



September 29, 2015

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*Sent via U.S. Mail and via email to [bcnelson@usbr.gov](mailto:bcnelson@usbr.gov)*

**RE: Comments on Draft Environmental Impact Statement for Coordinated Long-Term Operation of the Central Valley Project and State Water Project**

Dear Mr. Nelson:

On behalf of the Natural Resources Defense Council and The Bay Institute, we are writing to provide comments on the Bureau of Reclamation's Draft Environmental Impact Statement for Coordinated Long-Term Operation of the Central Valley Project and State Water Project ("DEIS"). Unfortunately, the DEIS fails to comply with the requirements of the National Environmental Policy Act ("NEPA"), because it fails to include a reasonable range of alternatives, fails to accurately inform the public and decisionmakers of potential significant environmental impacts and necessary mitigation measures, and fails to adequately analyze cumulative impacts. Because Reclamation has failed to use sound scientific information and instead used flawed and biased methods to assess potential environmental impacts, the DEIS fails to accurately assess likely impacts on fish and wildlife populations and fails to identify and propose reasonable mitigation measures for potentially significant impacts.

In addition, the DEIS largely ignores that over the past several years, the combination of the drought and CVP/SWP operations (including waivers of D-1641 water quality standards and other environmental protections) has driven Delta Smelt, winter run Chinook salmon, and other species to the brink of extinction. The DEIS never mentions that minimum Delta water quality standards under D-1641 were waived, and that RPA actions required under the biological opinions were not implemented during the drought, and the DEIS wholly fails to analyze the

impact of the reasonably foreseeable waiver of water quality standards in future droughts. Yet the DEIS only acknowledges under the No Action Alternative that abundance levels for delta smelt and other fisheries “are difficult to predict” and that “Currently low levels of relative abundance do not bode well for the Delta Smelt or other fish species in the Delta.” DEIS at 9-139.<sup>1</sup> Under the Second Basis of Comparison, the DEIS concludes that,

As described above for the No Action Alternative, abundance levels for Delta Smelt, Longfin Smelt, Striped Bass, Threadfin Shad, and American Shad are currently very low, and abundance and habitat conditions for fish in the Delta in future years are difficult to predict. It 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.

DEIS at 9-150.<sup>2</sup> Despite these acknowledgements that current operations may very well lead to extinction of the species, the DEIS proposes no mitigation measures and does not even conclude that the alternatives result in significant impacts to Delta Smelt. Similarly, for longfin smelt, the DEIS ignores that current operations have resulted in the U.S. Fish and Wildlife Service concluding that listing longfin smelt under the Endangered Species Act is warranted, and continuation of existing spring outflow conditions is likely to result in adverse effects on the species. As a result, the DEIS fails to accurately assess environmental impacts of CVP/SWP operations on Delta Smelt and longfin smelt.

With respect to salmonids, the DEIS acknowledges that climate change will make it more difficult to achieve water temperature requirements with current upstream reservoir operations, impacting salmon and steelhead. *See, e.g.*, DEIS at 9-126 to 9-127. Yet the DEIS fails to conclude that these temperance exceedances constitute a significant environmental impacts and fails to consider any mitigation measures.<sup>3</sup> During the current drought, the failure to meet minimum upstream water temperatures resulted in greater than 95% mortality of the 2014 brood year winter run Chinook salmon cohort, and may result in similar mortality for the 2015 brood year. Increased frequency, duration and intensity of upstream temperature exceedances as a

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<sup>1</sup> In part, this conclusion is based on inaccurate assessment of entrainment impacts of the alternatives on Delta Smelt, as discussed below.

<sup>2</sup> Many of the flaws identified in the Second Basis of Comparison (which is the same as Alternative 1) also affect the analyses of Alternatives 3 and 4, and our comments are intended to address the similar flaws in the analyses of those alternatives as well.

<sup>3</sup> In contrast, Reclamation’s revised draft environmental impact statement for the California WaterFix concludes that under the No Action Alternative, upstream reservoir operations will result in significant adverse environmental impacts to winter run Chinook salmon and green sturgeon spawning and egg incubation. *See, e.g.*, USBR, CA WaterFix RDEIS/SDEIR at ES-48.

result of climate change in combination with CVP/SWP operations are likely to cause significant environmental impacts. The DEIS also fails to demonstrate whether operations of Shasta Dam under the No Action Alternative are consistent with requirements of the 2009 NOAA biological opinion, which includes performance measures and other requirements to maintain adequate cold water pool for winter run Chinook salmon below the dam. As a result, the DEIS must be revised to analyze compliance with the biological opinion and to consider changes in reservoir operations to mitigate upstream temperature impacts, including reductions in upstream water diversions and deliveries to CVP contractors, including senior contractors.

Despite these short term and long term impacts, the DEIS asserts that with respect to several salmon and steelhead runs, the effects of CVP/SWP operations under Alternative 1 are similar to those under the No Action Alternative and Alternative 2. *See, e.g.*, DEIS at ES-30 to ES-31, 9-397 to 9-398.<sup>4</sup> However, the federal courts have twice held that operations under Alternative 1 would jeopardize the continued existence and recovery of listed salmonids and steelhead, in violation of the Endangered Species Act. The DEIS therefore suggests that operations under the No Action Alternative and under Alternative 2 would also jeopardize these listed salmonid species (primarily because of upstream water temperature impacts). Yet the DEIS does not identify a significant environmental impact from these effects, and it proposes no clearly defined mitigation measures to address these impacts (except for programs for upstream fish passage at major dams, which are already required under the No Action Alternative).

