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SL&DMWA

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December 5, 2016

VIA E-MAIL

Julia Long
Bureau of Reclamation
Shasta Lake, CA 96019
E-Mail: BOR-SLO-Sha-ltpeis-Public-Comments@usbr.gov

Re: **Draft Environmental Impact Statement for the Long-Term Plan to Protect Adult Salmon in the Lower Klamath River**

Dear Ms. Long:

On behalf of my clients, the San Luis & Delta-Mendota Water Authority ("Water Authority") and Westlands Water District ("Westlands") (collectively, the "Public Water Agencies"), I submit these comments in response to the Bureau of Reclamation's ("Reclamation") Draft Environmental Impact Statement for the Long-Term Plan to Protect Adult Salmon in the Lower Klamath River ("Draft EIS"). The Public Water Agencies appreciate the opportunity to provide comments on the Draft EIS, and to help ensure that Reclamation satisfies its obligations under the National Environmental Policy Act ("NEPA") and acts consistent with its statutory authority. SL&DMWA-1

The Public Water Agencies previously provided extensive comments during the scoping process for this Draft EIS. As those comments continue to be applicable to the Draft EIS, they are therefore attached hereto and incorporated by reference.

The Public Water Agencies' detailed comments regarding the Draft EIS are attached. Some of the Draft EIS's most significant issues and areas in need of revision include:

1) The Current Alternatives Are Too Narrow: The alternatives analyzed in the Draft EIS do not present a reasonable range of alternatives. The two alternatives are essentially one, both exclusively "flow" alternatives that share the exact same triggers and flow components. The alternatives are too narrow and will not satisfy NEPA's "reasonable range" standard for an alternatives analysis. The Draft EIS should be revised to include analysis of additional alternatives, including a true adaptive management alternative, and alternatives that include variation in the flow action. SL&DMWA-2

2) The EIS Fails to Disclose the Significant Scientific Uncertainty Regarding Ich Outbreaks and Regarding Flow Actions: There is significant uncertainty regarding the causative factors underlying the fish die-off that occurred in the lower Klamath River in late-summer/early-fall of 2002 ("2002 fish die-off") and consequently, there is significant uncertainty regarding what management actions may effectively reduce the likelihood of a future fish die-off. Despite these uncertainties, the Draft EIS insists on a single mechanism altering the flow regime, without including a sufficiently-robust adaptive management program that can both test hypotheses related to a fish die-off and incorporate an appropriate flow regime in the context of SL&DMWA-3

the suite of causal factors affecting a fish die-off. The Draft EIS fails to disclose this scientific uncertainty and fails to provide decision-makers with sufficient information to make an informed decision. The Draft EIS should be revised to disclose the scientific uncertainty associated with Ich outbreaks, the 2002 fish die-off, and the efficacy of a single focus on an altered flow regime in the context of other potential causative factors that may be related to the 2002 fish die-off.

SL&DMWA-3 (contd.)

3) The Presentation of Environmental Effects Masks the Maximum and Cumulative Effects of the Flow Actions: The Draft EIS's presentation of environmental effects as averages across water year types masks the maximum effects that could occur in a particular year or over several, consecutive years. Using averages to describe potential effects fails to disclose the extremity of effects that may occur in a particular year. Also, describing potential effects as occurring in a single year fails to capture the cumulative effects of consecutive flow actions over several dry years, such as recently experienced in 2013-2016. The EIS should be revised to ensure that these types of impacts are analyzed and disclosed.

SL&DMWA-4

4) The Water Supply Analysis is Errant and Understates Adverse Impacts: The Draft EIS's lack of post-processing of CALSIM II results in inaccurate analytical conclusions that do not reflect likely operations or conditions. While the Draft EIS briefly acknowledges this modeling issue, the Draft EIS fails to post-process the results so that more accurate estimates can be provided. These modeling errors and assumptions are utilized as inputs for analysis of impacts to resource categories other than water supply, and therefore skews much of the Draft EIS's analyses. The water supply, water quality, groundwater, air quality, agricultural, socioeconomic, environmental justice, and other related sections must be entirely redone to reflect real-world impacts, so that the potential impacts of the flow action alternatives are accurately presented.

SL&DMWA-5

Conclusion

The Public Water Agencies ask Reclamation to revisit the Draft EIS, to ensure that Reclamation is utilizing the NEPA process to develop a reasonable range of alternatives that meet the purpose and need for the action, and to analyze and disclose potential environmental effects of the alternative actions. Particularly in the face of significant scientific uncertainty regarding the underlying cause and effect relationships of fish disease in the lower Klamath River, it is imperative that Reclamation proceed in a scientific manner that examines and develops potential actions that can reasonably be expected to reduce the likelihood of future epizootic Ich outbreaks.

SL&DMWA-6

Thank you,

KRONICK, MOSKOVITZ, TIEDEMANN & GIRARD
A Professional Corporation

Elizabeth Leeper

ELIZABETH LEEPER
On behalf of the San Luis & Delta Mendota Water Authority and Westlands Water District

Attachments: (1) December 5, 2016, Detailed Comments Regarding Lower Klamath Draft EIS
(2) August 20, 2015 Scoping Comments Regarding Lower Klamath EIS

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ATTACHMENT 1

Detailed Comments on Draft EIS for Lower Klamath Long-Term Plan

(Submitted on Behalf of the San Luis & Delta-Mendota Water Authority and Westlands Water District)

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I. The Draft EIS Fails to Disclose and Address Significant Uncertainty Regarding Ich Outbreaks and Flow Actions

An essential attribute of the value of the NEPA process is its requirement to disclose and discuss the relevance of conflicting, inconsistent data and unavailable or incomplete data. Accordingly, when Reclamation is "evaluating the reasonably foreseeable significant adverse effects on the human environment in [the EIS] and there is incomplete or unavailable information," it is required to "always make clear that such information is lacking." 40 C.F.R. § 1502.22. If, for example, there is incomplete or unavailable information regarding the effects of the proposed action and the alternatives, Reclamation must disclose and discuss this issue. However, "[e]very effort should be made to collect all information essential to a reasoned choice between alternatives." NEPA Handbook at 8-16. At a bare minimum, if the relevant incomplete information "cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known," Reclamation must include a statement in the EIS explaining the nature of such information, its relevance, a summary of existing credible scientific evidence, and Reclamation's evaluation of potential impacts based on approaches or methods generally accepted in the scientific community. 40 C.F.R. § 1502.22(b). SL&DMWA-7

The Draft EIS fails to apply these principles.

There is significant uncertainty regarding the causative factors underlying the 2002 fish die-off, and consequently, there is significant uncertainty regarding what management actions may effectively reduce the likelihood of a future fish die-off. The Draft EIS fails to disclose this scientific uncertainty. The fact that there has been a substantial salmon die-off reported in only one year, despite a wide range of environmental conditions, including conditions similar to those in 2002, underscores the high degree of uncertainty in identifying relevant management actions or assessing the risks to the fall-run Chinook salmon population associated with alternative actions, including the No Action Alternative. To rectify this failure, the Final EIS should more explicitly reflect the limits and uncertainties of the available science demonstrating a causal relationship between fish die-offs and the variables that affect any die-off, and should include alternative management action scenarios to address the uncertain causative factors underlying the 2002 fish die-off.

A. The Final EIS Must Acknowledge Uncertainty Regarding the Causative Factors Underlying the 2002 Fish Die-Off

The Draft EIS asserts that "[h]igh fish densities—due to the relatively large run size . . ., low flows, and relatively high water temperatures—were identified as causative factors for the rapid spread of disease" underlying the 2002 fish die-off. Draft EIS at ES-1. The Draft EIS overstates the degree of scientific support for identifying any of the listed factors—fish density, large run size, low flow, or high water temperatures—as causative. The fact of the matter is, there have been a number of years in which these "causative" factors have been equal to or worse than those in 2002, the sole occasion of a fish die-off on record, and no die-off occurred. At most, each of the listed factors is a *possible* causative factor. The Draft EIS does not provide scientific support for the conclusion that any of these factors is causative, or explain the SL&DMWA-8

mechanisms by which these factors affect the presence or spread of disease in the lower Klamath River. No causal relationship has been scientifically established for any of the listed factors; the current scientific understanding of the contributing factors to Ich epizootic events is at the hypothesis stage. The EIS must disclose that the causal factors and their controlling mechanisms underlying Ich infection and fish die-off are unknown. SL&DMWA-8 (contd.)

B. The Final EIS Must Acknowledge Uncertainty Regarding the Effect of Increases in Flow on Possible Causative Factors Underlying the 2002 Fish Die-Off

Notwithstanding the uncertainty regarding the causative factors underlying the 2002 fish die-off, the Draft EIS repeatedly asserts that increasing flow to the lower Klamath River will "reduce the likelihood, and potentially reduce the severity, of any fish die-off in future years due to crowded holding conditions for pre-spawn adults, warm-water temperatures, and the presence of disease pathogens." *See, e.g.*, Draft EIS at ES-1. Such assertions fail to account for complex multi-factor dynamics of the Trinity and Klamath River systems and of fish disease. Such assertions are also problematic because they ignore the fact that the complexities of the Trinity and Klamath River systems preclude a reasonable level of confidence that increasing flow to the lower Klamath River will be an effective or efficient use of water. Revisions to the Draft EIS are required to address these issues.

The difficulty in assessing benefits of flow augmentation actions is underscored by the fact that there have been years such as 1987, 1989, and 2009 with relatively high adult salmon escapement and low fall flows with no flow augmentation releases and no fish die-off . More importantly, there have been 6 drought years since 1987 that have had low flows (average August or September flows less than 2,500 cfs) where no fish die off occurred even though Reclamation did not augment flows in those years. SL&DMWA-9

The Draft EIS should be revised to include, at a minimum, a full accounting of how many times a fish die-off has occurred in the context of the historic record and the number of times conditions have been equal to or worse than those hypothesized to be causal in which no action was taken and no die-off occurred. The inability to scientifically determine cause-effect relationships increases the uncertainty and reduces the confidence of being able to predict if and when a disease outbreak is likely, as well as predict whether any particular action, such as the flow augmentation actions, can be expected to reduce the likelihood of a disease outbreak or fish die-off.

The Draft EIS also needs to be revised to disclose the uncertainty regarding the Alternatives' ability to meet the Purpose and Need for the action. The Draft EIS states that "[a]lternatives were developed to meet the Purpose and Need for the project, which is to reduce the likelihood, and potentially reduce the severity, of any Ich epizootic event that could lead to an associated fish die-off in future years. The need is based on the past extensive fish die-off in 2002." Draft EIS, at ES-3; *see id.* at 1-8 (statement of purpose and need). The Draft EIS fails to disclose the uncertainties underlying the causative factors of the 2002 fish die-off and the uncertainties regarding what actions can reasonably be expected to reduce the likelihood or severity of an Ich epizootic event. The Draft EIS identifies the "need" for the action as the 2002 die-off event, however. Reclamation lacks sufficient scientific understanding regarding the

causative factors and mechanisms underlying the 2002 fish-die off to conclude flow actions will meet the purpose and need. It has not been scientifically established that augmentation flows improve fishery conditions with respect to reducing the likelihood of a fish die-off. It is therefore inappropriate to refer to augmentation flows as "needed" because it has not been scientifically established that augmentation flows are necessary or effective. In sum, the Draft EIS fails to—but must—support any conclusion that the Proposed Action will meet its stated purpose —"to reduce the likelihood, and potentially reduce the severity, of any Ich epizootic event that could lead to an associated fish die-off in future years." Draft EIS at 1-8. SL&DMWA-9

C. The Final EIS Must Therefore Include Alternative Management Action Scenarios and Enhanced Justifications for Any Flow Regime to Address These Significant Uncertainties

In light of the Draft EIS's failure to address uncertainties regarding Ich outbreaks and the effect of flow actions on Ich outbreaks, significant revisions are required.

First, the Final EIS should include alternative management action scenarios to address the uncertain causative factors underlying the 2002 fish die-off. Non-flow measures, or modified flow measures, may be equally or more effective at addressing the uncertain causative factors underlying Ich epizootic events, and warrant inclusion in the Final EIS's alternatives. SL&DMWA-10

Second, the Final EIS must include scientific justifications for any flow-based alternatives that it ultimately includes and explain the expected relationships between the flow actions and the potential contributing factors to Ich outbreaks. For example, the Draft EIS asserts and assumes that increasing flows will reduce the severity of any fish die-off due to warm-water temperatures (*see* Draft EIS at ES-1, 2-1), but the Draft EIS does not provide scientific support for the conclusion that the proposed action will significantly reduce water temperatures or address the potential effect artificially increasing flows may have on the then existing naturally established thermal refugia. As another example, the Draft EIS asserts and assumes that increasing flows will reduce levels of Ich infection in the lower Klamath River (*see* Draft EIS at 2-3), but the Draft EIS does not provide scientific support for any relationship between increased flows and reduced infection. In addition, the Draft EIS notes that "in 2015 the USFWS identified 'the pattern of upstream migration to be a more important factor in determining disease risk than run size alone' to suggest that run size should be de-emphasized as an indicator for disease risk (USFWS 2015)." Draft EIS, at 1-7. However, the Draft EIS fails to explain how or to what extent the flow components of the action alternatives may affect "the pattern of upstream migration."

The Final EIS needs to more fully explain the expected effects of the proposed flow actions and also disclose the uncertainties underlying the proposed action.

II. The Alternatives Analysis Is Inadequate and Lacks Scientific Support

The alternatives analysis presented in the Draft EIS is legally inadequate. The alternatives analysis must "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." 42 U.S.C. §§ 4332(2)(E), 4332(2)(C)(iii). Agencies must "rigorously SL&DMWA-11

explore and objectively evaluate all reasonable alternatives" and explain why any alternatives were eliminated from detailed consideration. 40 C.F.R. § 1502.14. Reasonable alternatives are those that are "technically and economically practical or feasible and meet the purpose and need of the proposed action." 43 C.F.R. § 46.420. "The range of alternatives includes those reasonable alternatives that meet the purpose and need of the proposed action, and address one or more significant issues related to the proposed action." 43 C.F.R. § 46.415. The Draft EIS fails to identify and analyze a reasonable range of alternatives and fails to explain the bases for the alternatives that were selected for detailed review.

SL&DMWA-11 (contd.)

A. **The Analysis of Alternatives 1 and 2 Is Inadequate**

1. **The Draft EIS Fails to Identify or Explain the Bases for the Selected Flow Regime Components**

The Draft EIS fails to explain the scientific bases or rationales for the various triggers and flow components of the action alternatives – Alternatives 1 and 2. Both alternatives are essentially the same action in that they include the same three flow components and criteria: "(1) a preventive base flow release that intends to increase the base flow of the lower Klamath River to 2,800 cfs, from mid-August to late September, to improve environmental conditions; (2) a one-day 5,000 cfs preventive pulse flow to be used as a secondary measure, to alleviate continued poor environmental conditions and to respond to signs of Ich infection in the lower Klamath River; and (3) a five-day, 5,000 cfs emergency pulse flow, to be used on an emergency basis as a tertiary treatment, to avoid a significant die-off of adult salmon when the first two components of the Proposed Action are not successful at meeting their intended objectives." Draft EIS, at ES-3 – ES-4, at 2-2 – 2-3. The Draft EIS fails to identify or explain the scientific bases for the selected flow components and criteria.

