Chapter 4
Errata

The following corrections or clarifications have been made to the Draft EIS text. These include minor corrections to improve writing clarity, grammar, typographical errors, and consistency; and corrections or clarifications in accordance with specific responses to comments, as described in Chapter 3, "Individual Comments and Responses," of this Final EIS. The text revisions are organized by the chapter, section, and page number that appear in the Draft EIS. Deletions are indicated by red strikethrough text (~~deleted text~~), and new text is indicated by red underlined text (new text). Text, table, and figure revisions are itemized below.

Corrections and clarifications are organized according to the section, chapter, and appendices to which they apply, beginning with the Executive Summary.

Executive Summary

Page ES-3, line 38:

The Proposed Action is comprised of three different flow augmentation components to be implemented as needed in a phased approach, based on environmental (e.g., flow) and biological conditions. The three components include: (1) a preventive base flow release that intends to increase the base flow of the lower Klamath River to 2,800 cfs, from mid-August to late September, to improve environmental conditions; (2) a one-day ~~5,000 cfs~~ preventive pulse flow (targeting 5,000 cfs in the lower Klamath River) to be used as a secondary measure, to alleviate continued poor environmental conditions and to respond to signs of Ich infection in the lower Klamath River; and (3) a five-day~~, 5,000 cfs~~ emergency pulse flow (targeting 5,000 cfs in the lower Klamath River), to be used on an emergency basis as a tertiary treatment, to avoid a significant die-off of adult salmon when the first two components of the Proposed Action are not successful at meeting their intended objectives. Reclamation would implement these flow augmentation components in coordination with Federal, State, and tribal resource specialists, including fisheries biologists and pathologists (i.e., LTP Technical Team).

Page ES-4, line 9:

Preventive Base Flow Augmentation Initiate preventive base flow augmentation from Lewiston Dam ~~when one or more~~ in consideration of the following conditions~~ occur~~:

Page ES-4, line 19:

In coordination with the LTP Technical Team, Reclamation will initiate preventive base flow augmentation releases when conditions warrant, which typically occurs by August 22, to meet the target flow (up to 2,800 cfs) in the lower Klamath River~~, if the fish harvest metric above is~~

~~not met~~. Reclamation will continue flow augmentation to target a flow of up to 2,800 cfs in the lower Klamath River, as measured at the Klamath, California gage through September 21. The LTP Technical Team would continue to implement fish pathology monitoring to determine the potential need for the secondary flow augmentation action (i.e., preventive pulse flow).

Page ES-5, line 7:

- Observed mortality of greater than 50 dead adult salmonids in ~~a~~ any 20 kilometer reach in 24 hours, coupled with the confirmed presence of Ich by the USFWS CA/NV Fish Health Center.

Page ES-5, line 15:

Table ES-1. Annual Implementation Schedule for Alternatives 1 and 2

Timeframe	Actions
March through May	1. Reclamation obtains Klamath Basin accretion forecasts from NOAA California Nevada River Forecast Center 2. Reclamation develops projections for lower Klamath River flows through September, based on: NOAA accretion forecast, 2013 USFWS and NMFS Klamath Project Biological Opinion-based flows below ~~release requirements from~~ Iron Gate Dam; tribal boat dance flows (even years in the Klamath River, and odd years in the Trinity River); and the Trinity River ROD flows from Lewiston Dam 3. Reclamation assesses environmental conditions and the applicability of augmentation criteria in collaboration with tribes and resource agencies 4. Reclamation assesses hydrologic conditions (current and projected) and water supply allocations in the CVP 5. Reclamation coordinates with the USFWS, CDFW, ~~and~~ NMFS, Yurok Tribe, and Hoopa Valley Tribe
May through July	1. Reclamation collaborates with tribes, CVP water and power users, regulatory agencies, and other key stakeholders for additional input 2. The LTP Technical Team continues to assess environmental conditions and the need for augmentation flows[1] 3. Reclamation refines the augmentation flow regime, if applicable 4. Reclamation coordinates with Humboldt County on potential use of their Contractual Right for preventive and emergency flow actions
August through September	1. Preventive flow augmentation is implemented, if needed 2. The LTP Technical Team conducts monitoring, evaluates data and conditions, and determines the need for supplemental actions; including preventive pulse flow and emergency pulse flow augmentation[1] 3. Monitor and research effects in Trinity River and lower Klamath River to inform adaptive management
October through December	1. The LTP Technical Team convenes to review and document outcomes from the year's activities

Notes:
[1] The LTP Technical Team would consist of Federal, State, and tribal resource specialists, including fisheries biologists or pathologists.

Key:
CDFW = California Department of Fish and Wildlife
CVP = Central Valley Project
NMFS = National Marine Fisheries Service
NOAA = National Oceanic and Atmospheric Administration
Reclamation = U.S. Department of the Interior, Bureau of Reclamation
ROD = Record of Decision
LTP = Long-Term Plan to Protect Adult Salmon in the Lower Klamath River
USFWS= U.S. Fish and Wildlife Service

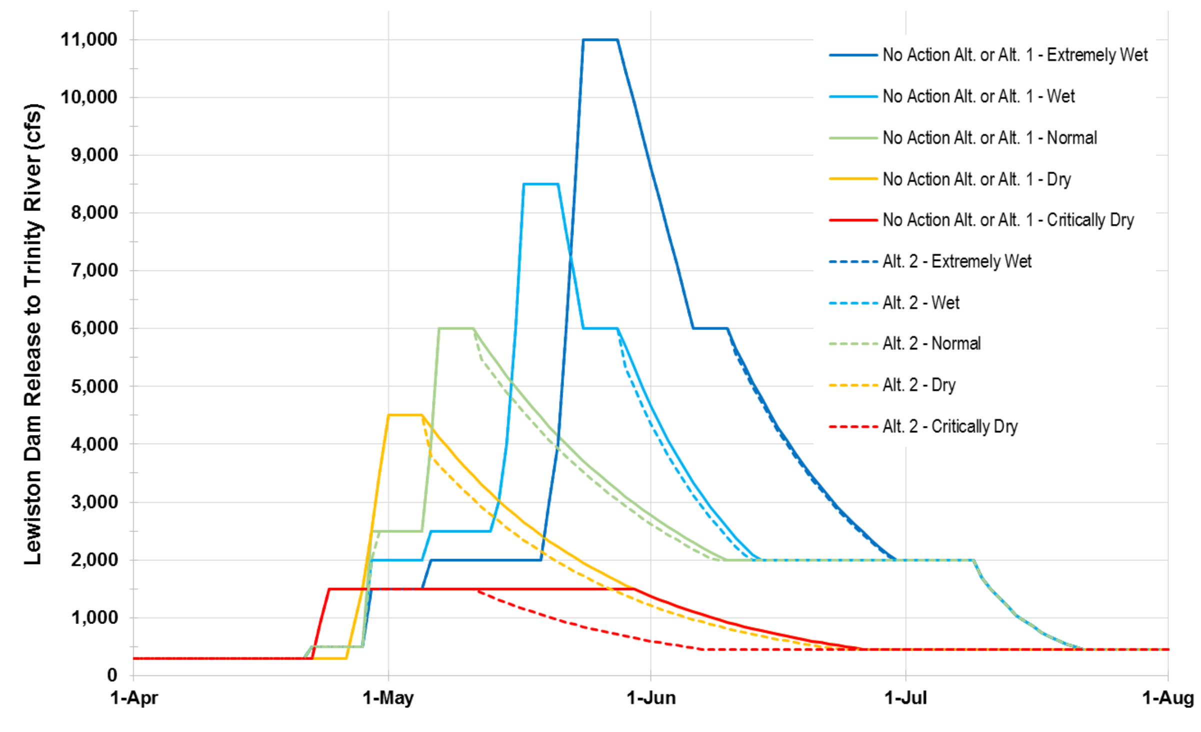
Page ES-6, line 2:

