigrating Chinook salmon should be quanified by a date that the project expects to see the increases by.
10	Vorpagel	Executive Summary	ES	ES-21	ES table 2	Sidr Channel Rearing Habitat Restoration (miles) - - - 0.8 0.8	This does not appear to be much habitat...please elaborate on how it will support all numbers of fish/juveniles that will be outmigrating.

Page 2		Shasta Lake Water Resources Investigation Feasibility Report Document Form--Draft Feasibility Report						
11	Vorpagel	Executive Summary	ES	ES-21	ES table 2 line 19	Riparian, Floodplain, and Side Channel Habitat Restoration (acres)	Almost 3 acres... This is not much, especially considering the acres of tributary riparian habitat which will be lost during the "Shoreline Enhancement, 130 acres."	
						- - - 2.9 2.9		
12	Vorpagel	Executive Summary	ES	ES-21	ES Table-2 Line 13	Increased Firm Water Supplies SOD (TAF/year)3 66.8 85.3 103.8 66.8 103.8	Please identify how this compares to the increased storage amount.	
13	Bratcher	Formulation of Alternative Plans	N/A	ES-23	5	CP4 would generate 563.3 million in net benefits.	General comment; the amount of net benefit is all based upon CALSIM runs using the 2004 OCAP BO flow requirements, so the new cost benefit info may be totally different. This essentially makes the entire Feasibility Study inaccurate and should be completely redone.	
14	Vorpagel	Executive Summary	ES	ES-27	ES Table 4	% of Total Construction Cost 12.4% 18.6% 61.2% 7.9% 100.0%	Please identify if this is what will be charged to fish/natural resource funding.	
15	Bratcher	Implementation Considerations	N/A	ES-29	N/A	Special Status Species	There are other critical special status species that could be affected (e.g. Delta Smelt). Document and analysis needs to fully evaluate the effects to these species and/or special habitats, as well as identify ways in which adverse effects could be minimized as well. In addition, the benefit to one species may result in a negative effect on another species (e.g. winter-run Chinook and bank swallow). This also needs to be evaluated.	
16	Bratcher	Implementation Considerations	N/A	ES-30	N/A	McCloud River	Please see our cover letter for the Department's position on the McCloud River. In addition, details about what Westlands Water District and/or other agricultural interests may obtain as a result of a dam raise needs to be fully disclosed within the FR and EIS, especially if they are subject to CEQA and CESA.	
17	Vorpagel	Executive Summary	ES	ES-31	Forth Paragraph	Water rights for the expanded Shasta Reservoir, which are appropriated by the SWRCB...	This almost sounds like a claim would be filed for the "extra" storage before the project can be operated. However, the water is already over allocated. This water should be considered for use as reserve water for instream beneficial uses, including a 1707 dedication.	
18	Vorpagel	Executive Summary	ES	ES-32	2nd to last bullet	Potential effects on Central Valley hydrology below CVP and SWP facilities...	Please identify if there will there be impacts below other dams when more flow is used from Shasta to meet instream flows downstream and in the Delta. These should be evaluated.	
19	Vorpagel	Executive Summary	ES	ES-33	last paragraph	If recommended for implementation, Reclamation and/or future project partners or beneficiaries would perform...	These will be required based on new BO. Please identify how BOR is transferring those studies and costs to future partners.	
20	Vorpagel	Executive Summary	ES	ES-34	Table ES-6	SWRCB Amended Water Right • Application • Draft (possibly final) environmental compliance documents	It appears that BOR would need to apply for the additional storage...CDFW recommends consideration of using 1707, instream beneficial use, not irrigation. This may create a situation where the State Board would be lead for CEQA.	
21	Bratcher	Federal Responsibilities	N/A	ES-34	N/A	Table ES-6	CDFW has previously provided additional Fish and Game Code sections which may apply. Please see earlier comment letters and/or correspondence.	
22	Dibble	Executive Summary		ES37		See bullet 2	See JDR comment on 3-6 & 3-7 below	
23	Vorpagel	Executive Summary	ES	ES-37	3rd paragraph	To date, one comprehensive plan (CP4) has been analyzed for financial feasibility-...	This will need to be re-evaluated with requirements found in the new BO's.	

Row #	Central Valley Water Resources Investigation Feasibility Report Comment Form--Draft Feasibility Report						
24	Vorpagel	Chapter 1, Introduction	1	1-4	3rd paragraph	Anadromous Fish Survival. The population of Chinook salmon in the Sacramento River has significantly declined over the last 40 years (DFG 2010).	Please start the sentence with, "...Since the building of the Shasta Dam, the population..."
25	Vorpagel	Chapter 1, Introduction	1	1-4	3rd paragraph	As with other Sacramento-San Joaquin Delta (Delta) tributaries, water temperature...especially in dry and critically dry years1.	Please make the following change (in bold): "As with other Sacramento-San Joaquin Delta (Delta) tributaries with dams, water temperature..."
26	Vorpagel	Chapter 1, Introduction	1	1-4	2nd to last paragraph	...the need for additional flood protection along the upper Sacramento River.	This appears to be overstated. More information is needed on the current concern regarding floods and their affect downstream. Please identify how often Shasta Dam spills.
27	Vorpagel	Chapter 1, Introduction	1	1-6	3rd paragraph	Keswick Reservoir also receives inflows from Whiskeytown Reservoir on Clear Creek.	Add language: "...Which receives water from Trinity Reservoir..."
28	Vorpagel	Chapter 1, Introduction	1	1-6	3rd bullet from bottom	Lower reaches of three primary tributaries flowing into Shasta Lake (Sacramento, McCloud, and Pit rivers) and all smaller tributaries flowing into the lake...	The document must fully address impacts from metals in the smaller tributaries. These seem to be overlooked throughout the document.
29	Vorpagel	Chapter 1, Introduction	1	1-6	2nd bullet from bottom	Trinity and Lewiston reservoirs	Please identify potential changes in operation to the Trinity River, as a result of a Shasta Dam raise.
30	Vorpagel	Chapter 1, Introduction	1	1-7	1st paragraph	The RBDD is directly adjacent to the Red Bluff Pumping Plant (RBPP), which is currently under construction.	Please update the RBDD sections.
31	Vorpagel	Chapter 1, Introduction	1	1-11	3rd paragraph	Most of the outflow from Shasta Dam travels south...to the Pacific Ocean through San Francisco Bay. The CVPIA also addresses the operational flexibility of the CVP...and improved water conservation.	This may have been a correct statement historically. Exportation from the Delta or the irrigation uses should also be mentioned and discussed.
32	Vorpagel	Chapter 1, Introduction	1	1-12	3rd paragraph		The amount of transfers needs to be identified, relative to how much comparable conservation is occurring.
33	Vorpagel	Chapter 1, Introduction	1	1-14	1st bullet	Construction on the RBDD began in April 2010.	Please update the RBDD sections.

Shasta Lake Water Resources Investigation Feasibility Report Comment Form - Draft Feasibility Report								
2nd ¶								
34	Vorpagel	Chapter 1, Introduction	1	1-19	1st paragraph	Analysis and conclusions presented in the 2009 California Water Plan Update...	The 2009 California Water Plan is currently being updated (2013). Please identify if there are new locations of use.	
35	Vorpagel	Chapter 1, Introduction	1	1-19	2nd paragraph	...the Delta Stewardship Council is developing a Delta Plan. In November 2011, the council published... to serve as a basis for future findings of consistency by State and local agencies with regard to "covered actions."	Please identify if this is the same document as the recent Bay Delta Plan, which was being evaluated in fall, 2012. If so, please update this section to reflect more recent changes to the BDP.	
36	Vorpagel	Chapter 1, Introduction		1-21	1st paragraph	The Program Plan also addressed the California Public Resources Code's protection of the McCloud River... but also provides for investigations for potential enlargement of Shasta Dam.	The CALFED document identified a dam raise of 6 to 8 feet. Please see other comments on the McCloud River in this spreadsheet and the comment letter.	
37	Vorpagel	Chapter 1, Introduction	1	1-21	5th paragraph	The CALFED Storage Program Preferred Program Alternative includes a proposed 6.5-foot raise of Shasta Dam which would expand the reservoir by approximately 256,000 acre-feet.	If the CALFED document is being used to identify and/or quantify the level of impacts, it can only be used for the 6.5 dam raise alternative.	
38	Bratcher	Federal/State	Introduction	1-24	N/A	Bay-Delta Conservation Plan	The BDCP has gone through several iterations since this version of the Feasibility Report was prepared. Please review and update the BDCP section as needed. Please also consider adding the Bay Delta Plan as another item/project that needs to be addressed and/or considered.	
39	Vorpagel	Chapter 1, Introduction	1	1-26	1st paragraph	Modifications of Shasta Dam and Reservoir could allow for increased system flexibility ...increases in water supply reliability.	There are no mention of impacts of reduced flows through the Delta, please elaborate.	
40	Vorpagel	Chapter 1, Introduction	1	1-27	1st paragraph	To the east are the Fall River and Pit River RCDs, and to the west and north are the Trinity County and Shasta Valley RCDs.	The Shasta Valley RCD is not a part of the Sacramento River system. The Shasta River flows to the Klamath.	
41	Vorpagel	Chapter 1, Introduction	1	1-27	2nd paragraph	Other Programs and Private Organizations	Also include the Churn Stillwater Creek Alliance.	

Shasta Lake Water Resources Investigation Feasibility Report Comment Form—Draft Feasibility Report

Page #							
42	Bratcher	"Water and Related Resources Problems, Needs, and Opportunities	2	2-3 to 2-4	N/A	Although some fluctuations occur from year to year, the overall trend for the past 10 years...	DFW does not believe this is true. While populations showed increases in the mid 2000's to as large as 15 to 17 thousand fish, the populations since then have not rebounded as hoped and remain less than 5 thousand for the past six years. Go to http://www.fws.gov/stockton/afrp/ to review Grandtab and ChinookProd tables, which currently contains data through the 2011 spawning season.
43	Vorpagel	Chapter 2	2	2-4	3rd paragraph	Although some fluctuations occur from year to year, the overall trend ...This increasing trend in salmon populations is likely due primarily to minimum release requirements at Shasta Dam, and to the TCD.	See other comments. The winter-run population is not in an increasing trend. There should possibly be mention of the Livingston Stone Hatchery at the base of the dam.
44	Vorpagel	Chapter 2		2-10	2nd paragraph from bottom	Additionally, development of additional water sources and increased storage... to maintain adequate supplies for agricultural and environmental purposes.	The impact of filling in of the system reservoirs with sediment is not mentioned, and/or how that changes the storage capacity.
45	Vorpagel	Chapter 2		2-11	2nd paragraph	For example, Shasta Lake is home to the largest concentration of nesting bald eagles in California, with 18 pairs nesting within 0.5 miles of the shoreline in any given year.	The impacts of inundating all those nesting trees needs to be adequately and completely assess. Impacts to trails like Clickapuit should also be addressed.
46	Vorpagel	Chapter 2		2-14	1st paragraph	Accordingly, there is a need to review flood control operations at Shasta Dam.	Comment for your consideration: While floods may have negative impacts upon man-made structures, flooding is a natural occurrence in rivers and acts to maintain ecosystem functions for a diverse number of species.
47	Vorpagel	Chapter 2	2	2-14	last paragraph	The Sacramento River downstream from Keswick Dam is critical habitat...and the Delta is one of the largest ecosystems for fish and wildlife habitat and production in the United States	Please identify the geographic extent of critical habitat and whether or not it includes the Delta.
48	Vorpagel	Chapter 2	2	2-15	2nd paragraph	Planning efforts, such as the BDCP, are intended allow implementation of projects...in the Delta to proceed within a stable regulatory framework.	Typo, need to add the word "intended to protect..."

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49	Vorpagel		2	2-15	last paragraph	The information used to assess existing and future resources conditions for water operations was developed in 2006... described in the 2004 OCAP BA (Reclamation 2004c) and the Coordinated Operations Agreement...	See comments about use of these older documents.
50	Vorpagel	Chapter 2	2	2-22	1st paragraph	The shoreline below full pool elevation is generally steep and devoid of vegetation that might otherwise help stabilize soils.	This could be a major impact with the raising of the dam. Shoreline processes, including wave action and changing reservoir levels, along with stormwater runoff will provide a constant mechanism by which soil in the new area of inundation can be constantly eroded and sediment transported into the lake resulting in elevated levels of suspended sediment and turbidity. These impacts seem to be downplayed throughout the document.
51	Vorpagel	Chapter 2	2	2-22	2nd paragraph	Shasta and Keswick dams have a significant influence on sediment transport...	See earlier comment about the filling of the reservoir with these sediments. This should be addressed.
52	Vorpagel	Chapter 2	2	2-22	2nd paragraph, last sentence	The river channel in the reach from Keswick Dam to RBDD is constrained by erosion-resistant formations and therefore is more stable.	This portion of the river is the major location for salmon spawning and therefore needs major spawning gravel injection to mitigate for the loss of sediment transport.
53	Vorpagel	Chapter 2	2	General comment			It took 6-9 years for the lake to fill. The act of reservoir filling may haveimpacts on fish, such as limiting options for augmenting flows for fall-run Chinook, steelhead, and late fall-run Chinook to avoid redd dewatering and/or provide habitat.
54	Vorpagel	Chapter 2	2	2-27	Table 2-7	1945-1952	Earlier section discussed large meandering belt along the Sacramento River, but that is not really accurate. This section is probably the more accurate statement. Perhaps the meandering belt is historic? Please elaborate.
55	Vorpagel	Chapter 2	2	2-28	2nd paragraph	Levees associated with the Sacramento River Flood Control Project begin intermittently downstream from the RBDD...	Check most current 303 d list 2008-2010. It is also listed for unknown toxicity and further down for pesticides. Pesticides are addressed in next paragraph.
56	Vorpagel			2-28	3rd paragraph	The Central Valley Regional Water Quality Control Board (RWQCB) determined that the 25-mile-long reach....is impaired because levels of dissolved metals periodically exceed levels identified to protect aquatic organisms (CVRWQCB 2002a).	This section needs to be significantly elaborated upon. The impacts of raising the dam will include the inundation of other abandoned mines.

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57	Vorpagel	Chapter 2	2	2-30	2nd paragraph	Of these, Bully Hill is the closest abandoned mine to the current shoreline...	A complete species list for all the impacted areas is needed, as well as a more recent search of the California Natural Diversity Data Base. It may be covered in appendixes, but it should be mentioned here also.
58	Carlson; Jennifer.Carlson@wildlife.ca.gov	FR - Water Resources and Related Conditions	2	2-32		Wildlife	The list of species presented should include which type of species instead of using generic terms like quail, falcon, hawk (these are not really species names). Then the second sentence refers to specific species like Hutton's vireo, warbling vireo, etc. When listing species, there should be some consistency in how they are listed. The list is not complete either - what about fishers, ringtail cat, coyotes, etc?
59	Bratcher	Existing Conditions Summary	2	2-33	N/A	Elk	Elk are currently present in the upper watershed and surrounding area. The two species in the region is Roosevelt and Rocky Mountain Elk. There are roosevelt elk west of the lake in the Douglas City area - they were transplanted there in 1999. North and east of the lake there are Rocky Mountain elk, and their populations are doing well also. These elk do not frequent the immediate Shasta Lake area, however.
60	Bratcher	Existing Conditions Summary	2	2-34	N/A	The CALFED Program Plan (CALFED 2000b) concluded that although Section 5093.542...	See Departmental comments about analysis of effects on the McCloud River in the comment letter.
61	Vorpagel	Chapter 2	2	2-34	1st paragraph	DFG has taken the position that it must participate in preparing the EIS to comply with Section 5093.542(d).	See Departmental comments about analysis of effects on the McCloud River in the comment letter.
62	Vorpagel	Chapter 2	2	2-37		USFS maintains...	Ramps would have to be removed and relocated. As per CDFW requirements, you cannot leave asphalt where it can enter the waters of the State. There are also walking and horse trails which could be impacted by the dam raising.
63	Vorpagel	Chapter 2	2	2-39	1st paragraph	The UPRR main line follows the I-5 alignment and crosses Shasta Reservoir at the Pit River Bridge.	It may cross at other locations further north; please verify.
64	Vorpagel	Chapter 2	2	2-39	2nd paragraph	Many areas scattered throughout Shasta and Tehama counties are served by individual septic systems.	Would the raising impact any gas lines? Please elaborate.
65	Vorpagel	Chapter 2	2	2-40	3rd paragraph	Prominent examples include the State of California's Delta Plan and the BDCP	Sites Reservoir (North of Delta Offstream Storage) should also be discussed/mentioned. That could be a major impact on water available to fill the larger Shasta.
66	Bratcher	Existing Conditions Summary	2	2-41	N/A	Accordingly, populations of anadromous fish are expected...	Identify rationale behind this statement, esp. in the context of BDCP, ocean conditions, the decline of the Bay Delta, or other elements that has resulted in recent declines in populations.