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The Draft EIS also fails to acknowledge or address the fact that there are many years within the historical record in which average flows in the lower Klamath were below Reclamation's proposed threshold of 2,800 cfs, and yet no epizootic Ich event and related fish die-off occurred. For example, the Draft EIS indicates that under Reclamation's proposed flow threshold, flow augmentation actions would have occurred in the majority of years, during the 1922-2002 CalSim period of analysis. Draft EIS, at 4-28, Figure 4-17. However, only a single fish die-off event occurred in any of those years, in 2002. The Draft EIS fails to reconcile Reclamation's proposal to make flow augmentation actions under conditions that have been shown not to result in an epizootic Ich event and related fish die-off. For example, the Draft EIS indicates that under conditions such as those present in 1931, 1977 and 1994, Reclamation would have made flow augmentation releases in excess of 90,000 acre-feet. Draft EIS, at 4-28, Figure 4-17. Yet, we know that in those years, despite low-flow conditions, no fish die-off occurred. The Draft EIS needs to be revised to explain the justification for making flow augmentation actions under conditions that have historically been shown to not result in a fish die-off.

(a) **Preventative Base Flow**

SL&DMWA-13

Regarding the trigger for preventative base flows—of projected flows of less than 2,800 cfs in August and September—the Draft EIS fails to explain the scientific bases for the proposed 2,800 cfs threshold. The Draft EIS fails to explain why 2,800 cfs was selected and fails to

compare the 2,800 cfs threshold to the flows in 2002, when the one and only fish die-off event occurred.

The selected time period for preventative base flows, from August 22-September 21, lacks explanation and is not scientifically supported. The Draft EIS states: "In coordination with the LTP Technical Team, Reclamation will initiate preventive base-flow augmentation releases by August 22 to meet the target flow (2,800 cfs) in the lower Klamath River, if the fish harvest metric above is not met. This date was selected based on historical harvest information for the estuary and the middle Klamath River area (as summarized in USFWS and NMFS 2013)." Draft EIS, at 2-3, at ES-4.[1] First, while the Draft EIS states that August 22nd was selected based on historical harvest information, this approach lacks scientific support and may or may not be relevant to actual biological conditions. Use of historical information, rather than real-time conditions and observations, is not tailored to address the underlying problem that Reclamation is seeking to address, because it fails to account for when the fish are actually present in the system. For example, the Draft EIS describes conditions in 2014, in which "[i]t was reported that the adult return had begun much earlier than expected, and thousands of fish were stalled at the mouth of Blue Creek on the lower Klamath River mainstem." Draft EIS, at 1-6. Use of a fixed date (August 22nd) to initiate preventative base flows, lacks scientific foundation because it fails to account for the variability in the fish return. Second, the Draft EIS fails to explain the basis for the selected end-date of September 21st to end the preventative base flows. And like the start date of August 22nd, a fixed end-date of September 21st fails to account for real-time migration patterns and is not tailored to actual conditions in the lower Klamath River. To the extent a flow action may be effective, the start and end dates for a particular flow action should be based on actual observed conditions, such as the essential fish density monitoring information described in the Draft EIS. *See* Draft EIS, at 2-6.

SL&DMWA-13 (contd.)

In addition, the triggers identified in the Draft EIS for initiation of the preventative base flow component are ill-defined and lack support. Draft EIS, at ES-4. The Draft EIS provides that preventative base flows will be initiated "when one or more of the following conditions occur: [1] Flow in the lower Klamath River is projected to be less than 2,800 cfs at the Klamath, California gage in August and September; [2] Ich infection of adult salmon or steelhead is identified in July and early August, suggesting a low-level infection is present that could worsen with poor environmental conditions; [3] Thermal regime of the lower Klamath River is inhibitory to the upstream migration of infected adult salmon; [4] High densities of Chinook Salmon and steelhead are holding in the lower Klamath River." Draft EIS, at ES-4 (emphasis added). These triggers lack definition. For example, what qualifies as a "low-level" of Ich infection? What temperature or thermal regime would be considered "inhibitory" to upstream migration? What constitutes "high densities" of fish holding in the lower Klamath River? The Draft EIS should be revised to clarify the thresholds at which a preventative base flow would be initiated.

(b) Preventative Pulse Flow and Emergency Pulse Flow

SL&DMWA-14

Regarding the preventative pulse flow, the Draft EIS states:

[1] Please note that the Draft EIS refers to a "fish harvest metric," however, no fish harvest metric is identified in the Draft EIS. *See, e.g.*, Draft EIS, at 2-3.

> During the preventive base flow period, a preventive pulse flow targeting a rate of 5,000 cfs for one 24-hour period at the Klamath, California gage would occur when the peak fall-run migration (typically the first or second week of September) is identified in the lower Klamath River, as indicated by fish density. This flow level, based on 2015 experience, intends to use a small volume of water to provide a change to the environmental conditions of the lower Klamath River; further reducing the Ich infection risk that could result in a disease outbreak (Reclamation 2015c). Specifically, the anticipated benefit of the pulse flow is to enhance flushing and dilution of parasites in the river when the bulk of fall-run Chinook Salmon adults are likely to be in the lower river; while also improving water quality/quantity to facilitate movement of adult salmon, eliminating the potential for crowding.

Draft EIS, at 2-3. However, the Draft EIS fails to explain the basis or rationale for the selected target rate of 5,000 cfs. In addition, the Draft EIS fails to describe or explain the expected effect of the pulse flow on "flushing and dilution of parasites" or the expected relationship between the pulse flow and water quality/quantity and fish movement. In particular, the Draft EIS fails to explain whether a pulse flow of 5,000 cfs is expected to meaningfully or substantially increase "flushing and dilution of parasites" in the locations where fish tend to hold in the lower Klamath River. The Draft EIS fails to present any evidence or scientific analysis of how flows of 5,000 cfs will affect velocity or turn-over rates in key locations in the lower Klamath where fish tend to hold and crowded conditions may occur, such as large thermal refugia pools like at Blue Creek. The presumption that increased flows will meaningfully increase "flushing and dilution of parasites" in these locations is not supported in the Draft EIS. The Draft EIS also fails to explain what changes in "water quality/quantity" would reasonably be expected to meaningfully or substantially affect fish movement or migration patterns.

SL&DMWA-14 (contd.)

Similarly, the Draft EIS fails to explain the basis or expected benefits of the emergency pulse flow component. The action alternatives include an emergency pulse flow release "to target a flow of 5,000 cfs in the lower Klamath River for up to five days in August or September." Draft EIS, at 2-4. However, the Draft EIS fails to explain the bases for either the target of 5,000 cfs or the duration of five days. In the past, the emergency pulse flow was described as a doubling of the 2,500 cfs preventative flow target and this "doubling" to 5,000 cfs was criticized by a federal district court in *San Luis & Delta-Mendota Water Authority v. Jewell*, 969 F. Supp. 2d 1211, 1225 n. 7 (E.D. Cal. 2013), where the court noted that "there appears to be no scientific basis for [the flow doubling] part of the [emergency release] proposal." The Draft EIS maintains this 5,000 cfs target without any scientific basis. The Draft EIS fails to explain the anticipated effect of the emergency pulse flow on the hypothesized causative factors of Ich infection and transmission. The Draft EIS fails to provide the public and decision-makers with the necessary information to evaluate the flow action alternatives.

2. The "Adaptive Management" Component of the Alternatives Lacks the Necessary Elements to be a True Adaptive Management Approach

Adaptive management is not defined as a management action targeting a desired species that is accompanied by a monitoring scheme. A management-action alternative that will be implemented in an adaptive framework, an adaptive management action, is derived via a structured decision process informed by generally recognized best available science and implemented with rigorous assessment transparently carried out in an open forum attended by stakeholders. Essential elements of an adaptive management framework are designed and implemented in a series of obligatory steps that include, but are not limited, to the following:

- Developing conceptual models that link salmon, essential environmental attributes, including pathogens, to ecological processes and potential management actions;
- Collecting relevant data and other information pertaining to physical and biotic components of the Klamath River system, salmon performance, and pathogen presence and outbreaks;
- Identifying an inclusive set of candidate management actions and formulating management hypotheses that can be tested using those data and observations;
- Constructing numerical (mathematical) models for purposes of testing the management hypotheses and identifying management-action scenarios that are likely to be effective from among candidate action scenarios; and
- Carrying out risk analysis that allows selection of an effective, efficient, and accountable management action from among best candidate actions by considering potential effects on legitimate stakeholder interests and concerns.

SL&DMWA-15

The full articulation of the structured-process steps above must accompany a management action alternative in order for that action to be characterized as adaptive management and implemented in an adaptive framework. A preferred alternative must extend from the steps above (a formal effects analysis) to include the following steps that immediately precede and accompany implementation of the management action:

- Identifying decision criteria including species and system response thresholds that trigger a management action;
- Designing a rigorous monitoring scheme in an experimental frame that is sufficiently rigorous to pick up signals of performance of the management action against the background of inter-year variation in system attributes; and
- Providing an institutional capacity to interpret monitoring results and, in response to emerging information, continue or adapt the implemented management action(s).

The management framework outlined in the Draft EIS fails to recognize these essential process steps or meet the standards put forth by the Department of the Interior for adaptive management, and should be revised.[2] The Draft EIS presents the proposed action and Alternative 2 as including an "adaptive management" approach but the decision-making process described in the Draft EIS lacks the necessary elements and processes to be a true adaptive management approach. *See* Draft EIS, at ES-6, ES-8, 2-6 – 2-11. For example, the Draft EIS states:

> As part of the Proposed Action, additional monitoring and research actions would be conducted—furthering scientific understanding of causative factors of Ich infection and outbreak in the lower Klamath River. Based on the concept of adaptive management, and utilizing additional scientific information on causative factors, Reclamation may refine trigger criteria for the three flow components (i.e., preventive base flow augmentation, preventive pulse flows, and emergency pulse flow augmentation) to further reduce the likelihood—and potentially the severity—of any Ich epizootic event. The process for potential refinement of flow component trigger criteria will be based on adaptive management principles[.]

SL&DMWA-15 (contd.)

Draft EIS, at ES-6. It is misleading to describe the alternatives as including adaptive management, for the reasons explained below.

The Draft EIS indicates that there is a programmatic misunderstanding of the role of adaptive management in conservation actions targeting specific resources. Adaptive management cannot organically emerge from the selection of a management action and a commitment to monitor the system after action is implemented. Adaptive management is not a characteristic or attribute of the action (alternative), it is the action itself. Accordingly it must be fully articulated in the EIS, including: reference to the conceptual ecological model upon which the action alternative was based; identification of data on salmon and environmental variables that inform the alternative; description of the numerical modeling effort that informed the

[2] See Williams, B. K., Szaro, R. C., & Shapiro, C. D. (2009). *Adaptive management: the U.S. Department of the Interior technical guide. (pp. 72). Washington, D.C.: U.S.* Adaptive Management Working Group: Department of the Interior. Williams, B. K. (2011). Adaptive management of natural resources-framework and issues. *Journal of Environmental Management, 92*(5), 1346-1353. Williams, B. K., Shapiro, C. D., & Brown, E. D. (2012). *Adaptive management: the U.S. Department of the Interior applications guide* (p. 120). Washington, D. C.: Adaptive Management Working Group, U.S. Department of the Interior. See also Murphy DD and Weiland PS (2011). The route to best science in implementation of the Endangered Species Act's consultation requirement: the benefit of structured effects analysis. *Environmental Management* 47:161-172, Murphy DD and Weiland PS (2014). Science and structured decision-making: fulfilling the promise of adaptive management. *Journal of Environmental Studies and Science* 4:200-207, Rose et al. (2015) Proposed best modeling practices for assessing the effects of ecosystem restoration on fish. *Ecological Modelling* 300:12-29, and Reynolds et al. (2016) A road map for designing and implementing a biological monitoring program. *Environmental Monitoring and Assessment* 188.7:1-25.)

selection of the action and its accompanying decision criteria; a sufficient description of the monitoring scheme that can establish it as adequate to assess the performance of the action and provide a basis for adapting or adjusting the action to make it more effective or efficient in meeting conservation objectives. Some of the above is included in the Draft EIS; most is not.

For an action alternative to be recognized as using an adaptive management approach, hypotheses must be developed, data collected and evaluated, trigger criteria identified, and other essential steps articulated to support and inform the implemented action plan as described above. Those elements are not accoutrements to the action, added on in the process of implementing the action in efforts to adapt the action to make it more effective and efficient. They are deliverables (steps) developed during the "effects analysis" that informs the identification of the action alternatives and provide the basis for the selection of a preferred alternative (see Murphy and Weiland 2011).[3] Hypotheses, data, numerical models, and decision criteria, as well as conceptual model development precedes and informs the identification of action alternatives, as does addressing explicit "scientific" questions of the sort identified in the Draft EIS. *See* Draft EIS, at 2-9, Table 2-3. Essentially, the Draft EIS has put the cart before the horse.

Equally important is to understand that the adaptive component of an implemented management scenario cannot be limited to refinement of the "trigger criteria of the three flow components," which is how the Draft EIS proposes to implement "adaptive management." Draft EIS, at 2-6. Adaptive management involves all aspects of the implemented action – refinement of trigger criteria, the timing of any augmentation action, the volumes of releases involved, phasing of release volumes, and auxiliary (conservation) actions undertaken at the same and different times. An adaptively managed flows augmentation program subjects all dimensions of the action to calculated adjustments in an effort to learn, validate, refute, and refine management actions; not just a level of augmentation necessary to avoid an outbreak of Ich, but the level of augmentation that, when combined with other conservation actions, demands the minimum releases to be effective (leaving reservoir waters available for other ecological and consumptive uses). SL&DMWA-15

If Reclamation wishes to use an adaptive management approach to develop effective and appropriate management actions, it needs to revisit its fundamental approach to long-term management for the lower Klamath River. In the ongoing planning effort to identify potentially effective and accountable management actions to reduce the likelihood of future outbreaks of disease in fall-run Chinook in the lower Klamath River, a structured-decision-making approach has not been implemented. A connection between models that allow scenario testing and selection of a defensible management action has still not yet been made. Well-designed adaptive resource management, informed by best available science (engaged through a structured effects analysis), is the appropriate framework for developing a range of alternatives that are scientifically robust and designed to provide additional information that can inform an effective and responsible management approach.

[3] Murphy DD and Weiland PS (2011). The route to best science in implementation of the Endangered Species Act's consultation requirement: the benefit of structured effects analysis. *Environmental Management* 47:161-172.