The DEIS is fundamentally flawed, and Reclamation must revise the DEIS to analyze a broader range of alternatives using a credible methodology for assessing environmental impacts, including cumulative impacts.<sup>5</sup>

I. The DEIS Fails to Accurately Assess Environmental Impacts to Fish and Wildlife:

In general, Chapter 9 of the DEIS fails to utilize recent scientific information and utilizes outdated and inaccurate models to assess potential impacts to fish and wildlife populations. As a result, the DEIS fails to accurately assess the likely environmental impacts of the alternatives on fish and wildlife and significantly understates the environmental impacts of some alternatives.

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<sup>4</sup> This is at least in part because of Reclamation's flawed methodology for assessing impacts, particularly with respect to operations in the Delta, as discussed elsewhere in this letter.

<sup>5</sup> In addition, Reclamation and DWR have not complied with CEQA, and compliance with CEQA is required before the Department of Water Resources could propose any changes to State Water Project operations. Numerous additional permits and approvals would be required before authorizing any changes to operations, including requirements under the federal Endangered Species Act, California Endangered Species Act, and other state and federal laws.

*A. The DEIS Fails to Accurately Assess Impacts to Delta Smelt:*

The DEIS substantially understates the environmental impacts of the alternatives on Delta Smelt because it ignores numerous recent scientific publications regarding the impact of water project operations on Delta Smelt, including: Rose et al 2013a, Rose et al 2013b, USGS 2015 (MAST report), and MacNally et al 2010. For instance, the only citation of Rose et al 2013a and 2013b in the DEIS occurs on page 9-115, in a discussion of delta smelt habitat, where it states that the DEIS chose not to use the life cycle model developed in these papers to assess impacts (the DEIS arbitrarily fails to provide any justification for choosing not to use this peer reviewed life cycle model to assess impacts). The DEIS' analysis of entrainment impacts on delta smelt wholly fails to discuss the conclusions of Rose et al 2013a and 2013b, which found that entrainment by the CVP and SWP was an important factor in the decline of delta smelt. *See* DEIS at 9-78 to 9-79. Similarly, the species description in the DEIS understates the role of entrainment as a stressor on the population and does not even mention the population level effects of entrainment. DEIS at 9-63 to 9-66. As a result of the failure to use sound scientific information, the DEIS misleads the reader on the impacts of entrainment by CVP/SWP operations on delta smelt.

In addition to failing to use the life cycle model prepared by Rose et al 2013 to assess impacts, the methodology used in the ADEIS to assess entrainment impacts is flawed and fails to adequately assess impacts under the alternatives.

First, the DEIS uses average OMR values to calculate entrainment. DEIS at 9-114. As a result, the DEIS does not account for changes in operations within the OMR ranges specified under the biological opinion under the No Action Alternative, Alternative 2, and Alternative 5. Because the DEIS does not account for reductions in OMR to avoid significant entrainment events and to manage entrainment throughout the season, and the estimates of smelt entrainment are therefore unreasonably high under these alternatives. This substantially biases the comparison of entrainment impacts in the DEIS under these alternatives as compared to other alternatives.

Second, the DEIS fails to adequately analyze entrainment impacts because it fails to assess whether entrainment under the alternatives would exceed the incidental take statement in the biological opinion, which is estimated to be 5% of the adult population based on the Fall Midwater Trawl Survey. *See* 2008 Delta Smelt biological opinion at 387. Modeling information in the DEIS indicates that entrainment would exceed the incidental take limit under several of the alternatives, as discussed below. Exceeding the incidental take limit would cause significant impacts.

Third, the DEIS also fails to adequately assess entrainment impacts by using a 5% threshold, such that alternatives with entrainment estimates within 5% are considered to have similar effects. DEIS at 9-114. This is unreasonable and understates the environmental impacts of

entrainment because it could result in a doubling of entrainment (5% versus 10%), and as noted above could result in substantially exceeding the incidental take limit. Kimmerer 2011 demonstrated that entrainment losses averaging 10% per year can be “...simultaneously nearly undetectable in regression analysis, and devastating to the population.”

The estimated entrainment under the Second Basis of Comparison approaches that 10% threshold for adults and greatly exceeds it for juveniles, *see* DEIS at 9-194, and Reclamation’s estimated entrainment under this alternative and several others would likely exceed the take limit in many years. This would cause significant adverse effects that are not reported in the DEIS.

As a result of these substantial flaws, the DEIS fails to adequately analyze Delta Smelt entrainment impacts under the alternatives. The DEIS must be revised to analyze whether entrainment would exceed the incidental take limit (5% of the population), revise estimates of entrainment under the No Action Alternative, Alternative 2, and Alternative 5 to account for changes in operations under Actions 1-3 of the Delta Smelt biological opinion, and to eliminate use of the 5% threshold of significance.