Page 8		Shasta Lake Water Resources Investigation Feasibility Report Comment Form - Draft Feasibility Report					
67	Bratcher	Rationale for Use of 2004 Biological Assessment for Water Operation Models	2	2-42	N/A	Use of the 2004 OCAP BO	This page also mentions the 2004 OCAP BO. See CDFW's comments about its use in the summary letter.
68	Bratcher	SLWRI-Specific Planning Objectives	3	3-4	N/A	Reference to the 2000 CALFED ROD	CDFW has made repeated requests to address compliance with CALFED ROD. Discussion regarding compliance with the CALFED ROD, ASIP, and MCSC still needs to occur.
69	Bratcher	SLWRI-Specific Planning Objectives	3	3-5	N/A	Reference to the 2000 CALFED ROD	Same comment as row 22.
70	Roberts: Jason.Roberts@wildlife.ca.gov	Plan Formulation	3	3-6 & 3-7	unknown	see comment	"Modeling studies will be updated...incorporated into future SLWRI documents" The modeling used for this document is outdated and needs to be updated. Sections of the document (as a whole) use updated information, while other sections such as modeling use outdated assumptions. The 2004 BiOp is outdated. The 2008 and 2009 BiOps should be the baseline for this document. Additionally, many modeling scenarios and evaluations have been developed through BDCP, which would most likely provide some useful information for this project.
71	Vorpagel	Chapter 3	3	3-8	3rd bullet	Alternatives that require future and ongoing action specific for success have a higher uncertainty than other plans.	Please identify how long will it take to fill the new reservoir space.
72	Vorpagel	Chapter 3 Management Measures	3	3-10	Table 3.1 8th	Although existing TCD at Shasta effectively meets objectives, potential may exist to further modify the device...	The temperature objectives are not always met. There is work which could be done to the TCD which would improve it, but those tasks are not necessarily tied to the raising of the Dam (as implied here).
73	Bratcher	Chapter 3 Management Measures	3	3-11		Table 3-1	While some of these management measures have been deleted from further consideration, they may prove useful when considering mitigation requirements/needs.
74	Bratcher	Management Measures	3	3-11		Table 3-1: Deleted: Construct a migration corridor from the Sacramento River to the Pit River	Any discussion of restoring fish above Shasta Dam should be updated to reflect the current status of that option, within the context of the 2009 OCAP BO, the Draft NMFS Recovery Plan, and BOR-generated analyses of that issue. To the extent that design has been completed, installation of structures to manage juveniles associated with the above rim dam relocation project needs to be mentioned and addressed within the SLWRI EIS.
75	Vorpagel	Chapter 3		3-12	Table 3.2 8th box	Extremely high cost for a very small potential benefit and severe environmental impacts.	Identify how much sediment is behind Shasta Dam.
76	Vorpagel	Chapter 3	3	3-18	Table 3.4	Reoperate reservoir for recreation	Please identify how this and reservoir reoperations will impact fish below the dam and the need for natural flood processes, including filling the reservoir.
77	Vorpagel	Chapter 3	3	3-19	3rd paragraph	(4) coordinated operation and precipitation enhancement.	Please identify how precipitation enhancement and reoperations will address surface water quality.

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78	Vorpagel	Chapter 3	3	3-20	2nd paragraph	These included (1) updating Shasta Dam and Reservoir flood management operations... the second measure...was subsequently eliminated from further consideration;	Whenever water is withdrawn, metals in the reservoir pool must be considered. They are at various levels at various times of the year. Phil Woodward at the Regional Board in Redding has studied this extensively.	
79	Vorpagel	Chapter 3		3-21	5th paragraph	Side channels and other features could be created to encourage spawning and rearing.	State Lands has some major issues with restoration projects... discuss this with Andrew Jensen for more current update of problems caused by trying to work with the State Lands Commission, which owns the lands under rivers. This is a major glitch or obstacle in this measure which may need to be resolved at upper management levels.	
80	Vorpagel	Chapter 3		3-22	1st	This measure would not be expected to conflict with other known programs or projects on the upper Sacramento River.	Discuss with State Lands Commission. They seem to have serious conflicts with these types of projects	
81	Vorpagel		3	3-22	2nd paragraph	Suitable spawning gravel has been identified as a potential limiting factor in the recovery of anadromous fish populations on the Sacramento River.	The document should mention existing amounts of gravel already required, timing of injections, current success and what would be the additional amount of gravel required because of this project. Also discus the costs associated with gravel augmentation.	
82	Vorpagel		3	3-22	2nd paragraph	Structural treatments may be required below Keswick Dam to prevent the gravel from being washed downstream.	See State Lands concern above.	
83	Vorpagel		3	3-22	2nd paragraph	Hydraulic and geomorphic evaluations are needed to determine the most effective gravel size distribution and the most appropriate locations for gravel placement.	To some extent these studies have already been done for the existing gravel projects and/or in other studies, but it was either a while ago or was uncomplete. We already know what size most appropriate for salmonids and have picked out injection sites.	
84	Vorpagel		3	3-23	last paragraph	Further, the measure could help provide additional control and dilution of acid mine drainage from Spring Creek.	The acid mine drainage from Iron Mountain Mine should not be used as a rationale for this project. That issue has been remedied. More metals are coming from the other abandoned mines around Shasta Lake and the raising of the dam will exacerbate those discharges. The so called "dilution" water from Shasta Lake is at times more contaminated than the current discharges from Iron Mt Mine or Spring Creek Reservoir. Raising the dam would create additional sources of metals.	
85	Vorpagel		3	3-24	3rd paragraph	The goal of the operation changes would be to minimize required evacuation of the reservoir...	Caution, may impact fish in downstream river.	

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86	Vorpagel		3	3-24	4th paragraph	The 2009 California Water Plan Update identified a host of urban and agricultural water use efficiency measures (DWR 2009).	While these measures were identified, they were generally described and did not go into enough detail as to how much water would be saved and/or specifically where it would be implemented.
87	Vorpagel		3	3	3-25	last paragraph	The lower reaches of intermittent and perennial streams tributary to Shasta Lake that support aquatic organisms native to the upper Sacramento River would be targeted...	There is no mention of the major tributaries with acid mine drainage. This issue is not properly addressed in this document.
88	Vorpagel		3	3	3-26	1st full paragraph	A limited amount of land contouring and imported fill material would be required...	Contact Andrew Jensen (CDFW Redding) about State Lands Commission issues with rehabilitation projects.
89	Vorpagel		3	3	3-26	4th paragraph	Potential methods to improve flood management would include improved long-range weather forecasting...and modifying target peak flows at Bend Bridge.	Ramping rates to reduce stranding of fish should also be confirmed and/or developed.
90	Vorpagel		3	3	3-26	1st paragraph	On occasion, however, outflows during flood operations are made through the flood control outlets and over the spillway.	Please identify how often a spill has occurred in the last 50 years.
91	Vorpagel		3	3	3-28	3rd paragraph	Shasta Dam has the ability to provide increased releases and high flow releases to reestablish Delta water quality.	The document must disclose what impacts the use of Shasta water would cause to other rivers which are used to meet Delta Water Quality objectives. An example: if we are meeting Delta flow requirements with Sacramento River water, what happens to the flows below Folsom Dam or Oroville Dam?
92	Vorpagel		3	3	3-28	3rd paragraph	Improved Delta water quality conditions could provide benefits...by potentially increasing Delta outflow during drought years, and reducing salinity during critical periods.	Lowered water quality may exist due to inundation of abandoned mines and additional turbidity caused by waves eroding new higher water line, which would not have vegetation to protect it from erosion due to the fluctuation of water levels. This entire subject is not addressed in the document.
93	Bratcher	Refinement of Anadromous Fish Survival Focus Alternative	3	3	3-37		Table 3-7; reference to 378,000 additional acre feet of water	Document should clearly reflect that this is an additional amount of water ABOVE what is already maintained to provide cold water for anadromous fish in the Sacramento River below Keswick Dam.
94	Vorpagel		3	3	3-39	last sentence	All comprehensive plans also provide for modernization of recreation facilities.	Asphalt boat ramps should be removed and replaced using concrete. Impacts to trails around the lake, such as Clickapudi, should also be evaluated.

Page 11		Shasta Lake Water Resources Investigation Feasibility Report Continued Joint Draft Feasibility Report						
95	Vorpagel		3	3-40	1st sentence	All alternatives could contribute to improved Delta water quality conditions and Delta emergency response	Please define Delta emergency response? This statement does not account for increase of metals from flooding old mines nor the increase in turbidity from wave action on exposed reservoir sides.
96	Vorpagel		3	3-44	1st sentence	The following is a description of the No-Action alternative, representing a scenario in which...	Sentence does not appear to make sense.
97	Vorpagel		3	3-50	Table 3-11	All CPs replace reservoir area septic systems with centralized wastewater treatment plants	That appears to be a large cost item. Please elaborate.
98	Vorpagel		3	3-54	1st paragraph	This action would contribute to replacement of supplies redirected to other purposes in the CVPIA...	Please define annual yield.
99	Vorpagel		3	3-57	Table 3-14	Impact WQ-4: Long-Term Sediment Effects That Would Cause Violations of Water Quality Standards...	The storm water pollution plan would not be able to address the entire new "ring" around the reservoir which would erode for years and years. There is therefore the potential for violating basin plan standards for turbidity and suspended sediments.
100	Vorpagel		3	3-57	Table 3-14	Impact WQ-6: Long-Term Metals Effects ... Mitigation Measure WQ-6: Prepare and Implement a Site-Specific Remediation Plan...	The impacts from those mines appear to be downplayed. The mine owners have tried for years to clean up these sources of contamination. Make sure the costs of this are represented in this documents. There is also no mention of the fact that Shasta Lake is listed for mercury on the SWRCB 303d list.
101	Vorpagel		3	3-66	2nd paragraph	The primary difference in the reservoir area would be that during extended drought periods...	Please elaborate on why this is the primary difference.
102	Vorpagel		3	3-66	2nd paragraph	Figure 3-5 shows the changes from existing and future conditions for a dam raise of 6.5 feet for a representative period of 1972 through 2002.	Please provide a comparable figure for the 18.5 foot raise.

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103	Bratcher	Adaptive Management of Cold Water Pool	3	3-86		Reclamation would manage the cold-water pool each year in cooperation with the SRTTG.	The SRTTG does not conduct monitoring. When last discussed at any level of detail (in 2008), the process under which this water was to be managed had not been clarified in a group setting. For more information on the role of the SRTTG, refer to the 2008 NMFS OCAP BO. The dedicated pool may be used beyond its role as a cold water source (e.g. fallflows for fall-run spawning, cottonwood recruitment). Please look at the draft of the CAR last worked on by Joseph Terry (USFWS) and other documents to support the original intent and plans for management. During PCT meetings in the last two+ years, CDFW has repeatedly requested that this be discussed, but this has not been acted upon by BOR.
104	Bratcher	Augment Spawning Gravel in the Sacramento River	3	3-84		Gravel augmentation would occur at one to three locations every year...On average, 5,000 to 10,000 tons of gravel would be placed each year...	This is vague and inconsistent with other mentions of this topic in the FR. The FR stated earlier that hydraulic and geomorphic investigations need to occur to determine the best approach to gravel augmentation. In addition, BOR needs to commit to an amount each year and clarify the conditions under which the injection may not occur.
105	Roberts	Plan Formulation	3	3-84	unknown	see comment	*"This alternative may also include development...impacts to water supply reliability."* The second sentence of the 'Adaptive Management of Cold-Water Pool' section does not accurately reflect the goal of CP4. The 378k acre feet of water is specifically for anadromous fish survival and very well could have conflicts with water supply reliability for that specific quantity of increased storage. Suggested Edit: Remove discussion of 'no conflicts with water supply reliability'.
106	Bratcher	Increase Anadromous Fish Survival	3	3-86		Reclamation would manage the cold-water pool each year based on recommendations from SRTTG... the computer model SALMOD was upgraded to evaluate changes in Chinook salmon population	See earlier comments about use of the SRTTG and how the dedicated pool amount should be correctly interpreted.
107	Bratcher	Increase Anadromous Fish Survival	3	3-86		Modeling with SALMOD showed increases in production of Chinook salmon populations, especially winter-run and spring-run Chinook	Please see other comments CDFW has made on this and other SLWRI documents with regards to spring-run Chinook on the mainstem Sacramento River.
108	Bratcher	Increase Anadromous Fish Survival	3	3-87		Gravel augmentation would occur on average at one or more locations...and, on average, 5,000 to 10,000 tons of gravel would be placed each year...	See earlier comments about gravel augmentation needs and requirements.
109	Roberts	Plan formulation	3	3-87	unknown	see comment	*"The majority of increased flow yield...would be for south-of-Delta agricultural and M&I deliveries"* The sentence needs to be reworded to include CVPIA Refuge Water Supply (Section 3406(d)). Suggested Edit: '...would be for south-of-Delta agricultural, M&I and CVPIA refuge water supply deliveries.'

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110	Bratcher	Increase Anadromous Fish Survival	4	4-2		Anadromous fish benefits were computed though multiplying the per habitat unit benefit estimate ...	CDFW has made numerous comments regarding the use of SALMOD. In addition to the summary letter associated with this review, please note earlier comments in the 2008 letter about quantifying benefit and the challenges placed therein when using SALMOD.
111	Vorpagel		4	4-2	4th paragraph	The underlying premise for the valuation approach is that increasing salmon populations...	Consider placing a value on the commercial fish, and the financial benefit of recreation days for fishing.
112	Vorpagel	Water Quality	4	4-12	Table 4-8 WQ	Long-term beneficial effects to reservoir water quality due to replacement of reservoir area septic systems with centralized wastewater treatment plants. Short-term adverse effects...	We disagree; the water quality in Shasta Lake will be significantly degraded due to suspended sediments from the "new" ring of exposed soils and wave action. Additionally the inundation of abandoned mines within Shasta Lake will create additional metals problems. The septic tanks being replaced by treatment facilities will be a very large expense, for a minimal benefit. Shasta Lake is also listed on the 303d list for mercury. This project will not change that fact.
113	Bratcher	Environmental Quality	4	4-15		Table 4-8 McCloud River	See earlier comments and summary letter regarding CDFW input on effects to the McCloud River.
114	Roberts	Preliminary Proposed Plan and Implementation Requirements	5	5-19	unknown	see comment	Water System Operations Analysis needs to be updated with current modeling, constraints, and BiOps (see JDR comment on 3-6 &3-7 above)
115	Roberts	Preliminary Proposed Plan and Implementation Requirements	5	5-20	unknown	see comment	Paragraph 4 describes how the document will be updated, these updates need to be incorporated
116	Roberts	Preliminary Proposed Plan and Implementation Requirements	5	5-20 & 5-21	unknown	see comment	Analysis of 2008 USFWS and 2009 BO RPA section of Chapter 5 needs to be updated. Judge Wanger issued his rulings on these BiOps. Update the text to reflect his ruling. Furthermore, both BiOps were not fully remanded, the text is not accurate and misleading.
117	Carlson	Off-Site Mitigation for Impacts on Biological Resources	5	5-26	Carlson	Details about off-site opportunities to mitigate impacts on biological resources in the primary study area are not yet available.	Details about the cost of mitigation and the potential effects of a project would seem essential to be included in a Feasibility Report. It is impossible to assess this document and the project's feasibility without complete information.
118	Roberts	Preliminary Proposed Plan and Implementation Requirements	5	5-27	unknown	see comment	The last paragraph of page 5-27 needs to be updated. The 2004 BiOp is outdated. The 2008 and 2009 BiOps should be the baseline for this document.
119	Carlson	Off-site Mitigation Development	5	5-28	Carlson	Preliminary cost allowances have been prepared based on these initial investigations. As the SLWRI progresses,	See comment above. These costs should have been included within this document to allow agencies review of their validity.

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120	Vorpagel		5	5-32	Table 5-5	Fish and Game Code Section 1602 application	CDFW code 1602 should be included on this list.	
121	Vorpagel		5	5-32	Table 5-5	State Lands cost $25	Please confirm the cost.	
123	Vorpagel		5	5-34	Table 5-6	Laws, Policies, and Plans	Fish and Game code 5650 needs to be added to this list, and the code section 1505 (protecting the spawning gravel below Keswick)...	
124	Vorpagel		5	5-34	First set bullets	Advanced Planning and Design Activities	The project needs to include a cleanup plan for the abandoned mines which will be inundated, as well as a stormwater prevention plan.	
125	Vorpagel		5	5-35	Table 5-7.	Table 5-7. Potential Federal and Non-Federal Responsibilities for Various Project Component O&M	Abandoned mine remediation must be addressed more ully.	
126	Roberts	Global	Global	Global	Global	see comment	When discussing SOD deliveries CVPIA refuge water supply, Section 3406(d) must be included.	

