

**San Luis & Delta-Mendota Water Authority**



P.O. Box 2157  
Los Banos, CA 93635  
Phone: (209) 826-9696  
Fax: (209) 826-9698

**Westlands Water District**



3130 N. Fresno Street  
P.O. Box 6056,  
Fresno, CA 93703-6056  
Phone: (559) 224-1523  
Fax: (559) 241-6277

**San Joaquin River Exchange Contractors Water Authority**



September 29, 2015

**VIA U.S. MAIL AND EMAIL**

Mr. Brian Nelson  
Bureau of Reclamation, Bay-Delta Office  
801 I Street, Suite 140  
Sacramento, CA 95814-2536  
Email: bcnelson@usbr.gov

Re: Draft Environmental Impact Statement for the Coordinated Long-term Operation of the Central Valley Project and State Water Project

Dear Mr. Nelson:

The San Luis & Delta-Mendota Water Authority, Westlands Water District, and the San Joaquin River Exchange Contractors Water Authority appreciate the opportunity to comment on the Draft Environmental Impact Statement for the Coordinated Long-term Operation of the Central Valley Project and State Water Project (“Draft EIS”).<sup>1</sup> In its coming Record of Decision, the United States Bureau of Reclamation (“Reclamation”) will be making policy decisions on a matter of vital importance to the future of California, including its protected fish and wildlife species, millions of its people, and millions of acres of its prime farm land.

Reclamation must make a new and thoughtful decision regarding how it will operate the Central Valley Project (“CVP”), in coordination with the Department of Water Resources’ operation of the State Water Project (“SWP”), to serve project purposes while meeting its obligations under section 7 of the federal Endangered Species Act (“ESA”). No one can afford a

---

<sup>1</sup> The member agencies of the San Luis & Delta-Mendota Water Authority and the San Joaquin River Exchange Contractors Water Authority are listed in the attached Exhibit A.

reflexive, status quo re-adoption of the policy decisions Reclamation made some seven years ago to adopt and implement the existing reasonable and prudent alternatives. The Draft EIS is in response to court orders entered in litigation brought by the Authority, Westlands and other water contractors challenging those decisions. As the courts have found, those decisions were unlawful, because they were made without the benefit of any environmental review under the National Environmental Policy Act (“NEPA”). Further, those decisions relied upon limited and now outdated science, and were not informed by the critical social and environmental impacts realized over the past seven years of implementing the existing reasonable and prudent alternatives. The seven years since have shown devastating adverse impacts from lost water supply due to the ESA restrictions, but no recovery in the protected species. Indeed, despite implementation of the ESA restrictions, the listed species have continued to decline. It is past time for a new approach.

The current NEPA review provides Reclamation with an opportunity to make a more informed and better decision than it did seven years ago, an opportunity Reclamation should embrace. NEPA requires no less. As the Council on Environmental Quality’s regulations dictate, “[a]n environmental impact statement is more than a disclosure document. It shall be used by federal officials in conjunction with other relevant material to plan actions and make decisions.” 40 C.F.R. § 1502.1. Reclamation’s environmental impact statement must analyze and inform the public and policy makers of whether and what changes to CVP and SWP operations are necessary to meet the requirements of the ESA, the available alternatives, the trade-offs inherent among the available alternatives, and potential mitigation for resulting impacts. The environmental impact statement should provide the information necessary to a decision that will maximize the ability of the CVP to achieve all its authorized purposes, while still providing the protection due listed species under the ESA.

We are disappointed that the Draft EIS ignores this opportunity. Although the Draft EIS states that a purpose of the proposed action is to “continue the operation of the CVP in coordination with operation of the SWP, for its authorized purposes,” that purpose is not reflected in the alternatives or analysis. It is a lengthy document that teaches very little, and falls well short of what NEPA requires. Some of the more significant deficiencies of the Draft EIS are:

- It does not critically examine the need for, or expected benefits for listed species of, the existing reasonable and prudent alternatives in the biological opinions, nor does it offer a meaningful comparison of the projected effects and benefits of alternatives.
- It does not identify any mitigation for lost CVP and SWP water supply, despite acknowledging that the existing reasonable and prudent alternatives will result in an average annual loss of over one million acre-feet of project water, and despite the devastating impacts on the human environment already caused by resulting water shortages, including overdrafting groundwater basins, land subsidence, and degraded air quality.
- It attempts to deny any significant future water supply impacts from implementing the existing reasonable and prudent alternatives by unreasonably

assuming that increased use of groundwater will entirely substitute for lost CVP and SWP water supply.

- It does not explain the significant scientific uncertainty underlying the existing biological opinions and similar prescriptions, and hence does not inform the public or decision makers of the true nature and range of the largely policy-based choices to be made regarding future operations.
- It neglects to consider an integrated approach to meeting the needs of both the delta smelt and salmonid species, to remedy the sometimes conflicting requirements of the two existing biological opinions.

We provide more detailed comments supporting these and additional points in the Exhibits attached to this letter.<sup>2</sup> Significant revisions and additional analyses are required for Reclamation to make a well-informed decision, and to meet NEPA's requirements.

All will benefit if Reclamation takes the opportunity before it and performs the NEPA review necessary to adequately inform its coming decisions. Under the current remand schedule in the delta smelt case, Reclamation's Record of Decision is due by December 1, 2015. As we have noted in prior comments, that is not enough time to make needed revisions to the Draft EIS. These parties are open to an extension of the current remand deadline, which of course the court would have to approve. We invite further discussion with Reclamation on this issue.

Thank you for your consideration of these comments.

Sincerely,



Daniel G. Nelson  
Executive Director  
San Luis & Delta-Mendota Water Authority



Thomas Birmingham  
General Manager  
Westlands Water District



Steve Chedester  
Executive Director  
San Joaquin River Exchange Contractors Water Authority

---

<sup>2</sup> The Authority submitted written comments on June 28, 2012 in response to the notice of intent and scoping, on May 3, 2013 in response to the first version of the administrative draft environmental impact statement, and on July 14, 2015 in response to the second version of administrative draft environmental impact statement. We incorporate those prior comments, including all attachments thereto, in these comments as well.

## **EXHIBIT A**

### **San Luis & Delta-Mendota Water Authority Member Agencies**

The Authority's members are:

Banta-Carbona Irrigation District; Broadview Water District; Byron Bethany Irrigation District (CVPSA); Central California Irrigation District; City of Tracy; Columbia Canal Company (a Friend); Del Puerto Water District; Eagle Field Water District; Firebaugh Canal Water District; Fresno Slough Water District; Grassland Water District; Henry Miller Reclamation District #2131; James Irrigation District; Laguna Water District; Mercy Springs Water District; Oro Loma Water District; Pacheco Water District; Pajaro Valley Water Management Agency; Panoche Water District; Patterson Irrigation District; Pleasant Valley Water District; Reclamation District 1606; San Benito County Water District; San Luis Water District; Santa Clara Valley Water District; Tranquillity Irrigation District; Turner Island Water District; West Side Irrigation District; West Stanislaus Irrigation District; Westlands Water District.

### **San Joaquin River Exchange Contractors Water Authority Member Agencies**

The Exchange Contractors' members are:

Central California Irrigation District; San Luis Canal Company; Firebaugh Canal Water District; Columbia Canal Company

## EXHIBIT B

### DETAILED COMMENTS REGARDING DRAFT EIS

#### **I. THE DRAFT EIS IS FUNDAMENTALLY FLAWED**

##### **A. The Draft EIS Fails To Analyze An Important Aspect Of The Decision Facing Reclamation – What Changes To CVP Operations Are, Or Are Not, Necessary To Comply With ESA Section 7**

The review provided in the Draft Environmental Impact Statement for the Coordinated Long-term Operation of the Central Valley Project and State Water Project (“Draft EIS”) pursuant to the National Environmental Policy Act (“NEPA”) is inconsistent with the district court’s rulings in the *Consolidated Smelt Cases* and *Consolidated Salmonid Cases* and with Reclamation’s obligations on remand. The court found that Reclamation violated NEPA when it adopted and implemented major changes to Central Valley Project (“CVP”) and State Water Project (“SWP”) (collectively, the “Projects”) operations pursuant to biological opinions (“BiOps”), changes that caused significant adverse effects on the quality of the human environment, without doing any NEPA review. To understand and inform the public and policymakers regarding its coming decision, Reclamation must consider whether and how the continued operations of the CVP and SWP should be modified to ensure compliance with the Endangered Species Act (“ESA”). Reclamation must engage in a fundamental reanalysis of the effect of CVP and SWP operations on the listed species, and the necessity for and efficacy of any measures intended to address such effects.

In recent years, changes to CVP and SWP operations that purportedly were “necessary” to comply with the ESA have severely impaired the ability of the CVP and SWP to meet their respective authorized purposes, with disastrous consequences. Reclamation’s present NEPA review should therefore be keenly focused on identifying actions it and the Department of Water Resources (“DWR”) can take to better serve all authorized purposes while still meeting the requirements of the ESA. In performing this assessment, Reclamation should generate and carefully consider the data and analysis of impacts and alternatives in the NEPA process, including new available scientific data and other changes since 2008. The task on remand is not to simply accept the reasonable and prudent alternatives (“RPAs”) of the BiOps, but rather to analyze anew what, if any, modifications to CVP and SWP operations are necessary to avoid jeopardy to the species. Reclamation’s analysis must consider what effect the coordinated operations of the CVP and SWP actually have on species survival and recovery, what measures are proposed to reduce or compensate for such effects, what the data show about the likely efficacy of those measures, and what other effects those measures will cause including through reductions of water supply. That analysis should distinguish between actions that are necessary to comply with the mandates of ESA section 7 (i.e., to avoid jeopardizing the species or adversely modifying its critical habitat), and other actions that might provide some additional protection or benefit for listed species, but are not necessary to comply with the ESA.

The Draft EIS suggests that it is intended to be used to inform Reclamation’s operation of the CVP. The Draft EIS states: “This EIS may be used by Reclamation or cooperating agencies

that are participating in the preparation of this EIS to inform future decisions related to operation of the CVP and SWP, and implementation of the RPAs in the 2008 USFWS BO and 2009 NMFS BO.” Draft EIS at ES-5. However, the Draft EIS does not critically examine the conclusions of the BiOps, or the RPAs. It accepts them as a given, rather than using the NEPA process to analyze the available data and inform decisions regarding what CVP and SWP operations are actually necessary to meet Reclamation’s ESA obligations. In order to serve the purposes of NEPA, the Draft EIS must be revisited and revised, to allow an up-to-date analysis that takes the requisite “hard look” at what, if any, modifications to CVP and SWP operations are necessary to comply with the standards of ESA section 7. *South Fork Band Council of Western Shoshone of Nevada v. U.S. Dep’t of Interior*, 588 F.3d 718, 726-27 (9th Cir. 2009). That review should expressly note scientific uncertainties and gaps in data, and indicate the significance of shortcomings in the data for the ultimate decision.

Reclamation is not bound to, and cannot, simply implement the reasonable and prudent alternatives prescribed by the wildlife agencies in the 2008 and 2009 BiOps. Instead, Reclamation must decide for itself what is or is not required to insure that its actions comply with its obligations under the ESA. 16 U.S.C. § 1536(a)(2); *Wild Fish Conservancy v. Salazar*, 628 F.3d 513, 518-19. In making that determination, Reclamation “may not rely solely on [the BiOps] to establish conclusively its compliance with its substantive obligations under section 7(a)(2).” *Pyramid Lake Paiute Tribe of Indians v. U.S. Dep’t of Navy*, 898 F.2d 1410, 1415 (9th Cir. 1990). “[T]he action agency must not blindly adopt the conclusions of the consultant agency.” *City of Tacoma, Wash. v. Fed. Energy Regulatory Comm’n*, 460 F.3d 53, 76 (D.C. Cir. 2006). This is because in the end, “the ultimate responsibility for compliance with the ESA falls on the action agency.” *Id.*; see also 16 U.S.C. § 1536(a)(1)-(2).

Reclamation must now reconsider whether and how the continued operations of the CVP and SWP should be modified to ensure compliance with the ESA. As Reclamation considers the 2008 and 2009 BiOps anew, it should “determine whether and in what manner to proceed with the action in light of its section 7 obligations and the Service[s’] biological opinion[s].” 50 C.F.R. § 402.15(a). Reclamation’s fresh review of the 2008 and 2009 BiOps and RPAs must not be arbitrary, capricious, or contrary to law, or Reclamation will violate its independent, substantive duty to comply with the ESA. Such independent liability will attach, for example, where the action agency is in possession of “new information” rendering the BiOp suspect. *Wild Fish Conservancy*, 628 F.3d at 532; *Pyramid Lake*, 898 F.2d at 1415. Such liability may also attach where the BiOp is based on data that contradicts the action agency’s own data or where the action agency, through the BiOp, failed to consider all relevant factors. See *Defenders of Wildlife v. U.S. Env’tl Prot. Agency*, 420 F.3d 946, 976 (9th Cir. 2005); *Res. Ltd., Inc. v. Robertson*, 35 F.3d 1300, 1305 (9th Cir. 1993); *Pac. Coast Fed’n of Fishermen’s Ass’ns v. Gutierrez*, 606 F. Supp. 2d 1122, 1189, 1191 (E.D. Cal. 2008).

Reclamation must review the scientific data underlying the prescriptions of the BiOps, the scientific data available today, and the experience of the past seven years, in order to determine what is necessary to meet its obligations under ESA section 7. The Draft EIS is inadequate to serve that purpose, and hence must be substantially revised to adequately inform Reclamation’s decision.

## **B. The Draft EIS Fails To Identify The Proposed Action**

The Draft EIS does not clearly identify the “proposed action.” The Department of Interior’s regulations for implementation of NEPA mandate that an EIS include a “description of the proposed action.” 43 C.F.R. § 46.415(a)(2). The regulations define the “proposed action” as “the bureau activity under consideration” and the regulations state that the “proposed action” must be “clearly described in order to proceed with NEPA analysis.” 43 C.F.R. § 46.30.

Apparently, Reclamation has not yet decided upon a proposed action. The Draft EIS does not contain a section entitled “proposed action,” nor does the document ever clearly identify the proposed action. The Draft EIS states: “This Draft EIS evaluates potential long-term direct, indirect, and cumulative impacts on the environment that could result from implementation of modifications to the continued long-term operation of the CVP and SWP.” Draft EIS at 1-1. Reclamation must decide upon a proposed action for the NEPA process. For example, unless and until Reclamation identifies and describes the “proposed action” it is difficult to imagine how Reclamation can develop a reasonable range of alternatives to the proposed action.

## **C. The No Action Alternative Is Incorrect**

An EIS must “[i]nclude the alternative of no action.” 40 C.F.R. § 1502.14(d). In an EIS, the action alternatives are compared to the no action alternative to measure the impacts of each action alternative. *See, e.g., Center for Biological Diversity v. U.S. Dept. of the Interior*, 623 F.3d 633, 642, (9th Cir. 2010) (“A no action alternative in an EIS allows policymakers and the public to compare the environmental consequences of the status quo to the consequences of the proposed action. The no action alternative is meant to ‘provide a baseline against which the action alternative[ ]’...is evaluated. *Id.* A no action alternative must be considered in every EIS. *See* 40 C.F.R. § 1502.14(d).”).

According to Reclamation’s NEPA Handbook, “[n]o action’ represents a projection of current conditions and reasonably foreseeable actions to the most reasonable future responses or conditions that could occur during the life of the project without any action alternatives being implemented.” Reclamation’s NEPA Handbook (Feb. 2012) at 8-8. Moreover,

[t]he no action alternative should not automatically be considered the same as the existing condition of the affected environment because reasonably foreseeable future actions may occur whether or not any of the project action alternatives are chosen. When the no action alternative is different from the existing condition, as projected into the future, the differences should be clearly defined. Differences could result from other water development projects, land use changes, municipal development, or other actions. “No action” is, therefore, often described as “the future without the project.”