B. The Range of Alternatives Examined in the EIS is Legally Inadequate

The Draft EIS only examines a No Action Alternative and two action alternatives – Alternative 1 and 2. Draft EIS, at ES-3 – ES-8, at 2-2 – 2-11. However, in effect, the Draft EIS only presents and analyzes a single action alternative, because Alternatives 1 and 2 are identical in terms of the flow regime components and implementation. It is evident from the Draft EIS that Reclamation failed to identify or consider reasonable alternatives to the proposed flow action. *See* Draft EIS, at 2-11 – 2-14 (describing alternatives eliminated from detailed evaluation). The Draft EIS does not present or examine a reasonable range of alternatives for the public or for decision-makers. The Draft EIS needs to be revised to include additional alternatives that are legally feasible and that avoid water supply impacts to CVP water users. SL&DMWA-16

1. The Description of the Selection Process for Alternatives Is Misleading

As explained above, the uncertainties underlying Ich infection and the causal mechanisms of Ich transmission in the lower Klamath River preclude Reclamation from presenting a particular action alternative as likely to reduce the occurrence of an epizootic Ich event. Yet, the Draft EIS asserts that "[i]n determining which alternatives would be carried forward, Reclamation considered how effectively the alternatives would meet the Purpose and Need, including Reclamation's ability to implement the alternatives as necessary (potentially as early as August 2017). Specifically, Reclamation considered the alternatives' ability to address one or more of the significant contributing factors to Ich epizootic events. To be viable, alternatives need to have the capability of meaningfully and substantially reducing the likelihood—and potentially reducing the severity—of any Ich epizootic event that could lead to an associated fish die-off." Draft EIS, at ES-3; *see id.* at 2-1 (identifying screening criteria for potential alternatives). This description of the selection process for alternatives is misleading because Reclamation lacks sufficient scientific understanding to determine if a particular action will "meaningfully and substantially" reduce the likelihood of any Ich epizootic event. SL&DMWA-17

In addition, for the two alternatives that were examined in detail in the Draft EIS, Reclamation failed to describe or explain how, or to what extent, the alternative action would "address one or more of the significant contributing factors to Ich epizootic events." Nor does the Draft EIS evaluate whether these alternatives meet the screening criteria for alternatives identified in the Draft EIS. Draft EIS, at 2-1. The Final EIS should describe the relationship between the screening criteria and the selected alternatives, and also disclose the uncertainty associated with selecting alternatives that can meet the purpose and need.

2. Alternatives 1 and 2 Are Essentially the Same Alternative and Do Not Provide a Range of Alternatives for Decision-Makers

The Draft EIS makes it clear that Alternatives 1 and 2 share the exact same flow components. *See* Draft EIS, at ES-7 (supplemental flows under Alternative 2 "would involve the same three components described for the Proposed Action (Alternative 1), including preventive base flow augmentation, preventive pulse flow, and emergency pulse flow augmentation"); *see also* at ES-8 ("annual implementation schedule for Alternative 2 would be the same as described SL&DMWA-18

for the Proposed Action (Alternative 1). Monitoring and research actions would be the same as those described for the Proposed Action (Alternative 1)"); at 2-10 – 2-11.

The sole difference between the two action alternatives is how the water from the Trinity River Division used for the flow action would be accounted for. *See* Draft EIS, at 2-2, 2-10. Under Alternative 1, water would be accounted for as water released under the 1955 Trinity River Division Act. Draft EIS, at 2-2. Under Alternative 2, water would be accounted for as water released under the Trinity River Record of Decision ("ROD"). Draft EIS, at ES-7, 2-10. Thus, both in terms of the water source and the components of the flow action, Alternatives 1 and 2 are identical and represent a single action alternative.

SL&DMWA-18 (contd.)

A single action alternative, such as that presented in the Draft EIS, is inadequate and does not satisfy NEPA's requirement that an EIS analyze a reasonable range of alternatives. 42 U.S.C. §§ 4332(2)(E), 4332(2)(C)(iii); 43 C.F.R. § 46.415. The Ninth Circuit Court of Appeals has found that an EIS that "considered only a no action alternative along with two virtually identical alternatives presents only two action alternatives" failed to comply with NEPA because the range of alternatives analyzed was inadequate. *Muckleshoot Indian Tribe v. U.S. Forest Service* (9th Cir. 1999) 177 F.3d 800, 813; *see Western Watersheds Project v. Abbey* (9th Cir. 2013) 719 F.3d 1035, 1051 (finding alternatives analysis in EIS inadequate where all four alternatives would authorize the same underlying action). Such a narrow alternatives analysis does not allow Reclamation to make an informed decision. And presenting what amounts to a single action alternative is particularly inadequate given the current state of the science and in the face of the uncertainty and complexity underlying an epizootic Ich event in the lower Klamath River.

3. There Are Other Reasonable Alternatives that Should Have Been Examined and Analyzed

There are several reasonable alternatives that should have been examined and analyzed in the Draft EIS. At a minimum, there should be an alternative that helps test the hypotheses regarding the potential causative factors of the 2002 fish die-off event, through either a true adaptive management approach or at least through an alternative that has variation in flow regimes to test biological and physical responses to flow actions. Potential alternatives are described below.

SL&DMWA-19

(a) The EIS Should Analyze and Present a True Adaptive Management Alternative that Utilizes Structured Decision-Making

A structured approach to developing management-relevant hypotheses, conceptual models, numerical operations models, and decision criteria in order to identify the causative factors that operate under specific environmental conditions in the lower Klamath River and lead to Ich infection and disease outbreak should be analyzed as an action alternative in the EIS. An example of an adaptive-management alternative using seasonal pulse flow operations from for consideration in the EIS analysis is summarized below.

SL&DMWA-20

Conceptual Model Predictions

The conceptual model for the risk of disease and die-offs of adult salmon during the late summer in the lower Klamath River is based on conditions that occurred during the die-off in 2002 and observations of returning adult salmon and environmental conditions through 2015. The conceptual model predicts:

- The risk of disease transmission among salmon increases when fish density in the lower river increases and fish are in close proximity to one another. Salmon density in the lower river is a function of a number of factors including adult escapement, seasonal timing of immigration, rate of upstream migration, and occurrence of impediments to upstream migration, such as exposure to elevated water temperatures.
- The risk of disease increases when thermal conditions in the lower river (average daily temperature greater than 23 degrees C) create a barrier to upstream migration and dispersal, which contributes to increased residence time and increased densities in the lower river.
- The risk of disease increases when August and September in-stream flows are reduced (less than 2,200 cfs based on 2002 conditions), resulting in reduced water velocities, increased contact time between pathogens and salmon, and reduced flushing of pathogens downstream and out of the lower river.
- The risk of disease increases when those three risk factors co-occur and pathogens are present in high densities. The lack of co-occurrence accounts for the formative observation that there was no disease outbreak in salmon in the lower Klamath River in many past years despite the occurrence of low flows or high escapement.
- Attraction and upstream migration behavior of adult salmon is stimulated by pulse flow conditions to a greater extent than steady base-flows. Pulse flows provide a migration cue, increase water depths and velocities, and may contribute to reduced water temperatures. More rapid upstream migration through the lower river serves to reduce exposure duration, reduce salmon density in the lower river, and contributes to greater geographic dispersion of adult salmon within the river, all of which contribute to a reduced risk of disease transmission and the potential for a fish die-off event.

SL&DMWA-20 (contd.)

Triggers for Implementing Management Actions

The triggers required to implement the proposed alternative management action in any given year include:

<u>1) Combined Flow-Temperature-Density Trigger:</u>

- Average daily river flow at the KNK gage between August 15 and September 15 less than 2500 cfs (this threshold was based on a base flow of 2,200 cfs from 2002 and 10%

buffer flow rounded up). For purposes of the NEPA analysis, river flows would be estimated using the hydrologic simulation model; **AND**

- Average daily water temperature at the KNK gage between August 15 and September 15 greater than 23 degrees C. For purposes of the NEPA analysis, water temperatures would be estimated based on the hydrologic- and water-temperature-simulation models; **AND**
- Predicted adult fall-run Chinook salmon escapement by PFMC to the Klamath and Trinity rivers greater than 150,000 fish (for purposes of the NEPA analysis escapement is used as a surrogate for salmon density and would be based on PFMC escapement estimates over the past 20 years). In the event that the alternative operation is implemented, real-time hydro-acoustic monitoring (or alternative monitoring methods such as Alaskan Picket Weirs) of fish densities and passage would be made at two locations near the mouth of the Klamath River estuary and near the confluence of the Trinity and Klamath Rivers for use in determining abundance and seasonal passage of adult salmon through the lower river.
- For purposes of the NEPA analysis pulse flow operations with releases from Trinity and Lewiston reservoirs would occur in those years when escapement, flow, and temperature triggers are all exceeded.

SL&DMWA-20 (contd.)

2) Infection/Mortality Triggers:

- Ich monitoring on gill arches of a subsample of adult salmon harvested from the river and used to manage pulse flows adaptively, including either an increase in the frequency, magnitude, or duration of pulse-flow releases from the proposed supplemental flow account. For purposes of the NEPA analysis, it is assumed that these conditions would occur in about 1 out of 20 years based on the single die-off event in 2002.
- Observed mortality of more than 50 dead adult salmon in a 24 hour period in a 20 km river reach with confirmed presence of pathogens. For purposes of the NEPA analysis it is assumed that this would occur in 1 out of 20 years, and would require in an increase in the frequency, magnitude, or duration of pulse flow events from the supplemental flow account.

Proposed Operations

Elements of the proposed alternative operations agenda include several considerations:

- The alternative would be implemented and monitored for a 10-year period followed by an independent scientific (peer) review. The scientific review may identify modifications to the (proposed) operations or performance monitoring and adaptive management program, continuation of the (proposed) operations, or implementation of an alternative management strategy.

- Water for this alternative would be provided in a manner that does not result in water supply impacts to CVP water users, such as through the acquisition of water from willing sellers;
- On January 1 of each year 40 TAF would be allocated to a supplemental flow account held in storage on the Trinity River. The storage would be managed by (released under the direction of) an Adaptive Management Committee. Water not used from the supplemental flow account in any given year would be carried over to the subsequent year and added to that year's allocation up to a maximum storage of 80 TAF. The supplemental flow account would be re-set to 40 TAF in any year that the Trinity or Lewiston reservoirs spill.
- The Adaptive Management Committee (AMC) would be responsible for meeting on an as needed basis to develop recommendations for pulse-flow supplementation using water resources available within the account. Reclamation would serve as chair of the AMC. Reclamation would have the final responsibility for determining flow allocations.
- Flow releases would begin August 22 or later, and would terminate September 19 each year unless an alternative period is selected, based on the AMC recommendation and real-time monitoring of salmon abundance and migration in (dispersal through) the lower river.
- One pulse flow release would be made each week. It would be comprised of a 1-day ramp up, 1-day sustained peak release, and 1-day ramp down to the un-augmented base-flow in the river. An example of an annual flow schedule for purposes of the NEPA analysis is outlined below, assuming a base-flow in the river of 2,200 cfs and peak run timing occurs during the first two weeks of September.

SL&DMWA-20 (contd.)

Date – Pulse flow peak	Peak Pulse Flow	Baseflow	Increase Above Peak
August 22	3500	2200	1300
August 29	3500	2200	1300
September 5	5000	2200	2800
September 12	5000	2200	2800
September 19	3500	2200	1300

- In the event that the Ich pathogen is detected or salmon mortality is observed, the AMC would allocate additional water from the supplemental flow account to increase the frequency, magnitude, or duration of the pulse flow releases

Performance Monitoring

The proposed adaptive management alternative would be implemented as a 10-year collaborative research program. Monitoring would include, but not be limited to:

- Real-time continuous monitoring of adult abundance during August-September and seasonal migration (timing) at two locations near the mouth of the Klamath Estuary and

near the confluence of the Trinity and Klamath rivers. Monitoring would provide information on adult abundance, migration timing, and response to pulse flows.

- Experimental acoustic tag monitoring of adult salmon captured and tagged near the mouth of the Klamath River and subsequent monitoring of upstream migration. Acoustic tag detectors would be placed in the lower Klamath River at (approximately) 10-mile intervals between the river mouth and the confluence with the Trinity River. Monitoring would be continuous between August 1 and September 30. Approximately 25 adult salmon would be captured by hook-and-line or other method, tagged, and released each week between August 1 and September 30. Information would include migration timing for entry into the river, migration rate, reach-specific mortality, reach-specific residence time, response to flow cues, and water temperatures. Mobile acoustic surveys would be performed weekly to determine occurrence of tagged salmon utilizing thermal refugia in the lower river.
- Mobile hydro-acoustic surveys of areas within the main-stem river and thermal refuge areas weekly (8 surveys) to assess fish densities and holding.
- Water temperature monitoring and mapping at selected locations in the lower river before, during, and after one pulse flow release at 3,500 cfs and at 5,000 cfs each year in the example operations schedule outlined above. Additional continuous water temperature monitoring near the surface and bottom would be conducted throughout the August 1 through September 30 period at each of the locations where acoustic tag detectors are deployed.
- Water velocity monitoring and mapping at selected locations in the lower river before (base flow), during, and after one pulse flow release at 3,500 cfs and at 5,000 cfs each year in the example operations schedule outlined above.
- Occurrence and density of Ich on gill arches of salmon sub-sampled from the lower river as carried out in the past.
- Occurrence of mortalities in the lower river and confirmation of pathogens as done in the past.
- Preparation of a technical documentation report on results of the performance evaluation for distribution and review by interested parties no later than April 1 each year.

SL&DMWA-20 (contd.)

Institutional Governance of Adaptive Management

The *Adaptive Management Team* (described above) deliberates and advises operations, including provision of pulse flows and other conservation responses to the threat of Ich outbreak and salmon die-off events. The Adaptive Management Committee (AMC) would be comprised of one representative each from the Bureau of Reclamation, USFWS, NMFS, CDFW, Public Water Agencies, and Tribes in a hierarchical governance structure, which includes:

A Management Team, including an Adaptive Management Program Manager (PM) and Reclamation, USFWS, and CDFW representatives. It makes decisions regarding allocation of budget, staff, and material, makes recommendations on action and research prioritization and

flow modifications, prepares draft work plans, and recommends changes to program components and governance.

An *Executive Oversight Team*, including Reclamation, USFWS, and CDFW representatives. It makes final decisions regarding flow actions, makes decisions about targets and objectives, makes decisions about program structure and changes, ensures interagency systems perspective and resolves agency and cross-agency disputes, and approves/decides on budget and staffing issues.

SL&DMWA-20 (contd.)

A *Technical Review Team*, including independent experts, agency staff, and contractors, which supports the Adaptive Management Team in non-decisional, technical roles. Contributes directly and through review to the monitoring and assessment of projects, analysis and evaluation of data and hypotheses, development and application of models, interprets results and presentation of findings in reports and at annual/biannual technical meetings, and advises on courses of action and a research agenda.

(b) At a Minimum the EIS Should Analyze Variations in the Flow Components Through a Range of Alternatives

At a minimum, the EIS should be revised to analyze a range of alternatives that provide variation in the flow components. Variation in flow criteria and action alternatives is necessary and appropriate given the significant uncertainty regarding the causal mechanisms underlying fish disease in the lower Klamath River.