With respect to the effect of changes in X2 on Delta Smelt, the DEIS wholly fails to analyze the effects of changes in spring X2 on Delta Smelt. *See* Mast Report 2015. The DEIS also fails to analyze the effects on Delta Smelt of waiving spring X2 requirements in recent years during the drought, as the population has declined to record low levels. With respect to changes in Fall X2, the document also largely ignores all of the comments of the Fish and Wildlife Service in the Bay Delta Conservation Plan process, and it ignores the additional biological analysis of BDCP impacts on delta smelt by Kimmerer et al prepared for the Nature Conservancy in 2013. These analyses demonstrate the significant role of CVP/SWP operations on delta smelt. Instead, the DEIS provides misleading information about other stressors. For instance, the DEIS repeatedly hypothesizes that discharge of agricultural runoff from the Colusa Drain led to measureable improvements in zooplankton abundance in 2011 and 2012, but it fails to inform the reader that Delta Smelt populations declined substantially in 2012. *See* DEIS at 9-65 and 9-66. In addition, on the same page the DEIS misstates the conclusions of the MAST report regarding the importance of implementation of the fall outflow RPA in 2011 (rather than agricultural runoff) on subsequent delta smelt abundance.

In addition, the DEIS fails to analyze the effects of CVP/SWP operations on Delta food webs, including phytoplankton and zooplankton that support delta smelt populations. Existing scientific information documents how changes in exports, residence time, and flows can affect these populations. *See, e.g.,* Jassby et al. 1995; Kimmerer 2002; Winder et al. 2011; Cloern and Jassby 2012. We raised this issue in our 2012 scoping comments, yet the DEIS wholly fails to analyze this impact. More recent studies document how changes in delta outflow can affect corbula populations and thus affect delta food webs. *See, e.g.,* Brown et al. 2012; Thompson et

al. 2012; Teh 2012; Baxter and Slater 2012. And while the DEIS mentions the effect of introduced species on the food web, see DEIS at 9-65, it ignores peer reviewed research that hydrologic modifications, including diversions by the CVP and SWP, have facilitated invasions of the estuary. See Winder et al 2011. The DEIS must be revised to analyze these effects of CVP/SWP operations on delta food webs.

Finally, although the DEIS discusses the effects of predation on Delta Smelt, it fails to consider the role of CVP/SWP operations in facilitating the abundance of invasive predators and worsening water quality. For instance, DWR and Reclamation have concluded that waiver of D-1641 outflow requirements during the drought have resulted in increased microcystis blooms, other water quality impairments, and increased populations of black bass and other nonnative predators that impact Delta Smelt. See USBR/DWR March 30, 2015 Temporary Urgency Change Petition, Attachment A, at 69-70. However, the DEIS wholly fails to analyze these indirect impacts of operations on water quality and fisheries, including analysis of changes in residence time as a result of operations, even though Reclamation's NEPA analysis of the California WaterFix includes modeling of changes in residence time and how that affects microcystis and other harmful algal blooms. The DEIS must be revised to analyze these effects of CVP/SWP operations on water quality, microcystis, and other harmful algal blooms.

The DEIS fails to use sound scientific information for the assessment of environmental impacts of the alternatives on delta smelt and it wholly fails to analyze important direct and indirect effects of CVP/SWP operations on Delta Smelt (such as spring X2, effects on food webs, effects on predator populations). As a result, the DEIS understates the impacts of Alternatives 1, 3, 4, and the Second Basis of Comparison, and it overstates the impacts of the No Action Alternative, Alternative 2, and Alternative 5.

*B. The DEIS Fails to Accurately Assess Impacts to Longfin Smelt<sup>6</sup>*

As with Delta Smelt, the DEIS fails to reference recent scientific information regarding longfin smelt, resulting in the document inaccurately assessing environmental impacts on the species. For instance, the DEIS fails to reference numerous recent scientific studies documenting winter / spring delta outflow as the primary driver of subsequent longfin smelt abundance, including MacNally et al 2010 and recent analysis by the Fish and Wildlife Service and California Department of Fish and Wildlife regarding flow and longfin smelt during the BDCP process (including Rosenfield and Nobriga in press). For instance, in 2013 the Fish and Wildlife Service noted that, "More than forty years of science has clearly established that Delta outflow is a

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<sup>6</sup> We also note that the Bureau of Reclamation is also subject to the requirements of the California Endangered Species Act with respect to longfin smelt, which is listed as a threatened species under state law, consistent with section 3406(b) of the Central Valley Project Improvement Act of 1992 and Section 8 of the Reclamation Act of 1902.

primary driver of longfin smelt abundance (e.g. Thomson et al. 2010). “ In contrast, page 9-67 includes a single sentence about the effect of delta outflow being the largest factor affecting longfin smelt abundance. In addition, as discussed above, the DEIS fails to analyze the effects of CVP/SWP operations on delta food webs and indirect effects on longfin smelt.

The DEIS uses an equation from Kimmerer 2009 to calculate average longfin smelt abundance by water year type, but because this analysis looks at each year in isolation, it understates the environmental impacts of multiple years of low outflow. In addition, because the DEIS ignores more recent scientific studies on flow thresholds for longfin smelt population growth prepared by the U.S. Fish and Wildlife Service in the BDCP process, the DEIS fails to assess whether spring outflows are likely to result in population growth. As a result, the DEIS likely understates the environmental impacts of the alternatives. We agree with the DEIS that the Second Basis of Comparison would result in far more adverse effects on longfin smelt than the No Action Alternative, DEIS at 9-196, but the DEIS fails to analyze whether the No Action Alternative results in adverse effects on longfin smelt.