Monitoring and research efforts will include both essential monitoring actions (e.g., monitoring required to measure the flow augmentation component triggers, such as Ich infestation level), as well as additional monitoring and research actions, to inform potential refinement of flow augmentation trigger criteria and assess effects of flow augmentation actions on Trinity River and lower Klamath River ecosystems.

Page ES-6, line 18:

Potential Additional Monitoring and Research Actions and Flow Component Trigger Criteria Refinement As part of the Proposed Action, additional monitoring and research actions would be conducted—furthering scientific understanding of causative factors of Ich infection and outbreak in the lower Klamath River. Based on the concept of adaptive management, and utilizing additional scientific information on causative factors, Reclamation, in coordination with the LTP Technical Team, may refine trigger criteria for the three flow components (i.e., preventive base flow augmentation, preventive pulse flows, and emergency pulse flow augmentation) to further reduce the likelihood—and potentially the severity—of any Ich epizootic event. The process for potential refinement of flow component trigger criteria will be based on adaptive management principles, as follows:

Page ES-8, line 8:



Key:
Alt = Alternative

Figure ES-2. Rescheduling of Trinity River ROD Flow Release Pattern for All Year Types Under Alternative 2

Page ES-9, line 18:

Both Alternatives 1 and 2 have the ability to meet the Purpose and Need, though each alternative would require coordination from a host of agencies and interested parties to implement. Though both alternatives have similar environmental effects, the main differences between the alternatives are the effects on CVP water deliveries, temperature effects in the Trinity and Sacramento Rivers, and the effects to hydropower generation. In general, in some drier years, Alternative 1 would reduce CVP water deliveries by up to 24 TAF, while Alternative 2 would reduce those same deliveries by about 6 TAF. Both alternatives could lead to changes in meeting water temperature objectives for ~~changes in~~ the mainstem of the Trinity River, with Alternative 1 having effects primarily in July through December while Alternative 2 would have effects on water temperature in April through July. Alternative 1 would also have effects on water temperatures in the Sacramento River, which could affect various life stages for Chinook Salmon in critical years. In addition, both alternatives would change hydropower generation, with Alternative 1 having the maximum decrease in TRD energy production of 9.8 gigawatt-hours in critical years. Details of these differences are provided in each EIS resource chapter, and are summarized below in Table ES-3.

Chapter 1, "Introduction"

Page 1-3, line 9:

In response, Reclamation collaborated with tribes, regulatory agencies, and other basin partners to develop and refine monitoring and flow augmentation criteria. A Lower Klamath River Flow Augmentation Subgroup (Subgroup) of the Flow Workgroup, (affiliated with the Trinity River Restoration Program (TRRP)) was established among the partners and met on many occasions. The Subgroup reviewed past analyses, researched contemporary disease propagation information, and studied hydrologic data. Ultimately, the Subgroup summarized their recommendations in a memorandum, 2012 *Fall Flow Release Recommendation*, to the Trinity Management Council (TMC)[4] Chair, dated May 31, 2012 (Trinity River Restoration Program 2012). Their primary recommendations were two-fold:

Page 1-3, line 30:

Reclamation prepared an Environmental Assessment (EA) and on August 10, 2012, signed a 26 Finding of No Significant Impact (FONSI) for the release of up to 44,800 acre-feet to augment 27 flows in the lower Klamath River for preventative purposes, along with up to 48,000 acre-feet 28 exclusively from Trinity Reservoir for emergency flow augmentation purposes if monitoring 29 indicated that this was necessary (Reclamation 2012a, 2012b). Klamath River Basin hydrologic conditions had deteriorated 30 over the course of the analysis, precluding additional releases from the Klamath River Basin, 31 whereas Trinity Reservoir storage in mid-summer was at 107 percent of the 15-year average.

Page 1-5, line 7:

NCAO prepared an EA and on August 6, 2013, signed a FONSI for the release of up to 62,000 4 acre-feet to augment lower Klamath River flows to a rate of 2,800 cfs for preventative purposes. 5 Citing sub-normal Klamath River Basin hydrology, the FONSI stated that augmentation would 6 be provided exclusively from Trinity Reservoir (Reclamation 2013a, 2013b).

Page 1-6, line 7:

Observed mortality of greater than 50 dead adult salmonids in ~~a~~ any 20 kilometer index reach in 24 hours combined with a confirmed presence of Ich by the USFWS Fish Health Center, then:

Page 1-7, line 20:

The 2014 fall-run Chinook Salmon return post-season estimate was 160,000 adults. Reclamation was unable to complete its evaluation of this action under the National Environmental Policy Act (NEPA) as has occurred in past years, because the release was undertaken only after monitoring indicated there was an emergency need for flow augmentation. Due to the emergency nature of the releases, Reclamation consulted with the Council on Environmental Quality (CEQ) regarding alternative arrangements under NEPA as provided for in CEQ regulations.

Page 1-8, line 8:

Reclamation prepared an EA and on August 20, 2015, signed a FONSI for the release of up to 51,000 acre-feet to augment lower Klamath River flows to a rate of 2,800 cfs for preventative purposes (Reclamation 2015b, 2015c). Approximately 48,000 acre-feet was released from Lewiston Dam to improve environmental conditions in the lower Klamath River. Although Ich was detected throughout the monitoring period, no fish die-off occurred. The post-season run size estimate was 83,800 adults (Trinity River Restoration Program 2016).