Attachment 2	Shasta Lake Water Resources Investigation Feasibility Report Comment Form - Version December 2012							
Reviewer Name:	Andrew Jensen, M.S., and Patricia Bratcher							Draft Fisheries and Aquatic Ecosystems Technical Report
Reviewer Email:	andrew.jensen@wildlife.ca.gov; patricia.bratcher@wildlife.ca.gov							
Reviewer Agency:	CA Dept. of Fish and Wildlife							
	601 Locust St., Redding, CA 96001							
Date:	3/10/13							
ITEM	REVIEWER	CHAPTER TITLE	CHAPTER NUMBER	PAGE NUMBER	LINE NUMBER	TEXT	COMMENT	
1	Jensen	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-3	2nd Paragraph	increased storage and the corresponding increase in surface area results in a greater total biomass and a greater abundance of plankton and fish, because available habitat area is increased.	Broad statement that is unsubstantiated, and does not take into account the loss of biomass that currently exists within the footprint of the increased storage area.	
2	Jensen	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-3	2nd Paragraph	Riffle habitat with gravel substrates and deep pool habitats are abundant in comparison with downstream reaches, although the habitats are still insufficient to support...	This is not necessarily true. Provide supporting documentation/sources.	
3	Bratcher	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-4		This reach provides much of the remaining spawning and rearing habitat of several listed anadromous salmonids, even though the amount of gravel available is insufficient.	Paragraph info seems contradictory; it first says it contains gravel needed for spawning, but then says the amount of gravel is insufficient.	
4	Bratcher	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-5	2nd Paragraph	varying widths, and aquatic habitats consist of shallow riffles, deep runs, deep pools at the bends, glides in the straight reaches, and shallow vegetated floodplain areas that become inundated during	IN the Red Bluff to Colusa reach, there are some levees and/or riprapped areas that have affected river meander. See the bank swallow study information, the TNC Sacramento River study, NODOS studies, and the Army Corps of Engineers Phase II Sacramento River Project for more information.	
5	Bratcher	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-8	1st Paragraph	Sacramento-San Joaquin Delta	To whatever extent it may be needed, this section and other sections discussing the lower Sacramento River should be updated to reflect existing conditions within the BDCP documents.	
6	Bratcher	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-15	1st Paragraph	Increased storage and the corresponding increase in surface area results in a greater total biomass and a greater abundance of plankton and fish...	This has already been commented on above. This is not necessarily true. Additional modeling of the cold water pool and possible changes in stratification, as a result of different dam raises and water outflow management, should be conducted to truly assess quantifiable changes to habitat and population response within the reservoir.	

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Shasta Lake Water Resources Investigation Feasibility Report Comment Form - Fisheries and Aquatic Ecosystems Technical Report

		Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-19	2nd Paragraph	Most of the lower gradient, potentially fish-bearing reaches of tributary streams to Shasta Lake are near their confluence with the reservoir...		
7	Jensen						Increased storage height will likely result in the loss of the currently available lower gradient habitat, fish bearing reaches within the tributary streams.	
		Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-20	First paragraph	Misspelling	The scientific name of golden shiner is misspelled (chrysoleucas, not chrysoleucus)	
8	Baumgartner							
		Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-33	2nd Paragraph	Redd Bluff Diversion Dam	The operation of the RBDD needs to be updated wherever this is mentioned. It is permanently in a gates up position.	
9	Bratcher							
		Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-33	2nd Paragraph	In recent years, changes to RBDD gate operations have been made to provide improved access for upstream and downstream migrating winter-run Chinook salmon.	De-watering of redds due to rapid flow release decreases from Shasta Dam in the fall also has a detrimental impact on winter-run Chinook, as well as the other runs of Chinook.	
10	Jensen							
		Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-33	3rd paragraph	The NMFS biological opinion (BO) for winter-run Chinook salmon (NMFS 1993a)...	This should further be elaborated upon to identify the requirements of the 2009 NMFS OCAP BO.	
11	Bratcher							
		Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-34	2nd Paragraph	Spring-Run Chinook Salmon	The Department previously commented on the issue of Spring-run Chinook salmon in our 2008 comment letter, stating that Region 1 has determined that due to the question of genetic integrity of spring-run in the upper Sacramento River, it is not worth including them in the analysis for this project. The extent of spring-run Chinook salmon spawning in the mainstem of the upper Sac River remains unclear. As previously stated, due to geographic overlap of ESU's and resultant hybridization since the construction of Shasta Dam, Chinook salmon that spawn in the mainstem during September are more likely to be early fall-run Chinook rather than spring-run Chinook salmon.	
12	Jensen							
		Draft Fisheries and Aquatic Ecosystems Technical Report	2	2-1	1st Paragraph	As described in the Environmental Impact Statement (EIS) Chapter 11, the SALMOD was used to support technical analysis.	The Department has previously provided comments in several letters on the use of SALMOD in the EIS, outlining the concerns the Department has regarding the use of SALMOD and the correct representation of data. This concern remains valid and needs to be addressed.	
13	Jensen							

Page 3	Shasta Lake Water Resources Investigation Feasibility Report Comment Form—Fisheries and Aquatic Ecosystems Technical Report						
14	Jensen	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-32	6th Paragraph	Juvenile winter-run Chinook salmon rear in the Sacramento River from July through March (Hallock and Fisher 1985). All winter-run Chinook salmon fry pass the RBDD by October; all emigrating pre-smolts and smolts pass the RBDD by March (Martin et al., as cited in NMFS 2009).	Likely not "ALL" winter-run (WR) Chinook fry and/or emigrating pre-smolts and smolts are past the RBDD by Oct and March, respectively. The minimum size of WR in early Nov (in the high 30's mm) is probably still fry sized, thus the statement that all fry are past RBDD by Oct is too inclusive. Department staff have observed that they continue to emigrate out and grow and rear all winter in the mainstem. The USFWS has charts describing WR and other run emigration from RBDD over the past decade or so, which illustrates that MOST WR are out by end of March but there are always a few left coming out so the "ALL" term used is not accurate.
15	Bratcher	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-34	6th Paragraph	Spring-Run Chinook Salmon	The potential for hybridization with fall-run Chinook needs to also be mentioned within this section (for spring-run that may be present on the Sacramento River itself). On the river, there is no natural barrier to separate these two runs. The document should possibly also mention the presence of spring-run Chinook on Clear Creek, which is a significant tributary in the upper Sacramento River system and a CVP stream.
16	Bratcher	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-37		Indirect evidence indicates that green sturgeon spawn mainly in the Sacramento River; spawning has been reported in the mainstem as far north as Red Bluff.	There is a lot of more recent data about green sturgeon. Eggs have been found north of RBDD, for example. This section needs to be updated to reflect current literature on green sturgeon life history.
17	Bratcher	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-53		New Zealand Mud Snail and Quagga Mussel	Discussion of the mud snail and quagga mussel needs to be updated to reflect current dataand/or reports on their presence and level of threat, including within the reservoir footprint
18	Jensen	2011 DFG Comment Letter	General Comment				The Department has provided numerous comments that have not been sufficiently addressed, specifically from a fisheries perspective including but not limited to the need for clarification on Alternative CP4, use of SALMOD and ongoing concerns the Department has with the use of SALMOD, the discussion and inclusion of spring-run in the project documents, and impacts to the fishery habitat below Shasta Dam. Until these comments are adequately addressed, they will remain valid and the Department will look forward to an adequate response.
19	Bratcher	Draft Fisheries and Aquatic Ecosystems Technical Report	2	2-1		As described in the Environmental Impact Statement (EIS) Chapter 11, the SALMOD was used to support technical analysis.	SALMOD is not designed to be used to address a variety of fisheries-related issues and/or impacts, such as whether or not changes in operation, with a dam raise, would affect the spread of quagga mussels, or the tradeoff in managing for one Chinook run over another. It also mentions the potential effect of redd dewatering but does not quantify or analyze its effect. In addition, the attachments are based upon an older NMFS OCAP BO and therefore do notreflect the impact on anacromous fisheries as per the 2009 NMFS OCAP BO flow requirements.

Page 4	Shasta Lake Water Resources Investigation Feasibility Report Comment Form - Fisheries and Aquatic Ecosystems Technical Report						
		2008 DFG Comment Letter / FR - Descriptions of No-Action Alternative and Comprehensive Plans	3	3-87	Figure 3-13	See 2008 DFG Comment Letter and FR Figure 3-13	The Department submitted substantial comments on the project, many of which have yet to be addressed. Specifically, the Department provided comments on the fact that it appears CP4 really only benefits anadromous fish during dry and critically dry years, which represents only 5-10 percent of the 1922-2003 period of simulation. During all other water-type years there is little change, to a negative change in production for Chinook from implementation of CP4. Clarification should be presented on the percentage of time CP4 will truly benefit the overall production of Chinook salmon, given the above information.
20	Jensen	FR - Descriptions of No-Action Alternative and Comprehensive Plans	3	3-84	4th paragraph	CP4: The adaptive management plan may include operational changes to the timing and magnitude of releases from Shasta Dam to benefit anadromous fish, as long as there are no conflicts with current operational guidelines or adverse impacts to water supply reliability.	CP4 is being pitched as the alternative that focuses on increasing anadromous fish survival by raising Shasta Dam. To be clear, the Department does not agree that Shasta Dam must be raised to increase anadromous fish survival. Changes in current flow releases, and further improvements in spawning and rearing habitat could also achieve increased fish survival. For example changing flow releases in the fall/late fall to eliminate the dewatering of salmonid redds would increase anadromous fish survival dramatically. Regarding CP4, this alternative is presented as specifically targeted at increasing anadromous fish survival", however on page 3-84 on the 4th paragraph a statement is made that causes the Department to question the true intention of the alternative. Specifically, the statement reads "The adaptive management plan may include operational changes to the timing and magnitude of releases from Shasta Dam to benefit anadromous fish, as long as there are no conflicts with current operational guidelines or adverse impacts to water supply reliability." If in fact the 378k acre feet of water is specifically for anadromous fish survival, and its use as such may
21	Jensen					Carry over of comment above (line 28); would not fit in one cell	very well have conflicts with current operational guidelines and/or have adverse impacts on water supply reliability, for that specific quantity of increased storage. Therefore, the adaptive management plan in CP4 should include only the operational changes to the timing and magnitude of releases from Shasta Dam to benefit anadromous fish, irregardless of the potential conflicts or impacts to operations and water supply, respectively.
22							

Attachment 1 — Shasta Lake Water Resources Investigation/Feasibility Report Comment Form- Version December 2013

Reviewer Name: Richard Lis, Brad Henderson

Botanical Resources and Wetlands Technical Report Comments

Reviewer Email: Richard.Lis@wildlife.ca.gov , Brad.Henderson@wildlife.ca.gov
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Reviewer Mailing Address: 601 Locust St., Redding, CA 96001
Date: January 8 2013

ITEM	REVIEWER	CHAPTER TITLE	CHAPTER NUMBER	PAGE NUMBER	LINE NUMBER	TEXT	COMMENT
1	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-1		This area is referred to as the "impoundment area"	The total acreage of the 1,050-foot impoundment area (i.e., the new lake) should be provided here along with the total acreage of existing terrestrial areas proposed to be inundated (3,000 acres inundated and 3,338 acres of relocation areas?).
2	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-1		"relocation areas"	Total acreage of relocation areas should be provided here.
3	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-1		Subsequently, botany studies have been expanded into select areas...	Please identify number of acres. Identify what percentage of existing terrestrial areas was surveyed. Please identify why the entire area was not surveyed? Surveys should be comprehensive over the entire site, including areas that will be directly or indirectly impacted by the project. Refer to CDFW's protocols for vegetation and plant surveys (2009) and incorporate by reference.
4	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-7		Table 1-1	Impacts: MB 456.59, BBA 91.67, SA 719.61, MCA 435.32, SCA 242.49, Pit A 527.54 Total: 3000.76
5	B. Henderson	"	1	1-8		Text including Barren and other types	This discussion and all following discussions for each land coverage/MCV type would be much more useful if the following information is included: 1. total acreage within the primary project area. 2. total acreage proposed to be altered or impacted via construction, inundation, etc. 3. Whether the plant community is considered to be sensitive by any state or federal agency (could be denoted in the tables as well).
6	B. Henderson	"	1	1-24		Gray Pine	Include the scientific name the first time a species in mentioned in the body of the text.
7	B. Henderson	"	1	1-27		Upper Sacramento River	Please identify if there is some definition for this portion of the project area - i.e., how far beyond the banks of the Sacramento River is the assessment area???
8	B. Henderson	"	1	1-29		Sensitive natural communities may be of special concern to these agencies and conservation organizations for a variety of reasons,	The document should include vegetation communities declining on a statewide level considered special concern (S1-S3 rank). For example, guidance on assessing sensitive plant communities can be found at: http://www.dfg.ca.gov/biogeodata/vegcamp/natural_comm_background.asp

Page 2 SLWRI FR Comment Form—CDFW—Botanical Resources and Wetlands Technical Report

9	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-29		Figures 1-3a through 1-3j map the potential locations of sensitive plant communities along the Sacramento River…	What about sensitive plant communities in the impoundment area??? Why have they not been mentioned? The maps below show an excessive amount of detail for species locations completely outside of the Sacramento River. Life histories for many species depicted are completely unrelated to the River and to this project. Furthermore, The CNDDB is NOT a public dataset, and should not be included on maps that will be made public in reports and other documents. The "Data Use Guidelines" document outlines appropriate ways to put the CNDDB data on maps, and provides details on the symbology http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp.
10	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment				Comment cont'd	These maps need to be substantially cleaned up to depict important resources within a narrowly defined area subject to project effects. This report should not depict tadpole shrimp locations for a project on the Sacramento River. The lack of detail for sensitive species occurrences within the impoundment area, where project impacts will be direct and substantial, is a major omission. Including so much unrelated information is a distraction. Focus on the real issues and the impacts.
11	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-30		Locator Map	Please state why off-site animal occurrences being mapped in a plant report.
12	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-51		These habitat types are tracked in the CNDDB…	This is not necessarily true. Please read the following link which provides more accurate information regarding jurisdictional determinations and rare natural communities: http://www.dfg.ca.gov/biogeodata/vegcamp/natural_comm_background.asp
13	N. Lis	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-72	22 et ff.	In 2004, botanical surveys were conducted…	What about sensitive plant communities in the impoundment area??? Why have they not been mentioned? The maps below show an excessive amount of detail for species locations completely outside of the Sacramento River. Life histories for many species depicted are completely unrelated to the River and to this project. Furthermore, The CNDDB is NOT a public dataset, and should not be included on maps that will be made public in reports and other documents. The "Data Use Guidelines" document outlines appropriate ways to put the CNDDB data on maps, and provides details on the symbology. http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp. These maps need to be substantially cleaned up to depict important resources within a narrowly defined area subject to project effects. This report should not depict tadpole shrimp locations for a project on the Sacramento River.

Page 3									
14	R. Lis	Botanical Resources and Wetlands Technical Report, Affected Environment	1	3-72	35 et al.	Based upon previous surveys resulting in ...	Specific survey reports are mentioned for surveys conducted in 2009 and 2010 on Nemacaulis denudata and Vaccinium sp.; however, these reports are not cited and appear to be unavailable and, thus, survey results are cited here as reference to Vaccinium sp., but not discussed above in reference to Nemacaulis diffusa. These reports and data sets from these reports must be made available and summaries of these reports should be added to the EIR/EIS to validate claims and assertions based upon them.		
15	B. Henderson	"	1	3-72		NSR conducted several botanical survey	Please identify how many total acres have been surveyed to date and what percentage of the direct impact area this represents.		
16	B. Henderson	"	1	3-72		Special status plant species detected during the surveys...in Attachment 3.	'Why are they not discussed here? Sensitive plants detected within the proposed inundation area will suffer a direct loss and should be a primary focus of this report. To put different effects analyses and discussion in different documents makes a complete review of the effects difficult to do.		
17	B. Henderson	"	1	3-72		Based on previous surveys...	This sentence does not make sense- what is meant by "based on"?		
18	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment	1	3-72		...these species outside of the proposed project area...	Please identify why surveys were conducted outside the project area? Why not inside the project area? This discussion should start with whether these species are known from the project area and whether would they be impacted. Secondly, this section should state whether in the opinion of NSR the project area supports potential habitat. The off site survey and genetic analysis should come later.		
19	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment	1	3-73		In 2010, botanical surveys were conducted in all relocation areas.	Please identify what species were observed during these surveys.		
20	R. Lis	Botanical Resources and Wetlands Technical Report, Affected Environment	1	3-74	34 et al.	Shasta snow-wreath is currently known from 23 locations.	Discussion of Nemacaulis diffusa in this section should include discussion of the fact that it is likely that the current distribution of populations of N. diffusa is a small reduced fraction of the original population distribution that existed prior to the completion of Shasta Dam and the filling of Shasta Lake. Although this is briefly mentioned in the Cumulative Effects section of the Draft EIS, p. 3.2-171, where the brevity may be appropriate, it needs to be more thoroughly discussed in the sections discussing the species and remnant populations as they exist today.) The filling of Shasta Lake very likely exterminated many populations of N. diffusa. Of significance is that most of the 23 extant populations occur near the periphery of Shasta Lake, suggesting that its distribution was not historically at much higher elevations and that the remaining populations have may be near some environmental limits that are reflected in the observed elevational limits. Discussion of these issues should be included in the		
						Comment #20 cont'd	affected environment as they are important for assessing levels of significant deleterious effects and for evaluation of any proposed mitigation measures.		
21	B. Henderson					Shasta snow-wreath is currently known from 23 locations...	Please identify if these were previously known or were identified during project-related surveys.		