The DEIS’ conclusion that the Second Basis of Comparison would “maintain the recent trajectory of loss” for longfin smelt (page 9-152) is understated; it is likely that the Second Basis of Comparison and Alternatives 1, 3 and 4 will jeopardize the continued existence and recovery of longfin smelt, consistent with the U.S. Fish and Wildlife Service’s recent conclusion that listing of longfin smelt under the Endangered Species Act is warranted but precluded. *See* 77 Fed. Reg. 19775 (April 2, 2012). In addition, the DEIS fails to demonstrate that implementation of the No Action Alternative would not result in significant impacts to the species, consistent with the finding that ESA listing is warranted and the ongoing population declines observed in numerous surveys. In fact, language in the DEIS admits that the No Action Alternative would result in “less adverse” effects than the Second Basis of Comparison, *see* DEIS at 9-156, but the DEIS fails to clearly state that the No Action Alternative results in adverse impacts on longfin smelt or to propose any mitigation measures to address that impact.

### *C. The DEIS Fails to Accurately Assess Impacts on Salmonids*

As with the pelagic species discussed above, the DEIS fails to accurately assess the environmental impacts of CVP/SWP operations on salmonid survival and abundance. The DEIS omits references to important scientific studies, and instead relies on contradictory modeling information that does not accurately assess impacts. As a result, the DEIS fails to accurately assess environmental impacts and propose necessary mitigation measures.

*1. The DEIS Fails to Accurately Assess Impacts to Migrating Salmonids in the Delta*

The DEIS fails to accurately assess impacts of CVP/SWP export pumping operations in the Delta on migrating salmonids, significantly understating the environmental impacts of increased pumping during migration seasons. For instance, recent life cycle models for fall run Chinook salmon and spring run Chinook salmon have been submitted to the Delta Science Program, which conclude that CVP/SWP delta exports significantly reduce spring and fall run salmon survival and abundance. *See* Cunningham et al 2015. The DEIS mentions this study briefly, but it fails to utilize this life cycle model to assess impacts. Similarly, Michel et al 2015 was recently published in the Canadian Journal of Fisheries and Aquatic Sciences, which reviews five years of acoustic tag data and demonstrates that increased flows dramatically increase survival of migrating salmon through the Sacramento River and Delta. Both of these studies contradict many of the methods and models utilized by Reclamation in the DEIS to assess impacts, such as the Delta Passage model (which predicts very minimal changes in survival and abundance despite significant changes in exports and Old and Middle Reverse Flows).

For example, Cunningham et al 2015 estimates that increasing exports by 30% above the 1967-2010 average would result in a 16-28% lower median survival rate from egg to adulthood for wild fall run Chinook salmon and a 39-59% reduction in median survival for spring run Chinook salmon, concluding that, “[a] 30% increase in exports decreased spring and fall stock survival to the point where they would all decline regardless of the climate scenario.” In contrast, the Delta Passage Model predicts “very similar estimates of survival” for spring and fall run Chinook salmon under the No Action Alternative compared to the Second Basis of Comparison, despite the substantial increase in exports under the Second Basis of Comparison. *See* DEIS at 9-169, 9-178.

In addition, the Delta Passage Model only attempts to estimate survival of salmon smolts, *see* DEIS Appendix 9J at 9J-1, and cannot assess impacts to salmon fry or parr. Yet fry and parr life stages are often the majority of salmon migrating through the Delta, and the DEIS wholly ignores the impacts of CVP/SWP operations on these salmonid life histories.

Similarly, the DEIS fails to explain the contradictory information from use of the OBAN life cycle model and the Delta Passage Model on salmon survival through the Delta. On page 9-162, the DEIS states that the Delta Passage Model results in similar winter run Chinook salmon survival through the Delta under the No Action Alternative and the Second Basis of Comparison, and on the same page it states that the OBAN life cycle model predicts that median survival through the Delta would be 12 percent higher under the No Action Alternative compared to the Second Basis of Comparison. The DEIS provides no justification for its statement that the OBAN model’s survival estimates “suggest a high probability of no difference between these

two bases of comparison.” DEIS at 9-162. In fact, the model demonstrates a very substantial difference in survival between the two alternatives, and Reclamation’s conclusory statement is arbitrary and capricious.

As a result, the DEIS fails to accurately assess environmental impacts of CVP/SWP operations in the Delta on migrating salmonids, and the conclusions drawn in the DEIS are arbitrary and capricious.

*2. The DEIS Fails to Accurately Assess Upstream Water Temperature Impacts to Salmonids*

The DEIS’ analysis of upstream temperature impacts on salmonids is flawed and understates the adverse impacts of CVP/SWP operations on salmonids (particularly in combination with climate change), and the DEIS fails to explicitly acknowledge that CVP/SWP operations cause significant adverse impacts and to propose mitigation measures to address these impacts in the short term. Reclamation’s conclusions in the DEIS are arbitrary and capricious.