Page 1-11, line 2:

Built between 1903 and 1962, PacifiCorp's Klamath Hydroelectric Project consists of seven hydroelectric developments and one non-generating dam. Reclamation owns Link River Dam which PacifiCorp operates in coordination with the company's hydroelectric projects. The Link River Dam, located upstream from PacifiCorp's projects, controls storage within, and releases from, Upper Klamath Lake. Upper Klamath Lake water releases (through Link River Dam) are directed by Reclamation to fulfill the primary objectives of regulating Klamath River flows to benefit fish and wildlife, including providing refuge supplies and meeting irrigation demands. ~~In addition, PacifiCorp manages~~ Upper Klamath Lake is also managed for flood control objectives. Diversions for hydroelectric purposes occur after these objectives are attained (PacifiCorp 2016).

Page 1-11, line 11:

On April 6, 2016, the U.S. Department of the Interior (DOI), U.S. Department of Commerce, PacifiCorp, and the States of Oregon and California, signed an agreement that, following a process administered by the Federal Energy Regulatory Commission (FERC), is expected to remove four dams (JC Boyle, Copco 1 and 2, and Iron Gate) on the Klamath River by 2020 (Reclamation 2016). The amended dam removal agreement, which uses existing non-Federal funding and follows the same timeline as the original 2010 Klamath Hydroelectric Settlement Agreement, ~~will be~~ was filed with FERC for consideration under their established processes. Under the agreement, dam owner PacifiCorp will transfer its license to operate the Klamath River dams to a private company known as the Klamath River Renewal Corporation. This company will oversee the dam removal in 2020. PacifiCorp will continue to operate the dams until they are decommissioned.

Page 1-12, line 27:

As described above, the CVP also diverts water from Trinity Lake via Lewiston Reservoir (on the Trinity River) to the Sacramento River system (see Figure 1-3). CVP pumping plants and canals include the Red Bluff Pumping Plant, which diverts water from the Sacramento River into the CVP Tehama-Colusa Canal; Folsom South Canal, which conveys water from Folsom Lake to southeastern Sacramento County; Contra Costa Canal Pumping Plant, which diverts water from Rock Slough in the Delta into the CVP Contra Costa Canal; and C.W. Jones Pumping Plant, which diverts water from the south Delta into the CVP Delta-Mendota Canal (Reclamation 2015~~c~~ d).

Page 1-15, line 18:

In 2008 and 2009 the USFWS and NMFS, respectively, issued biological opinions (BOs) for the Coordinated Long-Term Operation of the CVP and SWP (USFWS 2008, NMFS 2009). In these BOs, Reclamation analyzed its operations through the year 2030. Because the TRD is a component of the CVP, and Reclamation would need to revisit effects to Federal Endangered Species Act (ESA) listed species from operation of the CVP in 2030, Reclamation has chosen to analyze effects from the proposed action through the same time period, to be consistent with its BOs to operate the CVP.

Page 1-16, line 15:

___. 2012a. Final Environmental Assessment of 2012 Lower Klamath River Late Summer Flow Augmentation. August.

___. 2012b. Finding of No Significant Impact, 2012 Lower Klamath River Late Summer Flow Augmentation. August.

___. 2013a. Final Environmental Assessment, 2013 Lower Klamath River Late-Summer Flow Augmentation from Lewiston Dam. August.

___. 2013b. Finding of No Significant Impact, 2013 Lower Klamath River Late- Summer Flow Augmentation from Lewiston Dam. August.

Page 1-16, line 19:

___. 2015c. Finding of No Significant Impact, 2015 Lower Klamath River Late Summer Flow Augmentation from Lewiston Dam. August.

____. 2015d ~~e~~. Coordinated Long-Term Operation of the Central Valley Project and State Water Project, Final Environmental Impact Statement. November. Executive Summary (p. ES-2).

Page 1-17, line 8:

USFWS and NMFS (U.S. Department of the Interior, Fish and Wildlife Service and National Marine Fisheries Service). 2013a. Biological Opinion on the Effects of Klamath Project Operations from May 31, 2013, through March 31, 2023, on Five Federally Listed Threatened and Endangered Species. NMFS Southwest Region, Northern California Office, and USFWS Pacific Southwest Region, Klamath Falls Fish and Wildlife Office. (pp. 10 to 47).

Page 1-17, line 14:

USFWS (U.S. Department of the Interior, U.S. Fish and Wildlife Service), Reclamation (U.S. Department of the Interior, Bureau of Reclamation), Hoopa Valley Tribe, and Trinity County. 2000. Trinity River Mainstem Fishery Restoration Environmental Impact Statement/Report. October. Final – Executive Summary, Chapter 1, Chapter 2 and Appendix C. Draft – Chapter 2 (pp. 2-1 to 2-31) and Chapter 3 (p. 3-6).

Chapter 2, "Description of Alternatives"

Page 2-2, line 8:

Concerning the PacifiCorp Hydroelectric facilities, the U.S. Department of the Interior (DOI), U.S. Department of Commerce, PacifiCorp, and the States of Oregon and California, signed an agreement that, following a process administered by Federal Energy Regulatory Commission (FERC), to remove four dams (JC Boyle, Copco No. 1 and Copco No. 2, and Iron Gate) on the Klamath River. The amended dam removal agreement, which uses existing non-Federal funding, and follows the same timeline as the original 2010 Klamath Hydroelectric Settlement Agreement, ~~will be~~ was filed with FERC for consideration under their established processes. Under the agreement, dam owner PacifiCorp will transfer its license to operate the Klamath River dams to a private company known as the Klamath River Renewal Corporation (KRRC). The KRRC will oversee the dam removal work.

Page 2-2, line 18:

The Klamath Facilities Removal Final EIS/Environmental Impact Report (EIR) was completed in 2012 (DOI and DFG 2012); however, a Record of Decision (ROD) for the dam removal was not issued. On June 16, 2016, FERC approved a temporary suspension of the relicensing process in order for PacifiCorp and the KRRC to develop two additional applications for FERC review, including an application to transfer the four dams/facilities to the KRRC; and an application by the KRRC to surrender and remove the four dams. ~~As these applications are pending~~ These applications were submitted to FERC in September 2016, however, FERC has not approved the removal of the four dams. Therefore, for the purposes of this EIS, the No Action Alternative includes PacifiCorp operating under the current annual license with the dams remaining in place. The California Department of Fish and Wildlife (CDFW), funded by PacifiCorp, would continue to operate the Iron Gate Hatchery under its current operations. Flows downstream of Iron Gate Dam would remain similar to current flows, which are released consistent with the 2013 Klamath Biological Opinion (BO) for Reclamation's Klamath Project.