Page 4 — SLWRI FR Comment Form—CDFW—Botanical Resources and Wetlands Technical Report

22	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-74		Of these, 13 Shasta snow-wreath populations were discovered…	Please identify who conducted the surveys.
23	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-100		Acreage totals for relocation areas will be provided in the FEIS.	It would be useful to provide an acreage figure for the impoundment and relocation areas outside of the existing lake here. Again, it would differentiate between areas of permanent loss versus temporary impacts to the existing Shasta Lake.
24	B. Henderson	"	1	1-100		The National List of Plant Species That Occur in Wetlands: California Region 0	This reference was updated in 2012.
25	B. Henderson	"	1	1-112		Fish and Game Code authorizes DFG to accept a Federal biological opinion. .both the ESA and the CESA.	This can be done only IF the federal BO is consistent with the provisions of CESA.
26	B. Henderson	"	1	1-112		Project impact on these species are not considered significant…	Reword as "Impacts to these species are considered significant."
27	B. Henderson	"	1	1-112		Paragraph, California Department of Fish and Game Designations	Much of the discussion is this paragraph is incorrect. For example, plants are not included. Refer here for the correct information. http://www.dfg.ca.gov/wildlife/nongame/ssc/
28	B. Henderson	"	2	2-1		"List of Plant Species Observed	Move attachment 2 to the body of the text.
29	R. Lis	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-102	5 et ff.	The only MSCS species known to occur…	Discussion of impacts to Nevusia with a 6.5 foot dam dam raise should discuss the range of environmental effects that occur with the increase water level and how these will change the surrounding micro-climate of any populations not fully flooded by the higher water level. Precise computations should be presented on the populations that will be completely flooded (exterminated) from those that are suggested as only having a portion of the population destroyed. The reasons the populations are postulated as being partially destroyed must be described for each population as assumptions about ground water, local micro-climate, winds, temperatures, etc. may be correct or in error and need specification for proper evaluation for full impacts and potential for survival or extermination.
30	R. Lis	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-118	9 et ff.	Impact Bot-2 (CP2): Loss of MSCS Covered Species	The discussion of impacts with the raise of 6.5 feet on Nevusia was projected to occur on 12 of 23 populations with some having undocumented and unspecified portions of the populations effected. This section omits discussion of the increasing level of population destruction to Nevusia with the additional raise of 6 feet to 12.5 feet. Omitted here in CP2 are discussions of whether additional populations would be impacted. Further omitted are additional impacts to Vaccinium sp. and the other MSCS plant species and how these impacts would increase relative to the initial 6.5 ft. increase. This information is needed to properly evaluate the proposed alternatives and to determine if the mitigation has been properly scaled to meet the increasing level of impact with increasing losses to populations, acreage affected, and the species.

Page 9	SLWRI FR Comment Form—CDFW—Botanical Resources and Wetlands Technical Report						
31	R. Lis	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-126	8 et ff.	Impact Bot-2 (CP3): Loss of MSCS Covered Species	The increase of the dam to 18.5 feet omits an adequate discussion of the increase in effects from the 12.5 ft level which was inadequately described and evaluated in CP2. The discussion of impacts with the raise to 18.5 feet on Neviusia is completely unknown as presented in the impact assessment. The impact is stated to be significant with no further description as to how much more significant it would be and how these increasing raises in the dam would increase the level of damage and destruction to the various species. This section omits discussion of the increasing level of population destruction to Neviusia with the additional raise of 6 feet as additional to the 12.5 ft. raise. All MSCS species should be discussed individually with the increasing impacts to the populations and how (particularly with regard to Neviusia and Vaccinium sp.) these increasing impacts will effect the species as a whole in terms of surviving intact populations, genetic and phenotypic diversity and other factors affecting species survival, with some having undocumented and unspecified
						Comment #31 cont'd	portions of the populations effected. Also omitted are discussions of whether additional populations would be impacted. This information is needed to properly evaluate the proposed alternatives and to determine if the mitigation has been properly scaled to meet the increasing level of impact with increasing losses to populations, acreage affected, and the species.
32	R. Lis	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-133	31 et ff.	Impact Bot-2 (CP4): Loss of MSCS Covered Species	This impact would be similar to that discussed in CP3, which was inadequately discussed and described immediately above for CP3.
33	R. Lis	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-152	11 et ff.	Mitigation Measure Bot-2 (CP1):	First bullet: "When feasible, Reclamation will relocate populations of MSCS plants..." This would primarily pertain to Neviusia cliftonii and would involve approximately 50% of the known populations of the species. There have been no studies conducted that have attempted to reestablish this species in other locations. Studies to date have not been able to determine what factors are important for the species to survive. It apparently is not a species that can easily occupy other habitat as it has limited isolated populations. Most efforts at translocating or relocating native plants have not been successful over the long term (> 25 years). This bullet mentions "when feasible" yet does not indicate how feasibility will be determined and assessed. For most native plants there are no criteria to determine if such a project would be feasible in the sense that it also has a good chance of success. This mitigation measure is highly unlikely to succeed and needs to be fully described for each species that would be involved. Second Bullet: Development of mitigation and monitoring plan, states that

								this plan will identify suitable sites for mitigation, species to be planted, etc.; however, in the second paragraph following the third bullet it is written that potential mitigation lands containing comparable habitat have been identified adjacent to the project. These sites that have been identified should be listed now for each species and each population of each species that would be affected by the dam raise height being addressed. Missing from the discussion of the mitigation measures is what ratio of off-site planting would occur for each population destroyed. For instance a starting point would be to consider that any given new mitigation population may have a 5-10% chance of success for survival of one, over the next 100 years. Therefore for each population destroyed 10-20 or more off site populations should be established in the case of Newtonia, with the potential to destroy 12 populations, it would necessitate to establish 120-240 populations that would require monitoring for at least 50 years. For the other species and populations similar calculations would
	Elk					Comment #33 cont'd		be required. Chance of survival should also be estimated for 500 and 1000 years or more, which may require the establishment of many more hundreds of populations for each species affected. In the case of Newtonia, which could incur 50% destruction just with the 6.5 ft. dam increase additional calculations for threats and long term survival in the face of climate change would be required.
	Elk					Comment #33 cont'd		
33	R. Lia	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-158	21 et ff	Mitigation Measure Bot-2 (CP2);...		This measure is the same as for MM Bot-2 (CP1), thus the comments on this mitigation measure apply here also. In addition, there should be identification for the increase of damage to species and populations with the increase in dam height. This is absent here. There should be a full accounting for the damage to each species and population with the increase in dam height and thus the increase in terms of threats to each species and the increased costs and potential for success with increase in mitigation required.
35	R. Lia	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-161	1 et ff	Mitigation Measure Bot-2 (CP3);...		This measure is the same as for MM Bot-2 (CP1) and for MM Bot-2 (CP2), thus the comments on these mitigation measures apply here as well and require further data. In addition, there should be identification for the increase of damage to species and populations with the increase in dam height. This is absent here. There should be a full accounting for the damage to each species and population with the increase in dam height and thus the increase in terms of threats to each species and the increased costs and potential for success with increase in mitigation required.

Page 7								
		Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands			35 et ff.	Mitigation Measure Bot-2 (CP4)...	This measure is the same as for MM Bot-2 (CP1) and for MM Bot-2 (CP2), and MM Bot-2 (CP3), thus the comments on these previous mitigation measures appl here also and need expansion. There should be identification for the increase of damage to species and populations with the increase in dam height. This is absent here. There should be a full accounting for the damage to each species and population with the increase in dam height and thus the increase in terms o threats to each species and the increased costs and potential for success with increase in mitigation required.
		Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands			5 et ff.	Mitigation Measure Bot-2 (CP5)...	This measure is the same as for MM Bot-2 (CP1) and for MM Bot-2 (CP2), and MM Bot-2 (CP3), thus the comments on these previous mitigation measures appl here also and need expansion. There should be identification for the increase of damage to species and populations with the increase in dam height. This is absent here. There should be a full accounting for the damage to each species and population with the increase in dam height and thus the increase in terms o threats to each species and the increased costs and potential for success with increase in mitigation required.
37	R. Lis							
		Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands					The cumulative effects section is inadequate in addressing the species, habitats, and various effects that have occurred from the dam. This section should identify the cumulative effects that will occur with each proposed level of dam height increase and summarize how these potential effects may be exacerbated by other confounding factors such as climate change, population growth and the continuing demand for water.	
38	R. Lis		12	12-171	11 et ff.	Cumulative Effects		
		Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands			12 et ff.	Although causing similar effects CP1-CP5 differ in magnitude	This sentence correctly identifies that fact that CP1-CP5 would differ in the magnitude of their effects. Unfortunately the botanical effects section does not fully disclose, identify and quantify the increasing effects on the botanical resources. Essentially they are identified as "significant" with little additional detail. The quantification of the effects are vital to assessing the actual costs and losses, so this data can be used to accurately and effectively mitigate the true impacts. The mitigation section is weak, vague and inaccurate because the determination of effects is vague, imprecise, overly general and mostly repetitive of the vague determinations made previously. Even the large degree of mitigation that may be required for all the resources involved may themselves have cumulative effects that should be properly quantified and may require further mitigation.
39	R. Lis		12	12-172				
		Attachment 3 Special-Status plant species known to occur in the Shasta Lake and vicinity portion of the primary study area.	NA	A3-1	1 et ff.	Shasta snow-wreath (Neviusia cliftonii)	This section states that it has been recorded from 17 locations and that 9 of the 17 may be affected by the project. This data conflicts with the newer data stating that it has been found in 23 locations and 12 may be affected by the project. The discrepancy needs correction.	
40	R. Lis							

Attachment 4 — Shasta Lake Water Resources Investigation Feasibility Report Comment Form - Version December 2012

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Date: 12/20/12

Wildlife Resources Technical Report Comments

ITEM	REVIEWER	CHAPTER TITLE	CHAPTER NUMBER	PAGE NUMBER	LINE NUMBER	TEXT	COMMENT
1	Bratcher	Considerations for Describing Affected Environment and Environmental Consequences	1	1-2		Areas subject to physical disturbance as an indirect result of the proposed project (i.e., areas proposed as relocation sites...	Based upon information at the SLWRI PCT meetings, the relocation areas have not been completely identified for a variety of reasons, so the map provided an Figure 1-1 needs to be updated. Subsequently, the effect on fish, wildlife, and botanical species and habitats will need to be updated/completed. Any effects mentioned in this draft are also subsequently inaccurate.
2	Bratcher		1	1-2		The California Natural Diversity Database	Info from both the CNDDB and the USFWS ES Database (ESA Species List) needs to be requested, as the species presence list is over 5 years old.
3	Bratcher		1	1-7		Table 1-1	Table 1-7 of the MSCS identifies vernal pools as a habitat type within the Natural Seasonal Wetland Habitat Type. Vernal pools occur within the primary study area (in and near Redding, for example) and should be included within this table.
4	J. Carlson	Wildlife Resources Technical Report	1	1-3		Table 1-1	This table is kind of thrown into the report and there is very little description about what purpose it serves or how it will be used or interpreted. Clarification needed.
5	J. Carlson	Wildlife Resources Technical Report	1	1-11 to 1-21		Figure 1-2a to 1-2f	These maps are very hard to read due to the scale. Perhaps breaking up the maps into more sections and zooming in would be better. Shouldn't there be more "affected" habitat in the inundation zone that what is shown?
6	J. Carlson	Wildlife Resources Technical Report	1	1-9		Table 1-2 and 1-3	These tables show summary of wildlife habitat in the impoundment area as well as the relocation areas. Does this also reflect the acres of habitat that would be inundated? If so, specifying that would be helpful because it is not evident to me. It would be useful to include a total acreage value by habitat type. The totals of acres by lake arms isn't all that useful from a wildlife perspective.
7	J. Carlson	Wildlife Resources Technical Report	1	1-29		Oak woodlands	The habitat section is very sparse for this habitat type. Including a little more detail would be preferable including species occupying this habitat.
8	J. Carlson	Wildlife Resources Technical Report	1	1-38	Table 1-4	Northern goshawk	The potential for occurrence states that it is known to occur on the upper McCloud arm but does not specify if this is the primary study area or not. Please clarify.
9	R. Lis	Wildlife Technical Report	1	1-41		Shasta salamander	Take and loss of Shasta salamander (SS) is discussed and known from 39 sites surveyed to date. The survey methods were not discusseed in detail and the information about the size of the populations at the site is not given presented, thus it is not possible to calculate the actual take and loss of the SS. This species may be quite limited in its ability to migrate and thus the genetic diversity of the species throughout the study area should be investigated. There may be unique genetic populations dispersed within the impact area that would guide the design of mitigation options. It is likely that this species incurred significant habitat losses when Shasta Dam was built and filled. Further enlargement of the dam will cause further decline in the species habitat that needs to be estimated and included in full assessment of impacts to the species. SS habitat includes subterranean habitat to which access is important during the dry summer months. Therefore the inundation and destruction of habitat must account for the loss of subterranean habitat even if the water level does not completely submerge the habitat.
						Comment #9 cont'd	All sites must be enumerated and sites that may be above full pool elevations must be identified as to whether subterranean habitat would be destroyed such that survival of the site is reduced or rendered impossible. These sites must also be included in mitigation calculations.

Page 2		Shasta Lake Water Resources Investigation Feasibility Report Comment Form–Wildlife Resources Technical Report					
							impacts to the terrestrial mollusks are presented in terms of CWHR habitats and acreage yet there is no discussion about the actual sites where these mollusks were located and what microhabitat conditions exist on site to allow their existence. These mollusks are not equally and evenly distributed across within the habitat of any of the habitat types. They will undoubtedly be found in varying distribution and abundance within and between habitats. Analysis of these variables is needed both to identify complete impacts to the species and for determination of complete mitigation. Additional discussion must include the range of each species and the fraction of destruction to the totality of known populations of each species. These species also would have incurred extirpation of populations with the original construction of Shasta Dam. Estimates of the original destruction of species and the likely remaining is needed to accurately assess the cumulative effects of proposed future actions. Additional analysis should include
10	R. Lis	Wildlife Technical Report	1	1-41		Terrestrial Mollusks	assessment of what limits may exist for each species.
							such as elevation, because certain species may not be able to be exist at the same densities at higher elevations where temperatures and moisture would be subject to greater variation. All of this information is needed to develop complete and species specific
						Comment #10 cont'd	mitigation plans.
							The Mitigation measure in the old SLWRI EIR states that it would not be feasible to quantify the number of salamanders lost in the impoundment area; however, no surrogate measure was proposed or attempted to be calculated for mitigation. Estimates can be made based upon area of habitat, estimated quality of habitat, habitat complexity in terms of moisture, vegetation diversity, and through collecting efforts stratified and allocated among sites. These efforts would yield figures that would allow accurate computation of mitigation needed. Direct loss of individuals can be estimated based upon the factors discussed above and others when properly applied. The statement in this section that this cannot be done is a fallacy and will lead to the severe under-estimation of effects to the salamander.
11	R. Lis	Wildlife Technical Report	1	1-41	Section	Mitigation Measure Wild-1 (CP1)(From the old 2008 SLWRI EIS)	
							The mitigation measure in the older SLWRI EIS states that it would not be feasible to quantify the number of salamanders lost in the impoundment area; however, no surrogate measure was proposed or attempted to be calculated for mitigation. Estimates can be made based upon area of habitat, estimated quality of habitat, habitat complexity in terms of moisture, vegetation diversity, and through collecting efforts stratified and allocated among sites. These efforts would yield figures that would allow accurate computation of mitigation needed. Direct loss of individuals can be estimated based upon the factors discussed above and others when properly applied. This statement in this section that this cannot be done is a fallacy and will lead to the severe under-estimation of effects to these mollusks. The mitigation measure states that opportunities for restoration and enhancement of habitat will be explored and defined. These opportunities cannot be identified later, but must be identified now with extant populations around the lake. The
12	R. Lis	Wildlife Technical Report	1	1-41	Section	Shasta salamander	data collected on the populations that may be extirpated will provide the basic data
							on the species biology and ecology that can be used for such mitigation actions. Delay of these until will result in the determination that the data is not available and no
						Comment #12 cont'd	opportunities can be located for such actions.
							The statement is made that the carnivore surveys and detections of fisher for this project are the southeastern-most occurrences. This is an untrue statement and needs to be removed. Fishers have been detected south of the Fountain Fire area. Detections were both on public and private land, south of Burney and north of Shingletown. Several
13	J. Carlson	Wildlife Resources Technical Report	1	1-67		Pacific fisher	detections of fisher have been recorded in this area.