*Id.*

The Draft EIS's No Action Alternative does not allow the decisionmakers or the public to evaluate and compare the environmental consequences of implementing the BiOps and RPAs, because it *includes* the RPAs. The Draft EIS states:

For this EIS, the No Action Alternative is based upon the continued operation of the CVP and SWP in the same manner as occurred at the time of the publication of the Notice of Intent in March 2012. Thus, the No Action Alternative consists of the coordinated long-term operation of the CVP and SWP, including full implementation of the RPAs in the 2008 USFWS BO and 2009 NMFS BO because Reclamation provisionally accepted the BOs in 2008 and 2009, respectively, and is implementing the RPAs. The No Action Alternative also includes changes not related to the long-term operation of the CVP and SWP or implementation of the RPAs in the 2008 USFWS BO and 2009 NMFS BO . . . .

Draft EIS at 3-3. This description of the No Action Alternative is inconsistent with the district court's rulings regarding Reclamation's failure to comply with NEPA, and will result in an EIS that fails to comply with law. *See, e.g., Conservation Council for Hawaii v. NMFS*, --- F. Supp. 3d ----, 2015 WL 1499589 at \*25 (D. HI Mar. 31, 2015) (finding no action alternative unlawful because it "assum[ed] the very take activities the Navy was proposing to engage in").

The Draft EIS's No Action Alternative essentially pretends that the litigation and the court rulings that resulted in the remand never happened. The Draft EIS states that "[b]ecause the RPAs were provisionally accepted and the No Action Alternative represents a continuation of existing policy and management direction, the No Action Alternative includes the RPAs." Draft EIS at ES-8. However, that rationale ignores the reality that Reclamation was required, but failed, to conduct NEPA review *before* accepting and implementing the RPAs. The "existing policy and management direction" is unlawful because it was adopted without prior NEPA review.

The district court ruled that Reclamation violated NEPA by significantly modifying CVP operations to meet ESA requirements without first performing NEPA analysis of the impacts of such modifications or alternatives to such modifications. To remedy the error found by the court, Reclamation must place itself back in the position it was in before that error occurred (i.e. before provisionally adopting the BiOps without performing any NEPA analysis). Accordingly, in order to respond to the court's ruling on remand, here the "no action" alternative should be defined to include operations consistent with Reclamation's and DWR's obligations and all legal requirements *except* any ESA-related requirements that involve major changes to operations. Under this definition of "no action," CVP and SWP operations would continue in compliance with other regulatory requirements (e.g. D-1641 as modified by applicable laws, including Wilkins Slough requirements, FERC license requirements, American River in-river flow requirements, etc.). Comparing this no action alternative to the action alternatives developed

during the NEPA process will provide the most comprehensive and appropriate disclosure of the environmental impacts of the various action alternatives to comply with ESA requirements.<sup>1</sup>

Treating the BiOps as any part of the No Action Alternative is a highly inadvisable course of action, because it does not cure the NEPA violation found by the district court. It instead contradicts the district court's ruling, because the NEPA analysis does not measure and disclose the impacts of changes to CVP and SWP operations to comply with the ESA. And it defeats the purpose of the No Action Alternative—to provide a meaningful comparative scenario with which to gauge the impacts of the action alternatives. As the Ninth Circuit observed in a similar context, “[a] no action alternative in an EIS is meaningless if it assumes the existence of the very plan being proposed.” *Friends of Yosemite Valley v. Kempthorne*, 520 F.3d 1024, 1038 (9th Cir. 2008). To comply with the judgments in the *Consolidated Smelt Cases* and *Consolidated Salmonid Cases*, the No Action Alternative must be revised.

The definition of the No Action Alternative (and indeed all alternatives) is incorrect for a second reason. The Draft EIS provides that it “does not address the CVP facilities associated with Millerton Lake, including the Madera and Friant-Kern canals and their service areas, and the San Joaquin River Restoration Program because these facilities are not considered in the consultations related to the 2008 USFWS BO and 2009 NMFS BO.” Draft EIS at 3-16. Appendix 3A repeats that “Friant Division operations are not analyzed in th[e] EIS.” Draft EIS at 3A-64. But Friant Division operations should be included and analyzed in the EIS.

The Friant Division is a part of the CVP. It is operating now, and presumably it will be operating for the foreseeable future. Its operations will continue to affect the overall operations of the CVP and coordinated operations of the SWP. By failing to include Friant Division operations, the Draft EIS is taking an incomplete look at CVP operations, and may be missing important impacts and available alternatives. That omission violates NEPA. It is no excuse that the ESA consultations concluded in 2008 and 2009 failed to include Friant Division operations. Those ESA consultation failings does not warrant creating a NEPA defect as well.

**D. The Second Basis Of Comparison Is Not A Substitute For The Correct No Action Alternative**

The Authority, Westlands, and the Exchange Contractors appreciate Reclamation's efforts to provide a “Second Basis of Comparison” for comparing the environmental consequences of the alternatives, as a response to our concerns about the No Action Alternative. However, the true remedy is to correctly define the No Action Alternative in the first place. That would eliminate the need for a “second basis of comparison,” and simplify the Draft EIS.

---

<sup>1</sup> The situation here is unlike most other circumstances where NEPA review is performed, because the CVP and SWP were constructed and operating before NEPA and the ESA were even enacted. Thus, the “no action” alternative, which usually serves as the baseline for evaluating the significance of environmental impacts of action alternatives, is more complicated. The existing Projects, including operations, must be captured in the “no action” baseline so they are not included in the new effects of the action alternatives. For this reason, a hypothetical “no action” alternative that fails to account for current and previous operations of the Projects would be an improper baseline for comparative analysis. See *American Rivers v. Federal Energy Regulatory Comm.*, 187 F.3d 1007 (9th Cir. 1999).

The Draft EIS states:

this EIS includes a “Second Basis of Comparison” that represents a condition in 2030 with coordinated long-term operation of the CVP and SWP without implementation of the 2008 USFWS BO and 2009 NMFS BO RPAs. All of the alternatives are compared to the No Action Alternative and to the Second Basis of Comparison to describe the effects that could occur in 2030 under both bases of comparison.

Because several of the 2009 NMFS BO RPA actions had already been initiated prior to issuance of the 2009 NMFS BO; those actions are included in the Second Basis of Comparison. Reasonably foreseeable actions included in the No Action Alternative that are not related to the 2008 USFWS BO or 2009 NMFS BO are also included in the Second Basis of Comparison.

Draft EIS at ES-8.

We found the description and use of the Second Basis Of Comparison in the Draft EIS somewhat confusing. It is not a remedy for the defects in the No Action Alternative, because it still includes actions based on the BiOps. As we understand it, it does not provide a basis for comparison to CVP and SWP operations consistent with Reclamation’s and DWR’s obligations and all legal requirements *except* requirements related to the ESA.

If Reclamation adopts the Second Basis Of Comparison as its No Action Alternative, it should revise it to eliminate any actions taken in response to the BiOps and RPAs. The Second Basis Of Comparison includes the following “actions included in the 2008 USFWS BO and 2009 NMFS BO”:

- 2008 USFWS BO RPA Component 4, Habitat Restoration.
- 2009 NMFS BO RPA Action I.1.3, Clear Creek Spawning Gravel Augmentation.
- 2009 NMFS BO RPA Action I.1.4, Spring Creek Temperature Control Curtain Replacement.
- 2009 NMFS BO RPA Action I.2.6, Restore Battle Creek for Winter-Run, Spring-Run, and Central Valley Steelhead.
- 2009 NMFS BO RPA Action I.3.1, Operate Red Bluff Diversion Dam with Gates Out.
- 2009 NMFS BO RPA Action I.5, Funding for CVPIA Anadromous Fish Screen Program.
- 2009 NMFS BO RPA Action I.6.1, Restoration of Floodplain Habitat; and Action I.6.2, Near-Term Actions at Liberty Island/Lower Cache Slough and Lower Yolo Bypass; Action I.6.3, Lower Putah Creek Enhancements; Action I.6.4, Improvements to Lisbon Weir; and Action I.7, Reduce Migratory Delays and Loss of Salmon, Steelhead, and Sturgeon at Fremont Weir and Other Structures in the Yolo Bypass.

- 2009 NMFS BO RPA Action II.1, Lower American River Flow Management.

Draft EIS at 3-5 – 3-7. If the intent of the Second Basis Of Comparison is to provide a basis of comparison “that does not include implementation of the RPAs” then the Second Basis Of Comparison should not include actions under programs that are being implemented in response to, and in lieu of, the RPAs. Draft EIS at 3-22. The purpose of the No Action Alternative is to inform the public and policy makers of what conditions would be like without major ESA-related restrictions on CVP and SWP operations. The existing Second Basis Of Comparison improperly assumes that modifications to CVP and SWP operations are necessary to avoid jeopardy and includes certain existing actions that are dependent on the BiOps’ jeopardy determination.

In addition, the Second Basis of Comparison does not serve as a substitute for the correct No Action Alternative because the Draft EIS disregards the Second Basis of Comparison throughout much of its NEPA analysis. Critically, the Draft EIS fails to identify mitigation measures that could mitigate the impacts associated with implementing the RPAs, as we explain next.

#### **E. The Draft EIS Lacks Mitigation Measures For the RPAs**

In addition to analyzing the impacts of all potential, feasible alternatives, the EIS must include a discussion of the “means to mitigate adverse environmental impacts.” 40 C.F.R. § 1502.16(h). Accordingly, the EIS must identify all relevant, reasonable mitigation measures that could alleviate a project’s environmental effects, even if they entail actions that are outside the lead or cooperating agencies’ jurisdiction. *See* “Forty Most Asked Questions Concerning CEQ’s NEPA Regulations,” No. 19b. 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 or examine mitigation measures that may help mitigate the impacts of implementing the RPAs. Reclamation’s refusal to even consider ways to mitigate such impacts appears to be tied to its failure to critically examine the RPAs and analyze how the existing RPAs could be modified to mitigate their impacts, such as impacts to SWP and CVP water supplies and deliveries. *See South Fork Band Council of Western Shoshone of Nevada v. U.S. Dept. of Interior*, 588 F.3d 718, 727 (9th Cir. 2009). The EIS fails to provide this critical component of the analysis required by NEPA.

The Draft EIS acknowledges that NEPA requires analysis of mitigation measures, but the Draft EIS fails to identify any measures to mitigate the impacts of implementing the RPAs. The Draft EIS states: “An EIS must also identify relevant, reasonable mitigation measures that are not already included in the proposed action or alternatives to the proposed action that could be used to avoid, minimize, rectify, reduce, eliminate, or compensate for the project’s adverse environmental effects.” Draft EIS at ES-14. However, the EIS then states that “Mitigation measures were not included to address adverse impacts under the alternatives as compared to the Second Basis of Comparison because this analysis was included in this EIS for information purposes only.” *Id.* at ES-14 – ES-15. In other words, the Draft EIS admits there are adverse

impacts associated with implementing the RPAs, but fails to make any effort to identify mitigation measures to address those impacts.

For example, the Draft EIS confirms that continued implementation of the BiOps' RPAs will cause huge reductions in CVP and SWP water deliveries, yet the Draft EIS makes no effort to identify possible ways to mitigate those impacts. Draft EIS at 5-93 – 5-97 (tables showing reduced water deliveries and text describing reductions). It estimates that on a long-term annual average, the RPAs will reduce CVP water deliveries by 332,000 acre-feet annually, and reduce SWP water deliveries by 773,000 acre-feet annually. *Id.* In particular, implementation of the RPAs is expected to reduce deliveries to CVP South of Delta agricultural water service contractors “by 24 percent over the long-term conditions; 33 percent in dry years; and 37 percent in critical dry years.” Draft EIS at 5-95. And deliveries of “Article 21 water to SWP South of Delta water contractors would be reduced by 83 percent over the long-term conditions; 96 percent in dry years; and 92 percent in critical dry years.” *Id.* at 5-97. Yet, the Draft EIS fails to identify even a single mitigation measure that could help mitigate these water supply impacts. Failing to identify mitigation for the massive losses of water supply that will indisputably result from implementing the RPAs is inexplicable, and an obvious violation of NEPA.

**F. The Draft EIS Fails To Provide A Reasonable Range of Alternatives That Are Responsive To The Purpose And Need For The Action**

The alternatives presented and analyzed in the Draft EIS do not represent a reasonable range of alternatives that are responsive to the identified purpose and need for the proposed action. The listed alternatives do not reflect the critical inquiry - how can Reclamation best meet the authorized purposes of the CVP while also ensuring compliance with its obligations under ESA section 7? Further, it fails to consider an alternative that integrates the RPAs from the two BiOps, as a way to avoid or lessen conflicts between prescriptions for the delta smelt and salmonid species.

**1. The Draft EIS Fails To Apply The Purpose And Need In Its Development Of Alternatives**

An EIS must contain a statement of “purpose and need” which briefly specifies “the underlying purpose and need to which the [lead] agency is responding in proposing the alternatives including the proposed action.” 40 C.F.R. § 1502.13. The purpose and need statement “is a critical element that sets the overall direction of the process and serves as an important screening criterion for determining which alternatives are reasonable.” NEPA Handbook at 8-5. This statement of purpose and need is important because it will inform the range of alternatives ultimately selected for analysis in the EIS and “[a]ll reasonable alternatives examined in detail must meet the defined purpose and need.” *Id.* The ‘need’ for the action may be described as the underlying problem or opportunity to which the agency is responding with the action. The ‘purpose’ may refer to the goal or objective that the bureau is trying to achieve, and should be stated to the extent possible, in terms of desired outcomes.” 43 C.F.R. § 46.420(a)(1).

**Statement of Purpose**

The Draft EIS describes the “purpose” of the action as follows:

The purpose of the action considered in this EIS is to continue the operation of the CVP in coordination with operation of the SWP, for its authorized purposes, in a manner that:

- Is similar to historic operational parameters with certain modifications;
- Is consistent with Federal Reclamation law; other Federal laws and regulations; Federal permits and licenses; State of California water rights, permits, and licenses; and
- Enables Reclamation and DWR to satisfy their contractual obligations to the fullest extent possible.

Draft EIS at ES-6.

The Authority, Westlands, and the Exchange Contractors appreciate that the statement of purpose now includes satisfying contractual obligations to the fullest extent possible, and operating the CVP for its authorized purposes. However, implementation of the RPAs has prevented Reclamation from meeting the authorized purposes of the CVP. Reclamation’s inability to meet the CVP’s authorized purposes under the BiOps should be expressly acknowledged, and should inform the development of alternatives.

### **Statement of Need**

The Draft EIS describes the “need” for the action as follows:

Continued operation of the CVP is needed to provide river regulation, navigation; flood control; water supply for irrigation and domestic uses; fish and wildlife mitigation, protection, and restoration; fish and wildlife enhancement; and power generation. The CVP and the SWP facilities are also operated to provide recreation benefits and in accordance with the water rights and water quality requirements adopted by the SWRCB.

The USFWS and NMFS concluded in their 2008 and 2009 BOs, respectively, that the coordinated long-term operation of the CVP and SWP, as described in the 2008 Reclamation Biological Assessment, jeopardized the continued existence of listed species and adversely modified critical habitat. The USFWS and NMFS provided RPAs in their respective BOs as an alternative to the project described in the 2008 BA that would not jeopardize listed species or adversely modify critical habitat.

Draft EIS at ES-6.

This statement of need does not express the “underlying problem” that Reclamation is responding to. In the context here, providing water supply as fully as possible while still complying with the ESA gives rise to the *need* for the action. The “underlying problem” that Reclamation is responding to is the difficulty the CVP and SWP have had in serving water supply and other project purposes while complying with the ESA. That requires an analysis of what changes to operations, if any, are necessary to comply with the ESA, and based thereon whether the BiOp prescriptions or some alternative would better meet all project purposes while doing so.

## **2. The Range Of Alternatives Does Not Focus On The Key Issues**

The alternatives analysis is the “linchpin” of an EIS. *Monroe County Conservation Council, Inc. v. Volpe*, 472 F.2d 693, 697 (2d Cir. 1972). Federal agencies must to the fullest extent possible “[u]se the NEPA process to identify and assess reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment” and to use all practicable means to “avoid or minimize any possible adverse effects of their actions upon the quality of the human environment.” 40 C.F.R. § 1500.2(e), (f). Agencies must “rigorously explore and objectively evaluate all reasonable alternatives.” 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. Each action alternative should address the purpose of and need for the action . . .” NEPA Handbook at 8-9.