Page 2-2, line 39:

The Proposed Action is comprised of three different flow augmentation components to be implemented as needed in a phased approach, based on environmental (e.g., flow) and biological conditions. The three components include: (1) a preventive base-flow release that targets increasing the base flow of the lower Klamath River to 2,800 cfs from mid-August to late September~~,~~ to improve environmental conditions; (2) a preventive pulse flow (targeting 5,000 cfs in the lower Klamath River) to be used as a secondary measure to alleviate continued poor environmental conditions and signs of Ich infection in the lower Klamath River; and (3) a contingency volume, to be used on an emergency basis as a tertiary treatment (targeting 5,000 cfs in the lower Klamath River) to avoid a significant die-off of adult salmon when the first two components of the Proposed Action are not successful at meeting their intended objectives. An adaptive management approach that incorporates real-time environmental and biological monitoring would be used to determine if and when to implement any or all of these three flow augmentation components. Reclamation would implement these flow augmentation components in coordination with Federal, State, and tribal resource specialists, including fisheries biologists or pathologists (i.e., Long-Term Plan to Protect Adult Salmon in the Lower Klamath River [LTP] Technical Team).

The 2,800 cfs target flow release of the preventive base flow augmentation, and the 5,000 cfs target flow of the preventive pulse flow and emergency pulse flow augmentation, are flow levels used as planning estimates, and may be adjusted if real-time observations or advancements in understanding of the mechanisms that are causative factors of a fish die-off suggest these flow levels are more than that required to prevent a fish die off. Additionally, flow augmentation criteria may evolve over time based on monitoring and research of environmental and biological conditions.

Page 2-3, line 10:

Preventive Base Flow Augmentation Initiate preventive base-flow augmentation from Lewiston Dam ~~when one or more~~ in consideration of the following conditions ~~occur~~:

Page 2-3, line 21:

In coordination with the LTP Technical Team, Reclamation will initiate preventive base-flow augmentation releases when conditions warrant, which typically occurs by August 22, to meet the target flow (up to 2,800 cfs) in the lower Klamath River~~, if the fish harvest metric above is not met~~. This date was selected based on historical harvest information for the estuary and the middle Klamath River area (as summarized in USFWS and NMFS 2013). Reclamation will continue flow augmentation to target a flow of up to 2,800 cfs in the lower Klamath River, as measured at the Klamath, California gage through September 21. The LTP Technical Team would continue to implement fish-pathology monitoring to determine the potential need for the secondary flow augmentation action (Preventive Pulse Flow).

Page 2-4, line 13:

- Observed mortality of greater than 50 dead adult salmonids in ~~a~~ any 20 kilometer reach in 24 hours, coupled with the confirmed presence of Ich by the USFWS CA-NV Fish Health Center.

Page 2-5, line 1:

Table 2-1. Annual Implementation Schedule for the Proposed Action (Alternative 1)

Timeframe	Actions
March through May	6. Reclamation obtains Klamath Basin accretion forecasts from the NOAA California Nevada River Forecast Center 7. Reclamation develops projections for lower Klamath River flows through September, based on: the NOAA accretion forecast; 2013 USFWS and NMFS Klamath Project Biological Opinion-based flows below ~~release requirements from~~ Iron Gate Dam; tribal boat dance flows (even years in the Klamath River, and odd years in the Trinity River); and the Trinity River ROD flows from Lewiston Dam 8. Reclamation assesses environmental conditions and the applicability of augmentation criteria in collaboration with tribes and resource agencies 9. Reclamation assesses hydrologic conditions (current and projected) and water supply allocations in the CVP 10. Reclamation coordinates with the USFWS, CDFW, ~~and~~ NMFS, Yurok Tribe, and Hoopa Valley Tribe
May through July	1. Reclamation collaborates with tribes, CVP water and power users, regulatory agencies, and other key stakeholders for additional input 2. The LTP Technical Team continues to assess environmental conditions and the need for augmentation flows 3. Reclamation refines the augmentation flow regime, if applicable 4. Reclamation coordinates with Humboldt County on potential use of their Contractual Right for preventive and emergency flow actions
August through September	1. Preventive flow augmentation is implemented, if needed 2. The LTP Technical Team conducts monitoring, evaluates data and conditions, and determines the need for supplemental actions; including preventive pulse flow and emergency pulse flow augmentation 3. Monitor and research effects in Trinity River and lower Klamath River to inform adaptive management
October through December	1. The LTP Technical Team convenes to review and document outcomes from the year's activities

Note:
The LTP Technical Team would consist of Federal, State, and tribal resource specialists, including fisheries biologists or pathologists.
Key:
CDFW = California Department of Fish and Wildlife
CVP = Central Valley Project
NMFS = National Marine Fisheries Service
NOAA = National Oceanic and Atmospheric Administration
Reclamation = U.S. Department of the Interior, Bureau of Reclamation
ROD = Record of Decision
LTP = Long-Term Plan to Protect Adult Salmon in the Lower Klamath River
USFWS = U.S. Fish and Wildlife Service

Page 2-5, line 4:

Monitoring and research efforts will include both essential monitoring actions (e.g., monitoring required to measure the flow augmentation component triggers, such as Ich infestation level) as well as additional monitoring and research actions, to inform potential refinement of flow augmentation trigger criteria to improve performance, and to assess effects of flow augmentation actions on Trinity River and lower Klamath River ecosystems.

Page 2-6, line 1:

Fish Density, Including Estuary Counts Various methods would be utilized to determine fish densities, including estuary counts and other methods identified by the LTP Technical Team. The Yurok Tribe would collect harvest and catch effort data for the estuary. Estimates of fall-run Chinook Salmon adult abundance in the estuary will be made based on weekly or more frequent harvest quantity data and the fishing efforts of the Yurok Tribe. A key assumption is that the number of Chinook Salmon that escape estuary harvest is positively associated with the number of fish that are harvested. In addition, other methods for determining fish densities will be developed through the research and monitoring actions, such as in-river sonar.

Page 2-6, line 11:

Fish Health Monitoring (Ich) Monitoring and assessment of salmon and steelhead for the presence of Ich would be conducted along the lower Klamath River during the late-summer and fall months (July through October)~~ by the Yurok, Hoopa and Karuk Tribes, or resource agencies~~. Fish will be collected using gill nets, dip nets, spears, and hook-and-line. During monitoring activities, the first gill arch on each side of the fish will be removed and examined in the field for Ich with a dissecting microscope, and slides will be prepared for archiving. Samples will be provided to the USFWS CA-NV Fish Health Center for examination with more powerful microscopes. Individual Ich organisms on the gill arches would be counted as soon as possible. Additional information, including fish length and potential presence of a coded-wire tag will be recorded. If the fish is missing its adipose fin (indicative of coded-wire tagging), the head will be collected and frozen for later retrieval of the coded-wire tag. All results would be presented to the LTP Technical Team and KFHAT.