Even using flawed methodology, the DEIS demonstrates that there will be significant adverse effects on salmon from high water temperatures as a result of climate change and CVP/SWP operations, including under the No Action Alternative:

Under the No Action Alternative, the ability to control water temperatures depends on a number of factors and management flexibility usually ends in October when the cold water pool in Shasta Lake is depleted. With climate change, cold water storage at the end of May in Shasta Lake is expected to be reduced under the No Action Alternative for all water year types. This would further reduce the already limited cold water pool in late summer. **With the anticipated increase in demands for water by 2030 and less water being diverted from the Trinity River, it is expected that it would become increasingly difficult to meet water temperature targets at the various temperature compliance points. It is likely that severe temperature-related effects will be unavoidable in some years under the No Action Alternative. Due to these unavoidable adverse effects,** RPA Action Suite I.2 also specifies other actions that Reclamation must take, within its existing authority and discretion, to compensate for these periods of unavoidably high temperatures. These actions include restoration of habitat at Battle Creek (see below) which may support a second population of winter-run Chinook Salmon, and a fish passage program at Keswick and Shasta dams to partially restore winter-run Chinook Salmon to their historical cold water habitat.

DEIS at 9-127 to 9-128 (emphasis added).<sup>7</sup> The DEIS also uses Reclamation's salmon mortality model to estimate temperature impacts on salmon production and mortality, concluding that the impacts from the No Action Alternative and the Second Basis of Comparison are similar, *see* DEIS at 9-160, that winter run Chinook salmon mortality is 31.4% in critically dry years under the No Action Alternative, *see* DEIS at Appendix 9C-8, and that Sacramento River spring run Chinook salmon mortality is 21.9% on average and 84.8% in critically dry years under the No Action Alternative, *see* DEIS at Appendix 9C-7. Similarly, the SALMOD model results in the DEIS estimate that in approximately 10% of years, there would be zero production of spring run Chinook salmon below Shasta Dam. *See* DEIS at Figure B-3-1. And the DEIS estimates that under both the No Action Alternative and the Second Basis of Comparison, Reclamation will frequently violate temperature standards at Shasta Dam, *see* DEIS at 9-159 to 9-160, and at other reservoirs, *see* DEIS at 9-166 to 9-168. Yet the DEIS fails to explicitly identify upstream temperature mortality as a significant adverse impact, and the only mitigation measure identified in the DEIS (fish passage program) is a long term potential measure that is already required under the No Action Alternative and is therefore part of the baseline. That mitigation measure does not address the ongoing significant adverse impact in the near term, nor does it propose anything that is not already required.

Moreover, the DEIS relies on flawed methodologies to assess temperature impacts on salmonids, many of which provide contradictory results, and which mislead the public as to the effects of CVP/SWP operations. For instance, the DEIS uses the SALMOD model to calculate juvenile production and the extent of temperature related upstream mortality to eggs and fry, and concludes that the No Action Alternative results in similar impacts to the Second Basis of Comparison. DEIS at 9-162. Yet SALMOD's estimates of mortality and production are wildly inaccurate compared to recent data. For instance, Figure B-4-1 estimates that winter run Chinook salmon production would never drop below 500,000, yet in 2014 there was a total year class failure with over 95% mortality due to water temperatures. Figure B-4-1 also shows that according to the SALMOD model, in approximately 95% of years winter run Chinook salmon production does not vary by more than a few hundred thousand fish. Yet empirical data shows that winter run Chinook salmon egg to fry survival at Red Bluff Diversion Dam from 2002 to 2012 varied substantially, from a low of 15.4% to a high of 48.6%, with a mean of 26.4%. *See* U.S. Fish and Wildlife Service 2015 at Table 6c. Estimates for other salmon runs are similarly inaccurate compared to recent Sacramento River data from the U.S. Fish and Wildlife Service.

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<sup>7</sup> However, as noted above, the DEIS also fails to demonstrate whether operations of Shasta Dam under the No Action Alternative are consistent with requirements of the 2009 NOAA biological opinion, which includes performance measures and other requirements to maintain adequate cold water pool for winter run Chinook salmon below the dam. *See* DEIS at 9-125 (describing RPA requirements). To the extent that the modeled operations under the No Action Alternative fail to meet the RPA requirements, Reclamation must revise operations to be consistent with those RPA requirements.

And this recent data also contradicts the information presented in Reclamation's salmon mortality model, which significantly underestimates mortality compared to the recent data.

In addition, the analysis of water temperature impacts looks only at monthly average temperatures. DEIS at 9-109. As the DEIS notes briefly, "the effects of daily (or hourly) temperature swings are likely masked by the averaging process." DEIS at 9-110. This is clearly correct, and may help explain why the modeled results do not show the level of mortality seen from recent empirical data. Yet the DEIS fails to carry forward this caveat elsewhere in the discussion, when it presents the results of modeling. Similarly, the DEIS restricts its use of the IOS model to median escapement estimates and only uses a subset of the years from CALSIM, DEIS at 116, which excludes the highest mortality years in the driest years and therefore does not accurately assess impacts.

Finally, the DEIS' analysis of weighted usable area for rearing habitat fails to account for more recent scientific research demonstrating the strong effect of increased flow on downstream salmonid survival in the Sacramento River. *See* DEIS at 9-107 to 9-109. The methodology used in the DEIS does not account for the significant reduction in survival of migrating salmon under lower flow conditions in the Sacramento River. *See* Michel et al 2015. As a result, the DEIS fails to accurately assess the impact of reduced flow on salmon survival in the Sacramento River using this methodology.