The Draft EIS’s five alternatives (*see* Draft EIS at 3-31 – 3-42) do not reflect the necessary inquiry into what CVP and SWP modifications, if any, are necessary to satisfy Reclamation’s obligations under ESA section 7. Nor do the alternatives reflect an effort to design alternatives that meet the CVP’s authorized purposes, and avoid, minimize or mitigate impacts to those purposes that may result from modifications to CVP operations. “Alternative 1” is described as “identical to the Second Basis of Comparison.” *Id.* at p. 3-31. “Alternative 2” includes the operational components of the existing BiOps but does not include “RPA actions that would require future studies and environmental documentation to define recommended actions (generally, structural actions).” *Id.* “Alternative 3” includes CVP and SWP operations and ongoing operational management policies of the CVP and SWP that would be similar to the operational assumptions under the Second Basis of Comparison, but with specified changes to water demand assumptions, OMR criteria, and operations of New Melones Reservoir to meet SWRCB D-1641 flow requirements on the San Joaquin River at Vernalis. *Id.* at p. 3-34. “Alternative 3” also includes “Actions Related to Predation Control, Wetlands Restoration, Juvenile Salmonid Trap and Haul Program, and Chinook Salmon Ocean Harvest.” *Id.* at p. 3-37. “Alternative 4” includes ongoing operational management policies of the CVP and SWP that would be identical to operations described under the Second Basis of Comparison. *Id.* at p. 3-39. In addition, “Alternative 4” includes “Actions Related to Floodplain Protection, Levee Vegetation, Predation Control, Wetlands Restoration, Juvenile Salmonid Trap and Haul Program, and Chinook Salmon Ocean Harvest.” *Id.* “Alternative 5” was “developed considering comments from environmental interest groups during the scoping process.” *Id.* at p. 3-41. “Alternative 5” has CVP and SWP operations and ongoing operational management policies of similar to the operational assumptions under the No Action Alternative, with certain specified

changes to water demand assumptions, OMR criteria, and operations of New Melones Reservoir to meet SWRCB D-1641 flow requirements on the San Joaquin River at Vernalis. *Id.*

The Draft EIS fails to explain whether or how each of the selected alternatives avoid the likelihood of jeopardizing listed species or their critical habitat. Nor does the Draft EIS explain how the selected alternatives meet the purpose of enabling Reclamation and DWR to satisfy their contractual obligations to the fullest extent possible and meet the authorized purposes of the CVP and SWP, respectively. Such an analysis is necessary for both the decisionmakers and the public to evaluate and compare the alternative actions and inform the decision regarding what modifications, if any, to CVP and SWP operations, should be implemented. Unless and until Reclamation critically examines what action alternatives can meet the purpose and need, Reclamation cannot develop feasible alternatives. Mixing and tweaking elements of the RPAs of the existing BiOps, without ever fundamentally reconsidering the RPAs, does not suffice to meet Reclamation's NEPA obligations on remand. Reclamation's failure, to date, to take a "hard look" at what alternative actions could be taken that would meet its ESA obligations and also minimize or avoid impacts to the human environment has resulted in an inadequate range of alternatives in the Draft EIS. The alternatives should allow for adequate water deliveries and prevent significant impacts to public health and the human environment, and also explore various methods to sufficiently maintain and protect the listed species and their critical habitats.

### **3. In Developing Alternatives, Reclamation Should Consider Integration Of Measures For Delta Smelt And Salmonids**

The two BiOps were developed independently of each other in 2008 and 2009, and in some cases, have conflicting RPAs. For example, Delta outflow prescribed for the delta smelt can diminish carryover storage in reservoirs beneficial to temperature management for salmonid species. Experts have suggested that the measures in the two BiOps should be integrated to best account for the needs of all species overall. *See* National Research Council 2010, A Scientific Assessment of Alternatives for Reducing Water Management Effects on Threatened and Endangered Fishes in California's Bay Delta.<sup>2</sup> In 2011, federal agencies planned an integrated biological opinion. *See* Interim Federal Action Plan Status Update for the California Bay-Delta: 2011 and Beyond, available at <https://www.doi.gov/sites/doi.gov/files/migrated/news/pressreleases/upload/Final-Status-Update-2010-12-15.pdf>. That has not yet happened, however.

In order to better meet the purpose and need, Reclamation should develop alternatives that reflect a comprehensive and integrated approach to meeting its ESA obligations with respect to both delta smelt and salmonid species, something it and expert scientists have already identified as the appropriate approach. Such an inquiry may reveal that there are ways to maximize overall benefits to protected species while also reducing water supply impacts.

#### **G. The Comparison Of Alternatives Is Inadequate**

The Draft EIS's comparison of alternatives runs afoul of NEPA. NEPA requires an EIS to "present the environmental impacts of the proposal and the alternatives in comparative form"

---

<sup>2</sup> References cited are listed below, and will be submitted electronically with these comments.

in a manner that “sharply defin[es] the issues and provid[es] a clear basis for choice among options by the decisionmaker and the public.” 40 C.F.R. § 1502.14. Although the Draft EIS includes two comparison tables that purport to identify the differences between the alternatives, the No Action Alternative, and the Second Basis of Comparison, neither the tables nor the resource chapters of the Draft EIS provide a clear basis for choice among the options.

Because the proposed modifications of CVP and SWP operations are required under the ESA only if they are necessary to avoid jeopardy and destruction or adverse modification of critical habitat (*see* Draft EIS at ES-5), it is essential that for each alternative the EIS analyze and describe the estimated attributable increase or decrease in: (1) the numbers of individuals of each species, (2) the estimated population viability of the listed species, and (3) the amount or quality of their critical habitats under each alternative. This type of quantitative analysis would enable numerical comparisons of the type preferred in Reclamation’s NEPA Handbook. *See* NEPA Handbook at 8-13. If Reclamation concludes there is no way to reliably compute such differences among the expected outcomes of each of the alternatives, the EIS should reveal and explain that lack of pertinent information. The Draft EIS lacks any of this information and explanation, and hence is not in compliance with the NEPA requirement to “[d]evote substantial treatment to each alternative considered in detail . . . so that reviewers may evaluate their comparative merits.” 40 C.F.R. § 1502.14(b); *see also* NEPA Handbook at 8-8.

While the two comparison tables included in the Draft EIS’s Executive Summary chapter provide quantitative information regarding the reduction in surface water resources and water supplies,<sup>3</sup> for example, the information regarding fish and aquatic resources is wholly qualitative, and does not allow for an easy comparison of the relative merits of the various alternatives analyzed, or the trade-offs involved in choosing one alternative over another. The following entries from Table ES.2, Comparison of No Action Alternative and Alternatives 1 through 5 to the Second Basis of Comparison, demonstrate the problem. Regarding the effects of the No Action Alternative, Alternative 3, and Alternative 5 on the delta smelt, as compared to the Second Basis of Comparison, the Draft EIS states:

- No Action Alternative: “Overall, likely would result in better conditions for Delta Smelt, primarily due to lower percentage entrainment for larval and juvenile life stages, and more favorable location of Fall X2 in wetter years, and on average.” Draft EIS at ES-60.
- Alternative 3: “Overall, effects would be similar based on reduced entrainment and more favorable location of Fall X2.” *Id.* at ES-64.
- Alternative 5: “Overall, likely would result in better conditions for Delta Smelt, primarily due to lower percentage entrainment for larval and juvenile life stages,

---

<sup>3</sup> For example, Table ES.2 indicates that the No Action Alternative would result in reduced storage in San Luis Reservoir in October through February, April, and May of wet years, up to 57.2%, as compared to the Second Basis of Comparison. Draft EIS at ES-48; *see also* Draft EIS at 22-36 (Table 22.2). In contrast, Alternative 3 would result in reduced storage in San Luis Reservoir in December through February and June of wet years, up to 15.7%, as compared to the Second Basis of Comparison (*id.* at ES-51), and Alternative 5 would result in reduced storage in San Luis Reservoir in October through February and April through August of wet years, up to 9.9% (*id.* at ES-55).

and more favorable location of Fall X2 in wetter years, and on average.” *Id.* at ES-69.

These statements suggest that each of the three alternatives would result in similar or “better” conditions for delta smelt, but they do not identify how much “better” for delta smelt each alternative might be. The missing information is necessary to enable decisionmakers to evaluate the alternatives in light of the trade-offs involved in choosing one alternative over another. Table ES.2 indicates that the No Action Alternative results in significantly reduced storage in San Luis Reservoir in wet years as compared to Alternative 5 (Draft EIS at ES-48, ES-55), but the table indicates that both the No Action Alternative and Alternative 5 “likely would result in better conditions for Delta Smelt” (*id.* at ES-60, ES-69). As a modifier in this context, “better” is useless. How much better than the Second Basis of Comparison would the alternatives be for delta smelt? To a significant degree? Are the “better conditions” necessary to avoid jeopardizing the delta smelt or adversely modifying its critical habitats? Is the science too uncertain to be able to say? Is there a difference in the improvement between the No Action Alternative and Alternative 5? What is the water supply cost for these “better” conditions? The answers to these questions must be apparent in any comparison table in the final EIS.

The discussion in each of the various resource chapters of the Draft EIS does not enable a meaningful comparison of the alternatives either. For example, the following statements from Chapter 9 are provided in the discussion of the No Action Alternative and Alternatives 1 through 5 relative to the Second Basis of Comparison, regarding the effects on the Sacramento River Winter-Run Chinook Salmon:

- No Action Alternative: “These model results suggest that effects on winter-run Chinook Salmon would be similar under both scenarios [under the No Action Alternative and the Second Basis of Comparison], with a small likelihood that winter-run Chinook Salmon escapement would be higher under the No Action Alternative. This potential distinction between the two scenarios, however, may be offset by the benefits of implementation of fish passage under the No Action Alternative intended to address the limited availability of suitable habitat for winter-run Chinook Salmon in the Sacramento River reaches downstream of Keswick Dam. This potential beneficial effect and its magnitude would depend on the success of the fish passage program.” Draft EIS at 9-164.
- Alternative 3: “These model results suggest that effects on winter-run Chinook Salmon would be similar under both scenarios, with a small likelihood that winter-run Chinook Salmon escapement would be higher under Alternative 3 than under the Second Basis of Comparison. The ocean harvest restrictions under Alternative 3 could provide additional benefit, although the effects of the predator management program are uncertain.” *Id.* at 9-325.
- Alternative 5: “The analysis of temperatures indicates somewhat higher temperatures and greater likelihood of exceedance of thresholds under Alternative 5 as compared to the Second Basis of Comparison. This is reflected in the slightly lower survival of winter-run Chinook Salmon eggs predicted by Reclamation’s salmon mortality model. Flow changes under Alternative 5 would

have small effects on the availability of spawning and rearing habitat for winter-run Chinook Salmon as indicated by the decrease in flow (habitat)-related mortality predicted by SALMOD under Alternative 5. Through Delta survival of juvenile winter-run Chinook Salmon would be the same under both Alternative 5 and Second Basis of Comparison as indicated by the DPM results; and the OBAN results suggest that Delta survival could be higher under Alternative 5. Entrainment may also be reduced under Alternative 5 as indicated by the OMR flow analysis. Median adult escapement to the Sacramento River would be reduced slightly under Alternative 5 as indicated by the IOS model results which incorporate temperature, flow, and mortality effects on each life stage over the entire life cycle of winter-run Chinook Salmon. However, the OBAN model results indicate an increase in escapement over a more limited time period (1971 to 2002). Considering all the above analyses for the winter-run Chinook Salmon population, the changes in overall effects under Alternative 5 compared to Second Basis of Comparison are highly uncertain. However, the upstream fish passage included under Alternative 5 could benefit the winter-run Chinook Salmon population in the Sacramento River as compared to the Second Basis of Comparison if successful.” *Id.* at 9-359.

These descriptions do not indicate the materiality of the projected differences for the populations of affected fish species. Are the differences in projected conditions material? What criteria will be used to determine whether a particular difference is material? Is one alternative better suited than another in terms of avoiding jeopardy and destruction or adverse modification of critical habitat? As with Tables ES.1 and ES.2, the descriptions in the Draft EIS’s resource chapters do not enable decisionmakers or the public to understand the differences between Alternatives 1-5, the No Action Alternative, and the Second Basis of Comparison. More information is needed. If the expected relative benefit of a particular operation intended to protect fish populations is minimal, that information would usefully inform Reclamation’s ultimate decision on whether to adopt that measure, especially if that measure significantly impairs other project purposes. If the materiality of the differences in conditions is unknown, that absence of information should be expressly noted. A synthesis and presentation of information regarding the materiality of potential changes in operations for fish populations, or the lack of such information, would help inform the public and decision makers of the expected benefits or detriments of alternative operations.

Tables ES.1 and ES.2 and the resource chapters in the Draft EIS should be revised to provide a more meaningful comparison among all the alternatives. Dually providing analytic information in both text and tabular or other graphic formats will best provide full and understandable disclosure to the public and decision-makers of the relative merits of each action alternative and the No Action Alternative, and better inform and support any policy decisions Reclamation makes at the end of the NEPA processes. Without revision, the comparison of alternatives in the Draft EIS will violate NEPA’s requirement to “present complete and accurate information to decision makers and the public to allow an informed comparison of the alternatives considered in the EIS.” *Nat. Resources Def. Council v. U.S. Forest Serv.*, 421 F.3d 797, 813 (9th Cir. 2005).

**H. The “Snapshot” Look At The Year 2030 For The Effects Analyses Is Not Adequately Explained And Masks Aggregate Impacts**

The Draft EIS states that it “analyzes future conditions projected for the Year 2030,” and a “range of alternatives” for coordinated operations “in the Year 2030.” Draft EIS at ES-7, 3-1 and 4-1. The stated justification for looking to that single year is that “the coordinated long-term operation of the CVP and SWP, as described in the alternatives analyzed in this EIS, would continue to at least 2030 before major changes to CVP and SWP operations would be implemented.” Draft EIS at ES-7.

This does not explain why the analysis excludes consideration of the years from 2015 to 2029. Looking only to a single year fifteen years from today, in 2030, omits consideration of impacts in the interim period. For example, if the existing reasonable and prudent alternatives continue in operation each year until 2030, they will likely result in water supply impacts in each of those years. The nature of the impacts may change over that period, as other operations and conditions change. If Reclamation has concluded that conditions, operations and impacts in 2030 will typify all the intervening years, it has not explained and justified that conclusion. Another problem with limiting analysis to 2030 is it fails to consider fifteen years of impacts in the aggregate. The impacts to farms and communities and resources from one year of lost CVP water supply in 2030 is not the same as the accumulated impact of 15 years of lost CVP water supply. Finally, impacts of actions taken between now and 2030 may continue to be felt after 2030. For example, the Draft EIS projects increased use of groundwater to compensate for lost surface supplies. That will create a deficit in groundwater supplies that will have impacts well past 2030.

**I. The Draft EIS Fails To Acknowledge Or Incorporate The Lessons From Operating The Projects Under The BiOps The Past Seven Years**

For this NEPA review, Reclamation is not in a situation where it must rely entirely on projections and modeling to forecast what might happen with implementation of the RPAs. Reclamation has the unusual advantage of knowing the actual, observed consequences of implementing the BiOps over the past seven years. That information is highly useful in projecting what would likely occur with implementation of the RPAs between now and 2030. Unfortunately, the Draft EIS fails to take advantage of that experience. Instead its analysis largely ignores and indeed contradicts the realized effects of implementing the BiOps.

As detailed below, the Draft EIS relies heavily on modeling and assumptions without “truing up” those models and assumptions with what has actually occurred as a result of operating the CVP and SWP to meet the RPAs since 2008. For example, it assumes that groundwater will fully substitute for lost CVP and SWP supplies. But in fact, that is not what has happened since 2008. Instead, shortages of surface water supply have resulted in extensive fallowing of farm land, demonstrating that groundwater in fact cannot fully replace lost surface water supply. Further, in the years since the RPAs were adopted, the delta smelt and salmonid species have further declined, not recovered. That experience should inform any assessment of the supposed benefit of and necessity for the RPA prescriptions, and the impact of CVP and SWP operations relative to other stressors. Yet, as described above, the Draft EIS fails to critically examine the conclusions in the BiOps and RPAs at all.