Page 2-6, line 27:

Potential Additional Monitoring and Research Actions and Flow Component Trigger Criteria Refinement As part of the Proposed Action (Alternative 1), additional monitoring and research actions would be conducted to further scientific understanding of causative factors of Ich infection and outbreak in the lower Klamath River and the ecological impacts of management actions taken to minimize Ich. Based on the concept of adaptive management, and utilizing additional scientific information on the causative factors, Reclamation, in coordination with the LTP Technical Team, may refine trigger criteria of the three flow components (e.g., preventive base flow augmentation, preventive pulse flows, and emergency pulse flow augmentation) to further reduce the likelihood—and potentially the severity—of any Ich epizootic event. The process for potential refinement of flow component trigger criteria will be based on adaptive management principles, as follows:

Page 2-8, line 1:

Table 2-2. Potential Additional Monitoring and Forecasting Actions to Inform Flow Augmentation Trigger Criteria for Alternatives 1 and 2

Monitoring/Forecasting Actions	Data Type
Adult Salmon Abundance in Estuary/Lower Klamath River	
Yurok Tribal fishery landings	– Index of abundance/density
CDFW sport creel census	– Index of abundance/density
Summer snorkel surveys at thermal refugia	– Index of density
Sonar counts at thermal refugia or index sites	– Index of abundance/density
CDFW upriver weir counts	– Index of ultimate abundance
PSMFC pre-season run-size projections	– Index of abundance planning
Migration run timing in river and at hatchery	– Index of run composition and response to flow augmentation
Willow Creek weir counts (late August, removed at 2400 cfs)	– Index of run composition and response to flow augmentation
Karuk Tribal fishery and health monitoring/mouth of salmon	– Index of run composition and response to flow augmentation – Index of infectivity
Adult Salmon Pathology	
Adult salmon samples (lower Klamath River)	– Index of infectivity
External parasite/bacterial examination	– Index of infectivity
USFWS histology/pathology	– Index of infectivity/pathogenicity
Mortality/pre-spawning mortality	– Index of pathogenicity
Hatchery sampling	– Index of infectivity
Water Temperature and Flow	
USGS Gage No. 11530500	– River discharge
Yurok Tribe Environmental Program monitoring	– Water temperature
Annual hydrologic February – April forecasts	– Planning – river discharge
River water temperature forecasting models	– Planning – water temperature
Meteorology forecasting	– Planning – water temperature and river discharge

Key:
CDFW = California Department of Fish and Wildlife
PSMFC = Pacific States Marine Fisheries Commission
USFWS = U.S. Fish and Wildlife Service
USGS = U.S. Geological Service

Page 2-9, line 1:

Table 2-3. Potential Scientific Questions and Research and Monitoring Efforts to Support Hypothesis and Conceptual Model Development for Alternatives 1 and 2

Scientific Questions	Research and Monitoring Efforts
How well do Yurok Tribal fishery metrics and other fish density estimates reflect salmon abundance and densities in the lower Klamath River?	– Net harvest index of immigrating salmon abundance – Extent and persistence of thermal refugia use – Underwater observations of atypical salmon behaviors – Migration/movement responses to flow and temperature cues – Fishery independent measures of abundance – Test ARIS camera technology for measuring salmon abundance and densities – Efficacy of flow augmentation criteria for protecting late-running spring Chinook Salmon
What are the key dynamics and metrics for determining Ich (and other pathogens) infectivity and pathogenicity?	– Ich infectivity and relationships to adult salmon spatiotemporal dynamics – Triggers for Ich infectivity and pathogenicity – Relationship of Ich infectivity to gill hyperplasia and pathogenicity – Spatiotemporal and interannual dynamics of Ich infection – "Hangover Effect" (e.g., latent carry-over of pathogens to successive years) – Synergism of Ich infectivity with other pathogens (i.e., Columnaris) – Interaction of resident fish as a reservoir of Ich – Synergism of Ich infectivity with other stressors (water quality, microcystin) – Sentinel fish monitoring for presence or virulence of pathogens – Identification of controlling factors and thresholds for Ich infectivity – Appropriate metric levels (e.g., number of Ich per gill arch, percentage of fish infected) to trigger preventive base flow augmentation, preventive pulse flows, and emergency pulse flows – Time required for Ich to progress from low-level infection to a lethal prognosis
What potential techniques are available, and can effective monitoring and assessment techniques for Ich be used as part of annual management?	– Non-lethal histologic sampling techniques – Controlled experiments on Ich-infected adult salmon – Infective-stage parasite (theront) density in water samples – eDNA techniques to measure Ich presence and density – Use of sentinel fish histopathology monitoring – ARIS technology – Evaluate pathogenicity of different genotypes of Ich/genotype(s) in Klamath River
How have hatchery operations and in-river harvest affected run timing, and does current management accommodate or provide for manipulation of run-timing?	– Has selection of run-timing been significant in Klamath Basin stocks? – Would manipulation of broodstock selection be of value to reduce vulnerability?
How much influence does upstream reservoir management/operation have on lower Klamath River water temperatures?	– Water temperature monitoring at key measurement nodes – Improve/update calibration of water temperature models

Table 2-3. Potential Scientific Questions and Research and Monitoring Efforts to Support Hypothesis and Conceptual Model Development for Alternatives 1 and 2 (contd.)

Scientific Questions	Research and Monitoring Efforts
What are the potential inadvertent or unanticipated adverse effects of late-summer flow augmentation that may require monitoring and mitigation?	– Asynchronous cue attracting a pre-mature entry of fall run from ocean – Effects to resident fish, herpetofauna, and invertebrates, especially in upstream reaches – Advance immigration of fall run to upper Trinity River increasing potential of spawning overlap with spring run – Depending on source of late-summer flow, impair or delay immigration of spring run (i.e., reduction in spring Trinity River ROD releases) – Impacts to Hoopa and Yurok Tribal ~~fishery~~ fisheries (net-fouling) – Impacts to hatchery operations by prematurely queuing immigration/arrival – Impacts to thermal refugia – Genetic consequences or potential increased overlaps in spawning of spring-run and fall-run Chinook Salmon in the Trinity River
What are salmon responses to late-summer flow augmentation?	– Employ field and analytic techniques to monitor and measure salmon response to flow and temperature management – Migration initiation, rates, and behavioral responses – Flow, temperature relationships with infectivity and pathogenicity of Ich – Effect of temperature differentials above and below the Trinity River confluence on migrating salmon bound for Klamath River spawning grounds (i.e., thermal barrier to migration upstream in the Klamath River) – Timing and duration of reduced water temperatures – Effect of estuary dynamics upon fish behavior and Ich infectivity

Key:
ARIS = Adaptive Resolution Imaging Sonar
eDNA = Environmental DNA
ROD = Record of Decision

Page 2-12, line 1:

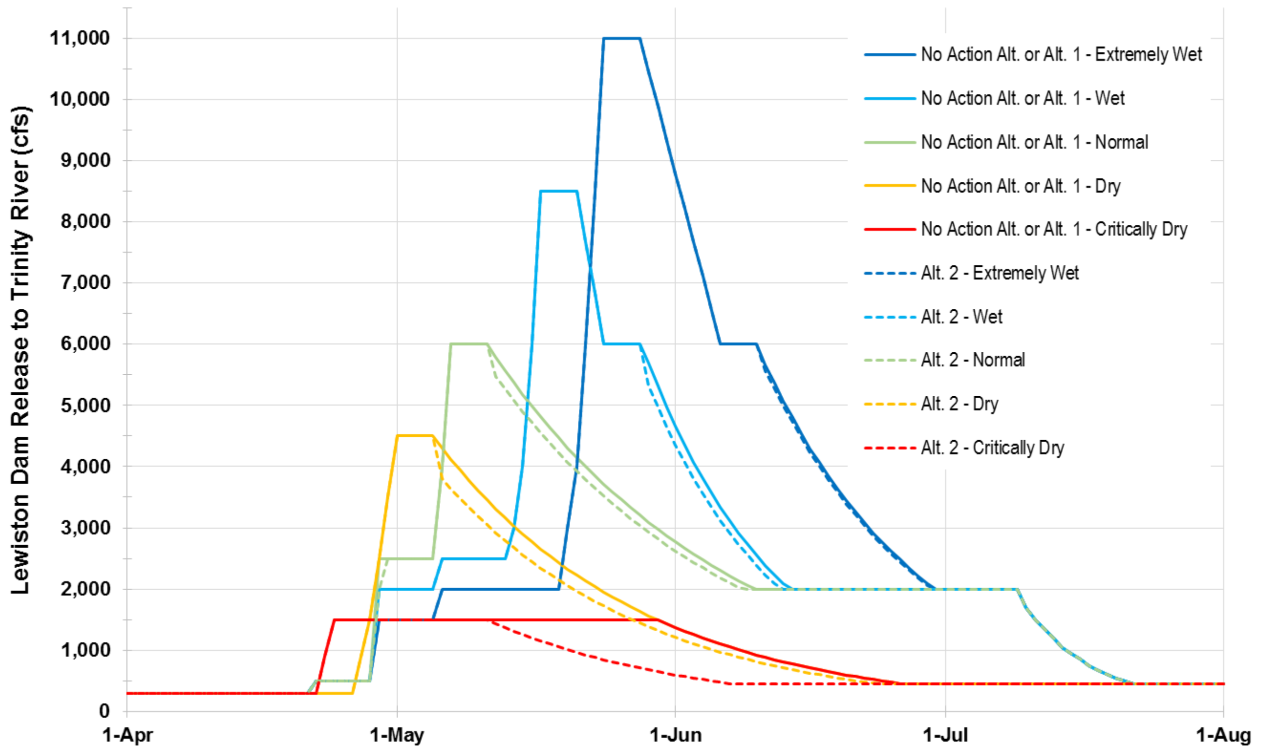


Figure 2-1. Rescheduling of Trinity River ROD Flow Release Pattern for All Year Types Under Alternative 2

Page 2-13, line 2:

Several non-structural alternatives were identified to provide additional flow through reoperating existing facilities or modifying regulatory requirements in the Klamath River Basin. In the Klamath River Basin upstream of the confluence with the Trinity River, these included: reoperating the Klamath Project through prioritizing fishery flows, acquiring water from willing sellers, or providing replacement water supplies; reoperating the Klamath Hydroelectric Project; reoperation of Klamath River tributary facilities; and altering flow requirements under the 2013 Klamath Project BO. Evaluations indicated that increased releases from Klamath River Basin sources would provide limited to no reduction in temperature in the lower Klamath River compared to increased releases from Trinity Reservoir. Since temperature is a significant contributing factor to Ich epizootic events, flow augmentation from Klamath River Basin sources would not be as effective as releases from the Trinity River Subbasin and would not address more than one of the contributing factors to an Ich epizootic event. Even though Klamath River Basin sources would not be sufficiently effective for the proposed action, there is justification for further study of the impacts from water diversion in the Klamath River Basin and associated water quality concerns on fishery and other resources in the lower Klamath River. These and related issues will be addressed in a future effort. Further, for the Trinity River Subbasin, non-structural flow augmentation measures that were not carried forward and incorporated into alternatives include: reoperation of storage in Trinity Reservoir based on acquiring water from willing sellers, providing replacement water supplies, modifying Reclamation's Safety of Dams storage restrictions for Trinity Dam, increasing wet year carryover storage in Trinity Reservoir, or carryover storage of Proviso 2 water up to 150 thousand acre-feet. As acquisition of water supplies from willing sellers and providing replacement water supplies from other sources to water users would not reliably provide needed water supplies, these measures would not be able to reliably reduce crowded holding conditions for pre-spawn adults nor reduce warm water temperatures in the lower Klamath River. Modifying Reclamation's Safety of Dams storage restrictions for Trinity Dam would result in unacceptable risks to human health and safety and associated potential for significant impacts due to dam failure. Increasing carryover storage in Trinity Reservoir, either through increasing carryover in wet years or accumulating unused portions of the Humboldt County contract water, would increase operational spills (such releases may not be considered a beneficial use). Additionally, carryover storage of Proviso 2 water implicates CVP system-wide operational criteria and plan that may require modification and a greater scale of analysis to determine potential impacts to the CVP from the potential change in operational criteria and plan. Because of the need for this additional analysis, this proposed alternative is not immediately implementable by August 2017 and as a result, would not meet the purpose and need.

Page 2-14, line 6:

Reclamation reviewed each of these concepts, and determined that many of them would not meet the purpose and need for the project, nor did they alleviate one or more of the significant impacts that might be associated with the Proposed Action. Further, none of these concepts would meaningfully and substantially reduce the likelihood, and potentially reduce the severity of Ich epizootic events. Some of these concepts, such as removal of the PacifiCorp dams and reconstructing facilities at Lewiston Dam and Reservoir would not be implementable in 2017. Several of these concepts are already being pursued in different venues, and while they cannot provide a solution on their own, ~~they're~~ they are part of the larger comprehensive management of the Klamath River system. Many of these elements–such as improving temperature management at Trinity Reservoir–will continue to be pursued in those venues, and Reclamation will support those efforts to the extent practicable.

Page 2-14, line 20:

DOI and DFG (U.S. Department of the Interior and California Department of Fish and Game). 2012. Klamath Facilities Removal Final Environmental Impact Statement/Environmental Impact Report. December. Chapter 2.

Page 2-14, line 32:

USFWS (U.S. Department of the Interior, U.S. Fish and Wildlife Service), Reclamation (U.S. Department of the Interior, Bureau of Reclamation), Hoopa Valley Tribe, and Trinity County. 2000. Trinity River Mainstem Fishery Restoration Environmental Impact Statement/Report. October. Final – Executive Summary, Chapter 1, Chapter 2 and Appendix C. Draft – Chapter 2 (pp. 2-1 to 2-31).