Page 9		Shasta Lake Water Resources Investigation Feasibility Report Comment Form - Wildlife Resources Technical Report					
							The effects to this and other species needs to be re-evaluated once a project footprint is finalized. To date, the location of sites to be mined for minerals to create cement is not completed, nor are the footprint of relocated facilities, roads, etc. In addition, due to the potential change in water management (including CP4, which includes a dedicated pool for natural resource uses), the potential for effect is largely incomplete. Upon completion of the actual project footprint and management plan, this an other documents that assess effects to species and special habitats needs to be redone. Similarly, using water to manage for one species (e.g. winter-run Chinook) may have negative effects on another species (e.g. bank swallow). This also needs to be analyzed.
14	Bratcher	Wildlife Resources Technical Report	1	1-68		Table 1-5	
15	Bratcher	Wildlife Resources Technical Report	1	1-68		Table 1-5, California Red-legged frog (CARLF)	For the CARLF, only protocol surveys can determine presence/absence as per ESA, so this determination is pre-decisional. Foothill yellow-legged frogs are know to occur in the valley section of tributaries on the west side of the Sacramento River, so this determination is wrong.
16	Bratcher	Wildlife Resources Technical Report	1	1-94		Swainson's Hawk	The species range of this species, as per DFW mapping websites, shows it extending up into the middle of Tehama County, which likes just below Shasta County. In addition, migratory patterns should be taken into account, since this species is known to occur (nest) in the Klamath Basin.
17	Bratcher	Wildlife Resources Technical Report	1	1-104		Land Management	The BLM Land and Resource Management Plan for the Redding Field Office should also be included on this list. BLM manages land on Clear Creek and along the Sacramento River, in addition to inholdings near and/or around Shasta Lake. Similarly, the USFS Mendocino National Forest manages a piece of property adjacent to Red Bluff Diversion Dam.
18	Bratcher	Wildlife Resources Technical Report: Attachments 1-7	Attachment 2	1-1		Table A1-1	Reference to its Land Management Plan should also be included. See comments below. This table is incomplete and needs to be updated to include additional species, particularly MSCS species. The CNDDB search is over 5 years old. See also comment about relying on just CNDDB for presence/absence determinations. As per MSCS, special habitats also need to be addressed. A list of special habitats can be requested and provided by the CDFW.
19	J. Carlson	Wildlife Resources Technical Report: Attachments 1-7	Attachment 2	18		Purple martin	The statement is made that 15-51% of the known nesting colonies for purple martin is along the Shasta Lake shoreline. That seems like a significant part of the nesting habitat for a species that is state-listed threatened.
20	J. Carlson	Wildlife Resources Technical Report: Attachments 1-7	Attachment 2	19		Shasta salamander	It is not specified in the species life history, like for the other species, the extent of the locations or numbers of the shasta salamander detections. Please elaborate on the extent of the detections that would be inundated.
21	Bratcher	Wildlife Resources Technical Report: Attachments 1-7	Attachment 4	A4-4		General Comment	CNDDB should not be the only source of info to determine whether or not a species is present. It is only as good as what is reported by people. USFS records, Audubon studies, Christmas bird count data, and WHR should also be investigated to determine potential presence. I have personally seen black-crowned night herons in the Redding vicinity, and it is a species identified in the MSCS, as are several others below.
22	J. Carlson	Wildlife Resources Technical Report: Attachments 1-7	Attachment 5			State and Federal lists of special-status wildlife species	The lists in the referenced attachment for both state and federal species are outdated. These lists expired in 2007, which is at least 4 years out of date. Please include an updated list within the last year.
23	J. Carlson	2011 DFG comment letter		3	Comment #5		They have not adequately addressed the effects on wildlife as far as quantification of the effect and lack of detail on impacts.
24	J. Carlson	2008 DFG comment letter on the Admin Draft SLWRI DEIS/R		14-17			As far as I can tell, they have not adequately adressed the species in DFW's 2008 letter including: Shasta salamander, peregrine falcon, purple martin, bald eagle, and bank swallow. They did address additional species, i.e. deer range, but could include a map showing these special habitats that will be impacted.

Page 4		Shasta Lake Water Resources Investigation Feasibility Report Comment Form - Wildlife Resources Technical Report						
25	J. Carlson	General	Throughout			Maps	It would be easier to understand what is going on if the maps were not broken up into 10 different smaller maps. One large map would be more helpful when looking at the project at least for the Shasta Lake and vicinity area.
26	J. Carlson	General	Throughout				The wildlife habitat description section could be improved. There are some major inconsistencies among the habitat types described as far as some that include species occupying the habitat, and others do not. Some of the habitat descriptions list the vegetation species that make up the habitat type and others do not. Habitat descriptions at a minimum should include an extensive description of what features make it the habitat it is.
27	J. Carlson	General		1-37	Table 1-4		This table lists wildlife species of concern within the Shasta Lake area, and discusses the potential for each species to occur within the primary study area. However, for some species it is not clear if it is within the primary study area or if it will be impacted. For species like the peregrine falcon, it may not occur within the study area but disturbance impacts could be a possibility. This should be discussed or disclosed.
28	Bratcher	Wildlife Resources Technical Report	General Comment			Shasta salamander	Take and loss of Shasta salamander is discussed and known from 39 sites surveyed to date. The survey methods were not discussed in detail, and the information about the size of the populations at the sites is not presented. Therefore, it is not possible to calculate the actual take and loss of the species.
29	Bratcher	Wildlife Resources Technical Report	General Comment			Shasta salamander	This species may be quite limited in its ability to migrate, so the genetic diversity of the species throughout the study area should be investigated. There may be unique genetic populations dispersed within the impact area that would guide the design of mitigation options. It is likely that this species incurred significant habitat losses when Shasta Dam was built and filled. Enlargement of the dam will cause further decline in the species habitat that needs to be estimated and included in full assessment of impacts to the species.
30	Bratcher	Wildlife Resources Technical Report	General Comment			Shasta salamander	Shasta salamander habitat includes subterranean habitat to which access is important during the dry summer months. Therefore, the inundation and destruction of habitat must account for the loss of subterranean habitat even if the water level does not completely submerge the habitat. All sites must be enumerated and sites that may be above full-pool elevations must be identified as to whether subterranean habitat would be destroyed such that survival of the site is reduced or rendered impossible. These sites must also be included in mitigation calculations.
31	Bratcher	Wildlife Resources Technical Report	General Comment			Peregrine Falcon	Effects to this species and other raptors were not clearly identified. This includes the potential for effect by construction-related impacts during the nesting season. Mitigation measures should include at least one preconstruction survey for this species within the disturbance area boundary and a buffer sufficient to address the potential for disturbance, as supported by scientific literature and/or an accepted peregrine falcon management plans. Clarification is needed on when this preconstruction survey would occur.
32	Bratcher	Wildlife Resources Technical Report	General Comment			Bald Eagle	Although the bald eagle is no longer listed under ESA, it remains listed as Endangered pursuant to CESA. It is also a fully protected species pursuant to FGC Section 3511 and is provided protection pursuant to the Federal Bald and Golden Eagle Protection Act (16 U.S.C. 668a-d). The FR, Technical Reports/Attachments, and future environmental documents need to fully analyze the effect of a loss of habitat and nest trees on individuals and on the population in general, and analyze the entire project footprint (primary study area and extended area combined) to make an overall determination of effects of the project on bald eagle.

Page 5	Shasta Lake Water Resources Investigation Feasibility Report Comment Form--Wildlife Resources Technical Report					
33	Bratcher	Wildlife Resources Technical Report	General Comment			Purple martin could be similarly affected by inundation. The total inundation of snags used by purple martin would result in a temporary, if not permanent, loss of nesting habitat for purple martin, although new habitat could eventually be created after trees are inundated and die. There are very few colonies within Shasta County; Shasta Reservoir represents 14% to 51% of the total interior Northern California population of western purple martin (Williams 1998). No mitigation seems to be proposed for the direct loss of nest trees that will be inundated by Alternatives CP1-CP5. If feasible, mitigation measures must be implemented to offset this impact (which is identified as significant).
34	Bratcher	Wildlife Resources Technical Report	General Comment			Bank Swallow	The FR and Technical Reports/Attachments contain contradictions and relies upon improper information with regard to the potential impact on listed species. An example of this is the impact to the State-listed Threatened bank swallow (Riparia riparia). Use of monthly flow models cannot reflect the daily or hourly flow fluctuations caused by dam releases that can destroy a nesting colony. The 2008 Administrative Draft Environmental Impact Statement/Environmental Impact Report (ADEIS/R) (Reclamation 2008) identified a potentially significant impact.
35	Bratcher	Wildlife Resources Technical Report	General Comment			Bank Swallow	The Sacramento River is estimated to support about 75% of the State's bank swallow population (Garrison 1998). The Department considers the combination of a loss of high flows, which encourage bank erosion, and daily flow fluctuations caused by dam releases during nesting, a potentially significant impact.

Attachment 5 Shasta Lake Water Resources Investigation Feasibility Report Comment Form Version December 2014

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Date: 1/7/13

Water Quality Technical Report Comments

ITEM	REVIEWER	CHAPTER TITLE	CHAPTER NUMBER	PAGE NUMBER	LINE NUMBER	TEXT	COMMENT
1	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	iv	Abbreviation	"...both agencies included an RPA in their Bo's" Page 1-31	This RPA is not included in abbreviation table.
2	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	1-5	Table 1-1	Table 1-1. Summary of Conventional Water Quality Constituents Collected in the Sacramento River at Red Bluff from 1996 to 1998	This table needs to be corrected. They are not using the correct water quality objectives in several instances. There are special objectives for the areas downstream of Keswick dam, i.e., DO must be 9 mg/l % saturation must be 95%. Copper standards are not from the CTR but special to the Basin Plan. The document needs to state if metals are dissolved or total.
3	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	1-6	Table 1-1 footnote b	Basin Plan Water Quality Objective	This is incorrect. The Basin Plan has special objectives for areas below Keswick Dam. The levels in this table are not for the specific reach.
4	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	1-14	Table 1-2 303(d) list	Shasta Lake 2006	This table is incorrect and out of date. Shasta Lake is also listed for mercury. There is some confusion regarding the area where the mines are impacting Squaw Creek. This may be due to the fact that there is a main arm of the Lake called the Squaw Creek arm. Another tributary on the West side is called Squaw Creek. Also known as "West Squaw Creek". It does not enter the Squaw Creek arm but is near Dry Creek, near the dam. The table should be revised, as should the text.
5	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	Page 1-14	Last paragraph	The sources of the metals in the two areas identified in Table 7-2 are associated with the Bully Hill/Rising Star mining complex adjacent to the Squaw Creek Arm.	The table number appears to be incorrect; should be Table 1-2 possibly.
6	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	1-35	2nd paragraph	Tributaries to the Main Body of Shasta Lake are also a source of metals, along with acid mine drainage from a number of mines in the Dry Creek and Little Backbone watersheds.	Dry Creek is not impacted by acid mine drainage. This is where the Regional Board calls the smaller Squaw Creek, West Squaw Creek. Little Backbone Creek is impacted by acid mine drainage.
7	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	1-36	4th paragraph	In a USGS study of mercury levels along the Sacramento River at Big Bend above Red Bluff, conducted from February 1996 to May 1998, mercury levels were consistently below the EPA criterion of 50 ng/L (USGS 2000b).	The Sacramento River is listed as impaired for mercury from Red Bluff to the Delta. It is also impaired for unknown toxicity from Keswick Dam to the Delta.

Page 2		Shasta Lake Water Resources Investigation Feasibility Report Comment Form--Water Quality Technical Report					
8	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	1-25	6th paragraph	For the primary study area the CVRWQCB has jurisdiction, while the extended study area encompasses the San Francisco Bay, Central Coast, Los Angeles, Lahontan...	The extended study area should also include the Trinity River and the North Coast RWQCB
9	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	1-26	2nd paragraph	For the primary study area the CVRWQCB has jurisdiction. An NPDES would not be required from the RWQCBs within the extended study area because no construction would occur.	The project may need a NPDES permit; please clarify if a stormwater prevention plan is just for the construction. It may need to be for other project activities.
10	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	1-28	2nd paragraph	The most prevalent contaminants in the Sacramento River basin are for organophosphate pesticides (agricultural runoff) and trace metals (acid mine drainage), for which TMDLs currently are being considered.	TMDL's have already been developed for the metals in the Sacramento River.
11	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	1-32	2nd paragraph	The CVRWQCB Basin Plan (originally published in 1998, last revised in September 2009) (CVRWQCB 2009) regulates waters of the State located within the primary study area.	The Basin Plan was originally published in 1975, per page 1-34.
12	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	1-34	3rd paragraph	The most recent edition, the fourth edition, was adopted in 1998 and amended in 2004.	Page 1-32 says it was revised in 2009. Please use the latest revision date.

Attachment 6 — Shasta Lake Water Resources Investigation Feasibility Report Comment Form: Version December 2012

Modeling Appendix Comments

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Date:	3-Jan-12

ITEM	REVIEWER	CHAPTER TITLE	CHAPTER NUMBER	PAGE NUMBER	LINE NUMBER	TEXT	COMMENT
1	Roberts	Modeling Appendix		2-4	unknown	see comment	Federal refuge assumptions are not accurate. 'Firm level 2 water needs' do not encompass level 4 water per CVPIA Refuge Water Supply Section 3406(d).
2	Roberts	Modeling Appendix	Global	Global	Global	see comment	The modeling assumptions are very outdated and need to reflect current BiOps and water quality control plans (e.g. the DCC closures are not accurately depicted for end-of-September storage levels at Shasta).
3	Roberts	Modeling Appendix		Table 1-25	Table 1-25	see comment	The refuge contract section needs to be quality-control reviewed. There is a typo for China Island, and other cells are not necessarily accurate (e.g. Los Banos is 10,470 instead of 16,700). The Department suggests that the table depicts Level 2 Water Supplies (Contract and Non-Project) instead of purely Contract amounts.

Attachment 7	Shasta Lake Water Resources Investigation Feasibility Report Comment Form Version December 2012							
							Geologic Technical Report Comments	
Reviewer Name:	Mark Smelser							
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Date:	15-Jan-13							
ITEM	REVIEWER	CHAPTER TITLE	CHAPTER NUMBER	PAGE NUMBER	LINE NUMBER	TEXT	COMMENT	
1	Smelser	Geologic Technical Report	General	N/A	N/A	N/A	A geologist licensed in the State of California is not identified as being responsible for the preparation of the Geologic Technical Report. The report relies on model results and provides interpretations and opinions regarding slope stability and future erosion. Such interpretations and opinions fall under the professional responsibilities of a state licensed geologist or geotechnical engineer. Consequently, such an individual should be formally indentified.	
2	Smelser	Geologic Technical Report	General	N/A	N/A	N/A	The Geologic Technical Report erroneously attributes geologic data to Hackel (1966) when the true reference should be Irwin (Irwin 1966, e.g., p. 23). The reliance on the 1966 reference and the use of outdated terms (e.g., Eastern Klamath Belt instead of Eastern Klamath Terrane) demonstrates that limited research was conducted in the preparation of the report. There has been a significant amount of geologic work conducted within the Klamath Mountains Geomorphic Province over the past several decades, which should be incorporated in this document. Please see USGS Open File Report 2003-306 (Irwin 2003) for an excellent bibliography on geologic research in the Klamath Mountains.	
3	Smelser	Geologic Technical Report	General	N/A	N/A	N/A	The Geologic Technical Report states that the nearest "active" fault to Shasta Dam is the Battle Creek fault zone and they use the term "active" as defined by the Alquist-Priolo Earthquake Fault Zoning Act (AP Act). Review of California's fault activity map (Jennings and Bryant 2010) shows the Battle Creek Fault zone as not exhibiting evidence of surface rupture within the last 11,000 years. Therefore, the Battle Creek fault is not an "active" fault as defined by the Act. The "active fault" declaration in the report again demonstrates limited research and a lack of oversight in the report preparation by a state licensed geologist. Moreover, to state that this fault zone is active and therefore imply the necessity for specific regulatory actions as defined in the AP Act could create undue concern, confusion, and perhaps even low level panic in the inhabitants of the Red Bluff area.	
4	Smelser	Geologic Technical Report	General	N/A	N/A	N/A	The Geologic Technical Report references a "Great Valley thrust fault system". Such a "system" is not formally recognized or documented within California's fault activity map (Jennings and Bryant 2010) so clarifying statements should accompany that statement.	