**J. The Draft EIS Fails To Disclose The Limits Of Scientific Knowledge And The Policy-Based Decision Facing Reclamation**

The Draft EIS is deficient because it lacks an analysis and explanation of the substantial scientific uncertainties underlying the conclusions and prescriptions in the BiOps. 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. The comments submitted by the State Water Contractors extensively document such uncertainties, and the scientific information not addressed in the Draft EIS. As the State Water Contractors note, the Draft EIS neglects to identify relevant data and studies that contradict some of its premises, and it treats mere hypotheses as accepted truths.

The available science falls well short of dictating any particular decision or specific requirement, e.g. a particular limit on negative OMR flows for delta smelt, as essential to the continued survival of the species. For example, as a National Research Council report explained about the OMR requirement for delta smelt:

there is substantial uncertainty regarding the amount of flow that should trigger a reduction in exports. In other words, the specific choice of the negative flow threshold for initiating the RPA is less clearly supported by scientific analyses. The biological benefits and the water requirements of this action are likely to be sensitive to the precise values of trigger and threshold values. There clearly is a relationship between negative OMR flows and mortality of smelt at the pumps, but the data do not permit a confident identification of the threshold values to use in the action, and they do not permit a confident assessment of the benefits to the population of the action. As a result, the implementation of this action needs to be accompanied by careful monitoring, adaptive management, and additional analyses that permit regular review and adjustment of strategies as knowledge improves.<sup>4</sup>

The Draft EIS should be revised to acknowledge and define this and similar gaps in knowledge for decision makers, and the public. Even with the benefit of the most recent data available, Reclamation’s coming decisions will be predominantly policy choices made in the context of significant scientific uncertainty.

Part 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. Past regulatory decisions taken without the guiding light of NEPA have been made with an unjustified claim of certainty or necessity without acknowledgment of the significant uncertainty or imprecision that accompanied such actions. This obscures the true weight of the policy decisions set before the agency, and discourages honest and critical evaluation of policy options.

---

<sup>4</sup> National Research Council (2012). Sustainable Water and Environmental Management in the California Bay-Delta. Washington DC: National Academies Press, at pp. 210-211.

In 2004, the National Research Council issued a report addressing the degree of scientific certainty, or lack thereof, regarding measures imposed under the ESA for the protection of listed fishes in the Klamath River basin. National Research Council, *Endangered and Threatened Fishes in the Klamath River Basin: Causes of Decline and Strategies for Recovery*. Washington, DC: The National Academies Press, 2004. To accomplish their charge, the committee developed “specific conventions for judging the degree of scientific support for a proposal or hypothesis” in the Klamath biological opinions. *Id.* at p. 35. The committee summarized these conventions in the following table:

**TABLE 1-2** Categories Used by the Committee for Judging the Degree of Scientific Support for Proposed Actions Pursuant to the Goals of the ESA

Basis of Proposed Action	Scientific Support	Possibly Correct?	Potential to be Incorrect
Intuition, unsupported assertion	None	Yes	High
Professional judgment inconsistent with evidence	None	Unlikely	High
Professional judgment with evidence absent	Weak	Yes	Moderately high
Professional judgment with some supporting evidence	Moderate	Yes	Moderate
Hypothesis tested by one line of evidence	Moderately strong	Yes	Moderately low
Hypothesis tested by more than one line of evidence	Strong	Yes	Low

These or similar criteria should be explicitly applied in the NEPA process here to assess the strength of any scientific justification for the reasonable and prudent alternatives in the existing BiOps, and any other proposed restrictions on CVP and SWP operations that are intended to benefit listed species. Doing so will assist decisionmakers and the public in better understanding the choices to be made among alternatives.

Some have sought to justify restrictions on CVP and SWP operations even in the absence of substantial scientific support, based on the “precautionary principle.” As the Klamath report observed, however, “even when a policy decision is made to apply the precautionary principle, the question of whether the decision is consistent with the available scientific information is important. . . . At some point [] erring on the side of protection in decision-making ceases to be precautionary and becomes arbitrary. One indication that policy-based precaution has given way to bias or political forces is a major inconsistency of a presumed precautionary action with the available scientific information.” *Id.* at 315. If Reclamation makes a policy decision to apply the precautionary principle here, that choice should be explicit, so that choice and the tradeoffs involved are made clear to the public and any reviewing courts. That policy choice has not been made explicit in past decisions. In the litigation regarding the 2009 Salmonid BiOp, for example, NMFS sought to justify a restriction on OMR flows based on precaution, but as the district court found “nowhere in the BiOp (or any other document in the administrative record

cited by the parties) [did] NMFS disclose its intent to use a ‘precautionary principle’ to design the RPA Actions.” *Consolidated Salmonid Cases*, 713 F. Supp. 2d 1116, 1145 (E.D. Cal. 2010).

The Draft EIS does a poor job of describing the full extent of available scientific data, and disclosing the scientific uncertainty underlying the necessity for and efficacy of the existing reasonable and prudent alternatives. The Draft EIS fails to disclose or acknowledge that there is significant uncertainty regarding the effects of CVP and SWP operations on ESA-listed species, and regarding the potential benefits of modifications to operations, such as those identified in the existing RPAs. Current science does not, and cannot, dictate the precise modifications to CVP and SWP operations, if any, that are necessary to avoid jeopardizing listed species. Rather, there is a range of alternative actions that Reclamation could take that would comply with its legal obligations, including its obligations under under ESA section 7, given the available scientific data. Selecting an action within that range is essentially a policy decision, not a decision ultimately dictated by science.

In sum, the NEPA review here should make clear the differences between what is known based on the best available science, and where the appropriate decision makers must make policy judgments in the face of uncertainty. Reclamation should be explicit in identifying the scientific uncertainty associated with any restrictions on CVP and SWP operations that are proposed as necessary to comply with the ESA, and acknowledge that it is essentially making a policy decision. Reclamation’s policy decision should be informed by a multitude of considerations, including avoiding water supply impacts to its CVP contractors.

## **II. THE ANALYSIS OF IMPACTS RELATING TO WATER RESOURCES AND AQUATIC SPECIES SUFFERS FROM ADDITIONAL DEFECTS**

An EIS’s discussion of environmental consequences “forms the scientific and analytical basis” for comparing the environmental impacts of the proposed action and the alternatives. 40 C.F.R. § 1502.16. One of the purposes of NEPA is to ensure that “environmental information is available to public officials and citizens before decisions are made and before actions are taken. The information must be of high quality.” 40 C.F.R. § 1500.1(b). An EIS must provide “full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment.” 40 C.F.R. § 1502.1. NEPA requires that all federal agencies, to the fullest extent possible, “utilize a systematic, interdisciplinary approach which will insure the integrated use of natural and social sciences” and “initiate and utilize ecological information in the planning and development of resource-oriented projects.” 42 U.S.C. § 4334(2)(A), (H).

### **A. The Draft EIS Makes Unreasonable And Unsupported Assumptions Regarding Water Supplies And Associated Environmental Impacts**

#### **1. The EIS Unreasonably Assumes That Increased Groundwater Use Will Fully Compensate For Lost Surface Water Supplies**

The Draft EIS makes several unreasonable and unsupported assumptions regarding water supplies that skew the environmental effects analyses and cause environmental impacts to be

masked or understated. First, the Draft EIS unreasonably assumes that future water demands will be met in dry and critical dry years. The Draft EIS states:

Under the No Action Alternative and Second Basis of Comparison, it is assumed that water demands would be met on a long-term basis and in dry and critical dry years using a combination of conservation, CVP and SWP water supplies, other imported water supplies, groundwater, recycled water, infrastructure improvements, desalination water treatment, and water transfers and exchanges. It is anticipated that individual communities or users could be in a situation that would not allow for affordable water supply options, and that water demands could not be fully met. However, on a regional scale, it is anticipated that water demands would be met.

Draft EIS at 5-67. This assumption is unreasonable and unsupported because it is grounded in several other unreasonable assumptions, particularly regarding the availability of groundwater, as discussed below.

Second, the Draft EIS unreasonably assumes that groundwater will not just continue to be available at current levels, but that groundwater use can be increased from current levels, despite recent landmark legislation that will significantly regulate groundwater use. *See e.g.*, Draft EIS at 19-48 (describing assumed “increase in groundwater pumping of approximately 6 percent” in Sacramento Valley and San Joaquin Valley). The Draft EIS states: “The No Action Alternative and the Second Basis of Comparison assume that groundwater would continue to be used even if groundwater overdraft conditions continue or become worse.” Draft EIS at 5-68. The Draft EIS only briefly acknowledges the California law regulating groundwater use, and then proceeds to ignore the implications of the new law on the availability of groundwater to meet future water demands. The Draft EIS states, in relevant part:

It is recognized that in September 2014 the Sustainable Groundwater Management Act (SGMA) was enacted. The SGMA provides for the establishment of a Groundwater Sustainability Agencies (GSAs) to prepare Groundwater Sustainability Plans (GSPs) that will include best management practices for sustainable groundwater management.

...

The SGMA requires the formation of GSPs in groundwater basins or subbasins that DWR designates as medium or high priority based upon groundwater conditions identified using the CAGESM results by 2022. Sustainable groundwater operations must be achieved within 20 years following completion of the GSPs. In some areas with adjudicated groundwater basins, sustainable groundwater management could be achieved and/or maintained by 2030. However, to achieve sustainable conditions in many areas,

measures could require several years to design and construct water supply facilities to replace groundwater, such as seawater desalination. Therefore, it does not appear to be reasonable and foreseeable that sustainable groundwater management would be achieved by 2030; and it is assumed that groundwater pumping will continue to be used to meet water demands not fulfilled with surface water supplies or other alternative water supplies in 2030.

Draft EIS at 5-68 – 5-69; *see id.* at 7-109 (“this EIS analysis assumes that the new facilities or conservation measures are not implemented by 2030. Therefore, reductions in groundwater use in accordance with the SGMA are not anticipated until after 2030”)

The assumption that groundwater use will increase in 2030, despite SGMA, is unreasonable and unsupported. For starters, SGMA requires that groundwater basins in critical overdraft begin being managed under groundwater sustainability plans starting in 2020. Cal. Wat. Code, § 10720.7(a)(1). The Draft EIS’s presumption that groundwater availability will not be affected in 2030, after ten years of implementing a sustainability plan for a basin in critical overdraft, is untenable. Likewise, the Draft EIS’s presumption that regulating agencies in other basins will do nothing in the first eight years that they are supposed to be moving towards sustainable use of groundwater is baseless. *See* Cal. Wat. Code, § 10720.7(a)(2) (requiring submittal of groundwater sustainability plans for other basins by 2022). The Draft EIS itself admits that “in some basins and subbasins, SGMA actions could be implemented early, and sustainable groundwater management might be fully underway by 2030.” Draft EIS at 7-142. Yet, the Draft EIS presumes that SGMA implementation will not affect the volume of groundwater available for use in 2030. The Draft EIS fails to acknowledge that SGMA requires annual reporting regarding water use to DWR and also requires DWR to assess each basin’s progress in achieving sustainability, at least every five years after a sustainability plan is submitted. Cal. Wat. Code, § 10733.8. This means that the Draft EIS’s assumption that the status quo for groundwater use will be maintained up to and including 2030 is incorrect, because managing agencies will be required to demonstrate progress towards sustainability (e.g. using less groundwater) by 2025 or 2027. Further, the Draft EIS does not recognize that in some cases sustainability may be achieved through reductions in water demands (e.g. fallowing of agricultural lands), and that these reductions do not require new “water supply facilities” to be in place before reductions are mandated. *See* Draft EIS at 5-68 – 5-69.

The Draft EIS fails to account for the fact that many of the groundwater basins that would be affected by reduced surface water supplies from the CVP and SWP are basins that have been identified as being in critical overdraft. The Draft EIS admits that “[d]ue to the low amounts of average annual precipitation, limited surface water supply and extensive agricultural water use, there are areas of significant overdraft that exist in the San Joaquin Valley Groundwater Basin. Eight subbasins in the San Joaquin Valley Groundwater Basin were identified in a state of critical overdraft: Chowchilla, Eastern San Joaquin, Madera, Kings, Kaweah, Tule, Tulare Lake, and Kern (DWR 1980).” Draft EIS at 7-28. But the Draft EIS fails to explain how it is reasonable to assume that groundwater use will increase in basins that are already in critical overdraft, and which will need to be managed for sustainability starting in 2020. Cal. Wat. Code, § 10720.7(a)(1). How can the Draft EIS assume that in 2030, these basins will be able to sustain increased use of groundwater to make up for lost CVP and SWP surface water supplies?

In fact, the Draft EIS elsewhere contradicts its own unreasonable assumption regarding SGMA and future groundwater use. In the discussion of cumulative effects on groundwater resources, the Draft EIS concedes that SGMA is expected to result in reduced groundwater use. It states:

Implementation of SGMA, will have a beneficial effect on groundwater resources, as most areas will develop plans to manage groundwater extractions to not exacerbate further groundwater level declines. The implementation of the SGMA in high and medium groundwater basins would reduce the impacts on groundwater levels, storage and groundwater supply by implementing sustainable groundwater management plans and actions at the local level.

Draft EIS at 7-142. The Draft EIS's expectation that implementation of SGMA will alleviate groundwater level declines is premised on SGMA resulting in reduced groundwater use. Yet, the Draft EIS's analysis assumes *increased* groundwater use in 2030.

Third, the Draft EIS assumes groundwater use can increase in the future, despite existing conditions indicating limitations on the availability and utility of groundwater. For example, the EIS acknowledges that "there are several locations [within the Sacramento Groundwater Basin] showing early signs of persistent drawdown, suggesting limitations due to increased groundwater use in dry years. Locations of persistent drawdown include: Glenn County, areas near Chico in Butte County, northern Sacramento County, and portions of Yolo County." Draft EIS at 7-14. The Draft EIS states that the "persistent areas of drawdown [in the Sacramento Groundwater Basin] could be early signs that the limits of sustainable groundwater use have been reached in these areas." Draft EIS at 7-15. Yet, the Draft EIS fails to reconcile its assumption of increased groundwater use in the future, with the existing conditions indicating that certain groundwater basins may not be able to sustain even the current levels of groundwater use.

Several recent reports provide evidence that is it unreasonable for the Draft EIS to assume that groundwater can make up the difference between future water demands and shortages in surface water supplies. In recent years the lack of surface water supply has resulted land fallowing, something that would not occur if groundwater could simply be substituted for lost surface supplies. As DWR recently reported, the experience in water years 2014 and 2015, in which CVP south-of-Delta agricultural contractors received zero CVP water supplies, was large-scale land fallowing and lost agricultural employment. As DWR observed: "[a]lthough groundwater and water transfers may make up for some of the lost surface water supplies, cuts of this magnitude [like those of 2014 and 2015] result in abandonment of permanent plantings such as orchards and vineyards, large-scale land fallowing, and job losses in rural communities dependent on agricultural employment." DWR, 2015 Drought Brochure, at 11.<sup>5</sup> DWR estimated that almost 700,000 acres of land were fallowed in 2014, as a result of the water shortages experienced that year. DWR, 2014 Public Update for Drought Response, at 34.<sup>6</sup> The

---

<sup>5</sup> Available at [http://www.water.ca.gov/waterconditions/docs/DWR\\_DroughtBroch\\_070815-web.pdf](http://www.water.ca.gov/waterconditions/docs/DWR_DroughtBroch_070815-web.pdf)

<sup>6</sup> Available at [http://www.water.ca.gov/waterconditions/docs/DWR\\_PublicUpdateforDroughtResponse\\_GroundwaterBasins.pdf](http://www.water.ca.gov/waterconditions/docs/DWR_PublicUpdateforDroughtResponse_GroundwaterBasins.pdf)

extent of land fallowing during the recent drought shows that during times of surface water shortages, such as the shortages that would occur under the RPAs, groundwater does not serve as a complete substitute.