Chapter 3, “Considerations for Describing Affected Environment and Environmental Consequences”

No corrections or clarifications have been made to the Draft EIS text for Chapter 3, “Considerations for Describing Affected Environment and Environmental Consequences.”

Chapter 4, “Surface Water Supply and Management”

Page 4-4, line 31:

The Trinity River Subbasin, part of the Klamath River Basin, extends over approximately 1,897,600 acres and ranges in elevation from over 9,000 feet above sea level in the headwaters area to less than 300 feet at the confluence of the Trinity River with the Klamath River (NCRWQCB et al. 2009; USFWS et al. 2000). ~~Average~~ Annual precipitation in the Trinity River Subbasin ranges from 30 to 70 inches per year, with a long-term average of approximately 62 inches per year. Over 90 percent of the precipitation has historically occurred between October and April. Precipitation ranges from mostly snow at higher elevations to mostly rain near the confluence with the Klamath River.

Page 4-5, line 3:

The Trinity River includes the mainstem, North Fork Trinity River, South Fork Trinity River, New River, and numerous smaller streams (NCRWQCB et al. 2009; USFWS et al. 2000 ~~1999~~). The mainstem of the Trinity River flows 170 miles to the west from the headwaters to the confluence with the Klamath River. The CVP Trinity and Lewiston dams are located at approximately River Miles 105 and 112, respectively; and upstream from the confluences of the Trinity River and the North Fork, South Fork, and New River. Flows on the North Fork, South Fork, and New River are not affected by CVP facilities. The Trinity River flows approximately 112 miles from Lewiston Dam to the Klamath River through Trinity and Humboldt counties and the Hoopa Indian Reservation within Humboldt County.

Page 4-5, line 12:

Trinity Lake, a CVP facility on the Trinity River formed by the Trinity Dam, was completed in 1962. The 2.4 million acre-feet (MAF) reservoir is located approximately 50 miles northwest of Redding (USFWS et al. 2000 ~~1999~~). Lewiston Reservoir, a CVP facility on the Trinity River formed by Lewiston Dam, was completed in 1963 and is located 7 miles downstream from the Trinity Dam. Lewiston Reservoir is used as a regulating reservoir for downstream releases to the Trinity River and to Whiskeytown Lake, located in the adjacent Clear Creek watershed, via Clear Creek Tunnel. Water is diverted from the lower outlets in Trinity Lake to Lewiston Reservoir to provide cold water to Trinity River. There are no other major dams in the Trinity River watershed.

Page 4-6, line 1:

Prior to completion of Trinity and Lewiston dams, flows in the Trinity River were highly variable and could range from over 100,000 cubic feet per second (cfs) in the winter and spring to 25 cfs in the summer and fall (USFWS et al. 2000 ~~1999~~). Total annual flow volume at Lewiston (immediately downstream from the current location of Lewiston Dam) ranged from 0.27 to 2.7 MAF with a long-term average of 1.2 MAF.

Page 4-6, line 29:

Additional water releases periodically occur into the Trinity River as part of flood control operations and to provide other flow releases (NCRWQCB et al. 2009; Reclamation 2011a). Although flood control is not an authorized purpose of the TRD, flood control benefits are provided through normal operations. The Reclamation Safety of Dams release criteria generally provide for maximum storage in Trinity Lake of 2.1 MAF between November and March. Trinity Lake is operated to target a minimum storage of 600 TAF to preserve cold water for release to the Trinity River; however, this target may be reduced in dry and critically dry water years if determined to be required by Reclamation, USFWS and NMFS (DOI and Hoopa Valley Tribe 2000). Initial flood releases are discharged from Trinity Lake into Lewiston Reservoir, and then, through the powerplant and into Whiskeytown Lake in the Clear Creek watershed. To reduce the potential for flooding on the Trinity River, releases into Trinity River generally are less than 11,000 cfs from Lewiston Dam (under Safety of Dams criteria) due to local high water concerns in the floodplain and local bridge flow capacities.

Page 4-8 line 6:

The Klamath River watershed extends over 15,600 square miles from southern Oregon to northern California, and ranges in elevation from over 9,500 feet above sea level near the headwaters to sea level at the Pacific Ocean (USFWS et al. 2000 ~~1999~~). The upper Klamath River basin extends over 60 miles from the headwaters to Iron Gate Dam (DOI and DFG 2012). The lower Klamath River basin extends 190 miles from Iron Gate Dam to the Pacific Ocean. Four major tributaries flow into the lower Klamath River, including Shasta, Scott, Salmon, and Trinity Rivers.

Page 4-8, line 13:

As shown in Figure 4-4, the lower Klamath River flows 43.5 miles from the confluence with the Trinity River to the Pacific Ocean (USFWS et al. 2000 ~~1999~~). Downstream from the Trinity River confluence, the Klamath River flows through Humboldt and Del Norte counties and through the ~~Hoopa Valley Indian Reservation,~~ Yurok Indian Reservation~~, and Resighini Indian Reservation within Humboldt and Del Norte counties~~ (DOI and DFG 2012). Historical flow in the Klamath River at Orleans from 2009 through 2016 is presented in Figure 4-5.

Page 4-14, Line 21:

Water from Whiskeytown Lake is released to the Sacramento River through the Spring Creek Tunnel which conveys water to the Spring Creek Conduit, and then to Keswick Reservoir. Water from Whiskeytown Lake also is released into Clear Creek directly from Whiskeytown Lake; or during high flow conditions (e.g., flood flows), from a Glory Hole within Whiskeytown Lake through a conduit into Clear Creek. Most of the flows are released through the Spring Creek Tunnel and Powerplant to Keswick Reservoir. ~~These flows into Keswick Reservoir provide cold water flows that reduce temperatures in the upper Sacramento River, especially during the fall months.~~ Water also is discharged from Whiskeytown Lake to Clear Creek to provide for instream flows and water for users located in the CVP Clear Creek South Unit within, or adjacent to, the Clear Creek watershed. In accordance with the 2009 NMFS BO RPA, Reclamation is required to manage Whiskeytown Lake releases to meet daily water temperatures in Clear Creek at Igo. Historical flow in Clear Creek near Igo from 2009 to 2016 is presented in Figure 4-10.

Page 4-128, line 5:

DOI and DFG (U.S. Department of the Interior and California Department of Fish and Game [now known as Department of Fish and Wildlife]). 2012. Klamath Facilities Removal Final Environmental Impact Statement/Environmental Impact Report. December. Chapter 1 (pp. 1-2 to 1-10) and Chapter 3.

Page 4-128, line 15:

____. 2013a. California Water Plan Update 2013 – Public Review Draft. Volume 2. North Coast Hydrologic Region (p. NC-2). San Joaquin River Hydrologic Region (pp. SJR-1 to SJR-2). Sacramento-San Joaquin Delta (p. D-1).