The DEIS demonstrates that current CVP/SWP operations, including water deliveries to Sacramento River Settlement Contractors and other senior water rights holders, in combination with climate change, will result in significant adverse effects on salmon caused by violations of water temperature requirements. The DEIS predicts that these impacts will become more severe as a result of climate change and increased demands for water. As a result, the DEIS must consider alternatives and/or mitigation measures that reduce upstream water deliveries, including deliveries to Sacramento River Settlement Contractors and other water rights holders.

### *3. The DEIS Fails to Accurately Assess Impacts to Salmonids in the San Joaquin Basin*

The DEIS fails to accurately assess environmental impacts to salmonids in the San Joaquin Basin because it fails to assess impacts to spring run Chinook salmon and because it fails to assess the impacts from changes in river flows.

First, the DEIS fails to acknowledge that small populations of spring run Chinook salmon have been established in recent years in the Stanislaus and other rivers. NMFS has acknowledged these populations exist, but the DEIS only analyzes impacts to fall run Chinook salmon and mistakenly concludes that spring run have been extirpated. DEIS at 9-87, 9-92. The DEIS

wholly fails to analyze impacts to spring run Chinook salmon in the Stanislaus River and other San Joaquin River tributaries.

Second, the DEIS acknowledges some of the studies documenting that salmon survival in the Stanislaus River and other San Joaquin tributaries is driven by river flow conditions. For instance, the DEIS cites Zeug et al 2014 to show that higher flow generally results in higher salmon survival and subsequent abundance. DEIS at 9-92. Yet the DEIS ignores other scientific studies which conclude that flows drive salmonid survival and abundance, including Sturrock et al 2015, Buchanan et al 2015, State Water Resources Control Board 2010, 2012.<sup>8</sup> The DEIS also fails to emphasize that inadequate flow is the dominant factor limiting salmon survival and abundance, instead relying on outdated research from 1982 to assert that survival through the Stockton Deepwater Ship Channel is one of the most limiting factors. DEIS at 9-92.<sup>9</sup>

However, the DEIS fails to utilize this scientific information on the importance of river flow in assessing environmental impacts. While the DEIS analyzes impacts from changes in operations on water temperatures, it wholly fails to assess the impacts from changes in flows on the Stanislaus River. *See, e.g.*, DEIS at 2-202 to 2-209 (analyzing impacts to fall run Chinook salmon and steelhead).<sup>10</sup> The available scientific evidence demonstrates that a reduction in flows below the minimum requirements of the biological opinion would result in very significant adverse effects on steelhead, fall run Chinook salmon, and spring run Chinook salmon. *See, e.g.*, Sturrock et al 2015; Zeug et al 2014; Buchanan et al 2015; State Water Resources Control Board 2010, 2012. And the State Water Resources Control Board, National Marine Fisheries Service, U.S. Fish and Wildlife Service, California Department of Fish and Wildlife, and many others have demonstrated that current flow levels on the Stanislaus River and other San Joaquin River tributaries are causing significant impacts to salmon and steelhead, demonstrating a need to substantially increase flows to sustain salmon.

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<sup>8</sup> The DEIS also cites to 2001 research by Mesick on the effect of fall flows and exports on straying, but ignores Marston et al 2012, which concluded that fall pulse flows and export rates are correlated with higher rates of straying.

<sup>9</sup> The DEIS also incorrectly asserts that flows must exceed 5,000 cfs to mobilize gravel in the Stanislaus River. DEIS at 9-95. That is incorrect; Kondolf 2001 concluded that flows below 5,000 cfs could mobilize the riverbed, particularly in certain reaches of the river.

<sup>10</sup> Elsewhere, the DEIS asserts that under the No Action Alternative, Reclamation will not fully implement the biological opinion requirements regarding Stanislaus River and Lower San Joaquin River flows, in order to make water available to contractors, yet asserts with no justification that the impacts would be “similar or reduced relative to recent conditions.” DEIS at 9-133. The DEIS reaches a similarly flawed conclusion with respect to the Second Basis of Comparison, concluding that the failure to implement the biological opinion requirements on the Stanislaus River would not improve. DEIS at 9-149.

This is particularly problematic for Alternative 3, which proposes to substantially reduce Stanislaus River flows. The DEIS wholly fails to analyze the impact of reduced flows, and based solely on temperature modeling concludes that Alternative 3 would have slightly beneficial effects on fall run Chinook salmon. DEIS at 9-316. Because the DEIS fails to assess the environmental impacts of reduced flows, which is the dominant factor affecting salmon and steelhead on the Stanislaus, Lower San Joaquin River, and other tributaries, the DEIS fails to accurately assess the environmental impacts of CVP/SWP operations on salmonids in the San Joaquin Basin. Reclamation's conclusions in the DEIS are arbitrary and capricious.

In addition, the DEIS fails to credibly analyze the impacts of the proposed trapping and barging of San Joaquin basin salmonids through the Delta under Alternative 3 and 4. The document makes unsubstantiated conclusions that this action would benefit salmonids without providing any analysis in the document. DEIS at 9-315 to 9-316. As a result, Reclamation's conclusion in the DEIS is arbitrary and capricious. There are substantial uncertainties regarding the effectiveness of capture operations (the stated goal is capturing 10-20% of the population) and potential adverse impacts. Moreover, coded wire tag data from the California Department of Fish and Wildlife show that salmon from the Merced Hatchery have successfully migrated through the Delta in recent years. *See* Kormos et al 2012; Palmer-Zwahlen and Kormos 2013. And in their comments on the ADEIS, NMFS raised substantial concerns that a trap and haul program would cause substantial adverse impacts on salmonids. The DEIS also fails to assess whether such a program is consistent with Reclamation's obligation to double natural production of salmon populations under the Central Valley Project Improvement Act.<sup>11</sup> Reclamation must substantially revise this section of the DEIS to provide a basis for its conclusion and to respond to the concerns raised by NMFS and others.