As Reclamation has previously considered, the EIS should analyze a pulse-flow only alternative. *See* Draft EIS, at 1-4 fn. 5 (describing an alternative developed by Reclamation staff, designed to use less water, that "would use intermittent pulse flows released from Trinity Reservoir to flush the free-swimming Ich life stage and induce fish migration"). This type of alternative would not include the preventative base flow component and would not have a fixed-date start time. Instead, it would use pulse flows during the observed migration period. An alternative to providing sustained preventative flows over an extended period of time during the adult fall-run Chinook salmon migration period is the use of pulse flow operations. It has been hypothesized that one of the factors contributing to a high risk of disease outbreak is a delay in upstream migration by adults in response to reduced flow and exposure to elevated water temperatures. In other rivers, such as the Mokelumne River (Del Real and Saldate 2015)[4] and others, pulse flow operations have been used as attraction flows and migration cues to stimulate upstream adult Chinook salmon migration. The Draft EIS should be revised to include a pulse-flow only alternative. This alternative could use 1-day pulse flows weekly as an alternative to prolonged increases in sustained preventative flows. Or, this a pulse flow only alternative could include an action alternative that only includes the preventative pulse and emergency pulse flow

SL&DMWA-21

[4] Del Real, C. and M. Saldate. 2015. Lower Mokelumne River upstream fish migration monitoring conducted at Woodbridge Irrigation District Dam August 2014 through July 2015. East Bay Municipal Utility District. 1 Winemasters Way, Lodi, CA 95240.

components of Alternatives 1 and 2. Such an alternative could help mitigate some of the water supply impacts of Alternative 1 and would also be more closely tailored to actual conditions for triggers for flow augmentation, because it would not include the fixed-date start or the preventative base flow components.

SL&DMWA-21 (contd.)

(c) The EIS Should Analyze an Alternative Involving the Purchase or Exchange of Water

At a minimum, the EIS should analyze an action alternative that involves the purchase or exchange of water to support the flow action, such as Reclamation has done in the past. As the Draft EIS acknowledges, in the first two years of making these types of flow augmentation actions, Reclamation obtained the water to support the flow actions through a water exchange: "Reclamation made preventative releases from Trinity Reservoir, part of the Reclamation's Central Valley Project (CVP), in the late summer of both [2003 and 2004], totaling 38,000 and 36,313 acre-feet, respectively, to improve fish habitat conditions in the lower Klamath River. The majority of that combined volume was acquired through an exchange with the Metropolitan Water District of Southern California." Draft EIS, at 1-1. The Draft EIS only briefly identifies and then dismisses the possibility of acquiring water for the flow augmentation actions, stating: "As acquisition of water supplies from willing sellers and providing replacement water supplies from other sources to water users would not reliably provide needed water supplies, these measures would not be able to reliably reduce crowded holding conditions for pre-spawn adults nor reduce warm water temperatures in the lower Klamath River." Draft EIS, at 2-13. However, the Draft EIS fails to explain why Reclamation could not acquire water supplies in one year, say a "wet" year, and then hold those supplies for use in a "dry" year for flow augmentation actions. In other words, a water source does not have to be available for acquisition every year to be "reliable" because water could be stored for later use. Reclamation failed to reasonably explore or consider an alternative that involves acquisition of water for the flow augmentation actions.

SL&DMWA-22

III. The Modeling and Analysis of Surface Water Resources and Supply is Inadequate and Flawed

The Draft EIS analysis is deficient in adequately disclosing the potential effects to water resources and the associated uses and physical phenomena dependent on those resources. The deficiencies range from the configuration and use of CalSim for the analysis of impacted Project operations, to an inadequate interpretation and reporting of analytical results.

SL&DMWA-23

A. The Modeling and its Assumptions Result in Limited and Flawed Results

Given even the narrow range of evaluated alternatives, the assumptions for the action's requirement for additional or modified flows in the Trinity River are not robust enough to adequately ascertain or disclose the potential risk or impact of the action to water resources. The Draft EIS describes (Environmental Impact Statement Analytical Tools Technical Appendix, Chapter 2) the development of flow augmentation quantities assumed in the modeling analysis. Each year of the 1922-2003 analysis may or may not have an assigned prescription for preventive base flow augmentation, preventive pulse flow augmentation and an emergency pulse flow augmentation (Table 2-8, Chapter 2). The prescriptions are derived by an interpretation of the limited historical record of actual augmentation efforts, projected hydrology and the

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extrapolation of crude statistical findings within those records. An example of the use of this information is the development of a flawed and potential understatement of the action concerning the assumption for the frequency of need for the emergency pulse flow augmentation. The impact analysis currently relies upon modeled operations that assume the use of emergency pulse flow augmentation during only 4 years of the 82-year analysis, which is derived from an assumed frequency of need (20 percent of the time) during the years (21 years) in which it is assumed that a preventive pulse flow augmentation is necessary, which is assumed as 40 percent of the time (applied to the 82-years of analysis) that the preventive base flow augmentation is necessary (53 years).

This modeling assumption which plays on judgment of the limited historical record to portray the action's call for water, particularly during drought, is woefully inadequate. Inspection of Table 2-8 shows that several years of the 1987-1992 drought barely escape the assignment of emergency pulse flow augmentation based on the Draft EIS analysis metric. Additional or alternative years of emergency pulse flow augmentation would change the impact analysis by significant amounts of water. The same flaw in frequency assumption applies to the assignment of years for preventive pulse flow augmentation. A more robust potential schedule for flow augmentation is necessary to adequately portray the potential for supplemental water down the Trinity River.

SL&DMWA-24 (contd.)

The Draft EIS also fails to acknowledge that the assumption and management of specific prescribed flows by year as analyzed by CalSim may not reflect actual operations of the CVP as it performs to the action. When recognizing the uncertain relationship between hydrology and the need for augmentation flows there is no certainty that CVP operators can allocate water resources from Trinity River prior to summer's end without reservation of an amount of water "just in case" the need arises, regardless of the modeling assumption. CalSim would not recognize this reservation of water in the Trinity system, and thus will not model the operation correctly.

The Draft EIS is not fully disclosing the potential impacts of the proposed action because of the sole reliance on CalSim to identify operational hydrologic differences. CalSim, as recognized as a generalized modeling tool that should be primarily interpreted in a comparative study mode, will be hard pressed to adequately disclose distinct, meaningful differences, particularly to CVP exports and deliveries, due to an action in the Trinity River ranging from zero to 144 TAF in a year (an average of 24 TAF). The results presented in the Draft EIS at least indicate the very fundamental intuitive conclusion that additional water down the Trinity River will lead to a reduction of water brought to the Sacramento Valley. However, the monthly timing and year to year distribution of affects is not well derived from CalSim. The shortcomings of CalSim in evaluating such discrete amounts of augmentation flows should be remedied by supplemental conceptual analysis of the range of "real" outcomes that may occur through operations of the CVP.

The Draft EIS's lack of post processing of the CalSim II results in counter-intuitive analytical conclusions. CalSim is known to be capable of generating counterintuitive results. For example, it appears that such is the case when reviewing South of Delta ("SOD") results. The additional Trinity River releases leads to less water brought to the Sacramento Valley, leading to less water entering the Delta, leading to less water being pumped at Jones, leading to less water

delivered to CVP SOD users. All very intuitive. However, the CalSim results indicate an increase in CVP San Luis Storage. The likely culprit of this circumstance is a less than fine-tuned CVP allocation scheme in the model that provides deliveries to the SOD service areas. Any conclusions that the proposed action alternatives would result in storage increases in critically dry years are inconsistent with recent real-world operations, erroneous, and in need post-processing analysis.

Another example of unrealistic modeling results is the conclusion that in critical years for CVP Agricultural Water Service Contractors south-of-the-Delta, allocations would be reduced by 10 percent. As the recent real-world drought operations demonstrate, allocations to these CVP contractors are at 0%; therefore, any reduction is impossible. That being the case, the water supply reduction would then impact the Exchange Contractors, Friant Division, managed wetlands, municipal & industrial supplies, Delta outflow, and/or reservoir releases, including the State Water Project. None of these likely impacts have been analyzed. SL&DMWA-24 (contd.)

Without some form of post-processing or fine tuning of CalSim the difference in water deliveries of the CVP due to the action is not best identified, affecting the economic analysis and other dependent analyses.

B. **The Presentation of Impacts Masks the Scope and Extent of Potential Impacts**

The presentation of impacts as the average of each year type masks the true impacts of the action and fails to disclose the extent of potential water supply impacts. Presentation of impacts as individual, year-type impacts fails to account for impacts of consecutive dry years and fails to analyze the operational and water supply impacts of cumulative loss of storage over several years, such as might occur during actual drought sequences like the 1930s, 1990s or 2013-2016.

The EIS needs to analyze and present impacts in a manner that shows the worst-case scenario impacts and cumulative impacts, so that impacts are not masked or underestimated. The recent experience of Reclamation making flow augmentation releases in four consecutive years during a drought when the Trinity Reservoir did not re-fill, demonstrates that the cumulative impacts of such releases will not be captured through single-year analyses. Also, presenting impacts as averages fails to show the maximum impact in a given year or water-year type and therefore will underestimate potential impacts. These inadequacies in the analysis of water supply and storage are carried throughout the Draft EIS because the CalSim modeling is used as an input for analyzing the impacts in numerous resource categories, and therefore skews much of the Draft EIS's analyses. SL&DMWA-25

The problem with the use of averages by water year type is exemplified by looking at Figure 4-17, at page 4-28 of the Draft EIS, which shows estimated flow augmentation volumes of the proposed action for the CalSim period of analysis (from 1922-2003). This chart exemplifies two problems with the use of averages. First, average mask the magnitude of water used for a flow augmentation action in a single year, such as the estimated volume of over 140,000 acre-feet of water under conditions in the year 1931. Draft EIS, at 4-28. The presentation of impacts as averages by water year type masks these type of extreme years.

Second, the chart shows that there would have been several consecutive years with significant flow augmentation volumes, such as the 1930-1932 period and the 1987-1992 period. However, the Draft EIS looks at impacts in terms of in a single year, rather than in terms of cumulative impacts from several consecutive years of flow augmentation actions. The Draft EIS fails to disclose the impacts that may occur during a series of dry years, where water storage is continuously depleted due to multiple years of flow augmentation actions. The Draft EIS needs to be revised to analyze and disclose these impacts.

SL&DMWA-25 (contd.)

The presentation of only "average" results is illustrated by a potential error in the Draft EIS CalSim modeling. Upon review of the CalSim output that is portrayed as the basis of the impact analysis for this Draft EIS we have found that two years of augmentation are modeled incorrectly. Using C100MIF as the parameter of required minimum releases from Lewiston to the Trinity River inclusive of augmentation flows, it appears that during 1931 and 1934 the assumed augmentation flows were not implemented in the model. For 1931, which happens to be the year of assumed maximum flow augmentation (144 TAF, Table 2-8, and elsewhere), it appears that only 56 TAF was modeled for Alternative 1. For 1934, the stated assumption of 50 TAF augmentation flow does not appear to have been implemented in the model. The absence of identifying the single-year impact of the maximum 144 TAF additionally required release is troubling enough, but the muting of the single worst year of assumed augmentation through averaging is misleading.

C. The Draft EIS Fails to Identify Any Potential Mitigation for Water Supply Impacts

The Draft EIS fails to identify any potential measures to mitigate for the modeled significant water supply impacts from implementing Alternative 1. NEPA requires that an EIS include a discussion of the "means to mitigate adverse environmental impacts." 40 C.F.R. § 1502.16(h). Draft EIS, at 4-126. Under the Draft EIS, an impact that results in a change that is greater than 5 percent is treated as significant impact. The Draft EIS states that the "CalSim II model output includes minor fluctuations of up to 5 percent due to model assumptions and approaches. Therefore, if the quantitative changes between a specific alternative and the No Action Alternative are 5 percent or less, the conditions under the specific alternative would be considered to be similar' to conditions under the No Action Alternative." Draft EIS, at 4-26. At a minimum, the Draft EIS should have identified potential mitigation measures for the water supply impacts that exceed this 5 percent threshold.

SL&DMWA-26

The Draft EIS identifies several water supply impacts associated with Alternative 1 that exceed the 5 percent threshold for treating an impact as significant. For example, the Draft EIS states that "[e]xports at Jones Pumping Plant under Alternative 1 are similar to the No Action with decreases of 0-3 percent, except in July and August of critical years where it is reduced by 7 percent." Draft EIS, at 4-66. In addition, the Draft EIS states "CVP NOD delivery under Alternative 1 is similar to the No Action Alternative with less than a 5 percent change in all year types for all customers, except critical years for CVP Agricultural Water Service Contractors where it is reduced by 10 percent (23 TAF to 21 TAF)." Draft EIS, at 4-70. The Draft EIS also states that "CVP SOD water deliveries under Alternative 1 are similar to the No Action Alternative with less than a 3 percent change or less in all year types for all customers, except

critical years for CVP Agricultural Water Service Contractors where it is reduced by 7 percent (137 TAF to 127 TAF)." Draft EIS, at 4-71.

The significant impacts to water supply during critical water year types identified in the Draft EIS warrant mitigation measures. Such measures must entail feasible, specific actions that could avoid impacts by eliminating certain actions; minimizing impacts by limiting their degree; rectifying impacts by repairing, rehabilitating or restoring the affected environment; reducing impacts through preservation or maintenance; and/or compensating for a project's impacts by replacing or providing substitute resources. 40 C.F.R. § 1508.20. The Draft EIS fails to identify any potential mitigation measures for these significant water supply impacts. The Draft EIS states that "[t]here are no mitigation measures proposed for direct environmental impacts from changes to CVP and SWP operational related changes in reservoir storage, elevation, downstream flows or deliveries. Impacts of these changes on other resource areas and potential mitigation measures, if required, are included in the chapters dealing with the specific resource area." Draft EIS, at 4-126. The Draft EIS fails to explain or justify why no mitigation measures are discussed for the direct impacts to CVP water exports and water deliveries. Moreover, the Draft EIS also fails to identify mitigation measures for the water-dependent resource areas, so both the direct and secondary impacts of reduced water supplies have no accompanying mitigation measures. The Final EIS must identify potential mitigation measures for the water supply impacts of the proposed action. 40 C.F.R. § 1502.16(h). SL&DMWA-26 (contd.)

IV. The Modeling and Analysis of Impacts to Fisheries is Inadequate and Flawed

A. The Draft EIS Fails to Utilize the Best Available Information to Assess Potential Impacts to Fisheries

In several aspects the Draft EIS fails to utilize and present the best available information to assess potential impacts to fisheries. For example, the Draft EIS cites a number of Central Valley river systems where Instream Flow Incremental Method (IFIM) studies have been conducted and provide information on the weighted usable area (WUA)-flow relationships. Draft EIS, at 7-45. However, the Draft EIS fails to present the results of the IFIM study conducted on the Trinity River as part of the impact analysis. As another example, the Draft EIS fails to utilize the Bureau of Reclamation or recent National Marine Fisheries Service egg mortality model as part of the analytical framework for assessing potential impacts of the proposed project, despite the sensitivity of recent events affecting winter-run Chinook salmon, as well as spring-run Chinook salmon, egg mortality on the Sacramento River. *See* Draft EIS, at 7-53. SL&DMWA-27

In addition, the Draft EIS fails to discuss available scientific literature regarding the relationship between water velocities and Ich outbreaks. The Draft EIS discusses the estimated change in water velocity in the lower Klamath River in response to an increase in flow from 2,000 cfs to 2,800 cfs and from 2,800 cfs to 5,000 cfs. Draft EIS, at 7-73. The increase in average cross-sectional velocity is reported to be 0.21 ft/sec for the lower flow range and 0.68 ft/sec for the higher flow range. The EIS does not discuss, however, any flow or velocity threshold for reducing the risk of Ich outbreaks or how the prescribed flow ranges were established to meet specific target velocity objectives. The only scientific information available in the literature regarding the relationship between velocity and Ich outbreaks is reported for

hatchery produced catfish where velocity increases substantially less than that presented in the EIS was reported to be effective in reducing the risk of disease (Bodensteiner et al. 2000).[5] The EIS discussion should be expanded to include a more complete presentation of the scientific literature regarding the effects of velocity on the risk of disease outbreak and how the changes in velocity estimated from the proposed alternatives relate to those reported velocity thresholds.