Responses to Comments from Natural Resources Defense Council

NRDC1-1: Please refer to Master Comment Response NEPA-1, "Sufficiency of the EIS."

NRDC1-2: Please refer to Master Comment Response CEQA-1, "CEQA Compliance."

NRDC1-3: Please refer to Master Comment Response CEQA-1, "CEQA Compliance."

NRDC1-4: Please refer to Master Comment Response CMS-1, "EIS Mitigation Plan," Master Comment Response CEQA-1, "CEQA Compliance," and Master Comment Response CEQA-2, "CEQA Mitigation."

NRDC1-5: Please refer to Master Comment Response CR-12, "Cultural Resources and CEQA," Master Comment Response CR-15, "National Historic Preservation Act Section 106 Consultations," and Master Comment Response CR-1, "Potential Effects to Cultural Resources."

NRDC1-6: Please refer to Master Comment Response CEQA-1, "CEQA Compliance," Master Comment Response P&N-1, "Purpose and Need and Objectives," Master Comment Response ALTR-1, "Range of Alternatives General," Master Comment Response NEPA-1, "Sufficiency of the EIS," Master Comment Response NEPA-2, "Cumulative Impacts," and Master Comment Response EI-1, "Intent of NEPA Process to Provide Fair and Full Discussion of Significant Environmental Impacts."

NRDC1-7: Comment noted.

NRDC1-8: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival," Master Comment Response P&N-1, "Purpose and Need and Objectives," Master Comment Response ALTR-1 "Range of Alternatives General," and Master Comment Response NEPA-1 "Sufficiency of the EIS."

NRDC1-9: The SLWRI has two primary coequal objectives that must be met, and neither must impede or harm the other objective. While the SLWRI is not the only way to improve anadromous fish survival, the most efficient way to meet both primary objectives is to enlarge Shasta Reservoir.

Please refer to Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions," Master Comment Response

ALTR-1, “Range of Alternatives General,” and Master Comment Response P&N-1, “Purpose and Need and Objectives.”

NRDC1-10: Please refer to Master Comment Response EI-1, “Intent of NEPA Process to Provide Fair and Full Discussion of Significant Environmental Impacts," Master Comment Response NEPA-2, “Cumulative Impacts,” Master Comment Response DSFISH-10, “Methodology for Evaluating Fisheries Impacts,” and Master Comment Response CR-1, “Potential Effects to Cultural Resources.”

NRDC1-11: The commenter does not raise a specific issue, instead the comment is vague and therefore no specific response can be provided.

Please refer to Master Comment Response GEN-1, “Comment Included as Part of the Record,” Master Comment Response EI-1 “Intent of NEPA Process to Provide Fair and Full Discussion of Significant Environmental Impacts,” and Master Comment Response GEN-4, “Best Available Information.”

NRDC1-12: Please refer to Master Comment Response CR-11, “Cultural Resources and NEPA,” and Master Comment Response CR-1, “Potential Effects to Cultural Resources.”

NRDC1-13: Please refer to Master Comment Response WASR-1, “Eligibility of the McCloud River as a Federal Wild and Scenic River,” and Master Comment Response WASR-6, “Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542.”

NRDC1-14: Please refer to Master Comment Response WASR-6, “Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542.”

NRDC1-15: Please refer to Master Comment Response GEN-5, “Some People Support Dam Raise and Others Oppose Dam Raise.”

NRDC1-16: Please refer to Master Comment Response NEPA-1, “Sufficiency of the EIS,” and Master Comment Response CEQA-1, “CEQA Compliance.”

NRDC1-17: Please refer to Master Comment Response ALTR-1, “Range of Alternatives General.”

NRDC1-18: SALMOD modeling results show that there are significant project benefits to anadromous fish in critical and dry years, when Chinook populations are at greatest risk. By increasing production in these years, relative to the base conditions, the risk of extirpation of listed species is greatly reduced, and therefore provides a significant

benefit to the species/run. Many sources identify Upper Sacramento River water temperatures during critical and dry year types as a highly important limiting factor to anadromous fisheries, including the NMFS Recovery Plan and the NMFS 2009 Biological Opinion. This interpretation of SALMOD results with a focus on critical and dry years is consistent with species needs and limitations identified above by fisheries agencies.

Please refer to Master Comment Response ALTR-1, "Range of Alternatives General," Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival," Master Comment Response P&N-1, "Purpose and Need and Objectives," and DSFISH-5 "Fish and Wildlife Coordination Act Report."

NRDC1-19: USFWS, in the *Draft Fish and Wildlife Coordination Act Report for the Shasta Lake Water Resources Investigation (CAR)* (June 2008), recommended that "…Reclamation should include a SLWRI alternative that evaluates the capability of increasing anadromous fish survival and water supply reliability without raising Shasta Dam." USFWS states that this alternative could be accomplished by a variety of measures. These USFWS measures are either included in the action alternative(s) evaluated in the EIS or were evaluated and eliminated through the plan formulation process.

Each of the USFWS measures is listed below along with Reclamation's response to each measure.

- Modifying the TCD at Shasta Dam to improve temperature control

As stated in Chapter 2, "Alternatives," Section 2.3.1, "Management Measures Common to All Action Alternatives," the Temperature Control Device would be modified to account for an increased dam height and to reduce leakage of warm water into the structure for all action alternatives.

- Improving spawning habitat by gravel augmentation

As stated in Chapter 2, "Alternatives," Section 2.3.6, "CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability," under CP4 and CP4A, spawning-sized gravel would be placed at multiple locations along the Sacramento River between Keswick Dam and the Red Bluff Pumping Plant (RBPP).

- Improving juvenile salmonid rearing habitat through large woody debris and riparian restoration (i.e., shaded riverine aquatic (SRA) cover) in the Keswick – RBDD reach, in lower reaches of the nonnatal tributaries, and in the Sacramento River downstream from Red Bluff Diversion Dam

As stated in Chapter 2, "Alternatives," Section 2.3.6, "CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability," under CP4 and CP4A, riparian, floodplain, and side channel habitat restoration would occur at one or a combination of potential locations along the upper Sacramento River.

As stated in Chapter 1, "Introduction," The location of the RBPP (which is directly adjacent to the Red Bluff Diversion Dam) was chosen as the downstream boundary of the primary study area because cold water released from Shasta Dam significantly influences water temperature conditions in the Sacramento River between Keswick Dam and the RBPP (NMFS 1993). After the RBPP, the river landscape changes to a broader alluvial stream system. The broader, slower nature of an alluvial stream system allows ambient air temperature to have a greater effect on the temperature of the Sacramento River. Therefore, improving juvenile salmonid rearing habitat in the Sacramento River downstream from RBPP was not evaluated under the SLWRI.

- Operational changes to Shasta Dam to increase cold water storage and/or increase minimum flows

As stated in Chapter 2, "Alternatives," Section 2.3.6, "CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability," CP4 and CP4A include an adaptive management plan for the cold-water pool. The adaptive management plan may include operational changes to the timing and magnitude of releases from Shasta Dam to benefit anadromous fish, as long as there were no conflicts with current operational guidelines or adverse impacts on water supply reliability.

- Increasing water use efficiency to a specified level (e.g., improve irrigation efficiency in the ACID canal)

As stated in Chapter 2, "Alternatives," Section 2.3.1, "Management Measures Common to All Action Alternatives," all action alternatives would include a water conservation program for increased water deliveries that would be created by the project to augment current water use efficiency practices. While specifics (e.g., which canal might be improved) are not discussed, the proposed program would consist of a 10-year initial program to which Reclamation would allocate approximately $1.6 million to $3.8 million to fund water conservation

efforts. Program actions would be a combination of technical assistance, grants, and loans to support a variety of water conservation projects, such as recycled wastewater projects, irrigation system retrofits, and urban utilities retrofit and replacement programs. Reclamation, in collaboration with project beneficiaries, would identify and develop water conservation projects for funding under the program. Reclamation would then implement an investment strategy, in coordination with project beneficiaries, to identify and prioritize projects which, in conjunction with other water conservation activities, would cost-effectively reduce water demand and increase water conservation.

- Considering conjunctive use of other existing and planned water storage facilities in the Central Valley.

As stated in the Plan Formulation Appendix, Chapter 2, "Management Measures," conservation groundwater storage near the Sacramento River downstream from Shasta Dam was initially retained as a management measure due to significant water supply benefits. However, it was eliminated from further development during the comprehensive plan phase. Subsequent operations modeling indicated tradeoffs between conjunctive use water supply benefits and critical gains in fisheries accomplishments. The resulting reduction in benefits to fisheries operations in dry and critical years was deemed unacceptable in terms of meeting primary project objectives.

Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival," Master Comment Response ALTR-1, "Range of Alternatives General," and Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

NRDC1-20: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival," Master Comment Response ALTR-1, "Range of Alternatives General," and Master Comment Response WSR-1, "Water Supply Demands, Supplies, and Project Benefits."

NRDC1-21: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River," and Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542," Master Comment Response CR-1, "Potential Effects to Cultural Resources," and Master Comment Response ALTR-1, "Range of Alternatives General."

NRDC1-22: Please refer to Master Comment Response ALTR-1, "Range of Alternatives General."

NRDC1-23: Please refer to Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements."

NRDC1-24: Please refer to Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements."

NRDC1-25: The 2008 USFWS BO and 2009 NMFS BO specify target minimum carry-over storages (COS) for Shasta Reservoir at the end of September. These COS targets are not required to be met in any specific year, but rather are required to be met in certain percentages of years of actual operations. This type of standard cannot be directly modeled in CalSim-II and is implemented in the simulation process by review of simulation results and adjustment of operational parameters until the COS requirements are met. The specific CalSim-II assumptions, and how the assumptions are implemented, are included in the Modeling Appendix, Table 2-1.

CalSim-II output tables of Shasta end–of-month storage are included for all alternatives in the Modeling Appendix, Attachment 1. For all action alternatives, the simulated Shasta end-of-month storage is higher than in the No-Action Alternative. The COS is higher in years when the COS target was met in the No-Action Alternative than in the years when the COS target was not met. Furthermore, the percentage of years in which the COS targets were met in the action alternatives is also increased over the No-Action Alternative. This is especially true in CP4 where the simulated COS is 382,000 acre-feet greater than the simulate COS in CP1. This is the expected result of increasing the COS requirement and was obtained, not by changing any direct requirements in the simulation, but by adjusting operations to increase the COS and optimize project benefits. The action alternatives, particularly CP4, all show the same types of impacts that would be the goal of an increased COS requirement, without imposing any specific COS requirements. While the analysis did not explicitly impose a COS requirement the simulation results for all alternatives do include a higher COS.

NRDC1-26: The benefits of the increased COS in the analysis were not obtained by requiring additional COS. Benefits, however, occurred because of the increased storage capacity and the operational assumptions made to optimize the water supply and environmental benefits resulted in increased COS. If Shasta Dam is constructed and operated under similar assumptions and rules to the current operations, then similar results would be expected. Currently the Sacramento River

Temperature Task Group (SRTTG) meets in the spring to develop temperature operation plans for the Shasta and Trinity divisions of the CVP pursuant to State Water Resource Control Board Water Rights Orders 90-5 and 91-1. This group is made up of representatives of Reclamation, NMFS, USFWS, CDFW, State Water Resource Control Board, Western Area Power Administration, and the Hoopa Valley and Yurok tribes. The SRTTG develops an initial plan, and monitors and adjusts the operation plan, including anticipated COS, throughout the year to improve and stabilize the Chinook population in the Sacramento River. The plan and any updates throughout the year are then submitted to the State Water Resources Control board and carried out by Reclamation.

While it is assumed that the benefits of additional COS are a result of the fact that there is more water in Shasta Reservoir at any time; however, the true benefits come from the fact that flow and water temperature in the Sacramento River are improved for the Chinook population by maintaining a larger cold water pool, or by additional releases to enhance flow conditions and reducing downstream in-river heating. Additional regulatory requirements for higher COS could reduce the operational flexibility of the system and impact the ability of this group to effectively manage Shasta Reservoir and Sacramento River temperatures.

This document is an Environmental Impact Statement and analyzes and documents potential environmental impacts of the project. An environmental document does not include recommendations for additional regulatory requirements on potential project operations. Before construction a Biological Assessment would be prepared which could address this topic. Before construction, compliance with the ESA would be completed and may include specific requirements for flows and temperature on the Sacramento River as well as COS in Shasta Reservoir.

NRDC1-27: Please refer to Master Comment Response DSFISH-3, "Fish Habitat Restoration."

NRDC1-28: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River," Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542" and Master Comment Response ALTR-1, "Range of Alternatives General."

NRDC1-29: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record," Master Comment Response

ALTR-1, “Range of Alternatives General,” and Master Comment Response NEPA-1, “Sufficiency of EIS.”

NRDC1-30: Please refer to Master Comment Response P&N-1, “Purpose and Need and Objectives,” and Master Comment Response ALTR-1, “Range of Alternatives General.”

NRDC1-31: Please refer to Master Comment Response P&N-1, “Purpose and Need and Objectives,” and Master Comment Response ALTR-1, “Range of Alternatives General."

NRDC1-32: Please refer to Master Comment Response ALTR-1, “Range of Alternatives General,” Master Comment Response ALTD-2, “Alternative Development- Anadromous Fish Survival,” Master Comment Response ALTD-1, “Alternative Development- Water Supply Reliability,” and Master Comment Response P&N-1, “Purpose and Need and Objectives.”

NRDC1-33: Please refer to Master Comment Response DSFISH-8, “National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions.”

NRDC1-34: Please refer to Master Comment Response DSFISH-8, “National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions.”

Additionally, as shown in Chapter 3, “Considerations for Describing Affected Environment and Environmental Consequences,” Section 3.2.9, “Cumulative Effects,” the CVPIA is in the list of present and reasonably foreseeable future actions included in the analysis of cumulative impacts. CVPIA includes actions that make all reasonable attempts to double the natural production of anadromous fish in the Central Valley streams. This was included in the cumulative effects analysis, and as described in Master Comment Response DSFISH-8, the SLWRI, along with other programs assists Reclamation and other resource agencies in working towards the doubling goal as no one single project can achieve the doubling goal on its own.

Please refer to Master Comment Response DSFISH-8, “National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions.”

NRDC1-35: Please refer to Master Comment Response DSFISH-2, “Other Fisheries Models and Tools.”

NRDC1-36: Please refer to Master Comment Response ALTR-1, “Range of Alternatives General,” Master Comment Response ALTD-2, “Alternative Development- Anadromous Fish Survival,” Master

Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response P&N-1, "Purpose and Need and Objectives," and Master Comment Response NEPA-1, "Sufficiency of the EIS."

NRDC1-37: The SLWRI has two primary coequal objectives that must be met, and neither must impede or harm the other objective. While the SLWRI is not the only way to improve anadromous fish survival, the most efficient way to meet both primary objectives is to enlarge Shasta Reservoir. The existing Shasta Reservoir cannot be reoperated to benefit anadromous fisheries without impacting water supply reliability.

Please refer to Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report," Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions," and Master Comment Response ALTR-1 "Range of Alternatives General."

NRDC1-38: The project is primarily intended to improve Chinook salmon survival in critical and dry years, particularly in a drought condition, when they are likely to be most at risk of significant population declines or even extinction. While overall benefits to production when all water year types are combined are not as pronounced, benefits in dry and critical years are significant. With the added risks of climate change, the benefit of an increased source of cold water adds to the reliability of suitable habitat available for Chinook salmon and other listed fish in the Sacramento River. Adding to that, the habitat restoration components provides an additional amount of available habitat necessary to improve conditions that can help increase the number of Chinook salmon and other listed fish in the Sacramento River.