*4. The DEIS Concludes that the Effects of Predator Control Program are Highly Uncertain and Could Cause Significant Adverse Environmental Impacts:*

As compared to the administrative draft, the DEIS' analysis of the impacts of predator control programs is substantially improved. For instance, the DEIS cites repeatedly to the Delta Science Program's independent peer review report (Grossman et al 2013) regarding the effects of predation on salmonids and the caveats that predator control programs will work as intended. *See* DEIS at 9-274 to 9-275. It also cites work by Peter Moyle suggesting that predator control programs could harm Delta Smelt, and acknowledges that predator control programs at the Columbia River have not demonstrated population level effects. DEIS at 9-274 to 9-276. As a result, the DEIS concludes that,

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<sup>11</sup> More broadly, the DEIS fails to assess whether any of the alternatives meet Reclamation's obligations under section 3406(b).

the program may be difficult to implement, may not be effective, and may cause unintended harm to other native Delta fish species. Consequently, the outcome of the predator management program is highly uncertain. Compared to the No Action Alternative, which does not include a predator reduction program, Alternative 3 may or may not provide a benefit to salmonids and may result in an adverse effect on Delta smelt.

DEIS at 9-276.

However, the DEIS fails to acknowledge that USBR's own studies regarding the Head of Old River Barrier on the San Joaquin River have shown that increased flows reduce predation on salmonids and reduced flows increase predation and reduce survival. *See* Bowen et al 20019 and 2010 (USBR Technical Memorandum 86-68290-10-07 and 86-68290-11). And the DEIS also inconsistently addresses the impact of CVP/SWP operations in contributing to predation by nonnative species, particularly by providing habitat conditions in the Delta and other rivers that favor non-native species. For instance, on page 9-354, the DEIS concludes that Alternative 5 may adversely affect striped bass, but the DEIS does not analyze whether or how that impact to striped bass may subsequently affect salmonids or other species.

*5. The DEIS Fails to Accurately Assess Impacts of Fishing Mortality and Greater Restrictions on Salmon Fishing Proposed in Some Alternatives:*

The DEIS incorrectly assesses the impact of greater restrictions on salmon fishing under Alternatives 3 and 4. For instance, the DEIS downplays the effectiveness of the recent restrictions on salmon fishing as a result of the 2012 winter run Chinook salmon biological opinion, and it does not mention that NMFS' recovery plan for winter run Chinook salmon lists the ocean fishery as a low stressor on the population. *See* DEIS at 9-118, 9-277 to 9-278. The DEIS must be revised to account for this information in assessing impacts. Moreover, mark select fisheries are likely to substantially reduce fishing opportunities and may not improve conditions for wild salmon because of bycatch mortality, and the DEIS fails to analyze these potential adverse impacts of mark select fisheries.<sup>12</sup> In addition, as NMFS noted in its comments on the ADEIS, the harvest rule specified in Alternatives 3 and 4 may be less protective of winter run Chinook salmon than the existing biological opinion, given the restrictions on fishing at low levels of abundance. As noted in our prior comments, we strongly recommend that Reclamation work with the Pacific Fishery Management Council regarding these conclusions.

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<sup>12</sup> In addition, the DEIS fails to analyze the socioeconomic effects of reducing salmon fishing as proposed under Alternatives 3 and 4. *See, e.g.,* DEIS at 19-77.

*6. The DEIS Fails to Accurately Assess Impacts of Climate Change on Salmon and Propose Mitigation Measures to Address those Impacts:*

We appreciate that the DEIS includes the potential effects of climate change on precipitation and temperature, in order to assess how climate change may affect CVP/SWP operations. The DEIS assumes that climate change will reduce reservoir storage and cause increased temperature impacts on salmonids. *See, e.g.*, DEIS at 9-120, 9-123, 9-126 to 9-127, 9-130, 9-132 to 9-133, 9-146. However, the document wholly fails to propose any short term measures to mitigate the effects of CVP/SWP operations in combination with climate change in order to avoid violations of downstream water temperature standards that imperil salmon. As a result, the DEIS predicts more significant impacts on salmonids from increased upstream temperature, without proposing any changes or modifications to operations in order for Reclamation to meet its existing obligations under state and federal law to avoid violating water temperature requirements. The DEIS must be revised to analyze mitigation measures and alternatives that reduce or avoid water temperature violations below dams, including reduced upstream diversions and deliveries to senior water contractors.

II. The DEIS Fails to Include a Reasonable Range of Alternatives:

NEPA requires consideration of a reasonable range of alternative actions that might achieve similar goals with less environmental impact. *See, e.g.*, 40 C.F.R. §1502.14. However, the DEIS fails to include any alternatives that substantially improve conditions for fish and wildlife species, or that incorporate increased water supply from other sources like water use efficiency or wastewater recycling. Reclamation has violated NEPA by failing to include any alternatives that reduce impacts on fish and wildlife populations and/or that meaningfully reduce reliance on the Delta, as required by the Delta Reform Act of 2009 (Cal. Water Code § 85021).