The Draft EIS also fails to present results of any actual observed changes in water velocities as a result of past flow augmentation actions, particularly in the key locations where fish tend to hold and crowd in the lower Klamath River. Reclamation has taken flow augmentation actions for the past several years, while Reclamation was also engaged in preparing a long-term plan for the lower Klamath River, and yet, Reclamation did not seek to gather relevant information regarding the actual effects of the flow augmentation actions on water velocities or turn-over rates at key locations in the lower Klamath River. This is information that could easily have been obtained by Reclamation and used to inform potential actions. Likewise, the Draft EIS relies on modeled results for evaluating potential water temperature impacts to fisheries, and fails to present actual observed temperature effects during past flow augmentation actions. The Draft EIS should be revised to include a discussion of actual observed conditions during past flow augmentation actions and utilize actual collected data to inform the effects analyses.

SL&DMWA-27 (contd.)

The Draft EIS also fails to take a hard look at modeling results and fails to reconcile apparently inconsistent modeling results. For example, Draft EIS at page 7 – 81 reports that winter-run would experience a greater than 7% increase in production in one critical water year while spring-run Chinook would experience an increase in production of nearly 24% compared to the No Action Alternative in one critical year. Draft EIS, at p. 7-81. The EIS does not provide any discussion, however, of how a reduction in deliveries of water from the Trinity River system to the Sacramento River system under Alternative 1 would result in an increase in production of salmonids. The Draft EIS also fails to reconcile the apparently inconsistent modeling results, which show both increases and decreases in salmonid production in critical water years. These same inconsistencies appear in the analysis regarding Alternative 2. See Draft EIS, at 7-103 (describing inconsistent results in critically dry years). The EIS should be expanded to include a discussion of the possible mechanisms underlying the predicted increase in production in these dryer years, as well as further more detailed documentation of the results of changes in production, both increases and decreases, by run, by year, and by location. In addition, Reclamation needs to reexamine modeling results and ensure that modeling anomalies are accounted for and that the impacts analysis presents an accurate estimate of potential impacts. For example, if the single dry year showing increases in winter-run and spring-run production is the result of a modeling anomaly, then that skews the presentation of impacts, particularly where impacts are presented as averages of particular water year types.

[5] Bodensteiner, L.R., R.J. Sheehan, P.S. Wills, and W.M. Lewis. 2000. Flowing water: an effective treatment for Ichthyophthiriasis. Journal Aquatic Animal Health 12(3): 209-219.

B. The Presentation and Analysis of Impacts Fails to Describe the True Impacts to Fisheries

The Draft EIS analysis and presentation of impacts fails to describe in a true manner the impacts that will be experienced by the fisheries. For example, the Draft EIS discusses using average monthly water temperatures as a metric for assessing potential adverse effects associated with the proposed project. Draft EIS, at 7-49. However, average monthly water temperatures are not a sensitive metric for analysis of fishery habitat changes or suitability and can bias and obscure important differences in habitat suitability occurring within a month. Typically average daily or the instantaneous maximum (frequently hourly) water temperatures are the established metrics typically used for assessing habitat suitability and the Draft EIS should be revised to evaluate potential impacts to daily water temperatures. As another example, the Draft EIS uses a "hydrologically representative 24-year period" as part of the water temperature analysis but fails to explain why a subset of years available from the CalSim 82 year analytical period was necessary to support the temperature analysis and fails to demonstrate that the 24 year period selected is in fact representative of a range of hydrologic conditions.

The uses of averages throughout the Draft EIS to describe impacts to fisheries masks the extent of potential impacts by not disclosing the most significant impacts in an individual year. This issue is pervasive throughout the Draft EIS. *See, e.g.*, Draft EIS, at 7-82 (presenting impacts as averages by water year), at 7-84 (same). Presentation of results as averages over a water year type obscures the magnitude of impacts that can occur as a result of the proposed project in individual year comparisons. For example, the Draft EIS reports that four out of 12 critical water years had reduced fall-run Chinook salmon production by more than 16%. Draft EIS, at 7-80. The EIS, however, does not include tabular summaries of the results of the analysis by year and therefore the magnitude of this adverse impact has not been fully disclosed. The EIS reports that the impact of reduced production is more than 16% but does not report how much more, in which specific years, and how these impacts to a specific year class of fall-run Chinook salmon would be propagated through reduced stock-recruitment in future years. Impacts of more than 16% reduction in the fall-run Chinook salmon production should be considered to be an adverse impact of the proposed project and require appropriate mitigation to reduce and avoid these adverse impacts. The EIS reports that the impacts to fall-run Chinook salmon production would be addressed through consultation with the resource agencies (Table 7 – 26) but does not discuss what actions would be implemented specifically to reduce and avoid these impacts to fall-run Chinook salmon production. This issue also applies to the discussion presented on page 7-81 where impacts to late fall-run Chinook salmon and steelhead production are more than 10% in 2 out of 12 critical years and 2 out of 18 dry years, more than 7% in 3 out of 12 critical water years for winter-run Chinook salmon and up to 100% mortality in 2 critical water years for spring-run Chinook salmon. All of these have the potential to be significant adverse impacts of the proposed project. The discussion of these impacts in the EIS should be expanded with additional documentation on the specific years and magnitude of reduction in production for each of these salmonid runs, as well as the specific mitigation that would be implemented to address these impacts.

SL&DMWA-28

The Draft EIS inaccurately characterizes impacts to fish under Alternative 1 as "similar" to the No Action Alternative by looking at averages over all water year types. For example, the Draft EIS states that the average overall affects to Central Valley winter-run Chinook Salmon

under Alternative 1 "are similar with a less than 1% reduction in spawning escapement [compared] to the No Action Alternative." Draft EIS, at ES-15, Table ES-3. Discussing "average overall affects" to fish species such as the Central Valley winter-run Chinook is misleading because the relevant impacts can occur in a single month, year, or over several consecutive years. For example, the Draft EIS reveals that under Alternative 1 "winter-run Chinook Salmon would experience reduced survival during several critical water years, resulting in a less than 1% average reduction in spawning escapement, a 9% reduction in fry-to-smolt survival and 5% reduction in smolt production under Alternative 1." Draft EIS, at ES-15, Table ES-3. These results indicate that there would be significant impacts to winter-run Chinook in critical water years. This same misleading representation of impacts is seen throughout the Draft EIS, in terms of presenting average results over all water year types. The entire assessment should emphasize the maximum effects in dry and critical years because those are the years that have the biggest impact on fish.

In addition, the Draft EIS fails to provide average daily or maximum daily water temperature statistics for the Sacramento River mainstem downstream of Keswick Reservoir, the Feather River, and the American River. *See* Draft EIS, at 7-49 (discussing daily water temperature statistics for Trinity and lower Klamath rivers). Water temperature conditions during the spawning and egg incubation period in late summer for winter-run Chinook salmon in the Sacramento River mainstem are considered to be an important environmental factor affecting egg survival and hatching success, however, the impact analysis presented in the Draft EIS does not effectively address either average daily temperatures, the 7-day average of the maximum daily temperatures, or the effects of cumulative changes in Shasta Reservoir coldwater pool storage on water temperature effects for the sensitive life stage of winter-run Chinook salmon egg incubation. The Draft EIS discusses the use of CalSim II, as well as the Sacramento River Basin Water Temperature Model, as part of the Interactive Object-oriented Salmon Simulation Model (IOS) simulation for winter-run Chinook salmon but fails to explain why more detailed results of a temperature analysis affecting winter-run Chinook salmon spawning and egg incubation are not included as part of the impact analysis. Draft EIS, at 7-53.

SL&DMWA-28 (contd.)

The Draft EIS also fails to fully examine potential impacts to coho salmon in the Trinity River. The Draft EIS at page 7 – 61 lines 30 – 36 discusses changes in flow conditions in the Trinity River that would result from flow augmentation releases during the August-September period. Draft EIS, at 7-61. However, the Draft EIS does not include a discussion of the potential impacts that increasing flows and associated water velocities during the August-September period would have on juvenile coho salmon, a listed species, rearing in the Trinity River. The unnatural reduction in water temperature and increase in velocity during the two-month flow augmentation period has the potential to adversely affect habitat quality and availability for juvenile coho rearing as well as growth and survival and yet no discussion of the changes in habitat quality or availability, using IFIM weighted usable area and other tools, is presented in the EIS.

In addition, the Draft EIS does not discuss or analyze the potential impacts of the flow augmentation actions on the thermal refugia habitat in the lower Klamath River. Observations of salmonids during the August-September period from the lower Klamath River show that in response to exposure to seasonally elevated temperatures many of the adult upstream migrating Chinook salmon and steelhead are attracted to the cooler thermal refugia habitat associated with

cooler inflows from tributary creeks. The Draft EIS does not discuss how the increase in mainstem flow under the proposed action would affect the water temperature conditions, geographic distribution, or aerial extent of these important thermal refugia. It has been hypothesized that increased water flow and velocities in the mainstem river would actually decrease the aerial extent, as well as beneficial cool water effects, associated with these refuges and reduce habitat quality and availability of lower river as a result of flow augmentation. These potential mechanisms should be identified and discussed as part of the EIS.

SL&DMWA-28 (contd.)

The Draft EIS's analysis of cumulative impacts is also inadequate. The Draft EIS discusses Alternative 1 cumulative effects in 2030 but does not describe how adverse impacts on individual year classes of Central Valley salmonids would be propagated through stock-recruitment relationships to population level impacts in subsequent years. Draft EIS, at 7-115, Table 7-27. Operations under proposed Alternative 1 are expected to contribute to an incremental degradation in the ability to successfully meet all of the temperature requirements for fishery protection on the Sacramento River system and Central Valley, which should be discussed as part of either the cumulative impact analysis or as part of the analysis of impacts of the proposed action. Many of the analyses showed that reduced water storage and cold water pool is expected to result in increased levels of salmonid egg mortality, particularly for winter-run and spring-run Chinook salmon under the No Action Alternative and that implementation of Alternative 1 would be expected to further impact the ability to meet water temperature requirements. Further, the discussion of cumulative impacts should be expanded to include a discussion of the effects of the proposed alternative operations over an extended period of drought years and the impacts of cumulative reductions in carryover storage on water temperature and other factors in response to Alternative 1. The Draft EIS fails to disclose or analyze the cumulative impacts of consecutive years of flow augmentation actions, particularly in several dry or critically dry years, such as experienced over the last several years. These inadequacies in presenting true impacts, due to describing impacts as averages and impacts in a single particular year, appear throughout the Draft EIS.

C. The Draft EIS Fails to Disclose or Identify Uncertainties and Assumptions Underlying the Analysis

The Draft EIS fails to identify or disclose several assumptions and uncertainties underlying the analysis of impacts. For example, the Draft EIS reports that the impact analysis is based on operations and hydrologic simulation modeling for the year 2030. Draft EIS, at 7-55. Using the year 2030 for modeling purposes introduces a number of undocumented assumptions regarding future projects and climate change, and increases the level of uncertainty associated with the underlying assumptions used in the impact analysis. The Draft EIS fails to explain why a future operations scenario with inherent uncertainty associated with climate change and other factors has been selected as the basis for assessing proposed project impacts.

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In addition, the Draft EIS fails to disclose the uncertainties associated with the hypothesized factors affecting the risk of disease outbreak and the conditions that occurred during the 2002 salmonid die-off. *See* Draft EIS, at 7-57. For example, the Draft EIS states that the "Current understanding of the mechanisms of the factors discussed above—that interact to result in Ich infection and epizootics that can lead to fish die-offs—is incomplete, and it is not possible to accurately quantify the reduced risk of disease that can be attributed to increased

flows." Draft EIS, at 7-73. However, the Draft EIS then jumps to the conclusion that "Alternative 1 would be expected to result in some level of reduced risk of Ich infection, epizootic outbreaks and consequent fish die-offs." Draft EIS, at 7-73. The Draft EIS needs to more explicitly quantify the uncertainty associated with implementing Alternative 1. The EIS should be expanded to disclose the high degree of uncertainty regarding the potential benefit of the flow augmentation in reducing the risk of disease outbreak, which may be none, the interaction of environmental factors contributing to increased risk, the potential change in risk that may occur at a variety of flow levels (e.g., 2,500 cfs or 2,250 cfs etc. rather than the proposed flow of 2,800 cfs) in addition to those included as part of the proposed project, and describe how information is being developed from biological and water quality monitoring, data analysis, experimentation, and modeling for the lower Klamath River that will help improve the ability to effectively predict conditions associated with an increase in the risk of disease outbreak in the future.

SL&DMWA-29 (contd.)

The Draft EIS also fails to address the potential inaccuracies in the modeling assumptions. For example, Draft EIS discusses estimated changes in cold water fish habitat based on storage and cold water pool volume within water storage reservoirs. Draft EIS, at 7-60. However, the Draft EIS does not discuss the actual conditions or applicability of the CalSim hydrologic information in representing changes in environmental conditions during sequential dry and critically dry years, such as during the 2012 – 2016 drought sequence. In addition, the Draft EIS indicates that the CalSim monthly model results were "down stepped" to daily for the water quality and temperature models. Draft EIS, at 7-45. But the Draft EIS fails to explain how the daily variation from the monthly output was generated. The Draft EIS should explain the assumptions and approach used to generate the daily numbers. Similarly, the Draft EIS needs to be revised to reconcile the apparent inconsistencies regarding treatment of significant temperature impacts. The Draft EIS treats *any* exceedance of temperature thresholds as significant. Draft EIS, at 7-50. However, this treatment seems inconsistent with the 5% or less change in metrics such as flow and temperature being not significant because the modeling can't detect differences that small. Can the model detect a difference of one exceedance of the temperature threshold?