Please refer to Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report," and Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions."

NRDC1-39: Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon," Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report," and Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions."

NRDC1-40: Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon," Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report," and Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions."

NRDC1-41: Modeling results show that there are significant project benefits to anadromous fish in critical and dry years, when Chinook populations are at greatest risk. By increasing production in these years, relative to the base conditions, the risk of extirpation of listed species is greatly reduced, and therefore provides a significant benefit to the species/run. Many sources identify Upper Sacramento River water temperatures during critical and dry year types as a highly important limiting factor to anadromous fisheries, including the NMFS Recovery Plan and the NMFS 2009 Biological Opinion. This interpretation of SALMOD results with a focus on critical and dry years is consistent with species needs and limitations identified above by fisheries agencies.

Please refer to Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival," Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon," Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report," and Master Comment Response DSFISH-10, "Methodology for Evaluating Fisheries Impacts."

NRDC1-42: Please refer to Master Comment Response NEPA-1, "Sufficiency of the EIS," Master Comment Response EI-1, "Intent of NEPA Process to Provide Fair and Full Discussion of Significant Environmental Impacts," Master Comment Response P&N-1, "Purpose and Need and Objectives," and Master Comment Response GEN-8, "Public Outreach and Involvement."

NRDC1-43: Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon," and Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

NRDC1-44: Please refer to Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

NRDC1-45: Please refer to Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

The commenter included comments previously submitted by CDFW in Attachment 1 on the Draft Feasibility Report of the SLWRI. Reclamation was not able to find the referenced comments regarding modeling tools beyond SALMOD in the referenced text.

NRDC1-46: Please refer to Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

NRDC1-47: Negative impacts shown in the modeling results are almost entirely limited to water year types that are wetter than normal, when anadromous fish are at a relatively low risk of large scale flow and temperature related mortality, and potential extirpation. Further, for all plans, annual average changes across all years, and across critical and critical/dry years when fish are most at risk, are either insignificant or significantly beneficial.

Chapter 12, "Botanical Resources and Wetlands" Mitigation Measure Bot-7 has been revised to clarify how Reclamation will implement a riverine ecosystem mitigation and adaptive management plan to mitigate, to the extent feasible, the identified effects of an altered Sacramento River flow regime on existing riparian and wetland communities, and associated instream, riparian, and wetland habitat values for aquatic and terrestrial special-status species along the Sacramento River from Shasta Dam to Colusa (River Mile 144).

Please refer to Master Comment Response DSFISH-3, "Fish Habitat Restoration," and Master Comment Response DSFISH-9, "Flow-Related Effects on Fish Species of Concern."

NRDC1-48: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

NRDC1-49: SALMOD does incorporate results from IFIM modeling conducted by USFWS, which includes spawning habitat conditions at various flow rates. Therefore, the analysis conducted does evaluate any potential impact to spawning habitat from both changes to flow and water temperature. During the planning stages (development of the Plan Formulation Report), it was identified that the biggest benefits were shown to Chinook salmon came when water temperatures were lowered rather than when flows were adjusted to meet the AFRP flow goals. Therefore, the CP4 was developed specifically to establish a cold water pool for fish benefits. This proved, through the SALMOD results, to have the highest juvenile production. Reclamation recognizes the ecological importance of flow-related geomorphic processes in the Sacramento River, however, the SLWRI does not eliminate these processes, and does restore floodplain and side channel habitat.

NRDC1-50: Chapter 12, "Botanical Resources and Wetlands" Mitigation Measure Bot-7 has been revised to clarify how Reclamation will implement a riverine ecosystem mitigation and adaptive management plan to mitigate, to the extent feasible, the identified effects of an altered Sacramento River flow regime on existing riparian and

wetland communities, and associated instream, riparian, and wetland habitat values for aquatic and terrestrial special-status species along the Sacramento River from Shasta Dam to Colusa (River Mile 144).

Please refer to Master Comment Response DSFISH-9, "Flow-Related Effects on Fish Species of Concern.

NRDC1-51: Please refer to Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

NRDC1-52: Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon," and Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

NRDC1-53: Reclamation recognizes there are limitations to the SALMOD model, including the potential that mortality may be underestimated due to the difficulty in quantifying resource competition and predation, but may also be overestimated for some life stages. Please keep in mind that SALMOD was used to compare the proposed action alternatives, and was not intended to produce exact numbers. SALMOD underestimates mortality both under the no action and action alternatives. The identified limitations do not preclude the ability of SALMOD to identify potential effects to Chinook salmon caused by changes in operations.

In addition, SALMOD is a widely accepted tool that was developed with agency input and has been applied for numerous other studies. The SALMOD model was set up based on USFWS Instream Flow Incremental Methodology (IFIM) data, with direct input from USFWS and CDFW personnel (i.e., Mark Gard, Doug Killam), as well as incorporating comments from the resource agencies before completion of the model structure. SALMOD has been one of the primary tools used to evaluate salmonid responses to revised water operations in the upper Sacramento River, including the most recent Biological Assessment on the Continued Long-Term Operations of the CVP and SWP (Reclamation 2008) and resulting 2009 BO and Conference Opinion on the Long-Term Operations of the CVP and SWP (NMFS 2009).

Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon," Master Comment Response DSFISH-2, "Other Fisheries Models and Tools," and Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

NRDC1-54: Please refer to Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

NRDC1-55: For the DEIS, the number of spring-run spawners incorporated into the model was revised from 1,000 down to 207 based on USFWS and CDFW comments, and is now based on historical data. The DEIS acknowledges that SALMOD was not designed to address the small spawning populations associated with historic spring-run Chinook spawning numbers, but notes that the historically based spawning number was used because of direction from the CDFW and USFWS. However, there is no model currently available for analyzing low populations of Chinook salmon. As described in DSFISH-1, SALMOD is currently the best (and only) available tool for predicting project-related outcomes for all four Chinook salmon runs in the upper Sacramento River. At present, Reclamation is not aware of any proposed tools and/or analytical approaches that could better assess the potential impacts of the project alternatives on spring-run Chinook salmon. Furthermore, SALMOD was used for spring-run Chinook salmon evaluations in the 2008 Reclamation Long-Term Operation BA and the 2009 NMFS BO. As such, Reclamation believes that its approach to assessing project impacts on spring-run Chinook is consistent with the best available science and analytical tools, and is supported by the direction received from the resource agencies.

Chapter 11, "Fisheries and Aquatic Ecosystem," Section 11.3.1, notes that: "Populations of 500 or more spawning Chinook salmon are considered necessary for accurate results using SALMOD because it is a deterministic model that relies on the "law of large numbers." When populations are "low" (an arbitrary term), mean responses are quickly affected by environmental stochasticity and individual variability, which are factors SALMOD was not designed to address. Therefore, because the 1999 to 2006 average for spring-run Chinook salmon was 207 adult spawners, the criterion of 500 or more fish was not met. However, because of concerns expressed by CDFW and USFWS, the spawning population was left at 207 fish for purposes of the model." However, in the 2009 BO, NMFS used 1,000 adult spring-run spawners to compensate for the fact that the actual spawning population is less than 500 fish.

NRDC1-56: Reclamation acknowledges that SALMOD, like any numerical model, has limitations that must be considered when interpreting its results. However, Reclamation believes that SALMOD is the best available tool, and Reclamation sought resource agency input when developing the model. SALMOD was set up based on USFWS Instream Flow Incremental Methodology (IFIM) data, with direct input from both USFWS and CDFW (i.e., Mark Gard, Doug Killam), as well as incorporating comments from CDFW, USFWS and Reclamation fisheries experts before completing the model structure. The model has been peer reviewed, including by Lisa Thompson and Chris Mosser of U.C. Davis (2011), and despite its limitations has been accepted as a

valid tool for numerous studies, including the most recent Biological Assessment on the Continued Long-Term Operations of the CVP and SWP (Reclamation 2008) and resulting 2009 BO and Conference Opinion on the Long-Term Operations of the CVP and SWP (NMFS 2009).

According to the CDFG 2008 letter, the agency does not believe that egg and juvenile mortality are directly related to water temperature and flows, and that juvenile production is more highly correlated with the number of adult spawners. While this may be true most of the time, and that habitat may not typically be limiting juvenile production, the effects to winter-run Chinook salmon, as shown through the results from SALMOD, are that these fish are at greater risk during critical and dry water years, when water temperatures are more difficult to control. During these times, habitat (particularly cooler water temperature) is likely limiting, as observed during significant dry periods such as 1976 and 1977 and 1987 through 1992. As observed in the Sacramento River in 1976 and 1977, there were a large number of spawners (over 35,000 adults spawners in 1976 and over 17,000 in 1977), however warm waters and low flow conditions in the river precluded successful returning spawners 3 years later. Similar results are shown in the output of SALMOD.

Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon," and Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

NRDC1-57: Reclamation acknowledges that SALMOD, like any numerical model, has limitations that must be considered when interpreting its results. However, Reclamation believes that SALMOD is the best available tool, and Reclamation sought resource agency input when developing the model. SALMOD was set up based on USFWS Instream Flow Incremental Methodology (IFIM) data, with direct input from both USFWS and CDFW (i.e., Mark Gard, Doug Killam), as well as incorporating comments from CDFW, USFWS and Reclamation fisheries experts before completing the model structure. The model has been peer reviewed, including by Lisa Thompson and Chris Mosser of U.C. Davis (2011), and despite its limitations has been accepted as a valid tool for numerous studies, including the most recent Biological Assessment on the Continued Long-Term Operations of the CVP and SWP (Reclamation 2008) and resulting 2009 BO and Conference Opinion on the Long-Term Operations of the CVP and SWP (NMFS 2009).

For the DEIS, the number of spring-run spawners incorporated into the model was revised based on USFWS and CDFW comments, and is based on historical data. The DEIS acknowledges that SALMOD was

not designed to address the small spawning populations associated with historic spring-run Chinook spawning numbers, but notes that the historically based spawning number was used because of direction from the CDFW and USFWS. At present, Reclamation is not aware of any proposed tools and/or analytical approaches that could better assess the potential impacts of the project alternatives on spring-run Chinook salmon. As such, Reclamation believes that its approach to assessing project impacts on spring-run Chinook is consistent with the best available science and analytical tools, and is supported by the direction received from the resource agencies.

Chapter 11, "Fisheries and Aquatic Ecosystem," Section 11.3.1, notes that: "Populations of 500 or more spawning Chinook salmon are considered necessary for accurate results using SALMOD because it is a deterministic model that relies on the "law of large numbers." When populations are "low" (an arbitrary term), mean responses are quickly affected by environmental stochasticity and individual variability, which are factors SALMOD was not designed to address. Therefore, because the 1999 to 2006 average for spring-run Chinook salmon was 207 adult spawners, the criterion of 500 or more fish was not met. However, because of concerns expressed by CDFW and USFWS, the spawning population was left at 207 fish for purposes of the model."

Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon."

NRDC1-58: For the DEIS, the number of spring-run spawners incorporated into the model was revised based on USFWS and CDFW comments, and is based on historical data. The DEIS acknowledges that SALMOD was not designed to address the small spawning populations associated with historic spring-run Chinook salmon spawning numbers, but notes that the historically based spawning number was used because of direction from the CDFW and USFWS. At present, Reclamation is not aware of any proposed tools and/or analytical approaches that could better assess the potential impacts of the project alternatives on spring-run Chinook salmon. As such, Reclamation believes that its approach to assessing project impacts on spring-run Chinook salmon is consistent with the best available science and analytical tools, and is supported by the direction received from the resource agencies.

NRDC1-59: While Reclamation acknowledges that fish can be impacted by temperature changes on a finer time scale than the weekly average temperatures assessed by SALMOD, Reclamation is not aware of any widely available and agency accepted tools which can be used for long-term simulations of the effect of temperature variations at a finer time scale. Further, Reclamation is not aware of any tool which can be used to develop reliable long term temperature data on a finer time scale,

considering that Calsim-II — the only widely accepted tool for simulating long-term systemwide operations of the CPV/SWP system — operates on a monthly time scale.

SALMOD was set up based on USFWS Instream Flow Incremental Methodology (IFIM) data, with direct input from USFWS and CDFW personnel (i.e., Mark Gard, Doug Killam), as well as incorporating comments from the resource agencies before completion of the model structure. The model has been peer reviewed, including by Lisa Thompson and Chris Mosser of U.C. Davis (2011), and has been accepted as a valid tool for numerous studies, including the most recent Biological Assessment on the Continued Long-Term Operations of the CVP and SWP (Reclamation 2008) and resulting 2009 BO and Conference Opinion on the Long-Term Operations of the CVP and SWP (NMFS 2009).

Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon."

NRDC1-60: Text was added to clarify that these are factors that can be exacerbated by project operations, however they cannot be directly quantified.

NRDC1-61: Please refer to Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

NRDC1-62: Please refer to Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

NRDC1-63: Please refer to Master Comment Response CR-1, "Potential Effects to Cultural Resources," and Master Comment Response CR-11, "Cultural Resources and NEPA."

NRDC1-64: Please refer to Master Comment Response CR-12, "Cultural Resources and CEQA."

NRDC1-65: Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.3, "Direct and Indirect Effects," describes in great detail the impacts and benefits to the fisheries in the Sacramento River and Delta. The commenter has not provided any specific example of how the DEIS is misleading.

SALMOD results show that there are significant project benefits to anadromous fish in critical and dry years under CP4, when Chinook populations are at greatest risk. By increasing production in these years, relative to the base conditions, the risk of extirpation of listed species is greatly reduced, and the project therefore provides a significant benefit to the species/run.

Many sources identify that Upper Sacramento River water temperatures, particularly during these year types, are extremely important to anadromous fisheries and are considered one of the limiting factors to these species. Increasing the cold water pool in Shasta Lake to benefit anadromous fish was specifically identified in both the NMFS Draft Recovery Plan (2009) and the Final Recovery Plan (2014), as water temperatures and flow, particularly during dry and critically dry years (e.g., drought periods) are of stressors of "very high" importance for Chinook salmon populations, and those populations are highly vulnerable to prolonged drought conditions. The beneficial impacts claimed from the SALMOD modeling results are consistent with species needs and limitations identified above by fisheries agencies.

Please refer to Master Comment Response DSFISH-3, "Fish Habitat Restoration," and Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

NRDC1-66: The commenter does not raise a specific issue, instead the comment is vague and therefore no specific response can be provided.

Please refer to Master Comment Response GEN-4, "Best Available Information," and Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest."

NRDC1-67: Baseline conditions and alternatives all include the operational RPA requirements. All operations simulation modeling in the DEIS was performed with the CalSim II simulation model, the best available tool for modeling joint CVP/SWP system operations in California. The assumptions in the modeling, used in support of this document, included the 2008/2009 BO's as well as the most recent versions of all other regulatory conditions. Specific details of the assumptions included in the CalSim-II modeling are included in the Modeling Appendix. In the modeling many other water supply and water quality requirements must be met to allow exports. Delta wide requirements are met with the additional releases from the enlarged Shasta reservoir allowing additional pumping. The results of this modeling include the system response to the project including changes in reservoir storages, releases, stream flows, and Delta exports. These results are summarized in the text with full results included in the Modeling Appendix.

Please refer to Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements."

NRDC1-68: Adaptive management, by definition, allows for adjustments of existing or developments of new rules based on specific,

rare, or unforeseen future conditions that are not adequately covered by existing rule definitions at the time they occur. Since these future conditions are not known at the present time the rules cannot be developed and cannot be implemented in the modeling and analysis. As stated in the Modeling Appendix, Chapter 2, "CalSim-II," Section "Model Assumptions," Reclamation worked collaboratively with NMFS, USFWS, and CDFW to implement the RPAs. During this process the adaptive management provisions were taken into consideration to the extent possible to allow flexibility in future operations if and when required.

NRDC1-69: Table 2-1 in Chapter 2, "CalSim-II," of the DEIS Modeling Appendix lists the assumptions used in the operations modelling using CalSim-II. As described in the DEIS, the Fall X2 RPA Action is implemented in the operations modeling. The full set of CalSim-II outputs for existing and future conditions and all action alternatives were included in the DEIS DVD, which was mailed to all stakeholders on the SLWRI mailing list. However, the results presented in the Attachment 1 to the Fisheries and Aquatic Ecosystems Technical Report were incorrectly summarized in the DEIS. These tables have been revised to correctly summarize the data. Please see the updated information on X2 position in Tables 2-97 through Table 2-120 that show compliance of Fall X2 RPA action requirements.

NRDC1-70: Table 2-1 in Chapter 2, "CALSIM," of DEIS Modeling Appendix lists the assumptions used in the operations modelling using CalSim-II. Part B of RPA Component 1, Action 1 – "First Flush" is included in the DEIS operations modeling using CalSim-II. In the DEIS operations modeling, Part A of the action (December 1-December 20) is not implemented in the model because, it was considered unlikely or rarely to occur on the basis of historical salvage data.