In addition, the existing problems with land subsidence provide evidence that there are significant and irreversible consequences of relying on groundwater to make up for surface water shortages. For example, a NASA report from August of 2015 shows that areas of the Central Valley have suffered extreme land subsidence during the recent drought. During the period of May 2014-January 2015, NASA observed that certain areas of the Central Valley subsided by over 13 inches. NASA, Progress Report, at 1.<sup>7</sup> This land subsidence is, or threatens to, impact major infrastructure, including the California Aqueduct and Mendota Canal, which provide critical conveyance of surface water supplies throughout California. *See id.* (subsidence of approximately 14 inches observed within a half a mile of the California Aqueduct). The NASA report shows how subsidence rates can accelerate with increasing reliance on groundwater. For example, the report states that during the period of July 2013 through March 2015, a subsidence bowl near the California aqueduct “impacted the aqueduct significantly,” causing 8 inches of subsidence along a 1.3 mile stretch of the aqueduct. *Id.* at 14-15.

The Draft EIS’s unreasonable assumption regarding future groundwater use is a significant error for several reasons. For one, the EIS assumes that groundwater will effectively make up the difference between future water demands and other water supplies. Draft EIS at 5-68 – 5-69. In addition, the EIS presumes that groundwater will provide over one-third of the total future water supplies. *See id.* at 5-68, Table 5.10 (identifying groundwater as providing 2,644,047 acre-feet of the total 7,798,561 acre-feet future water demand). Most importantly, the unreasonable assumption regarding future groundwater supplies permeates the analyses of environmental effects and causes environmental effects in multiple resource categories to be understated.

## **2. The Draft EIS’s Unreasonable Assumptions Regarding Water Supplies Skew The Analyses Of Other Resource Categories**

### **(a) Impacts To Agricultural Resources Are Underestimated**

The Draft EIS’s unreasonable assumptions regarding future use of groundwater skew the analyses of impacts to other resource categories. For example, the analysis of impacts to agricultural resources assumes that groundwater use in 2030 will increase, in response to reductions in the availability of CVP and SWP water supplies. “The analysis does not restrict groundwater withdrawals based upon groundwater overdraft or groundwater quality conditions.” Draft EIS at 12-24. While the Draft EIS acknowledges that “the Sustainable Groundwater Management Act requires preparation of Groundwater Sustainability Plans (GSPs) by 2020 or 2022 for most of the groundwater basins in the Central Valley Region,” the EIS still assumes that “Central Valley agriculture water users would not reduce groundwater use by 2030, and that groundwater use would change in response to changes CVP and SWP water supplies.” *Id.* The presumption that agriculture water users would be able to *increase* groundwater use as needed to support existing cropping levels, despite being subject to stricter regulation of groundwater use is

---

<sup>7</sup> Available at [http://www.water.ca.gov/groundwater/docs/NASA\\_REPORT.pdf](http://www.water.ca.gov/groundwater/docs/NASA_REPORT.pdf)

unreasonable, and disguises the potential for land fallowing and other impacts to agricultural production. Due to this unreasonable assumption, the Draft EIS concludes that implementation of the RPAs will not measurably reduce agricultural production. For example, the Draft EIS concludes that “Agricultural production in the Sacramento Valley would be similar (less than 5 percent change) under the No Action Alternative and the Second Basis of Comparison over long-term average conditions and in dry and critical dry years due to increased use of groundwater . . . .” Draft EIS at 12-28. The Draft EIS reaches the same flawed conclusion with respect to agricultural production in the San Joaquin Valley. *See id.* at p. 12-30.

The Draft EIS’s conclusions regarding no significant impacts to agricultural production are also contradicted by substantial evidence indicating that lands will be fallowed in response to reductions in surface water supplies from the CVP and SWP. In Westlands Water District, for example, land fallowing has significantly increased during the last two years of zero percent CVP contract allocations to Westlands. See Exhibit C, Westlands Water District Water Supply Graph, attached. In 2014, farmers within Westlands fallowed over 200,000 acres and farmers are expected to fallow a similar amount of acreage in 2015, due to the lack of CVP surface water supplies. The Draft EIS itself acknowledges that “[i]n extreme dry periods, such as 2014 when there were no deliveries of CVP water to San Joaquin Valley water supply agencies with CVP water service contracts, permanent crops were removed because the plants would not survive the stress of no water or saline groundwater (Fresno Bee 2014).” Draft EIS at 12-10. Yet, the Draft EIS does not appear to apply these observed facts to its analysis of how agricultural resources will be impacted by reduced CVP and SWP deliveries in the future. And despite the recognition that farmers have fallowed crops because saline groundwater is not suitable for certain crops, the Draft EIS does not consider groundwater quality as a factor in evaluating the ability to increase groundwater use for agricultural production. *See* Draft EIS at 12-24 (“The analysis does not restrict groundwater withdrawals based upon groundwater overdraft or groundwater quality conditions.”). The observed trends in land fallowing in response to reductions in surface water supplies need to be incorporated into the EIS’s analysis of expected impacts to agricultural production.

#### **(b) Socioeconomic Impacts Are Underestimated**

The Draft EIS’s unreasonable assumption about groundwater use, and resulting conclusions regarding effects on agriculture, skew the analysis of socioeconomic impacts. The assessment of socioeconomic impacts to agriculture-dependent communities in the Central Valley region is grounded in the faulty assumption that “the impact to irrigated acreage and agricultural production is relatively small” and that “[m]ost of the change in CVP or SWP irrigation supplies would be offset by changes in groundwater pumping, with only small changes in crop acreage in production.” Draft EIS at 19-39. In turn, the Draft EIS’s estimates of socioeconomic impacts associated with reduced agricultural production are gross underestimates. For example, the Draft EIS states:

The agricultural production value under long-term average conditions would be reduced by less than 1 percent (\$1.6 million/year in the Sacramento Valley and \$0.5 million/year in the San Joaquin Valley) primarily due to an increase in groundwater pumping of approximately 6 percent. The agricultural production

value under dry and critical dry conditions also would be reduced by less than 1 percent (\$11.3 million/year in the Sacramento Valley and \$20.3 million/year in the San Joaquin Valley) primarily due to an increase in groundwater pumping.

Draft EIS at 19-48. If reasonable assumptions were made regarding groundwater use and agriculture production, the estimated socioeconomic impacts of implementing the RPAs would be significantly greater.

The Draft EIS significantly underestimates the socioeconomic impacts of reduced CVP and SWP water supplies. For example, the Draft EIS concludes that implementation of the RPAs will only result in the loss of 254 agricultural-related jobs in the San Joaquin Valley in dry or critically dry years. See Draft EIS at 19-49, Table 19-61. Yet, existing literature provides evidence that past reductions in CVP and SWP water deliveries have resulted in significantly more lost jobs than the Draft EIS estimates. For example, several economic reports have estimated the number of jobs lost as a result of reductions in CVP and SWP water deliveries in 2009, and one of the most recent reports estimates that 9,100 agricultural-related jobs were lost in the San Joaquin Valley as a result of the 2009 water supply reductions.<sup>8</sup> The report also found that the lost jobs corresponded to land fallowing that occurred in response to reductions in CVP and SWP water deliveries, and estimated that “the 2009 water supply reductions reduced harvested acreage in the San Joaquin Valley by 240,000 acres . . .” *Id.* This report indicates that reductions in CVP and SWP water deliveries would be expected to result in significant losses in agricultural-related jobs, and contradict the Draft EIS’s conclusion that similar job losses will not occur in the future in response to reductions in water deliveries. The Draft EIS must look at empirical data and existing literature to inform its conclusions regarding impacts to agriculture and agricultural-related jobs.

The actual impacts to agriculture-dependent communities from reduced CVP and SWP water supplies are not revealed in the Draft EIS, but the importance of agriculture to the Central Valley economy is clear. The Draft EIS fails to identify the percent of the total workforce within the Central Valley region that depend on agriculture for employment, but the Draft EIS does show that over half of the state’s farm employment is in the Central Valley region. See Draft EIS at 19-9, Table 19.10. The Draft EIS also acknowledges that “farming is one of the most important basic industries in the Central Valley; and supports many other businesses including farm inputs (e.g., fertilizer, seed, machinery, and fuel) and processing of food and fiber grown on farms. As a result, employment both directly on farm and indirectly dependent on farming is higher than the values” reported in the Draft EIS for “farm employment.” *Id.* at p. 19-14. For example, as the Draft EIS acknowledges, a “study of the local economy in four counties of the San Joaquin Valley found that, for every on-farm job, about two and one-half additional jobs are supported because of inputs purchased for farming operations (NEA 1997).” *Id.* at p. 19-14. This means that there are cascading socioeconomic impacts that result from decreased agriculture productivity. The central role of agriculture in Central Valley communities makes it

---

<sup>8</sup> Auffhammer, M., Foreman, K., and Sunding, D. (2014) Turning Water Into Jobs: The Impact of Surface Water Deliveries on Farm Employment and Fallowing in California’s San Joaquin Valley, *Submitted for publication*, at p. 4.

even more critical that Reclamation include reasonable assumptions regarding water supplies, and regarding the corresponding impacts on agriculture of reduced water supplies.

**(c) Environmental Justice Impacts Are Underestimated**

Due to the Draft EIS's unreasonable assumptions about groundwater use and in turn, agriculture and agriculture-dependent communities, the Draft EIS provides no analysis of the environmental justice impacts that result from reduced CVP and SWP water supplies. Despite the Draft EIS's acknowledgment that communities throughout the Central Valley, and particularly the San Joaquin Valley, are areas with higher concentrations of minority populations and/or populations below the poverty level, the issue of environmental justice is left unexamined in the Draft EIS. The Draft EIS states the reason for this omission is that changes in employment related to irrigated agriculture and M&I water supplies would be similar under the RPAs and compared to the Second Basis of Comparison, and therefore, "these changes are not analyzed in this EIS." Draft EIS at 21-46. However, as explained above, the Draft EIS's assumption that groundwater can provide a substitute for reduced CVP and SWP water supplies due to implementation of the RPAs is unreasonable and contrary to observed conditions in the San Joaquin Valley. Reduced CVP and SWP water supplies have, and will continue to have, a significant impact on the agricultural communities throughout the Central Valley, and will cause environmental justice impacts on communities that are already suffering.

The Draft EIS acknowledges that many of the areas that would be impacted by reduced water deliveries from the CVP and SWP, such as the San Joaquin Valley, are areas with higher concentrations of minority populations and/or populations below the poverty level. For example, the Draft EIS recognizes that portions of the San Joaquin Valley are considered "poverty areas": "Merced, Fresno, Tulare, and Kern counties are defined as poverty areas because more than 20 percent of the populations in these counties are below the poverty level." Draft EIS at 21-16. Also, "[t]here are communities within these counties that have higher concentrations of minority populations and/or populations below the poverty level. These communities are mainly farming communities that have been impacted by loss in agricultural employment . . ." *Id.* There is no debate that these communities are disadvantaged communities that are negatively impacted by the lost agricultural employment that results from reductions in surface water supplies.

Conditions during the recent drought exemplify the types of impacts that occur in these disadvantaged communities, due to reductions in water supplies and the resulting land fallowing. As the EIS describes: "increased levels of land fallowing on irrigated cropland in the San Joaquin Valley has resulted in significant economic losses in small farming communities. Higher than typical unemployment rates has resulted in increased food insecurity." Draft EIS at 21-21. The Draft EIS recognizes that agriculture-dependent communities, such as Huron and Mendota, have experienced increased unemployment and increased reliance on social services "at a time when both agricultural cultivated acreage and farm employment in the area declined; and included five consecutive years with reduced water availability . . ." Draft EIS at 21-23. The observed relationship between reduced surface water supplies and reduced agricultural productivity and farm employment shows that the reductions in CVP and SWP water supplies due to implementation of the RPAs will negatively impact these agriculture-dependent communities. The Draft EIS's failure to provide any analysis of the environmental justice impacts to these areas with higher rates of minority populations and/or poverty levels from lost

farm employment is an alarming omission. These communities are already disproportionately suffering and the Draft EIS cannot turn a blind eye to the known environmental justice impacts that result from reduced CVP and SWP water supplies.

**(d) Air Quality And Public Health Impacts Associated With Land Fallowing Are Underestimated**

The Draft EIS's unreasonable assumptions regarding future use of groundwater also infect its analysis of air quality impacts. As explained above, recent history shows that groundwater does not adequately make up for water shortages. Shortages in the almost seven years that the Smelt BiOp RPA has been implemented (six of which the Salmon BiOp RPA was also being implemented) have resulted in large-scale land fallowing. Because the Draft EIS does not properly acknowledge the extent of land fallowing that results from implementation of the RPAs, the air quality effects associated with fallowing, including increased levels of airborne dust and particulate matter and increased risk of exposure to Valley Fever, are necessarily underestimated in the Draft EIS.

The Draft EIS acknowledges that “[a]ir quality issues may be exacerbated under dry conditions. When water supplies and irrigation levels are decreased in urban, rural, and agricultural areas, there is increased potential for the formation and transport of fugitive dust.” Draft EIS, at 16-13. Yet, the Draft EIS states that because “irrigated acreage under Alternatives 1 through 5 would be similar to irrigated acreage under both the No Action Alternative and the Second Basis of Comparison[,] . . . there would be no change in potential for dust generation.” Draft EIS at 16-24. This is a mistake. As explained above, there are significant changes in irrigated acreage due to implementation of the RPAs that necessarily result in a change in the potential for dust generation. Reclamation must analyze the concomitant air quality impacts.

Reclamation must also go one step further and ensure that any effects on air quality do not violate the federal Clean Air Act, 42 U.S.C. §7401 *et seq.* The Draft EIS already acknowledges that numerous counties in the Central Valley Region are designated as nonattainment for Ozone, PM 2.5, and PM 10 under state and federal Clean Air Act standards. Draft EIS at 16-8 – 16-9. Because of this, Reclamation is required to comply with various reductions and control measures designed to meet the National Ambient Air Quality Standards. It could violate the Clean Air Act if Reclamation chooses an alternative that worsens Ozone, P.M. 2.5, or PM 10 because doing so could violate measures already in place to rectify air quality problems in existing nonattainment areas. The Final EIS must make these trade-offs clear.

The federal Clean Air Act also prohibits Reclamation from engaging in any activity which does not conform to a Clean Air Act implementation plan. 42 U.S.C. 42 U.S.C. § 7506(c). Accordingly, the Final EIS should analyze the alternatives in a manner that allows the decisionmaker to determine whether or not implementation would be consistent with existing implementation plans. Until the shortcomings in Chapter 16 are corrected, the Draft EIS's analysis of air quality impacts is insufficient.

### 3. CVP Water Supply Impacts To CVP Wildlife Refuges And San Joaquin River Exchange Contractors Are Underestimated

The Draft also understates the CVP water supply impacts to wildlife refuges and the San Joaquin River Exchange Contractors (“Exchange Contractors”). First, as Reclamation is aware, section 3406(d) of the 1992 Central Valley Project Improvement Act (“CVPIA”) requires Reclamation to deliver CVP water supplies to wildlife refuges. Section 3406(d) of the CVPIA describes two categories of refuge water supplies: “Level 2” and “Level 4.” The refuges use water to provide needed habitat during waterfowl migration periods in the fall, winter, and spring. In critically dry hydrologic years, the refuge water supply contracts and section 3406(d) of the CVPIA authorize reductions in Level 2 water deliveries by no more than 25%. Shortages to the refuges are triggered when deliveries to agricultural contractors are reduced, a circumstance made more frequent and extensive due to the loss of supply from implementation of the reasonable and prudent alternatives in the biological opinions.

Table 5.26 in the Draft EIS purports to identify the changes in CVP water deliveries under the No Action Alternative as compared to the Second Basis of Comparison for CVP refuges. For CVP refuges located south of the Delta, the table identifies *no* difference (0 acre-feet) over the long-term between the No Action Alternative and the Second Basis of Comparison. Draft EIS at 5-94. The chapter does not explain how it is possible that there will be no change in deliveries between the No Action Alternative and the Second Basis of Comparison, despite the admitted water supply loss due to the reasonable and prudent alternatives included in the No Action Alternative. The conclusion that this loss of supply makes no difference to refuge is unsupported and contrary to actual experience.