D. <u>The Draft EIS Fails to Identify Potential Mitigation For Impacts to Fisheries</u>

The Draft EIS identifies several significant impacts to fish species under the proposed action, but the Draft EIS fails to identify any potential mitigation measures to address those impacts. Potentially significant adverse impacts are identified, for specific years, in the Draft EIS analysis in terms of reduced production of various runs of Chinook salmon in the Central Valley. However, the Draft EIS relies on coordination with agencies to somehow mitigate those impacts. The Draft EIS states: "The analyses for Alternative 1 showed reduced survival of early life stages of winter-run (up to 9 percent) and fall-run Chinook Salmon smolt production (up to 6 percent). These effects would be minimized through implementation of the consultation procedures required by the 2009 NMFS BO, or through coordination with resource agencies on real-time operations." Draft EIS, at 7-114; see id. at 7-109. Reliance upon consultation under the 2009 NMFS BO is inappropriate. Reclamation's Draft EIS proposes a wholly discretionary action to benefit unlisted fish species outside of the CVP place of use. To suggest that the CVP mitigate for the impacts of Reclamation's choice is not a mitigation, it is an increased adverse impact that would require even greater mitigation. Further, coordination with resource agencies

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is an inadequate mitigation measure to address significant adverse impacts to fall-run and other Chinook salmon species identified in the EIS and should be revised to provide specific mitigation measures designed to reduce and avoid the adverse impacts identified in the EIS. Shifting responsibility and/or deferring mitigation to undefined "consultation procedures" does not satisfy Reclamation's obligations under NEPA to identify potential mitigation measures.

Potential mitigation measures need to be identified for the additional reason that Reclamation should analyze any additional impacts associated with potential mitigation. For example, within the context of mitigating impacts to salmonids, the potential water supply and other impacts associated with implementation of mitigation measures, particularly in dry and critically dry years, to minimize and avoid these adverse impacts to salmonids should be discussed and disclosed as part of the EIS. *See* Draft EIS, at 7-114.

SL&DMWA-30 (contd.)

V. The Draft EIS is Deficient in Several Other Areas

A. The Draft EIS Fails to Examine Whether the Proposed Action is Subject to Consultation under the Endangered Species Act

The Draft EIS briefly discusses the Endangered Species Act ("ESA") but fails to examine whether the proposed action of Alternative 1 is subject to consultation under the ESA. *See* Draft EIS, at 15-6 – 15-7. The Draft EIS states that "[i]n carrying out its obligations, Reclamation must consult with the appropriate regulatory agency or agencies (e.g., USFWS and NMFS) if the Federal undertaking is likely to affect a listed species or critical habitat." Draft EIS, at 15-7. However, the Draft EIS misstates the threshold for triggering consultation requirements under the ESA and also fails to examine whether the proposed action meets that threshold.

Section 7(a)(2) of the ESA requires that each federal agency ensure that any action which it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of any listed species' critical habitat. 16 U.S.C. § 1536(a)(2). "Section 7 imposes on all agencies a duty to consult with either the Fish and Wildlife Service or the NOAA Fisheries Service before engaging in any discretionary action that may affect a listed species or critical habitat." *Karuk Tribe of California v. U.S. Forest Service*, 681 F.3d 1006, 1020 (9th Cir. 2012) (emphasis added). Therefore, the threshold for consultation is a "may affect" standard, not the "likely to affect" standard described in the Draft EIS. Draft EIS, at 15-7.

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Under 40 C.F.R. § 1502.25(a), "to the fullest extent possible" agencies must "prepare draft environmental impact statements concurrently with and integrated with environmental impact analyses and related surveys and studies required by . . . the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.), and other environmental review laws and executive orders." The Draft EIS fails to analyze whether the proposed action, of implementing Alternative 1, meets the "may affect" threshold for ESA consultation. The Final EIS should include such an analysis, based on the potential impacts to ESA-listed species described in Chapter 7 of the EIS and any other relevant chapters or sections. This analysis should result in the conclusion that the proposed action is subject to consultation under the ESA, due to the impacts of Alternative 1 on water storage and associated temperature management and flow impacts on ESA-listed species.

B. **The Description of Legal Authority for the Proposed Action Lacks Support**

The Draft EIS states:

> The Trinity River Division Central Valley Project Act of 1955 (PL 84-386) provides the principal authorization for implementing the action alternatives. Specifically, Section 2 of the 1955 Act limits the integration of the TRD with the rest of the CVP and gives precedence to in-basin needs including that "the Secretary is authorized and directed to adopt appropriate measures to insure preservation and propagation of fish and wildlife…" (Proviso 1) and "that not less than 50,000 acre-feet shall be released annually from the Trinity Reservoir and made available to Humboldt County and downstream users." (Proviso 2) The following are also authorities for the Proposed Action: the Trinity River Basin Fish & Wildlife Management Act of 1984 (Act of October 24, 1984 (PL 98-541); as amended by the Act of October 2, 1992 (PL 102-377); Act of November 13, 1995 (PL 104-46); Act of May 15, 1996 (PL 104-143)) (that directs the Secretary to restore the fish populations impacted by the TRD facilities); the Fish and Wildlife Coordination Act (FWCA) (16 USC 661) and section 3406(b)(1) of the Central Valley Project Improvement Act (CVPIA). In addition, the Proposed Action is also consistent with Reclamation's obligation to preserve tribal trust resources.

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Draft EIS, at 1-15; *see* Draft EIS, Statutory Authority Appendix. For the reasons explained by the San Luis & Delta-Mendota Water Authority ("Water Authority") in prior administrative comment letters, and in prior and current litigation regarding Reclamation's flow augmentation actions, the statutes cited in the Draft EIS do not authorize the flow augmentation actions described in Alternatives 1 and 2. First, a federal district court held that Proviso 1 of the 1955 Act does not authorize flow augmentation actions from the TRD to benefit fish located in the lower Klamath River. *San Luis & Delta-Mendota Water Authority v. Jewell*, 52 F. Supp. 3d 1020, 1063, 1070 (E.D. Cal. 2014). Therefore, Reclamation is estopped from relying on Proviso 1 as the source of statutory authority for these types of flow augmentation actions. Second, Proviso 2 of the 1955 Act does not authorize these flow augmentation actions, because that proviso is directed at ensuring water for consumptive use by "downstream users." Third, the Trinity River Basin Fish & Wildlife Management Act of 1984, as amended, does not authorize the flow augmentation actions because it only authorizes non-flow physical restoration activities. Fourth, the Fish and Wildlife Coordination Act is not an independent source of authority and therefore cannot authorize the flow augmentation actions. Fifth, section 3406(b)(1) of the Central Valley Project Improvement Act does not authorize the flow augmentation actions because it only addresses impacts of the CVP not otherwise addressed in CVPIA section 3406 and does not apply to releases from the TRD, which are addressed in section 3406(b)(23) of the CVPIA. Finally, the tribal trust obligation is not an independent source of authority and therefore cannot authorize the flow augmentation actions.

The Draft EIS fails to identify the legal authority that supports Alternative 2. The Draft EIS should be revised to clarify the legal authority for Alternative 2.

The Draft EIS also makes reference to use of a Humboldt County "Contractual Right" for the preventative and emergency flow actions. *See* Draft EIS, ES-5, Table ES-1 (item #4 in the May-July time period); *see also id.* at 2-5, Table 2-1 (same). However, the Draft EIS fails to describe or explain the nature of any such "Contractual Right," and the Draft EIS fails to explain how any such "Contractual Right" could be used to support the flow actions. The Water Authority has previously explained that the contract between Humboldt County and Reclamation cannot lawfully be relied on as a source of authority for making these types of flow actions. The Draft EIS should be revised to eliminate reference to the Humboldt County "Contractual Right". SL&DMWA-32

C. The Draft EIS's Analysis of Impacts to Groundwater Resources is Inadequate

The Draft EIS's analysis of impacts to groundwater resources is cursory and fails to take the requisite "hard look" at the potential impacts that may result from the proposed action of Alternative 1. *Citizens to Preserve Overton Park, Inc. v. Volpe* (1971) 401 U.S. 402, 416. The Draft EIS acknowledges that "Alternative 1 deliveries to the CVP Agricultural Water Service Contractors NOD in critical years would decrease by 10 percent in comparison to the No Action Alternative. A decrease in deliveries of 10 percent represents 2 thousand acre-feet (TAF), which, as a result of decreased supplies, would create additional demand that would vary geographically. It is not possible to speculate how water districts would manage water supplies in response to decreases in surface water supply, or how water users might react. Accordingly, Alternative 1 may potentially impact groundwater use and elevations during critical years in localized areas (e.g., service areas of water service contractors) compared to the No Action Alternative." Draft EIS, at 6-11. This analysis is inadequate because it provides only a qualitative analysis that fails to provide the decision-makers with sufficient information regarding the possible groundwater impacts that may result from Alternative 1. The Draft EIS asserts that it cannot "speculate" regarding how water districts would manage water supplies but Reclamation and others have available substantial information regarding how CVP agricultural contractors have responded to reductions in CVP water deliveries in the past and Reclamation should use that information to describe the type of impacts that are likely to occur. Reclamation should perform a similar analysis and description for impacts to groundwater from reductions in water deliveries to CVP agricultural contractors south-of-the-Delta. *See* Draft EIS, at 6-12. SL&DMWA-33

In addition, the Draft EIS fails to identify any potential mitigation measures for the groundwater impacts that result from reductions in CVP water deliveries. The Draft EIS states that "[c]hanges in CVP operations under action alternatives, as compared to the No Action Alternative, would not result in substantial changes in groundwater resources. Therefore, there would be no adverse impacts to groundwater resources, and no mitigation measures are required." Draft EIS, at 6-15. The Draft EIS's conclusion that Alternative 1 would not result in "substantial" changes in groundwater resources lacks support and is internally inconsistent. The Draft EIS acknowledges that implementation of Alternative 1 will significantly reduce water deliveries to CVP agricultural contractors in critically dry years. Draft EIS, at 6-11 – 6-12, 4-70 – 4-71. The Draft EIS also discloses that implementation of Alternative 1 may impact groundwater use and elevations in critically dry years in the Sacramento and San Joaquin

valleys. Draft EIS, at 6-11 – 6-12. Therefore, the Draft EIS must be revised to identify potential mitigation measures for the adverse impacts to groundwater resources in critically dry years. 40 C.F.R. § 1502.16(h).

SL&DMWA-33 (contd.)

Responses to Comments from San Luis & Delta-Mendota Water Authority

SL&DMWA-1: Reclamation appreciates the participation of the San Luis & Delta-Mendota Water Authority (SL&DMWA) and their input on the development of this project. Reclamation believes that the participation by the SL&DMWA as a cooperating agency has improved understanding of the issues associated with implementation of the actions. Reclamation thoroughly considered all input and comments received during the development of the EIS, including those already provided by SL&DMWA (i.e., Attachment 2 of SL&DMWA December 5, 2016, comment letter *Comments Letter in Response to Notice of Intent to Prepare a Draft Environmental Impact Statement for the Long-Term Plan to Protect Adult Salmon in the Lower Klamath River*); these comments will not be further addressed here. Comments received from cooperating agencies throughout the development of the EIS, including those provided again by the SL&DMWA, resulted in changes to the alternatives development and refinement, as well as the assessment of impacts.

SL&DMWA-2: Please refer to the responses to comments for SL&DMWA-10 to SL&DMWA-22.

SL&DMWA-3: Please refer to the responses to comments for SL&DMWA-7 to SL&DMWA-9

SL&DMWA-4 Please refer to the responses to comments for SL&DMWA-23, SL&DMWA-24, SL&DMWA-25, SL&DMWA-27, and SL&DMWA-28.

SL&DMWA-5: Please refer to the response to comment for SL&DMWA-24.

SL&DMWA-6: Please refer to Master Response "Range of Alternatives" and Master Response "Scientific Support for Flow Augmentation."

SL&DMWA-7: Reclamation recognizes that there is uncertainty regarding the causative factors of the 2002 fish die-off and the associated trigger criteria for the flow augmentation components of the action alternatives. The Draft EIS addressed this uncertainty throughout the document. For example, the Executive Summary (see page ES-9) of the Draft EIS recognized that scientific uncertainty of the causative factors of Ich outbreaks and fish die-off was an area of controversy. Chapter 1, "Introduction" (pages 1-1 to 1-8) describes the history of flow augmentation actions since 2002, including the development and evolution of the flow augmentation criteria. As described in Chapter 2, "Description of Alternatives" (pages 2-6 to 2-9) of the Draft EIS, due to recognized uncertainty, both action alternatives provide for additional monitoring and research actions. These actions would be conducted to further the scientific understanding of causative factors of Ich infection and outbreak in the lower Klamath River. Chapter 7, "Biological Resources – Fisheries" identifies that the understanding of fish disease processes in the lower Klamath River has evolved. Reclamation believes that through the identified additional monitoring and research activities incorporated into the action alternatives, the scientific understanding of Ich infection and outbreak will be furthered, and actions can be modified based on refined understanding.

In addition, recognizing potential uncertainty, Reclamation funded an Independent Scientific Peer Review in 2016 to evaluate the scientific validity of the flow augmentation criteria which were developed based on an understanding of the causative factors of an Ich epizootic. The peer

reviewers indicated that the flow augmentation criteria are generally supported by available science relative to disease ecology of adult salmon, including the correlation between water temperature and disease transmission, though the availability of published literature, as opposed to "grey literature" would strengthen the scientific underpinnings of the flow criteria (Reclamation 2016).

Please also refer to Master Response "Scientific Support for Flow Augmentation."

SL&DMWA-8: Please refer to Master Response "Scientific Support for Flow Augmentation."

SL&DMWA-9: Please refer to Master Response "Scientific Support for Flow Augmentation" and Master Response "Best Available Information."

SL&DMWA-10: In response to the initial point raised by the commenter, Chapter 2, "Description of Alternatives" of the Draft EIS discusses non-flow related measures that consisted of such elements as fisheries management actions, improvement in water quality or temperature, implementing additional habitat improvement or water quality improvement projects, and other measures. Reclamation reviewed each of these measures and determined that many of them would not meet the purpose and need for the project, nor did they alleviate one or more of the significant impacts that might be associated with the Proposed Action. Further, none of these concepts would meaningfully and substantially reduce the likelihood, and potentially reduce the severity of Ich epizootic events, or they would not be implementable in 2017. See pages 2-11, 2-13, and 2-14 of the Draft EIS. Please also refer to Master Response "Range of Alternatives."

In response to the second point raised by the commenter, as described throughout Chapter 7, "Biological Resources – Fisheries" of the Draft EIS, the main benefits of increasing flows is to cue the dispersal of fish upstream (mostly due to lower water temperatures) and the dispersal by flushing of Ich pathogens downstream. In other words, reducing fish density reduces the risk of spreading the pathogen. This theory is supported by science, as confirmed through the Independent Peer Review process funded by Reclamation, in which five independent peer reviewers evaluated the science and assumptions of the flow augmentation trigger criteria. Additionally, as available data increases through the monitoring and research programs, Reclamation, in coordination with the LTP Technical Team and resource agencies, will adapt the flow augmentation actions based on monitoring and research results. Please refer to Master Response "Scientific Support for Flow Augmentation" and Master Response "Best Available Information."

SL&DMWA-11: See Master Response "Range of Alternatives." Also see responses to comments for SL&DMWA-12 to SL&DMWA-15.

SL&DMWA-12: Please refer to Master Response "Scientific Support for Flow Augmentation."