In our scoping comments, we requested that Reclamation analyze an alternative in the DEIS that substantially increases Delta outflow in the winter-spring period to protect longfin smelt and other fish and wildlife species, and includes increased water use efficiency, water recycling, and other regional water supply programs to increase water supply reliability even if Delta exports decrease. *See* attachment 1 (scoping comments). However, Alternative 5 wholly fails to include any increase in regional and local water supplies, and Alternative 5 also fails to meaningfully increase Delta outflow.

Appendix 19A of the DEIS makes assumptions regarding investments in regional and local water supplies by SWP and CVP contractors, demonstrating that changes in local and regional water supplies are a reasonable alternative to consider. Yet Reclamation has failed to include an alternative that includes increased investments in these regional supplies, despite our scoping comments.

Similarly, none of the alternatives meaningfully increase Delta outflow in the winter and spring months, despite the significant adverse impacts on longfin smelt and other species affected by current outflow levels. Alternative 5 provides extremely limited increases in delta outflow. The model runs for Alternative 5 appear to be constrained by several assumptions, including assumptions concerning the amount of deliveries in any year to upstream contractors such as the Sacramento River Settlement Contractors, and export levels. Those assumptions can and should be modified to reflect alternative water supplies available to contractors and the need to reduce CVP/SWP diversions and deliveries to comply with environmental requirements. Modifying those assumptions would allow significant changes in the model output to improve reservoir levels and outflows. As noted above, the DEIS assumes that increased outflow necessarily results in reduced reservoir storage and increased water temperatures at upstream reservoirs, but that depends on assumptions regarding water diversions and exports. We understand that Phase 2 of the State Water Resources Control Board's update of the Bay Delta Water Quality Control Plan includes operational changes so that substantially increased delta outflow does not impact water temperature control at upstream reservoirs, and that the same is true for Alternative 8 in the BDCP / California WaterFix EIS. Reclamation must review this work to modify Alternative 5 so that it results in substantial increases in spring outflow and does not impair upstream water temperature compliance, even if that results in reduced exports and diversions upstream.

Finally, the DEIS also fails to include any alternatives that address the impacts of upstream operations and climate change. As noted above, the DEIS asserts that the effects of climate change and CVP/SWP operations (including water deliveries to senior contractors) will make it difficult to meet temperature compliance standards. DEIS at 9-126 to 9-127. However, the DEIS fails to include any alternative that would avoid this impact and meet temperature compliance obligations, including reductions in water deliveries to senior contractors.

Overall, the DEIS fails to analyze a reasonable range of alternatives that would eliminate or reduce the environmental impacts of ongoing CVP/SWP operations, as required by NEPA.

### III. Alternatives are Not Consistent with Reclamation's Water Rights and the Purpose and Need Statement

In addition, Alternative 3 is not consistent with the stated purpose and need in the DEIS, because the New Melones Operations Criteria in Alternative 3 would cause Reclamation to violate the terms and conditions of its existing water rights and the State Water Resources Control Board's Water Rights Decision 1641 ("D-1641"). *See, e.g.*, DEIS at 3-36. It appears that other alternatives, except for Alternative 5, likewise would result in violations of Reclamation's water rights permits with respect to Vernalis pulse flow obligations under D-1641. *See* DEIS at 3-42. Reclamation is obligated to meet Vernalis pulse flow requirements under D-1641, as the State

Water Resources Control Board has repeatedly made clear, and Reclamation must include these pulse flows under the No Action Alternative.

IV. The DEIS Fails to Accurately Assess Cumulative Impacts

Reclamation has violated NEPA by failing to analyze the cumulative impacts. The DEIS identifies a number of other projects that could result in cumulatively significant impacts, including new reservoirs (including Temperance Flat and raising Shasta Dam) and the California WaterFix project, as well as other regional water supply projects. DEIS at 3-45 to 3-55. Many of these projects, such as the California WaterFix, Temperance Flat Dam, and expansion of Shasta Dam, have prepared CALSIM modeling as part of their NEPA analyses, enabling quantitative analysis of the cumulative effects. However, the DEIS wholly fails to provide any quantitative analysis of the cumulative impacts of CVP/SWP operations in conjunction with these other projects, and provides only a single page of analysis of cumulative impacts. DEIS at 9-422 to 9-423. This vague discussion only considers a few of the actions identified in Chapter 3, (regulatory flow standards), and this discussion of cumulative impacts does not include any analysis of cumulative impacts from the California WaterFix, reservoir proposals (including Temperance Flat dam and expansion of Shasta Dam, for which Reclamation has prepared NEPA documents), and the other water supply projects identified in Chapter 3 of the DEIS.

V. Conclusion

As discussed above, the DEIS fails to accurately assess environmental impacts of CVP/SWP operations, fails to consider a reasonable range of alternatives, and includes alternatives that violate Reclamation's water rights and the purpose and need statement of the DEIS. Reclamation must substantially revise the DEIS and recirculate it for public comment to comply with NEPA.

Thank you for consideration of our views.

Sincerely,



Doug Obegi  
Natural Resources Defense Council



Gary Bobker  
The Bay Institute

**Enclosures**