Between 1992, when the CVPIA was implemented, and 2008, when Reclamation began implementing the RPA in the Smelt BiOp, Reclamation delivered the minimum 75% of Level 2 supply to south-of-Delta wildlife refuges in just three years out of seventeen: 1992, 1993, and 1994. Reclamation, 2015 Summary of Water Supply Allocations. In contrast, since 2008, south-of-Delta wildlife refuges have been shorted to *less* than 75% in two years: in 2014, they received 65%, and in 2015, they anticipate receiving even less. While these shortages have occurred in drought years, Reclamation’s ability to export water south of the Delta is adversely affected by limitations on CVP operations, which include implementation of the RPA actions. The Draft EIS must analyze how implementation of the alternatives may further limit exports, including during drought years, and then look at the real impact to south-of-Delta wildlife refuges. Receiving less than 100%, particularly less than 75%, has harmful effect on the refuges, including inability to provide habitat for local breeding wildlife and migratory shorebirds, growing food for migratory birds, and diminishing water quality. Impacts from these shortages are described in the August 21, 2015 declaration of Ricardo Ortega filed in *San Luis & Delta-Mendota Water Authority v. Jewell*, E.D. Cal. Case No. 1:15-cv-01290. Second, the Draft EIS makes the same error in estimating the difference in water supply impacts to the Exchange Contractors as it does for estimating impacts to the wildlife refuges. Table 5.26 identifies *no* difference (0 acre-feet) in annual average deliveries between the No Action Alternative and the Second Basis of Comparison for the Exchange Contractors. Draft EIS at 5-94. Again, Reclamation’s Summary of Water Supply Allocations shows that the combination of RPA implementation and drought conditions have resulted in real impacts to the Exchange Contractors’ water supply. Since 2008, the Exchange Contractors have been shorted to less than

their 75% contractual minimum supply in two years: 2014 and 2015. These shortages have caused the Exchange Contractors' member entities to reduce the allocation to their growers, and growers have in turn had to fallow land and increase groundwater use. The Exchange Contractors, like the south-of-Delta agricultural water service contractors discussed elsewhere in these comments, suffer significant adverse socioeconomic impacts as a result of such shortages.

The water supply analysis should be corrected to address the very real likelihood of shortages to refugees and the Exchange Contractors resulting from project modifications, and the concomitant impacts of these shortages should be discussed in the final EIS's resource chapters.

**B. The Draft EIS Fails To Adequately Describe And Analyze The Impacts Of Increased Groundwater Use**

In addition to unreasonably assuming that increased groundwater use will fully compensate for lost surface supplies, the Draft EIS fails to adequately describe or analyze the impacts of increased groundwater use in response to diminished CVP and SWP supplies. The EIS briefly acknowledges that increased groundwater use will lead to declining groundwater levels, more land subsidence, and reductions in groundwater quality, but it fails to analyze the materiality or consequences of such impacts, let alone potential mitigation.

**1. The Draft EIS Fails To Provide The Reduction In Availability Of SWP And CVP Water By Groundwater Basin**

The foundation for analysis of groundwater level impacts is the change in availability of SWP and CVP water within the area being analyzed (typically a groundwater basin). While the Draft EIS provides information about the aggregate change in availability of SWP and CVP water, Chapter 7 does not quantify (with the exception of the analysis for the Central Valley Region) the change in availability by groundwater basin. Without that quantification, the basis for analysis of groundwater level impacts in the Draft EIS is unclear, which prevents decision makers and interested parties from making a meaningful review of the impacts presented in the Draft EIS.

The Draft EIS does not employ any modeling at all to assess impacts to groundwater outside the Central Valley. Absent a quantified estimate of the change in SWP and CVP water available to groundwater basins, the "impacts analysis" essentially becomes limited to general observations about how a theoretical increase in groundwater production might impact groundwater levels. This appears to be the case in this Draft EIS – for example, page 7-123 discusses impacts of the No Action Alternative relative to the Second Basis of Comparison on groundwater use and elevations for the San Francisco Bay Area, Central Coast, and Southern California Regions as follows:

Under the No Action Alternative, it is anticipated that CVP and SWP water supplies in the San Francisco Bay Area, Central Coast, and Southern California regions would be reduced as compared to CVP and SWP water supplies under the Second Basis of Comparison, as discussed in Chapter 5, Surface Water Resources and Water Supplies. The reduction in surface water supplies could

result in increased groundwater withdrawals, decreased groundwater recharge, and decreased groundwater levels in areas with CVP and SWP water users. It may be legally impossible to extract additional groundwater in adjudicated basins without gaining the permission of watermasters and accounting for groundwater pumping entitlements and various parties under their adjudicated rights.

The essence of this analysis is that increasing groundwater production results in lower groundwater levels. While there should be general agreement with this principle, it does not provide information that is specific to groundwater basins, and does not define the potential magnitude of the impacts.

The analysis of other topics, like subsidence and groundwater quality, are closely related to groundwater levels, and without quantification of the groundwater level impacts the analysis of these other topics also appears to be limited to general principles rather than quantified impacts. For example, the Draft EIS discussion of land subsidence impacts of the No Action Alternative relative to the Second Basis of Comparison on subsidence and groundwater quality for the San Francisco Bay Area, Central Coast, and Southern California Regions again is expressed in the form of general principles rather than quantified impacts. For example, the Draft EIS discusses the potential land subsidence as follows on page 7-124:

“Increased use of groundwater and reductions in groundwater levels would result in an increased potential for additional land subsidence under the No Action Alternative as compared to the Second Basis of Comparison in the Santa Clara Valley Groundwater Basin in the San Francisco Bay Area Region, and the Antelope Valley and Lucerne Valley groundwater basins in the Southern California Region”

While there may be general agreement with the principle that reductions in groundwater levels result in an increased potential for land subsidence, information is not provided on the reductions in SWP and CVP water available to these basins that cause these impacts, and the potential subsidence impact is not quantified.

## **2. The Draft EIS Fails To Present Information On Changes In Groundwater Levels In A Form Useful To Decisionmakers And The Interested Public**

A fundamental purpose of NEPA is to ensure that decision makers and interested members of the public have enough information about impacts to make informed decisions about the project being analyzed. The information provided needs to be in a form that is understandable, and which can be effectively used as the basis for a decision about the project. The quantified information provided on groundwater level impacts in the Central Valley Region fails to achieve that purpose because it is unnecessarily difficult to understand and interpret. As discussed below, a reader must evaluate a discussion of “post processing” in a technical

groundwater modeling appendix in order to understand the groundwater level impacts presented within the Draft EIS. That is not reasonable.

A common method to summarize groundwater levels for alternatives is to show: (1) maps of groundwater levels at the end beginning and end of the study period, and the change in groundwater levels; and (2) hydrographs of groundwater levels at selected locations, which show the groundwater level trends. These types of presentations provide useful information that is relatively easy to understand. For example, the maps can provide a basis to understand what areas experience declines in groundwater levels and how large those declines are over the period analyzed. That helps show if a given groundwater basin is in overdraft, what areas might be susceptible to subsidence, and what the flow patterns are. This type of information has presumably already been developed using the model, and should be included in the Draft EIS.

Information about groundwater levels for each alternative can then be supplemented with quantified information that compares different alternatives (for example, maps of differences in groundwater levels at the end of the study period between alternatives, and hydrographs at selected locations showing the differences in groundwater levels over time).

The Draft EIS does not include information on groundwater levels for each alternative, and instead is limited to information that shows differences between alternatives. This does not give decision makers and interested parties a full understanding of groundwater conditions needed to evaluate the impacts of the project. For example, because only differences in groundwater levels are provided, there is no information about whether groundwater levels are rising or falling in any particular alternative, which may impact an assessment of the potential for subsidence.

The maps presenting differences between alternatives are not clearly explained within the Draft EIS. For example, Figure 7.15 (titled “Forecast Groundwater-Level Changes for Alternative 2 and No Action Alternative Compared to Second Basis of Comparison for Average July in a Future Wet Year”) is difficult to interpret, leaving decision-makers and the interested public to attempt to interpret these results. Possible interpretations might include:

- Interpretation A - The difference in groundwater levels represents the difference that would occur between two scenarios for a single occurrence of a future wet year. Under this interpretation, the map can be read as showing in some areas might experience from 200 to 500 feet of lowering of groundwater levels in an individual year.
- Interpretation B – The difference in groundwater levels represents an average for all years classified as “wet.” Under this interpretation, the map can be read as showing groundwater levels in some areas might be from 200 to 500 feet lower on average in years classified as “wet,” but does not tell a reader anything about what happens in an individual year.

Because the Draft EIS does not include information about groundwater levels for each alternative individually, a reader cannot look at the groundwater levels for each alternative to try

and interpret what these differences might mean, which complicates the interpretation of information like Figure 7.15.

The text of the Draft EIS also does not help a reader understand what the results are. For example on page 7-121 groundwater level impacts are described as follows:

Overall, under the No Action Alternative as compared to the Second Basis of Comparison, July average groundwater levels decrease approximately 2 to 10 feet in most of the central and southern San Joaquin Valley Groundwater Basin in all water year types. July average groundwater levels decline 10 to 50 feet in the Delta-Mendota, Tulare Lake, and Kern County subbasins; and 100 to over 200 feet in the Westside subbasin in all water year types. In critical dry years, groundwater levels decline by up to 200 feet in the Westside subbasin. Groundwater level changes in the Sacramento Valley are forecast to be less than 2 feet. The groundwater level change hydrographs show that in the central and southern San Joaquin Valley, groundwater levels can fluctuate up to 200 feet in some areas due to climatic variations under the No Action Alternative compared to the Second Basis of Comparison.

It is not clear whether the differences in groundwater levels between the two scenarios represent changes in levels that might be experienced in a single year, or if they are differences in groundwater levels which have been averaged over a number of years. This language can be read to be consistent with either Interpretation A or Interpretation B above.

Based on our review, to resolve this question a reader must make a close reading of Section 7A.3.1 (“Post-Processing and Results Analysis”) of Appendix 7A to understand what the results presented in the Draft EIS actually mean (and even then, it is complicated by the lack of results for individual alternatives that can be used to help confirm the interpretation). Our best judgment is that the interpretation in the second bullet above (Interpretation B) is the correct one, though we are not 100 percent certain of that interpretation.

The interpretation of the hydrographs presenting differences in groundwater levels over time at specific locations between alternatives (for example, Figure 7.21 which is titled “Forecast Groundwater-Level Change Hydrographs for Alternative 2 and No Action Alternative Compared to Second Basis of Comparison at Example Locations in the San Joaquin Valley”) has similar complications to the maps showing groundwater level changes. Based on our review of Section 7A.3.1 of Appendix 7A, our best judgment is that these graphs show the difference in the groundwater levels at a given location between two alternatives, though again we are not 100 percent certain of that interpretation.

### **3. The Draft EIS Fails To Provide Information Regarding Long-Term Decline In Groundwater Levels Due To Implementation Of The RPAs**

The Draft EIS fails to describe the aggregate impacts to groundwater levels due to the expected increase in groundwater pumping from now through 2030, and beyond. The Draft EIS

acknowledges that groundwater levels have experienced significant declines over the last few years, due to increased groundwater pumping in reaction to diminished supplies of surface water. For example, the Draft EIS states that “[r]ecent information indicates that between the spring 2010 and spring 2014, groundwater levels declined at some wells in the Delta-Mendota subbasin by up to 20 feet (DWR 2014c, 2014d). Draft EIS at 7-30 – 7-31. In addition, the Draft EIS acknowledges that “[r]ecent information indicates that between the spring 2013 and spring 2014, groundwater levels have declined at some wells in the Westside subbasin by up to 40 feet within the 1-year period (DWR 2014c, 2014d).” Draft EIS at 7-42. Yet, the Draft EIS does not discuss the implications of similar periods of groundwater draw down that are expected in the future due to implementation of the RPAs.

The Draft EIS states that the reasonable and prudent alternatives in the biological opinions will result in declines in groundwater levels in the future. The Draft EIS states:

In areas of the Central Valley Region that use CVP water service contract and SWP entitlement contract water supplies, the CVP and SWP water supplies would be less under the No Action Alternative as compared to the Second Basis of Comparison. The differences would result in increased groundwater use and decreased groundwater levels in the San Joaquin Valley Groundwater Basin under the No Action Alternative as compared to the Second Basis of Comparison.

Draft EIS at 7-121. In particular, “July average groundwater levels decline 10 to 50 feet in the Delta-Mendota, Tulare Lake, and Kern County subbasins; and 100 to over 200 feet in the Westside subbasin in all water year types. In critical dry years, groundwater levels decline by up to 200 feet in the Westside subbasin.” Draft EIS at 7-121. Yet, the Draft EIS provides no analysis of the significance of such declines, nor does it analyze whether the affected groundwater basins can withstand the expected levels of decline. The Draft EIS fails to explain the consequences of such significant declines in groundwater levels in any meaningful detail. Critically, the Draft EIS fails to evaluate the aggregate impacts to groundwater levels if the RPAs are implemented from now until 2030. If the RPAs result in consistent declines in groundwater levels because of reductions in surface water supplies, what are the implications for groundwater availability, groundwater quality, and land subsidence? The Draft EIS fails to tell decision makers or the public what are the aggregate impacts to groundwater levels, or the expected consequences of a long-term trend of declining groundwater levels. This is a significant omission that must be remedied in the final EIS.

#### **4. The Draft EIS Omits The Modeling Results And Data Regarding Land Subsidence**

While the Draft EIS acknowledges that certain areas are experiencing significant land subsidence as a result of increased groundwater use, the Draft EIS provides only a limited and qualitative analysis of expected land subsidence. In fact, the Draft EIS omits the land subsidence modeling results that show the expected total subsidence resulting from groundwater use, claiming that the results are “overly conservative.” The Draft EIS states:

CVHM includes a module known as the SUB package that computes the cumulative compaction of each model layer during the model simulation. The cumulative layer compactions at the end of the simulation are summed into a total subsidence. However, this version of the SUB package does not consider the potential reduction in the rate of subsidence that would occur as the magnitude of compaction approaches the physical thickness of the affected fine-grained interbeds. Thus, subsidence forecasts from the predictive versions of CVHM were judged to be overly conservative. Therefore, a qualitative approach was used for the estimation of the potential for increased land subsidence in areas of the Central Valley that have historically experienced inelastic subsidence due to the compaction of fine-grained interbeds.

Draft EIS at 7-112; *see id.* at 7A-17. Reclamation's decision to omit available land subsidence modeling results from the Draft EIS does not serve the informational purposes of NEPA. If Reclamation concluded that the results were overly conservative, it should explain why, but still provide the results to help inform the decision-makers and the public. In addition, Reclamation should identify what information, if any, supports the conclusion that the rates of subsidence would decline by 2030. Reclamation should also identify what information supports its conclusion that the subsidence estimated by the groundwater model is "overly conservative."

The Draft EIS's qualitative analysis of land subsidence impacts is effectively meaningless. Despite acknowledging the observed impacts of land subsidence, the Draft EIS does nothing more than tell the reader that the implementation of the reasonable and prudent alternatives will make land subsidence worse in the future. The Draft EIS confirms that in "areas adjacent to the Delta-Mendota Canal in this subbasin, extensive groundwater withdrawal has caused land subsidence of up to 10 feet in some areas. Land subsidence can cause structural damage to the Delta-Mendota Canal which has caused operational issues for CVP water delivery." Draft EIS at 7-31. Yet, in describing the expected land subsidence associated with implementing the reasonable and prudent alternatives, the Draft EIS only provides a "there will be more" conclusion. The Draft EIS states: "Under the No Action Alternative, potential for land subsidence due to groundwater withdrawals in the Delta-Mendota and Westside subbasins of the San Joaquin Valley Groundwater Basin would increase as compared to the Second Basis of Comparison due to the increased groundwater withdrawals." Draft EIS at 7-122. The Draft EIS also says: "increased groundwater pumping under the long-term average conditions may result in an additional increment of subsidence in those areas within the Central Valley. The additional amount of subsidence and the economic costs associated with it have not been quantified in this EIS. However, total subsidence-related costs have been shown to be substantial, as reported by Borchers et al. (2014) who estimated that the cost of subsidence in San Joaquin Valley between 1955 and 1972 was more than \$1.3 billion (in 2013 dollars). These estimates are based on the impacts to major infrastructure in the region including the San Joaquin River, Delta Mendota Canal, Friant-Kern Canal and San Luis Canal in addition to privately owned infrastructure. The incremental subsidence-related costs, expressed on an annual basis, could be an unknown fraction of that cumulative cost." Draft EIS at p. 19-49; *see also* p. 19-61. Thus, the Draft EIS confirms that increased land subsidence will result from implementation of the reasonable and

prudent alternatives, and will likely be a problem, but it leaves unanalyzed and unanswered how big a problem.