SL&DMWA-13: In the Executive Summary and Chapter 2, "Description of Alternatives" of the Draft EIS, text on page ES-4 (lines 9-23) and page 2-3 (lines 10-27) was revised to indicate that preventive flow augmentation would be implemented in consideration of the four triggers. The text was also revised to state that augmentation releases would occur when conditions warrant, which typically occurs by August 22, and a reference to the fish harvest metric was removed. August 22 was selected as the date of release for the purposes of modeling and analyses based on

recommendations from NMFS and USFWS, as well as being the time for which fall-run Chinook Salmon are typically in the area of the confluence. However, in the future, consultation with the LTP Technical Team will dictate the actual date of release based primarily on flow, fish density, and level of infectivity. Text was also revised on these pages (ES-4 and 2-3) to indicate that the target flow is up to 2,800—instead of being exactly 2,800—to allow flexibility in management actions based on the real-time environmental and biological conditions. See Chapter 4, "Errata" of this Final EIS. Flows ranging from 2,500 to 3,200 were identified in three different sources (DFG 2004, Strange 2010, and TRRP 2012) and summarized by NMFS and USFWS in a 2012 joint memo as the minimum-flow recommendations to protect fall-run Chinook Salmon. The joint memo then recommended a 2,800 cfs minimum flow between August 22 and September 21, dependent on the cumulative fish harvest.

This commenter felt that the trigger criteria lacked definition, providing an example of needing additional clarification on what constituted a low-level Ich infection. On page 2-4 (lines 1 and 2) of the Draft EIS, a definition was provided for low-level infections of Ich. The other triggers, however, may vary by year, and cannot be explicitly defined. For example, thermal conditions that may inhibit upstream migration may vary based on the level of fish density. Additionally, environmental conditions may result in different effects to fish even if the same number of fish were present. Because of these annual unknowns, Reclamation intends to manage the flow augmentation program through an adaptive management process. Therefore, based on annual conditions, and through discussions with the LTP Technical Team, Reclamation may decide to delay or not implement the flow augmentation.

Please also refer to Master Response "Scientific Support for Flow Augmentation."

SL&DMWA-14: Chapter 7, "Biological Resources – Fisheries" page 7-68 (lines 1-7) and page 7-97 (lines 9-20) of the Draft EIS includes a discussion on the effects of increased flows in relation to river channel inundation, water velocity, and changes in water temperature, which are important in the disruption of infectivity and virulence of Ich. Additional text was added to page 7-17 (line 8) of the Draft EIS describing results from previous studies linking increased flow and water velocity to a decrease in the spread of pathogens. The duration of the increased flow is based on recommendations by USFWS, NMFS, and CDFW, and Reclamation intends to monitor the effects of the preventive and emergency pulse flows on the pathogen infectivity rate, and will use those results towards adapting, if necessary, future management actions and flow augmentation releases. Additional citations were added to the *Reference* section of Chapter 7 of the Draft EIS on pages 7-119 and 7-125. See Chapter 4, "Errata" of this Final EIS.

Before and during implementation of flow augmentation actions, Reclamation considers the input of all LTP Technical Team members and real-time environmental and biological conditions. The flow augmentation trigger criteria—including the criteria for preventive pulse flows—is based on the best available information (see Master Response "Scientific Support for Flow Augmentation"). Further, as also described in Chapter 2, "Description of Alternatives" of the Draft EIS (page 2-6), flow augmentation criteria may be refined annually, in coordination with the LTP Technical Team in following adaptive management concepts, utilizing additional scientific information developed through monitoring and research efforts.

SL&DMWA-15: Please refer to Master Response "Best Available Information" and Master Response "Range of Alternatives."

While the Draft EIS Chapter 15, "Consultation, Coordination and Compliance" discusses the consultation and outreach activities in support of the EIS that were initiated in mid-2015 (page 15-1), Draft EIS Chapter 1, "Introduction" describes how Reclamation has been working with stakeholders in an open forum regarding the fish die-off in the lower Klamath River since 2002 (see page 1-1).

Since 2002, Federal and State agencies, tribes and other interested parties have been collecting relevant data (e.g., Ich presence and fish health statistics, historic and current hydrologic data, and water temperature) through monitoring activities, and have been investigating and implementing potential management actions. The determination of annual management actions was based on conceptual relationships between flow, velocity, temperature, Ich infectivity, fish density, run timing, and fish stress. In collaboration with tribes, regulatory agencies, and other basin partners, Reclamation developed and refined monitoring activities and flow augmentation criteria, risk assessments, and environmental impacts associated with the release of augmentation flows in 2012, 2013, 2015, and 2016.

Draft EIS Chapter 2, "Description of Alternatives" describes the essential monitoring actions and additional monitoring and research actions that will further scientific understanding of causative factors of Ich infections and outbreak in the lower Klamath River (see pages 2-5 to 2-9).

Additional monitoring and research actions are based on adaptive management concepts, they're consistent with the Department of the Interior technical guidance, and include further development of hypotheses and conceptual models to identify causative factors, development and refinement of performance measures, and collection and evaluation of relevant data. The monitoring process would be administered by Reclamation with input from the LTP Technical Team (in which SL&DMWA is invited to participate). Potential modifications from the adaptive management approach may include refinement of trigger criteria; changes to timing of flow augmentation, changes to the volume of releases and phasing of release volumes, and conservation actions undertaken at the same and different times.

SL&DMWA-16: Please refer to the response to comment for SL&DMWA-10. Please also refer to Master Response "Range of Alternatives."

SL&DMWA-17: Chapter 1, "Introduction" of the Draft EIS describes the Purpose and Need (see page 1-8). The purpose of the Proposed Action is to reduce the likelihood, and potentially reduce the severity, of any Ich epizootic that could lead to an associated fish die-off in future years. Primary factors, consistent with current scientific evidence, that contribute to infection dynamics and outbreaks of Ich disease in adult salmon returning to the Klamath River include the presence of the Ich pathogen, high water temperatures in the lower Klamath River, low flow conditions in the lower Klamath River and large run size of fall-run Chinook Salmon.

Draft EIS Chapter 2, "Description of Alternatives" describes the alternative development and screening and the alternatives retained for detailed analysis.

Please refer to Master Response "Scientific Support for Flow Augmentation" which discusses Reclamation's funding of an Independent Scientific Peer Review to evaluate the scientific validity of the flow augmentation criteria.

Please also refer to Master Response "Best Available Information" and Master Response "Range of Alternatives."

SL&DMWA-18: The two court cases cited in the SL&DMWA comment are not applicable to this EIS. In *Muckleshoot Indian Tribe v. U.S. Forest Service (9th Cir. 1999),* the court stated that the two action alternatives evaluated in the EIS where virtually identical and failed to comply with NEPA. However, the court went on to state that the difference between the two action alternatives was re-labeling a portion of the lands as a donation (rather than an exchange) and adding 141 acres of donated land. The court stated that "…we are troubled that in this case, the Forest Service failed to consider an alternative that was more consistent with its basic policy objectives than the alternatives that were subject of final consideration." In *Western Watersheds Project vs. Abbey* (9th Cir 2013), U.S. Department of the Interior, Bureau of Land Management (BLM) considered four alternatives. Each of the four alternatives were considered in detail, including the no-action alternative, and would have reauthorized grazing at the exact same level (3,120 animal unit months), with the distinguishing factors between the no-action alternative and the action alternatives being the terms and conditions imposed on the grazing permit. The court questioned how an agency can make an informed decision when each alternative considered would authorize the same underlying action, permitting grazing at the level of 3.120 Animal Unit Month (AUM). Although both Alternatives 1 and 2 meet the Purpose and Need in a similar manner, the effects of these two alternatives differ, particularly related to water source, water deliveries, groundwater, hydropower generation, and Sacramento and Trinity River fisheries.

Chapter 2, "Description of Alternatives" of the Draft EIS (pages 2-1 to 2-15) discusses the alternative development and screening process, and discloses why alternatives were eliminated from detailed evaluation. Reclamation found only two of these alternatives, the Proposed Action (Alternative 1) and Alternative 2, to be both feasible and meeting the Purpose and Need, including the ability to implement the alternatives as necessary (potentially as early as August 2017). Both alternatives are consistent with Reclamation's policy objectives.

The Proposed Action and Alternative 2 are distinctly different alternatives. Reclamation identified three different flow augmentation components for both alternatives, to be implemented in addressing the primary factors currently thought to contribute to the infection dynamics and outbreaks of Ich disease in adult salmon returning to the Klamath River. However, the source of the flows (i.e., water stored in TRD for CVP purposes vs. water reserved to specifically meet Trinity River ROD volumes), and the effects on reservoir storage levels, hydropower generation, downstream fisheries, and CVP deliveries are different. The Proposed Action (Alternative 1) includes supplemental flows from water stored in the TRD for CVP purposes, whereas the Trinity ROD Flow Reschedule Alternative (Alternative 2) supplemental flows would come sequentially from water stored in Trinity Reservoir, primarily through modifying the pattern of releases (i.e., rescheduling) for Trinity River ROD flows.

As recommended by SL&DMWA, Chapter 2, "Description of Alternatives" includes the Trinity River Record of Decision Flow Rescheduling Alternative (Alternative 2), (see pages 2-10 and

2-11). This alternative was specifically identified and recommended by SL&DMWA and Westlands Water District in a letter to Reclamation on August 20, 2015 (See Appendix A – Attachments to Comments of Regional and Local Governments, Agencies, and Interest Groups for this Final EIS).

In summary, Reclamation took a hard and careful look, and acted reasonably, in considering a wide range of alternatives.

Please also refer to Master Response "Range of Alternatives," and Master Response "Scientific Support for Flow Augmentation."

SL&DMWA-19: Please refer to Master Response "Range of Alternatives." Please also refer to responses for SL&DMWA-15, SL&DMWA-20, SL&DMWA-21, and SL&DMWA-22.

SL&DMWA-20: Reclamation appreciates the participation by SL&DMWA as a cooperating agency in the development of the EIS. At the Cooperating Agency Workshop # 3, held on July 25, 2016, an adaptive management alternative was presented by SL&DMWA and was discussed with Reclamation and the other cooperating agencies. Many of the elements of SL&DMWA's adaptive management alternative have been incorporated into the action alternatives evaluated in the EIS. For example, in Chapter 7, "Biological Resources – Fisheries" (pages 7-14 to 7-17) of the Draft EIS and as clarified in this Final EIS (see Chapter 4 "Errata"), the primary factors currently thought to contribute to infection dynamics and outbreak in adult salmon returning to the Klamath River are described, and these causative factors are similar to those identified by the commenter in the conceptual model predictions. In addition, many of the performance monitoring actions identified by the commenter are incorporated into the action alternatives as described in Chapter 2, "Description of Alternatives" (pages 2-5 to 2-9) in the Draft EIS, including water temperature, fish health (e.g., Ich on gill arches), and fish density monitoring.

The commenter has provided no evidence that weekly pulse flows, as provided for in the adaptive management alternative, would meet the Purpose and Need. Also, please refer to Master Response "Scientific Support for Flow Augmentation" and Master Response "Range of Alternatives."

SL&DMWA-21: Please refer to Master Response "Range of Alternatives" and Master Response "Scientific Support for Flow Augmentation."

SL&DMWA-22: Chapter 2, "Description of Alternatives" of the Draft EIS discusses non-structural flow augmentation measures, including acquisition of water supplies from willing sellers and providing replacement water supplies from other water sources to water users. It was determined that acquisition of water supplies from willing sellers, and providing replacement water supplies from other sources to water users, would not reliably provide water supplies necessary to reduce crowded holding conditions for pre-spawn adults nor reduce warm water temperatures in the lower Klamath River (see page 2-13).

Reclamation also evaluated retaining more water in Trinity Reservoir during extremely wet and wet years, effectively increasing carryover storage in these years, for the purpose of providing supplemental flow releases in future years. At the Cooperating Agency Workshop #3,

Reclamation provided a memorandum outlining the rationale for eliminating this concept as well as revising Reclamation's Safety of Dams storage restrictions for Trinity Reservoir.

Reclamation also evaluated whether there could be new CVP operational efficiencies for balancing Shasta releases and Trinity exports that could lead to increased storage levels. Preliminary analysis focused on identifying opportunities to delay Trinity exports in late winter/early spring, replacing this resource with releases from Shasta that would reduce later spring flood spills from Shasta Reservoir. This analysis concluded that there were very few of these opportunities present within the historical period of record. Furthermore, highly accurate forecasts of Shasta inflow, which are not currently feasible, would be required in order to accurately predict spill. These limitations combined show that this alternative is unlikely to lead to a benefit that supports the Purpose and Need of the action.

Please also refer to Master Response "Range of Alternatives."

SL&DMWA-23: For details on the use of CalSim II for the analysis of how the alternatives impact CVP operations, see the Analytical Tools Appendix of Chapter 2, "Water Operations Modeling." For the interpretation and reporting of analytical results see the Draft EIS, Chapters 4 to 14. For responses to specific comments on these topics, see the response to comments for SL&DMWA 24 and 25.

SL&DMWA-24: The common theme of this comment is that the modeling and analysis is not adequate to evaluate the potential impacts to water resources, and it points out several possible examples. Chapter 4, "Surface Water Supply and Management" (pages 4-26 and 4-27) of the Draft EIS, and Chapter 2, "Water Operations Modeling" (page 2-28) of the Analytical Tools Technical Appendix, discuss appropriate use of CalSim II results, which is applicable to several of the specific examples. The specific examples are used to support several points. The remainder of this response has been split to allow a complete and appropriate response for each issue raised.

Point 1 – The frequency assumed for flow augmentation is not representative of the true magnitude required.

The procedure used to develop the required flow augmentation years and volumes, for each year used in the analysis, is documented in the Analytical Tools Technical Appendix, Chapter 2, "Water Operations Modeling" (pages 2-19 to 2-27). Three technical memorandums, referenced in this appendix, were developed to document how data from previous flow augmentation efforts was used to develop statistics of how often flow augmentation and volumes would be required. The technical memorandums are; *Historic Klamath River at Klamath Daily Flow Analysis and Incorporation of Climate Change, Final Technical Memorandum*; *Frequency of Action Analysis: Preventive Pulse and Emergency Flows, Final Technical Memorandum*; and *Integration of Pulse Flow Frequency Estimates into CalSim Modeling, Final Technical Memorandum*. Reclamation conducted a webinar on June 8, 2016 on the methods and assumptions used to estimate flow augmentation quantities for all three components (i.e., preventive base flow augmentation, preventive pulse flows, and emergency pulse flow augmentation). In addition, the three technical memorandums were provided to the cooperating agencies for review before use in the analysis and no comments were received.

The guidelines developed in the technical memorandums provided statistical guidance on the anticipated frequency of flow augmentation but not on specific annual conditions. There are currently no tools available to predict Ich infestation, making it impossible to assign flow augmentation to specific years. To evaluate the upper bounds of potential impacts, the preventive pulse flow augmentation was imposed in the 20 driest years, and the emergency pulse flow augmentation was imposed on the 4 driest years, as shown in Table 2-8. "Summary of Preventive Base Flow Augmentation, Preventive Pulse Flow and Emergency Pulse Flow Augmentation Volume by Water Year" (pages 2-24 to 2-25).

Point 2 – The CalSim simulations do not reflect actual operations of the CVP, specifically that the model is not capable of simulating the CVP operations reserving water during the spring months for potential augmentation use in the fall.

Please refer to Master Response "Best Available Information."