OMR flows reported in the DEIS in wet years during the month of December are highly negative due to the following reasons. CalSim-II is based on monthly time-steps, whereas the Part B of the RPA Action 1 contains a partial-month (14 day) action condition. Therefore, the action is implemented in CalSim-II based on a day-weighted average approach. The OMR regulation is only enforced starting Dec 21 and the monthly average results do not explicitly show the partial-month requirements. And there are a few wet years where the first flush does not occur until January.

NRDC1-71: As stated in Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.3, "Direct and Indirect Effects," An increase in Delta outflow of 200 to 300 cfs during dry or critical water years would not result in significant impacts to Delta fisheries, particularly at flows between 3,500 and 6,000, while a decrease in Delta outflow in

November by around 700 cfs when outflows are higher in November would also not result in significant impacts to Delta fisheries.

While Delta outflow criteria for delta and longfin smelt, as identified in SWRCB 2010 (the cited report provided by the commenter), are not always met under the action alternatives; they are also not always met under the baseline conditions during those same years (Existing Conditions and No-Action Alternative). Green sturgeon were not listed in Table 2 of SWRCB 2010, Species of Importance, and page 53 of the same report states "No specific Delta outflow requirements are recommended for Chinook salmon."

NRDC1-72: The Modeling Appendix, "Attachment 2 SRWQM," includes the output for all water temperatures and includes the water years. While these results do show up in a monthly format, water temperatures were not calculated as monthly temperatures. The SRWQM calculates water temperatures in 6-hour intervals. These water temperatures were used in the impact assessment, even though the monthly values were shown in the figures.

Please refer to Master Comment Response DSFISH-10, "Methodology for Evaluating Fisheries Impacts."

NRDC1-73: The Modeling Appendix, "Attachment 2 SRWQM," includes the output for all water temperatures and includes the water years. While these results do show up in a monthly format, water temperatures were not calculated as monthly temperatures. The SRWQM calculates water temperatures in 6-hour intervals. These water temperatures were used in the impact assessment, even though the monthly values were shown in the figures.

Please refer to Master Comment Response DSFISH-10, "Methodology for Evaluating Fisheries Impacts."

NRDC1-74: The assumptions in the modeling used in support of the DEIS included the 2008/2009 BO's as well as the most recent versions of regulatory conditions. Specific details of the assumptions, included in the CalSim II modeling, are included in the Modeling Appendix. As stated in the Modeling Appendix, "It is assumed that either VAMP, a functional equivalent, or SWRCB D-1641 requirements would be in place in 2020. CVP and SWP VAMP export restrictions during the April 15 to May 15 pulse period were not included in CalSim-II modeling."

NRDC1-75: While it is likely that the resource agencies will step in and cease operations before take limits are reached, Reclamation cannot assume at this stage that this will occur. Based on modeling results, if

the resource agencies fail to take this step, these are the number of fish that would be entrained under the operational scenarios. The differences under each action alternative are shown in separate tables in Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.3, "Direct and Indirect Effects," which show that minimal changes from the baseline conditions would occur. If, however, resource agencies require operations to cease before reaching take limits, then no impact to the listed species would occur.

Please refer to Master Comment Response ESA-1, "Compliance with the Endangered Species Act."

NRDC1-76: The Wildlife Resources Technical Report, Attachment 11, "California Red-legged Frog Habitat Assessment Report 2012," provides information on the California red-legged frog (*Rana draytonii*) (CRLF) site assessments that were conducted during 2010 and 2012. Following the USFWS guidance, Reclamation conducted CRLF site assessments that included the southern and southwestern portions of Shasta Lake and a standard 1.0-mile radius buffer area.

The Wildlife Resources Technical Report, Attachments 18 – 23, provide information on CRLF Habitat Assessments for potential downstream restoration areas.

NRDC1-77: Please refer to Master Comment Response CEQA-1, "CEQA Compliance," and Master Comment Response CEQA-2, "CEQA Mitigation."

NRDC1-78: Chapter 2, "Alternatives," describes the baselines for comparison. Multiple baselines are used to allow for informed decision-making by describing the 1) differences in the no-action/no-project alternative as compared to the action alternatives and 2) existing conditions as compared to the action alternatives. Efforts were made to simplify the document as much as feasible while meeting the needs to disclose environmental effects to the extent required to meet current legal requirements for full disclosure, including multiple baselines.

Please refer to Master Comment Response CEQA-1, "CEQA Compliance."

NRDC1-79: As stated in Chapter 1, "Introduction," the Final EIS is being published along with the Final Feasibility Report. The Final Feasibility Report incorporates information contained in the Final EIS by reference, and will be used to determine the type and extent of Federal interest in enlarging Shasta Dam and Reservoir. The Final EIS and the Final Feasibility Report will be used together to support the Federal decision. Analysis for the DEIS relied on the updated USFWS

2008 Revised Biological Opinion on the Coordinated Operations of the Central Valley Project and State Water Project in California. (USFWS 2008) and the NMFS 2009 Revised Biological Opinion on the Long-Term Central Valley Project and State Water Project Operations Criteria and Plan (NMFS 2009).

The Draft Feasibility Report was not incorporated by reference into the DEIS. The feasibility report has been updated to reflect the 2008 and 2009 BOs.

Please refer to Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest."

NRDC1-80: As stated in Chapter 1, "Introduction," the Final EIS is being published along with the Final Feasibility Report. The Final Feasibility Report incorporates information contained in the Final EIS by reference, and will be used to determine the type and extent of Federal interest in enlarging Shasta Dam and Reservoir. The Final EIS and the Final Feasibility Report will be used together to support the Federal decision. There is no NEPA requirement to update the feasibility report.

NRDC1-81: Comment noted.

NRDC1-82: A discussion of the key indicators of climate change in California based on California Environmental Protection Agency's publication, "Indicators of Climate Change in California," (2013) is presented in Chapter 2, "Summary of Previous Studies of Climate Change in the Study Area," of the Climate Change Modeling Appendix of the EIS.

NRDC1-83: As described in DEIS Chapter 5, "Air Quality and Climate" Section 5.2, "Regulatory Framework," CEQ issued guidance on including GHG emissions and climate change impacts in environmental review documents under NEPA. CEQ's guidance (issued February 18, 2010) suggests that Federal agencies "consider opportunities to reduce GHG [(greenhouse gas)] emissions caused by proposed Federal actions, adapt their actions to climate change impacts throughout the NEPA process, and address these issues in their agency NEPA procedures." The following are the two main factors to consider when addressing climate change in environmental documentation:

- The effects of a proposed action and alternative actions on GHG emissions
- The impacts of climate change on a proposed action or alternatives

Effects of the no-action and action alternatives on GHG emissions are discussed in Chapter 5, "Air Quality and Climate," Section 5.3, "Environmental Consequences and Mitigation Measures."

Cumulative effects of climate change on resource areas are discussed in the "Cumulative Effects" sections in each of the resource section chapters of the DEIS. In addition, the Climate Change Modeling Appendix provides an assessment of the potential to achieve the objectives of the SLWRI under projected future climate change. (See CC-1 for a description of the differences between the Appendix and the information used in the DEIS chapters).

Because of the very uncertainty related to how global climate change will impact runoff and water temperatures at a regional or local scale, the quantitative analysis of future operational scenarios becomes speculative and must, by nature incorporate a number of scenarios, each of which may be more or less likely than other scenarios. Reclamation used the best available information and science in developing Chapter 5, "Air Quality and Climate," and the Climate Change Modeling Appendix.

Please refer to Master Comment Response CC-1, "Climate Change Uncertainty and Related Evaluations."

NRDC1-84: Please refer to Master Comment Response CC-1, "Climate Change Uncertainty and Related Evaluations."

NRDC1-85: As described in DEIS Chapter 5, "Air Quality and Climate," Section 5.2, "Regulatory Framework," CEQ issued guidance on including GHG emissions and climate change impacts in environmental review documents under NEPA. CEQ's guidance (issued February 18, 2010) suggests that Federal agencies "consider opportunities to reduce GHG [(greenhouse gas)] emissions caused by proposed Federal actions, adapt their actions to climate change impacts throughout the NEPA process, and address these issues in their agency NEPA procedures." The following are the two main factors to consider when addressing climate change in environmental documentation:

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Please refer to Master Comment Response CC-1, "Climate Change Uncertainty and Related Evaluations," and Master Comment Response CC-2, "Climate Change Projections."

NRDC1-86: Reclamation as the lead agency has determined the appropriate baseline assumptions and tools for analysis and has consulted other agencies, tribal members, and the public through the scoping process. Please see Chapter 6, "Hydrology, Hydraulics, and Water Management," Section 6.3.1, "Methods and Assumptions," and the Modeling Appendix for a further discussion on this topic. The EIS relies on the most current RPAs in the 2008 and 2009 Biological Opinions that avoid jeopardy.

Please refer to Master Comment Response ALTR-1, "Range of Alternatives General," Master Comment Response DSFISH-2, "Other Fisheries Models and Tools," Master Comment Response ALTS-1, "Alternative Selection," and Master Comment Response ESA-1, "Compliance with the Endangered Species Act."

NRDC1-87: The discussion of cumulative impacts within each resource area (Chapters 4–25) focuses on significant and potentially significant cumulative impacts, and mitigation is provided for adverse cumulative impacts, where feasible. As described in EIS Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," cumulative impacts were evaluated both qualitatively and quantitatively.

Quantitative cumulative impacts evaluations were generally based on evaluations using existing and future conditions modeling. Modeling for both existing and future conditions reflect operations described in the

2008 Reclamation Long-Term Operation BA and operational requirements in the 2008 USFWS BO and the 2009 NMFS BO, as described in Table 2-2 of the Modeling Appendix. Existing conditions modeling was based on a 2005 level of development and current facilities, as defined in 2012 (referred to as a 2005 baseline). Future conditions (No-Action Alternative) modeling was based on a projected 2020 level of development for the Sacramento Valley, a projected 2030 level of development for the San Joaquin Valley, and reasonably foreseeable future projects and facilities (referred to as a 2030 baseline).

The Final EIS has been revised to reflect, for each resource category, where the analysis of cumulative impacts was quantitative, and where the analysis was qualitative. For example, cumulative effects on hydrologic conditions for the proposed project were analyzed quantitatively using modeling runs with the No-Action Alternative (future conditions) compared to modeling runs with existing conditions. The No-Action Alternative was compared to existing conditions to identify the cumulative impacts of reasonably foreseeable future projects and conditions on hydrologic conditions. Similarly, project alternatives were compared to existing conditions (thus satisfying CEQA requirements) and to the No-Action Alternative (satisfying NEPA requirements) to identify the combined cumulative effect of project alternatives and other foreseeable projects and facilities. As described above, the SLWRI No Action Alternative (2030 baseline) includes forecasted 2020-2030 level of development and related demands for water. This quantitative analysis of cumulative impacts for hydrologic conditions is beyond perfunctory.

Another example of a quantitative analysis can be found in Chapter 5, "Air Quality and Climate." For the analysis of cumulative impacts on air quality for the project, a quantitative assessment of effects was made to assess the regional cumulative impacts on air quality quantitatively using modeling analyses. As described in Chapter 5, "Air Quality and Climate," significance thresholds for the Shasta County Air Quality Management District (SCAQMD) are defined in the Shasta County General Plan (SCAQMD 2004). The analysis of local cumulative impacts is based on both the plan approach, which defines impact thresholds, and the list approach, which identifies projects that may emit pollutants in the same area as the SLWRI. SCAQMD standards for criteria pollutants have been established to limit the emissions of individual projects when considering the cumulative effect of all projects on regional pollutant concentrations. Therefore, a significant direct project impact would also be a cumulatively considerable incremental contribution to a significant cumulative impact. This quantitative analysis of cumulative impacts for air quality conditions is beyond perfunctory.

As a related example, the cumulative effect of the SLWRI comprehensive plans in combination with other past, present, and reasonably foreseeable projects is evaluated in the EIS for climate change on a quantitative basis. The ways in which the project would affect GHG production are described in Chapter 5, "Air Quality and Climate." The Climate Change Modeling Appendix provides a summary of global climate forecasts and a discussion of the cumulative implications of climate change for California water resources. This appendix also includes quantitative analyses of climate change for selected comprehensive plans on relevant resource areas. The discussion of climate change implications provided in the Climate Change Modeling Appendix provides context for consideration of cumulative conditions. The cumulative effects analysis of the SLWRI was tiered to the CALFED analysis with updated projects and modeling. Reclamation believes that this analysis of cumulative impacts is more than perfunctory, satisfies NEPA requirements, and provides a "useful analysis of the cumulative impacts of past, present and future projects" as referenced by the commenter.

Please refer to Master Comment Response NEPA-2, "Cumulative Impacts."

NRDC1-88: Please refer to Master Comment Response BDCP-1, "Relationship of the SLWRI to the Bay Delta Conservation Plan," and Master Comment Response EI-7, "Bay Delta Conservation Plan Too Speculative to Provide Meaningful Quantitative Cumulative Analysis in SLWRI EIS."

NRDC1-89: Please refer to Master Comment Response BDCP-1, "Relationship of the SLWRI to the Bay Delta Conservation Plan," Master Comment Response EI-7, "Bay Delta Conservation Plan Too Speculative to Provide Meaningful Quantitative Cumulative Analysis in SLWRI EIS."

NRDC1-90: Both the North-of-Delta Offstream Storage Investigation (Sites Reservoir) and the Upper San Joaquin River Basin Storage Investigation (Temperance Flat) are still planning studies with multiple potential alternatives. Because actions have not been authorized for either study by Congress at this time, Reclamation considers that a selection of any one alternative is too speculative at this point in time for consideration in the quantitative analysis. Both studies are considered in the qualitative cumulative effects analysis and considered in the cumulative effects analysis for relevant resource areas throughout the DEIS qualitatively in combination with one another. The text in Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," of the Final EIS has been amended to

reflect project updates for the storage projects in the assessment of qualitative cumulative impacts.

Please refer to Master Comment Response EI-7, “Bay Delta Conservation Plan Too Speculative to Provide Meaningful Quantitative Cumulative Analysis in SLWRI EIS," and Master Comment Response NEPA-2, “Cumulative Impacts.”

NRDC1-91: It is unlikely that any of the regulatory requirements, including those established in the BOs or by the SWRCB, in the reasonably foreseeable future would be removed. These standards require that specific X2, Delta outflow, OMR and entrainment requirements are met so as to protect fish species in the Delta. As a result, there would be minimal cumulative impacts to Delta fish, as identified in Chapter 11, “Fisheries and Aquatic Ecosystems,” Section 11.3.5, “Cumulative Effects.”

Please refer to Master Comment Response NEPA-2, “Cumulative Impacts.”

NRDC1-92: Please refer to Master Comment Response CEQA-1, “CEQA Compliance,” and Master Comment Response CEQA-2, “CEQA Mitigation.”

NRDC1-93: Please refer to Master Comment Response FISHPASS-1, “Fish Passage Above Shasta Dam.”

NRDC1-94: Please refer to Master Comment Response CR-1, “Potential Effects to Cultural Resources,” Master Comment Response ALTD-2, “Alternative Development- Anadromous Fish Survival,” and Master Comment Response ALTD-1, “Alternative Development- Water Supply Reliability.”

NRDC1-95: Please refer to Master Comment Response CR-1, “Potential Effects to Cultural Resources,” and Master Comment Response CR-11, “Cultural Resources and NEPA.”

NRDC1-96: Please refer to Master Comment Response CR-15, “National Historic Preservation Act Section 106 Consultations.”

NRDC1-97: Please refer to Master Comment Response CR-1, “Potential Effects to Cultural Resources,” and Master Comment Response CR-11, “Cultural Resources and NEPA.”

NRDC1-98: Please refer to Master Comment Response WASR-6, “Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542.”

NRDC1-99: Please refer to Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542."

NRDC1-100: Please refer to Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542," and Master Comment Response ALTR-1, "Range of Alternatives General."

NRDC1-101: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River."

NRDC1-102: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response CEQA-1, "CEQA Compliance," Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542," and Master Comment Response NEPA-1 "Sufficiency of EIS."

NRDC1-103: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability, "Master Comment Response CEQA-1," "CEQA Compliance," Master Comment Response NEPA-1, "Sufficiency of the EIS," Master Comment Response CR-1, "Potential Effects to Cultural Resources," Master Comment Response CR-11, "Cultural Resources and NEPA," WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River," and Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival."

NRDC1-104: Please refer to Master Comment Response NEPA-1, "Sufficiency of the EIS."