## **5. The Draft EIS Fails To Account For Or Analyze Expected Impacts To Groundwater Quality**

Likewise, the Draft EIS provides no meaningful analysis of expected impacts to groundwater quality. The “Groundwater Model Documentation” in Appendix 7A indicates that one of the modeling objectives was to evaluate “[c]hanges to groundwater quality based on a potential inducement of migration of poor quality groundwater because of groundwater flow changes.” Draft EIS at 7A-3. However, there is no further discussion of how the model would be used to make this evaluation.

Despite extensive acknowledgement of existing groundwater quality issues, and the stated intent to use the groundwater model to evaluate groundwater quality, the Draft EIS merely provides a qualitative analysis of groundwater quality impacts associated with implementing the reasonable and prudent alternatives. For example, the Draft EIS states: “In areas that use CVP and SWP water supplies, groundwater quality under the No Action Alternative could be reduced as compared to the Second Basis of Comparison in the central and southern San Joaquin Valley Groundwater Basin due to increased groundwater withdrawals and resulting potential changes in groundwater flow patterns.” Draft EIS at 7-122. The Draft EIS makes no effort to describe the extent or magnitude of impacts to groundwater quality, nor does the Draft EIS consider the implications of degraded groundwater quality in areas that are already experiencing groundwater quality issues. At a minimum, the Draft EIS should provide informative examples of the types of groundwater quality degradation that may occur in particular regions and how the degradation may impact the ability to use that water for municipal or agricultural use. Simply stating that groundwater quality would be “reduced” does not provide the decision makers or the public with sufficient information to evaluate the impacts of implementing the existing reasonable and prudent alternatives, or to allow for meaningful comparison among the alternatives.

### **C. The Draft EIS’s Analysis Of Effects On Surface Water Resources And Water Supplies Is Inadequate**

#### **1. The Draft EIS Presents Incomplete Modeling Information Regarding Surface Water Supplies**

Chapter 5 and its accompanying appendices present an incomplete picture of the modeling work that supports Reclamation’s conclusions regarding surface water supply. Revision is required.

First, a partial set of CalSim II model results are reported in Appendix 5A, but the Draft EIS does not explain why these particular set of outputs or metrics have been selected and does not describe their importance. For example, the significance of flows through Steamboat Slough is not described. There is also no explanation of why results for Millerton Reservoir are presented in the comparative analysis when simulation of the CVP Friant Division is identical across all alternatives.

Second, the Draft EIS does not adequately explain its assumptions or its modeling of changed circumstances. For example, the reasonable and prudent alternative in the NMFS BiOp requires Reclamation to achieve certain end-of-September and end-of-April storage resulting from the operation of Lake Shasta for a percentage of years. Draft EIS at 3A-31. The Draft EIS states that no specific CalSim II modeling code is implemented to simulate these performance measures (Draft EIS at 5A-9) and there appears to be no check that these performance measures are being met. Indeed, figures presented in Appendix 5A (Draft EIS at 5A-159 and 5A-161) suggest these criteria are not being met. Reclamation should explain why it is not simulating performance measures, and its rationale for not ensuring that performance measures are being met.

Reclamation should also revise the Draft EIS to explain its treatment of changing demands. For example, the Draft EIS provides: “By 2030, water demands associated with water rights and CVP and SWP contracts in the Sacramento Valley [are] projected to increase by 443,000 acre-feet per year, especially in the communities in El Dorado, Placer, and Sacramento Counties.” Draft EIS at 5-66. The Draft EIS does not explain if or how these increased demands are represented in CalSim II.

Third, the Draft EIS should provide further explanation of its treatment of modeling anomalies. For example, the Draft EIS states: “in very dry years, the model simulates minimum reservoir volumes (also known as ‘dead pool conditions’) that appear to prevent Reclamation and DWR from meeting their contractual obligations, including water deliveries.” Draft EIS at 5-63. Further discussion of these anomalies in simulated reservoir operations should be included in the final environmental document. In real time operations reservoirs are operated to avoid dead pool conditions and measures taken could include relaxation of some flow criteria or changes to contract allocation procedures, impacting deliveries. Allowing simulated storage to fall to dead pool may result in an over-estimate of CVP delivery capability to CVP contractors south-of-the-Delta in dry years.

## **2. The Draft EIS Does Not Set Necessary Thresholds Of Significance**

Chapter 5 also fails to allow decisionmakers and the public to understand how the proposed modifications in the various alternatives will have different effects on surface water supply. The Draft EIS does not explain whether the reasonable and prudent alternatives and the proposed operation of the CVP and SWP would significantly affect the quality of the human environment. The Draft EIS Executive Summary includes a list of substantial beneficial and adverse impacts; however thresholds or levels of significance for metrics are not set.

The Draft EIS states that “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 and/or Second Basis of Comparison are 5 percent or less, the conditions under the specific alternative would be considered to be “similar” to conditions under the No Action Alternative and/or Second Basis of Comparison.” Draft EIS at 5-60. While there is uncertainty associated with any model results, the selection of 5 percent as the level to define “similar” conditions is unsupported and is in conflict with other environmental projects and programs that have used CalSim II for impact analysis.

The Draft EIS defines an appropriate use of modeling results as identifying trends that differentiate alternatives and for quantifying specific levels of impacts. Applying the 5 percent threshold to average monthly or average annual values may result in not reporting significant trends. The 5 percent threshold would seem more appropriate when applied to individual monthly results, not averages.

### **3. The Draft EIS Improperly Treats Climate Change And Sea-Level Rise**

The Draft EIS's modeling of climate change and sea level rise also warrants revision. As noted elsewhere in these comments, the Draft EIS analyzes future conditions projected for the year 2030. Assumptions regarding sea-level rise and climate change are included in all of the alternatives, including the No Action Alternative and Second Basis of Comparison. These assumptions are the same across all alternatives. Therefore, the effects of climate change and sea-level rise are assumed to be similar across all alternatives.

The Draft EIS deviates from past practice by not also presenting an analysis of the future No Action Alternative *without* the effects of climate change. For example, the 2015 SWP Delivery Capability Report published by DWR presents model results for a "base" scenario and an "early long-term" scenario. The latter includes climate effects associated with a 2025 time horizon and a 15 cm sea-level rise, the former does not.

Model results for the No Action Alternative cannot be compared to current or recent historical CVP and SWP operations because the effects of climate change cannot be isolated from the effects of changing regulatory requirements, land use, and facilities.

The analysis of alternatives with climate change and sea-level rise appears to be consistent with past studies and reports produced by DWR and Reclamation. However, the Draft EIS fails to present or discuss any sensitivity analysis for climate change assumptions. Such an analysis could include climate change scenarios based on GCM results representing warmer and drier conditions rather than the Q5 scenario, which is derived from the central tending consensus of climate projections. Similarly, no sensitivity is presented for sea-level rise. For example, a 12 cm or 18 cm rise, which corresponds to the range of projections from the work conducted by Rahmstorf, could also be considered. There is little discussion of whether the use of more recent IPCC CMIP 5 climate projections would significantly change the analysis. More explanation is required.

### **4. Additional Errors And Inconsistencies In Chapter 5 And Its Accompanying Appendices**

CalSim II model results are summarized in Chapter 5 of the Draft EIS and are presented in more detail in Appendices 5A through 5C. There are some errors and inconsistencies in these reported results. For example, south-of-Delta average annual CVP M&I deliveries under the No Action Alternative are reported as 15 TAF per year (Table C-19-1-2). This value is extremely low and inconsistent with the corresponding exceedance plot (Figure C-19-1-5). The geographical breakdown of M&I deliveries also appears to be incorrect; no CVP M&I deliveries are reported for the Tulare Lake Region (Table C-19-1-1). Some mislabeling of results adds to

the confusion. For example, total CVP deliveries south-of-Delta are stated to include “Settlement” deliveries (Table C-19-1-2). Instead, results are the total of water service contract deliveries and refuge deliveries. Deliveries to the Exchange Contractors are not reported, although Settlement Contractor deliveries are reported under the Sacramento Valley. Reclamation should review the presentation of model results for correctness and consistency.

#### **D. The Analysis Of Effects On Aquatic Species In Chapter 9 Is Inadequate**

Chapter 9 of the Draft EIS is intended to describe the fish and aquatic resources that occur in the portions of the project area that could be affected as result of implementing the alternatives evaluated in the EIS and to describe the potential impacts to those resources. However, Chapter 9 includes flaws in both its description of the affected environment and its analysis of impacts.

##### **1. Chapter 9’s Discussion Of Affected Environment Requires Revision**

The Draft EIS’s discussion of affected environment in Chapter 9 requires revision because it contains a number of unsupported statements and includes a number of statements that are not based on the best and most current science. Such statements must be supported or revised in the Final EIS, at minimum to ensure the final environmental document complies with the requirement in the CEQ regulations that “[a]gencies . . . insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements” and “identify any methodologies used and . . . make explicit reference by footnote to the scientific and other sources relied upon for conclusions in the statement.” 40 C.F.R. § 1502.24.

Without revision, Chapter 9’s conclusory statements made without support will run afoul of NEPA’s requirements. For example, at page 9-57, lines 38-39, the Draft EIS states that “[spring-run Chinook Salmon] [y]earlings typically enter the Delta as early as November and December and continue outmigration through at least March.” The Draft EIS does not explain how yearling spring-run are being identified, whether by length at date criteria or genetics. Reclamation cites NMFS 2009 in support, which in turn cites to Snider and Titus 2000. Snider and Titus 2000 describe using length at date criteria, and nowhere say that yearling spring-run typically enter the Delta in November through mid-March. In fact, under the length at date criteria there is no yearling spring-run sized Chinook in November and December; yearling spring-run ends in mid-October. In order to insure scientific integrity of this statement, it must accurate, and it must be supported. There is a great deal of uncertainty when using length at date criteria to distinguish yearling spring-run from other juveniles that needs to be acknowledged.

The discussion regarding nonnative invasive species at page 9-80 provides another example. There, the Draft EIS states that “[n]ot all nonnative species are considered invasive or harmful. Some introduced species do not greatly affect the ecosystem, or have minimal ability to spread or increase in abundance. Others have commercial or recreational value (e.g., Striped Bass, American Shad, and Largemouth Bass).” *Id.* at 9-80. This statement is unsupported, and is contrary to the general understanding that *all* nonnative species increase competition and therefore are considered invasive or harmful where they prey on or compete with native species. That some may value these species for other reasons does not remove their adverse effect on

native species. Finally another example of an unsupported—and therefore problematic—statement in Chapter 9 is at page 9-97, in the discussion of predation. At lines 22-27, the Draft EIS notes NMFS made reference to predation studies regarding predation loss on the Tuolumne and Stanislaus rivers that showed significant loss in run-of-river gravel mining ponds and dredged areas. Yet, the Draft EIS also notes that NMFS’s statements were made *without citation*; without adding citation, Reclamation cannot now adopt NMFS’s observations wholesale. Doing so would lack “scientific integrity” and would be contrary to 40 C.F.R. § 1502.24. Revision of Chapter 9 is required to ensure that these, and similarly unsupported statements, identify and be consistent with scientific support.

Additional portions of the affected environment section of Chapter 9 require revision to add references to the best and most recent science. In several places Chapter 9 cites outdated science in the face of more recent science. For example, at page 9-56, the Draft EIS uses Feyrer et al. 2007 to support the connection between X2 and hypothesized habitat, but does not support a connection between X2 and presence or absence of Delta Smelt. This discussion should be revised to add reference to the more recent Feyrer 2011 study, but that study also does not provide a connection between X2 and the presence or absence of Delta Smelt. And Kimmerer et al. 2013, at page 13, warrants discussion, as it explains that X2, or the volume of the low salinity zone, in the spring and fall are not a driver of Delta Smelt abundance, and notes that “[g]iven the difficulty in determining the controls on the delta smelt population, it is not surprising that such a simple descriptor of habitat is inadequate for this species.” Another example of a statement requiring revision to reference updated science is at page 9-92. The Draft EIS notes that “the cause of the mortality in the ship channel has not been studied,” and identifies possible causes for mortality. However, certain posited causes, i.e., low dissolved oxygen and water quality have been resolved by aeration and upgrades to the Stockton sewage treatment plant, respectively.

The comments submitted by the State Water Contractors identify additional examples of outdated or mis-cited scientific studies, or misstatements of the available data in Chapter 9. The Authority, Westlands, and the Exchange Contractors join in those comments.

## **2. Chapter 9’s Impact Analysis Discussion Is Flawed**

The resource chapters’ “Impact Analysis” sections are intended to allow the comparison of environmental consequences of the No Action Alternative and Second Basis of Comparison to the environmental consequences of the Action Alternatives. In Chapter 9, however, the Draft EIS fails to present the impacts of the alternatives in a manner that “sharply defin[es] the issues and provid[es] a clear basis for choice among options by the decisionmaker and the public.” 40 C.F.R. § 1502.14. With respect to impacts on fish and aquatic resources, the key issue is whether the proposed modifications in the various alternatives will avoid jeopardizing listed species—accordingly, Chapter 9 must enable a comparison among the alternatives that addresses jeopardy. To the extent possible, that analysis should be quantitative.

In order to undertake a useful comparison among the alternatives, the final EIS must allow its readers to answer a number of questions: How many more fish are expected to survive and reproduce under one scenario as opposed to another? If reverse flows in Old and Middle rivers are limited by other existing non-ESA regulations but not by additional measures under the ESA, what are the expected effects on population abundance? If additional restrictions on such

flows are imposed under the ESA, what is the expected effect on abundance of listed species? Do other measures that do not involve restrictions on CVP and SWP operations, such as habitat restoration, offer greater promise of improving abundance? The Draft EIS does not answer any of these or similar questions.

The synthesis and conclusion sections of Chapter 9's impacts analysis are lacking. First, Chapter 9 contains a number of conclusory statements that seem to lack any analytic support at all. For example, in discussing changes in fish entrainment, the Draft EIS states that “[c]hanges in CVP and SWP operations can affect through-Delta survival of migratory (e.g., salmonids) and resident (e.g., Delta and Longfin smelt) fish species through changes in the level of entrainment at CVP and SWP export pumping facilities.” Draft EIS at 9-113. This statement is unsupported. There is no evidence that exports are negatively related to through-Delta survival based on CWT and acoustic tag experiments, and there is no support for concluding that entrainment is related to abundance. This conclusory statement is not based on scientific evidence.

Another example comes in the Draft EIS's discussion of the Second Basis of Comparison, the Draft EIS states that “[s]imilar to the No Action Alternative, reasonable and foreseeable non-CVP and –SWP water resources projects to provide additional water supplies would be implemented, in addition to restoration of more than 10,000 acres of intertidal and associated subtidal wetlands in Suisun Marsh and Cache Slough; and up to 20,000 acres of seasonal floodplain restoration in the Yolo Bypass.” *Id.* at 9-150. Yet, despite this significant restoration, the Draft EIS concludes “[i]t is not likely that operations of the CVP and SWP under the Second Basis of Comparison would result in improvement of habitat conditions in the Delta or increases in populations for these fish by 2030, and the recent trajectory of loss would likely continue.” *Id.* This conclusion specifically, and Chapter 9 generally, both elicit the same question—why? Why, if there will be significant habitat restoration, is the Second Basis of Comparison not expected to result in improvement of habitat conditions in the Delta? The Draft EIS fails to explain that factors other than habitat restoration may be more significant in affecting population loss, or to provide any explanation at all for its conclusion.