The CalSim II model was specifically developed to reflect actual operations of the CVP and SWP, and it is currently the premier simulation model of the system. The model has been, and continues to be, used to support analysis of potential CVP and SWP system operations for numerous studies, feasibility analysis and environmental documentation of projects throughout the State of California. At the present time this is the best available tool for simulation of potential impacts of projects on CVP and SWP system operations.

As described in the Draft EIS, Chapter 2, "Description of Alternatives" page 2-2, Alternative 1 does include an assumption that water is reserved during the spring months for potential augmentation of flow release in the fall. This is implemented in the CalSim II model by assuming that a volume of water equal to the mean augmentation requirement for the current year type is not available for use in the delivery allocation procedure. This reservation effectively reserves the water in the reservoir by not scheduling it for delivery.

Point 3 – Does not fully disclose potential impacts of the proposed action because of the sole reliance on CalSim II, a generalized modeling tool. Post processing of results, to eliminate counterintuitive results, should have been performed.

As described in Point 2, CalSim II is the best available tool to for this analysis. Counterintuitive results are an important issue in the review of any analysis process. One important use of tools such as CalSim II is that when counterintuitive results are discovered during an analysis, further investigation can show that the analysis is incorrect and requires refinement or post processing, or that the intuitive results do not apply in the specific instance increasing knowledge from the analysis.

The example of counterintuitive result for increased storage in San Luis during critically dry years referenced in the comment implies that the water could have been delivered, and that project delivery impacts are inaccurate. Examining the results shows that the increased storage is during the middle portion of the year, and by the end of the year, San Luis Reservoir storage is very close to the No Action Alternative values. This represents a change in the annual schedule of inflow into and releasing from San Luis Reservoir, but not a significant change in annual deliveries.

Point 4 – The CalSim simulation results are not representative of recent, real world, drought operations.

The alternatives considered in the EIS were analyzed in a wide range of hydrologic conditions, including drought conditions in 1927 to 1934, and 1987 to 1992. The CalSim II simulations include assumptions for compliance with Federal and State regulatory requirements during those periods. The CalSim II model simulates long-term operational policies that are applied in all years and year types that may not represent historical annual or short-term responses to extreme conditions by Reclamation, California Department of Water Resources (DWR) and other agencies to reduce adverse conditions to a wide range of water users. Actions such as recent changes in CVP and SWP drought operations and potential modification of regulatory requirements under emergency conditions are situation specific, and may not represent long-term operational goals appropriate for use in long-term analysis as performed in support of this EIS.

SL&DMWA-25: This comment makes several points. The response has been split to allow a complete and appropriate reply for each issue raised.

Point 1 – Averages by water year type does not disclose true impacts of the action.

Chapter 4, "Surface Water Supply and Management" (pages 4-26 and 4-27) of the Draft EIS, and Chapter 2, "Water Operations Modeling" (page 2-28) of the Analytical Tools Technical Appendix, discuss appropriate use of CalSim results, including use during extreme conditions, such as the 1930 and 1990 drought periods. These drought periods include mainly dry and critically dry year types, often within consecutive years, and represent anticipated extreme conditions. The average by water year types, for dry and critically dry years, represents anticipated impacts during those extreme conditions of potential consecutive years requiring flow augmentation.

Point 2 – Cumulative impacts of augmentation releases will not be captured through single-year analysis.

The CalSim II simulation model is not a single year model. The model simulates system operations on a continuous month-by-month basis, with the ending conditions of a month becoming the starting condition of the next month for the entire 1922 to 2003 simulation period. Because of this, any cumulative impacts due to consecutive years of drought is accounted for in the CalSim II simulations and in any subsequent analysis based on the CalSim II results.

Point 3 – Potential error in the Draft EIS CalSim II modeling.

The 144 TAF required augmentation in 1934—with only 56 TAF actual augmentation—is based on the simulation of Trinity Lake approaching dead pool in 1934, which resulted in only 56 TAF physically available for augmentation in that year. This is representative of "worst case" conditions, when there is zero CVP allocation and no water physically available in Trinity Lake to meet the required augmentation. Chapter 4, "Surface Water Supply and Management" (pages 4-26 and 4-27) of the Draft EIS, and Chapter 2, "Water Operations Modeling" (page 2-28) of the Analytical Tools Technical Appendix, discuss appropriate use of CalSim results, including reservoirs reaching dead pool storage levels.

SL&DMWA-26: 40 Code of Federal Regulations 1502.16(f) and (h) states that the "[Environmental Consequences] section shall include discussions of:

- Natural or depletable resource requirements and conservation potential of various alternatives

- Mitigation measures and means to mitigate adverse environmental impacts (if not fully covered under Section 1502.14(f)."

In *Robertson v. Methow Valley Citizens (US Supreme Court 1989)* the court held that "NEPA does not impose a substantive duty on agencies to mitigate adverse environmental effects or to include in each EIS a fully developed mitigation plan. Although the EIS requirement and NEPA's other 'action-forcing' procedures implement that statute's sweeping policy goals by ensuring that agencies will take a 'hard look' at environmental consequences and by guaranteeing broad public dissemination of relevant information, it is well settled that NEPA itself does not impose substantive duties mandating particular results, but simply prescribes the necessary process for preventing uninformed -- rather than unwise -- agency action. While a reasonably complete discussion of possible mitigation measures is an important ingredient of an EIS, and its omission therefrom would undermine NEPA's 'action-forcing' function, there is a fundamental distinction between a requirement that mitigation be discussed in sufficient detail to ensure that environmental consequences have been fairly evaluated and a substantive requirement that a complete mitigation plan be actually formulated and adopted."

Chapter 4, "Surface Water Supply and Management" of the Draft EIS describes the surface water resources and water supplies in the study area, and potential changes that could occur as a result of implementing the alternatives (see page 4-1). A summary of environmental consequences and consideration for mitigation measures for the Proposed Action (Alternative 1) and Alternative 2 is provided on pages 4-120 to 4-125. The change in water supply itself does not represent an impact to the environment; it is the result of the change in water supply to resource categories described in Chapters 5 to 14 of the Draft EIS, and the impacts are evaluated under NEPA and mitigation measures are identified.

While CVP water supply reductions may be over 5 percent for certain water contractor groups in certain year types, this does not necessarily translate into impacts on resource categories affected by water supply—such as water quality or socioeconomics. Even so, this EIS does offer a number of mitigation measures, which represents Reclamation's best effort to formulate mitigation where possible.

SL&DMWA-27: Although multiple tools may be available to conduct fisheries analyses, not all tools are necessary. For example, the Instream Flow Incremental Methodology (IFIM) results and subsequent weighted usable area (WUA) values for the Trinity River were not used because WUA relationships used for the Trinity River Flow Study have likely changed, based upon implementation of the Trinity River ROD and the numerous channel rehabilitation projects completed to date. Reclamation's egg-mortality model was also not used because both SALMOD and the IOS models incorporated mortality to the egg life stage based on environmental conditions, including flow and temperature. The Analytical Tools Technical Appendix provides information on the tools applied in the Draft EIS (see Chapters 2-7). In

addition, Attachment 1-Selection of Analytical Tools to the Analytical Tools Technical Appendix in the Draft EIS describes other available tools that were not applied, and rationale as to why these tools were not utilized in EIS analyses.

Chapter 7, "Biological Resources – Fisheries" pages 7-69 (lines 1-7), 7-74 (lines 1-20), and 7-98 (lines 9-20) of the Draft EIS includes a discussion on the effects of increased flows in relation to river channel inundation, water velocity, and changes in water temperature, which are important in the disruption of infectivity and virulence of Ich. Additional text was added to page 7-17 (line 9) of the Draft EIS describing results from previous studies linking increased flow and water velocity to a decrease in the spread of pathogens. The duration of the increased flow is based on recommendations by USFWS, NMFS, and CDFW; and Reclamation intends to monitor the effects of the pulse flows, both preventive and emergency, on pathogen infectivity rate, and will use those results towards adapting, if necessary, future management actions and flow augmentation releases. Additional citations were added to the *Reference* section, on pages 7-118 and 7-123. See Chapter 4, "Errata" of this Final EIS.

Model results should not be viewed on an annual basis per se, but they should show trends of results, given that they are used for alternative comparisons. Given the complexity of the water system and associated aquatic ecosystem, tools are not available to reliably quantify the numbers of individuals of species, the viability of species populations, and the amount and quality of critical habitat. The analysis in the Draft EIS relied on modeling tools and qualitative analyses to provide indication of these attributes for comparison among alternatives rather than attempting absolute quantification. However, numerical indications of potential changes in species abundance and habitat availability are presented throughout the impact analysis in the Draft EIS. For example, SALMOD and the IOS Model provide outputs that indicate potential changes in salmon abundance, even though SALMOD looks at the effects on a year-to-year basis with the same starting population, whereas IOS looks at the additive effects over consecutive years. Both methods provide value in determining the effects of the changes in habitat conditions under each alternative. Habitat quality was addressed in terms of water temperature and WUA for salmonids.

Please also refer to Master Response "Scientific Support for Flow Augmentation" and Master Response "Best Available Information."

SL&DMWA-28: Chapter 7, "Biological Resources – Fisheries" page 7-51 (starting on line 31) of the Draft EIS, provides an explanation of how the water temperature thresholds were applied in response to the resolution of the modeled data. The Analytical Tools Technical Appendix, Chapter 3, "Reservoir and River Temperature Modeling" starting on page 3-3 (line 1) provides an explanation of the application and simulation periods for the RBM10 model, that's responsible for generating simulated water temperatures for the Klamath and Trinity Rivers.

Given the complexity of the water system and associated aquatic ecosystem, tools are not available to reliably quantify the numbers of individuals of species, the viability of species populations, and the amount and quality of critical habitat. The analysis in the Draft EIS relied on modeling tools and qualitative analyses to provide indication of these attributes for comparison among alternatives rather than attempting absolute quantification. However, numerical indications of potential changes in species abundance and habitat availability are

presented throughout the impact analysis in the Draft EIS. For example, SALMOD and the IOS Model provide outputs that indicate potential changes in salmon abundance, even though the SALMOD looks at the effects on a year-to-year basis with the same starting population, whereas IOS looks at the additive effects over consecutive years. Both methods provide value in determining the effects of the changes in habitat conditions under each alternative.

SALMOD and IOS, like any model of a natural system, are based on simplified rules and assumptions used to represent and approximate the complex factors that drive real-world conditions; while these assumptions can form a reasonably accurate and useful simulation of natural conditions, they cannot exactly replicate or predict actual conditions. Similarly, because it is not possible to fully understand or quantify all of the variability found in natural systems, and the complex interactions between different components of those systems, there are inherent uncertainties associated with the assumptions in all fisheries models, including SALMOD and IOS. These required simplifications and inherent uncertainties in model inputs naturally lead to uncertainties in the accuracy of model outputs for any individual model run relative to actual, real-world conditions.

In addition, SALMOD and IOS rely on output from a sequence of other models (CalSim-II and Sacramento River Water Quality Model (SRWQM)) for its flow and water temperature inputs. These models contain similar simplifications and uncertainties, which further influence the overall accuracy of a single fisheries model run (as would occur with any ecological model using the same tools for input). For instance, CalSim-II, the best available tool for predicting system-wide water operations throughout the Central Valley, simplifies the system by assessing flows on a monthly basis and at a relatively coarse geographic scale, while fish populations are affected by changes on much finer temporal and geographic scales, so flows must be downscaled using an additional set of assumptions to approximate natural processes. As documented in the Analytical Tools Appendix, Chapter 3, “Reservoir and River Temperature Modeling,” the CalSim II monthly results were disaggregated into mean daily flows for use in daily or sub-daily water temperature modeling. The SALMOD and IOS models use the simulated mean daily flow and 6-hour temperatures from the temperature modeling to reflect their influence in the salmon survival values produced by both models. IOS results do include survival rates of each life stage of winter-run Chinook Salmon. Model results for both IOS and SALMOD were included with the Draft EIS on compact disc.

Effects to Coho Salmon in the Trinity River, resulting from changes in flow and water temperature caused by the flow augmentation releases, are discussed in the Draft EIS on pages 7-61 to 7-63, and 7-66 to 7-68 for Alternative 1, and pages 7-91 to 7-97 for Alternative 2 in Chapter 7, “Biological Resources – Fisheries.” These effects include potential stranding, effects to water temperature, available habitat, and effects to spawning redds.

The Cumulative Effects Technical Appendix (page 1-1) of the Draft EIS describes the NEPA cumulative effects requirements. The cumulative effects analyses focus on the potential impacts to its associated environment resulting from the incremental impact of the proposed action when added to other past, present, and reasonably-foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions.

Please also refer to Master Response “Best Available Information.”

SL&DMWA-29: The Analytical Tools Technical Appendix of the Draft EIS (see Chapters 2 to 7) provides the assumptions and uncertainties for each tool used to develop the analyses presented in Chapters 4 to 15 of the Draft EIS. Please also refer to the response for SL&DMWA-28. Please also refer to Master Response "Range of Alternatives" and Master Response "Scientific Support for Flow Augmentation."

SL&DMWA-30: Please see the response to comment for SL&DMWA-26.

Draft EIS Chapter 7, "Biological Resources – Fisheries" discusses environmental consequences (see pages 7-42 to 7-114) and potential mitigation measures (see page 7-107 to 7-114) as a result of implementation of Alternative 1 and 2. Therefore, Reclamation took a "hard look" at the environmental consequences and discussed possible mitigation measures to allow for an informed agency decision. It is also appropriate that Reclamation consult with NMFS on resolving effects to listed fish species from the Preferred Alternative (i.e., Proposed Action – Alternative 1).

SL&DMWA-31: Chapter 15, "Consultation, Coordination and Compliance" discusses the "completed, ongoing, and anticipated" regulatory compliance efforts that Reclamation must follow to implement this program. This includes Section 7 consultation with both USFWS and NMFS under the Endangered Species Act. Reclamation is currently undergoing formal Section 7 consultation with NMFS for anadromous fishes in both the Klamath and Sacramento River Basins.

SL&DMWA-32: Please refer to Master Response "Reclamation Authority to Release Flows."

SL&DMWA-33: As described in Chapter 6, "Groundwater Resources/Groundwater Quality" (on page 6-15), the magnitude of any changes to groundwater pumping due to decreases in water supply, assuming all decreases in water supply would be made up by increased groundwater pumping, would be minor and would not result in substantial changes in groundwater resources. The assumption that all decreases in water supply would be met by increased in groundwater pumping is a conservative assumption to better define the maximum extent of groundwater resource impact (see pages 6-7 to 6-14). Because of the relatively minor potential impacts of based on this conservative estimate and the limited frequency of occurrence mitigation was not proposed. There is significant uncertainty in the analysis of the magnitude of potential groundwater resource impacts due to water delivery changes that cannot be captured in the analysis. The water supply impacts used to support the analysis were developed using the CalSim II model. The CalSim II model simulates long-term operational policies that are applied in all years and year types and may not represent historical or potential annual or short-term responses by Reclamation, DWR and other agencies to reduce adverse conditions such as water supply shortage to specific locations in critical years. Simply stated, a decrease in surface water delivery to any specific location as represented in the CalSim II simulations could be met in a number of ways other than groundwater pumping including water purchases, exchange, transfer, land fallowing, and crop pattern adjustments, any or all of which could reduce the impact on groundwater resources.