Second, Chapter 9 fails to contain any synthesis or conclusions that address the *significance* of effects from the different alternatives on listed species. Nowhere does the chapter identify whether one alternative as compared to another (or to the No Action Alternative or the Second Basis of Comparison) will have any population level effects. As stated repeatedly in these comments, it is crucial that decisionmakers and the public be able to determine whether an alternative avoids jeopardizing listed species. An assessment of any population level effects is important to that determination. The discussion in the Draft EIS does not enable such assessment. For example, in Chapter 9's comparison of the No Action Alternative to the Second Basis of Comparison for Coho Salmon in the Trinity River Region, it states that long term average monthly water temperatures would be similar to, although slightly higher than temperatures under the No Action Alternative as compared to the Second Basis of Comparison. The discussion notes that the temperature model outputs indicate that the temperature threshold for coho “would be exceeded about 8 percent of the time in October, about 1 percent more frequently than under the Second Basis of Comparison.” *Id.* at 9-154. Here the Chapter identifies a quantitative difference, but does not explain what exceeding the threshold means for Coho Salmon—does the entire year-class die if the threshold is exceeded? If that is the case, is it

possible that a 1 percent increase in the exceedance of the threshold may have a population level effect? Why or why not?

Elsewhere, the Draft EIS notes that “[i]n the estimation of potential entrainment loss and comparison of the results for each of the alternatives, differences in entrainment estimates of greater than 5 percent between alternatives are considered biologically meaningful, with potential effects on Delta Smelt.” Draft EIS at 9-114. Again, this statement fails give any explanation as to why or how Reclamation determined that a 5 percent difference in calculated entrainment would be considered biologically meaningful; the statement begs the question—what is the effect of a 5 percent change in calculated entrainment on the Delta Smelt population as a whole? Is there population-level significance?

Chapter 9’s comparison of the No Action Alternative to the Second Basis of Comparison with respect to spring-run Chinook Salmon provides another example of the Draft EIS’s failure to address the significance of impacts. After discussing model results, the chapter notes that “overall, effects on spring-run Chinook Salmon could be slightly more adverse under the No Action Alternative than under the Second Basis of Comparison, with a small likelihood that spring-run Chinook Salmon production would be lower under the No Action Alternative.” *Id.* at 9-171. This statement does not explain what “slightly more adverse” means in the context of a jeopardy analysis. Is there a population level effect under the No Action Alternative versus Second Basis of Comparison? Why or why not? Similar questions exist with respect to the chapter’s summary of effects for other species, including steelhead, Green Sturgeon, and others. *See, e.g.*, Draft EIS at 9-190 (“overall, effects on steelhead could be slightly more adverse under the No Action Alternative than under the Second Basis of Comparison”), 9-193 (“Overall, the increased frequency of exceedance of temperature thresholds under the No Action Alternative could increase the potential for adverse effects on Green Sturgeon in the Sacramento and Feather rivers relative to the Second Basis of Comparison.”). The failure to explain the significance of impacts precludes decisionmakers from complying with their charge under NEPA.

Third, Chapter 9’s Impact Analysis fails to appropriately note the relative significance of impacts from CVP and SWP operations compared to impacts from other stressors. Although modifications of CVP and SWP operations to adjust outflow and reduce entrainment have been the primary method of addressing problems with Bay-Delta ecosystem management, there is little evidence that such modifications have been effective for improving or protecting the health of listed species or their habitat.<sup>9</sup> The populations of the Delta Smelt and other listed species have declined in the more than six years since the RPAs from the 2008 and 2009 BiOps began being implemented. *See, e.g.*, Draft EIS at 9-63. Chapter 9 does not analyze one of likely reasons for this fact, e.g. the low relative importance of CVP and SWP operations on the status of the species in the context of multiple stressors. Chapter 9 acknowledges the existence of other stressors for listed species, but does not explain which of these stressors are of equal or greater significance to species’ population levels versus CVP and SWP projects, or explain the scale of flow variations resulting from such modifications versus the natural flow variations due to the Bay-Delta tidal system.<sup>10</sup> NMFS’s 2014 Recovery Plan for the Evolutionarily Significant Units

---

<sup>9</sup> The Authority, Westlands, and the Exchange Contractors incorporate their September 2012 and July 2014 comments on related topics to provide further support for the points in these comments.

<sup>10</sup> In addition to discussing the relative significance of fluctuations in flow due to CVP and SWP operations versus the tide, the final EIS should expressly acknowledge the limits in the available scientific data related to effects of

of Sacramento river Winter-Run Chinook Salmon and Central Valley Spring-Run Chinook Salmon and the Distinct Population Segment of California Central Valley Steelhead provides a helpful resource for such comparisons. NMFS 2014 (attached) at A-1 (showing relative significance of entrainment versus harvest, predation, and other stressors).

Finally, Chapter 9 is problematic because it seems to purposefully avoid using recent science that would tend to show the reduced relative importance of CVP and SWP operations on listed species. For example, Chapter 9 contains the following discussion regarding X2 and Delta Smelt:

The overlap of the low salinity zone (or X2) with the Suisun Bay/Marsh is believed to lead to more favorable growth and survival conditions for Delta Smelt in fall. (Baxter et al. 2010; Feyrer et al. 2011). To evaluate fall abiotic habitat availability for Delta Smelt under the alternatives, X2 values (in km) simulated in the CALSIM II model for each alternative were averaged over September to December, and compared for differences. There are uncertainties and limitations associated with this approach, e.g., it does not evaluate other factors that influence the quality or quantity of habitat available for Delta Smelt (e.g., turbidity, temperature, food availability), nor does it take into account the relative abundance of Delta Smelt that might benefit from the available habitat in the simulated X2 areas, in any given year. Other scientists have developed and described life cycle models to evaluate Delta Smelt population responses to changes in flow-related variables (e.g., Maunder and Deriso 2011; Rose et al. 2013 a, b; Reed et al. 2014), but these life cycle modeling approaches were not selected for use in the current study. In this study, simulated fall X2 values are used as a tool to compare the alternatives, as one of the factors that would indicate suitable habitat to benefit Delta Smelt.

Draft EIS at 9-115. This approach has acknowledged limitations, and is based on outdated science (e.g. Baxter et al. 2010, Feyrer et al. 2011). Yet, Reclamation announces that it does not use more recent life cycle modeling approaches in the Draft EIS, but does not explain why. Would the more recent studies produce different conclusions? More detail is required.

In sum, the Draft EIS's description of the affected environment of and impacts to fish and aquatic resources from the alternatives is flawed. Significant revision is required in order to enable readers of the final environmental document to understand and evaluate the real impacts of the alternatives on listed aquatic species.

---

additional outflow. Given the many stressors and changes in the Bay-Delta ecosystem, there is significant uncertainty about the potential benefits of increased outflow for Delta Smelt, longfin smelt, and several other species including white sturgeon and green sturgeon. (Delta Science Program 2014.) Numerous studies have concluded that more flow is not necessarily the solution in highly altered systems. (Poff et al. 1997; Hart and Finelli 1999; Bunn and Arthington 2002; Poff and Zimmerman 2010.) Efficient or targeted use of flow is more likely to attain specific ecological benefits, particularly when paired with additional actions to address non-flow stressors.

### **III. RECLAMATION MUST SIGNIFICANTLY REVISE THE EIS TO MEET ITS NEPA OBLIGATIONS**

To date, Reclamation has failed to utilize the NEPA process for its intended purpose – to infuse environmental considerations into its decision and inform decision makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts to the human environment. As the Council on Environmental Quality’s regulations explain:

The primary purpose of an environmental impact statement is to serve as an action-forcing device to insure that the policies and goals defined in the Act are infused into the ongoing programs and actions of the federal government. It shall provide full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment. . . . Statements shall be concise, clear, and to the point, and shall be supported by evidence that the agency has made the necessary environmental analyses. An environmental impact statement is more than a disclosure document. It shall be used by federal officials in conjunction with other relevant material to plan actions and make decisions.

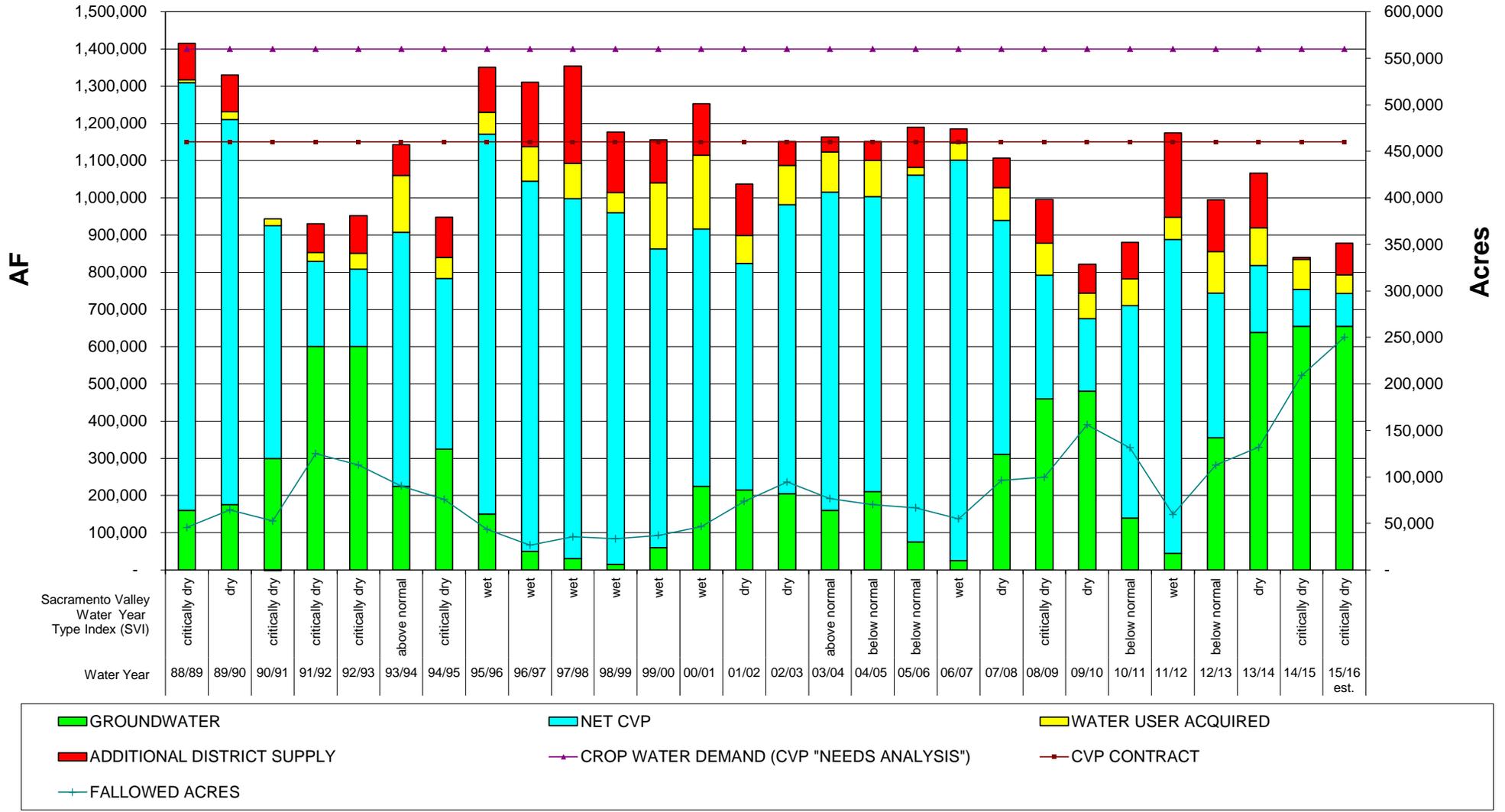
40 C.F.R. § 1502.1. The Draft EIS fails to achieve this primary purpose.

As detailed above, Reclamation must significantly revise the Draft EIS to satisfy its NEPA obligations. The Authority, Westlands, and the Exchange Contractors urge Reclamation to perform the requisite analyses and disclosures to inform decisionmakers and the public before a decision is made regarding possible modifications to CVP and SWP operations. Reclamation’s upcoming decision has the potential to have significant environmental consequences throughout California and exacerbate the impacts of the state’s on-going drought. In the face of such an important decision, it is critical the Reclamation perform a thorough NEPA analysis, one that critically examines alternatives and mitigation measures that can minimize or avoid impacts to the human environment.

**EXHIBIT C**

**WESTLANDS WATER DISTRICT WATER SUPPLY GRAPH**

# WESTLANDS WATER DISTRICT WATER SUPPLY 1988 THROUGH 2015



## Cited References

Auffhammer, M., Foreman, K., and Sunding, D. 2014. Turning Water Into Jobs: The Impact of Surface Deliveries on Farm Employment and Fallowing in California's San Joaquin Valley. Submitted for publication.

Bunn, S.E. and Arthington, A.H. 2002. Basic principles and ecological consequences of altered flow regimes for aquatic biodiversity. *Environmental Management* 30: 492-507.

California Department of Water Resources. 2014. Public Update for Drought Response, [http://www.water.ca.gov/waterconditions/docs/DWR\\_PublicUpdateforDroughtResponse\\_GroundwaterBasins.pdf](http://www.water.ca.gov/waterconditions/docs/DWR_PublicUpdateforDroughtResponse_GroundwaterBasins.pdf).

California Department of Water Resources. 2015. Drought Brochure, [http://www.water.ca.gov/waterconditions/docs/DWR\\_DroughtBroch\\_070815-web.pdf](http://www.water.ca.gov/waterconditions/docs/DWR_DroughtBroch_070815-web.pdf).

Delta Science Program. 2014. Workshop on Delta Outflows and Related Stressors - Panel Summary Report, <http://deltacouncil.ca.gov/sites/default/files/documents/files/Delta-Outflows-Report-Final-2014-05-05.pdf>.

Farr, T.G., Jones, C., and Liu, Z. 2015. Progress Report: Subsidence in the Central Valley, California. NASA, Jet Propulsion Laboratory California Institute of Technology, [http://water.ca.gov/groundwater/docs/NASA\\_REPORT.pdf](http://water.ca.gov/groundwater/docs/NASA_REPORT.pdf).

Feyrer, F., Newman, K., Nobriga, M., and Sommer, T. 2011. Modeling the effects of future outflow on the abiotic habitat of an imperiled estuarine fish. *Estuaries and Coasts* 34:120-128.  
Hart, D.D. and Finelli, C.M. 1999. Physical-biological coupling in streams: the pervasive effects of flow on benthic organisms. *Annual Review of Ecology and Systematics* 30: 363 -395.

Kimmerer, W.J., MacWilliams, M.L., and Gross, E.S. 2013. Variation of fish habitat and extent of the low-salinity zone with freshwater flow in the San Francisco Estuary. *San Francisco Estuary and Watershed Science* 11(4).

National Marine Fisheries Service. 2014. Recovery Plan for the Evolutionary Significant Units of Sacramento River Winter-Run Chinook Salmon and Central Valley Spring-Run Chinook Salmon and the Distinct Population Segment of California Central Valley Steelhead.

National Research Council. 2004. Endangered and threatened fishes in the Klamath River Basin: causes of decline and strategies for recovery. The National Academies Press.

National Research Council. 2010. A scientific assessment of alternatives for reducing water management effects on threatened and endangered fishes in California's Bay Delta. The National Academies Press.

Ortega, Ricardo. 2015. Declaration of Ricardo Ortega in Support of Plaintiffs San Luis & Delta-Mendota Water Authority and Westlands Water District's Motion for Preliminary Injunction and Temporary Restraining Order, *San Luis & Delta-Mendota Water Authority v. Jewell*, E.D. Cal. Case No. 1:15-cv-01290.

Poff, N.L., Allan, J.D., Bain, M.B., Karr, J.R., Prestegard, K.L., Richter, B., Sparks, R., and Stromberg, J. 1997. The natural flow regime: a paradigm for river conservation and restoration. *BioScience* 47:769-784.

Poff, N.L. and Zimmerman, J.K. 2010. Ecological responses to altered flow regimes: a literature review to inform the science and management of environmental flows. *Freshwater Biology* 55: 194–205.

Salazar, K., and Looke, G. Letter to Sutley, N. 2010. California Bay-Delta Joint Initiative.

United States Department of the Interior, Council on Environmental Quality, United States Department of Agriculture, United States Department of Commerce, United States Environmental Protection Agency, United States Department of the Army. Interim Federal Action Plan Status Update for the California Bay-Delta: 2011 and Beyond, <https://www.doi.gov/sites/doi.gov/files/migrated/news/pressreleases/upload/Final-Status-Update-2010-12-15.pdf>.

United States Bureau of Reclamation. 2015. Summary of Water Supply Allocations.