Page 4-128, line 16:

____. 2013b. North-of-the-Delta Offstream Storage Preliminary Administrative Draft Environmental Impact Report. December. Chapter 6 (pp. 6-21 to 6-22).

Page 4-129, line 9:

NCRWQCB et al. (California North Coast Regional Water Quality Control Board and Bureau of Reclamation). 2009. Channel Rehabilitation and Sediment Management for Remaining Phase 1 and Phase 2 Sites, Draft Master Environmental Impact Report and Environmental Assessment. June. Chapter 1 (pp. 1-2 to 1-9) and Chapter 4 (pp. 4.4-1 to 4.4-4, and p. 4.81).

Page 4-129, line 16:

Reclamation (U.S. Department of the Interior, Bureau of Reclamation). 1997. Draft Central Valley Project Improvement Act – Programmatic Environmental Impact Statement/Report. September. Chapter 2.

Page 4-129, line 19:

____. 2010. New Melones Lake Area, Final Resource Management Plan and Environmental Impact Statement. February. pp. 5-18 to 5-20.

Page 4-129, line 28:

____. 2013. Shasta Lake Water Resources Investigation Draft Environmental Impact Statement. June. Executive Summary (p. ES-1); Chapter 6 (pp. 6-1 to 6-2); and Hydrology, Hydraulics, and Water Management Technical Report (pp. 1-1 to 1-15).

Page 4-129, line 32:

____. 2015b. Coordinated Long-Term Operation of the Central Valley Project and State Water Project, Final Environmental Impact Statement. November. Chapter 3, Chapter 5, Chapter 6, Chapter 9, Appendix 3A and Appendix 5A Section A.

Page 4-129, line 34:

Reclamation et al. (Bureau of Reclamation, U.S. Army Corps of Engineers, California Reclamation Board, Sacramento Area Flood Control Agency). 2006. Folsom Dam Safety and Flood Damage Reduction Draft Environmental Impact Statement/Environmental Impact Report. December. Chapter 1 (pp. 1-1 to 1-4).

Page 4-130, line 1:

SWRCB (State Water Resources Control Board). 2012. Public Draft, Substitute Environmental Document in Support of Potential Changes to the Water Quality Control Plan for the San Francisco Bay-Sacramento/San Joaquin Delta Estuary: San Joaquin River Flows and Southern Delta Water Quality. December. Chapter 2 (p. 2-5, and pp. 2-22 to 2-28).

Page 4-130, line 18:

USFWS (U.S. Department of the Interior, U.S. Fish and Wildlife Service), Reclamation (U.S. Department of the Interior, Bureau of Reclamation), Hoopa Valley Tribe, and Trinity County). 2000. Trinity River Mainstem Fishery Restoration Environmental Impact Statement/Report. October. Final – Executive Summary, Chapter 1, Chapter 2 and Appendix C. Draft – Chapter 2 (pp. 2-1 to 2-31) and Chapter 3.

Chapter 5, "Surface Water Quality"

Page 5-7, line 32:

Some fish and wildlife are also affected by salinity concentrations in the Delta because certain salinity levels are required for survival during different life stages. One measure of salinity in the western Delta is known as ~~*X2*~~ X2. X2 refers to the horizontal distance from the Golden Gate Bridge, up the axis of the Delta estuary, to where tidally averaged near-bottom salinity concentration of two parts of salt in 1,000 parts of water occurs. The X2 standard was established to improve shallow water estuarine habitat in the months of February through June, and relates to the extent of salinity movement into the Delta (DWR et al. 2013). The location of X2 is important to both aquatic life and water supply beneficial uses.

Page 5-10, line 13:

Trinity River Water temperature objectives (summarized in Table 5-3) have been ~~were~~ set ~~forth in the North Coast Basin Plan specifically applicable to~~ for the Trinity River, from Lewiston Dam to Douglas City and to the confluence with the North Fork Trinity River. These criteria are reach dependent, and vary seasonally. ~~They were developed to enhance the productivity of the Trinity River Fish Hatchery, specifically for salmon and steelhead trout populations.~~ The summer-fall criteria were set to protect adult holding and spawning adults in the river as well as from the Trinity River Fish Hatchery (NCRWQCB 2011). The spring-summer temperature objectives were set to protect juvenile out-migrants (DOI and Hoopa Valley 2000).

Page 5-11, line 1:

Table 5-3. Water Quality Objectives for Temperature in the Trinity River

Source	Target Reach	Dates	Temperature Target
North Coast Regional Water Quality Control Board Basin Plan[1]	• Lewiston to Douglas City	All Years • July 1 to September 15	≤ 60° F
SWRCB's Order WR-90-5[2]	• Lewiston to Douglas City	• September 16 – 30~~1~~	≤ 56° F
	• Lewiston to the confluence with the North Fork Trinity River	• October 1 to December 31~~1~~	≤ 56° F
Springtime Objectives of the Record of Decision for the Trinity River Mainstem Fisheries Restoration EIS/EIR[3]	Lewiston to Weitchpec	Normal and Wetter Water Years • April 15 to May 22 • May 23 to June 4 • June 5 to July 9	≤ 55° F ≤ 59° F ≤ 62.5° F
		Dry and Critically Dry Water Years • April 15 to May 22 • May 23 to June 4 • June 5 to June 15	≤ 59° F ≤ 62.5° F ≤ 68° F

Sources:
[1] *NCRWQCB 2011*
[2] *SWRCB 1990*
[3] *DOI and Hoopa Valley 2000; USFWS et al. 2000; USFWS and Hoopa Valley Tribe 1999*
Key:
EIR = Environmental Impact Report
EIS = Environmental Impact Statement
SWRCB=California State Water Resources Control Board

Page 5-11, line 10:

The water quality objectives are based on temperature-flow relationships that maintain TRFE flow regimes and protect adult salmonids holding and spawning. The objectives are also consistent with the temperature standards specified in the NCRWQCB *Water Quality Control Plan for the North Coast Region* (also known as the "Basin Plan") (Hoopa Valley TEPA 2008, NCRWQCB 2011).

Page 5-13, line 3:

As shown in Table 5-6 and Figure 5-1, water temperature data for the Trinity River, between 2001 and 2015, show seasonal trends and the warming effect of ambient conditions ~~at the downstream location~~ as you move downstream from Douglas City to above the North Fork Trinity to Weitchpec. Compliance locations for water quality monitoring along the Trinity River are shown in Figure 5-2. Monitoring of water temperatures of the Trinity River on the Hoopa Valley Tribal reservation occurs at the U.S. Geological Service gage (Gage # 11530000).

Page 5-14 line 1:

Table 5-6. Monthly Average of Water Temperatures Recorded at Trinity River Compliance Locations

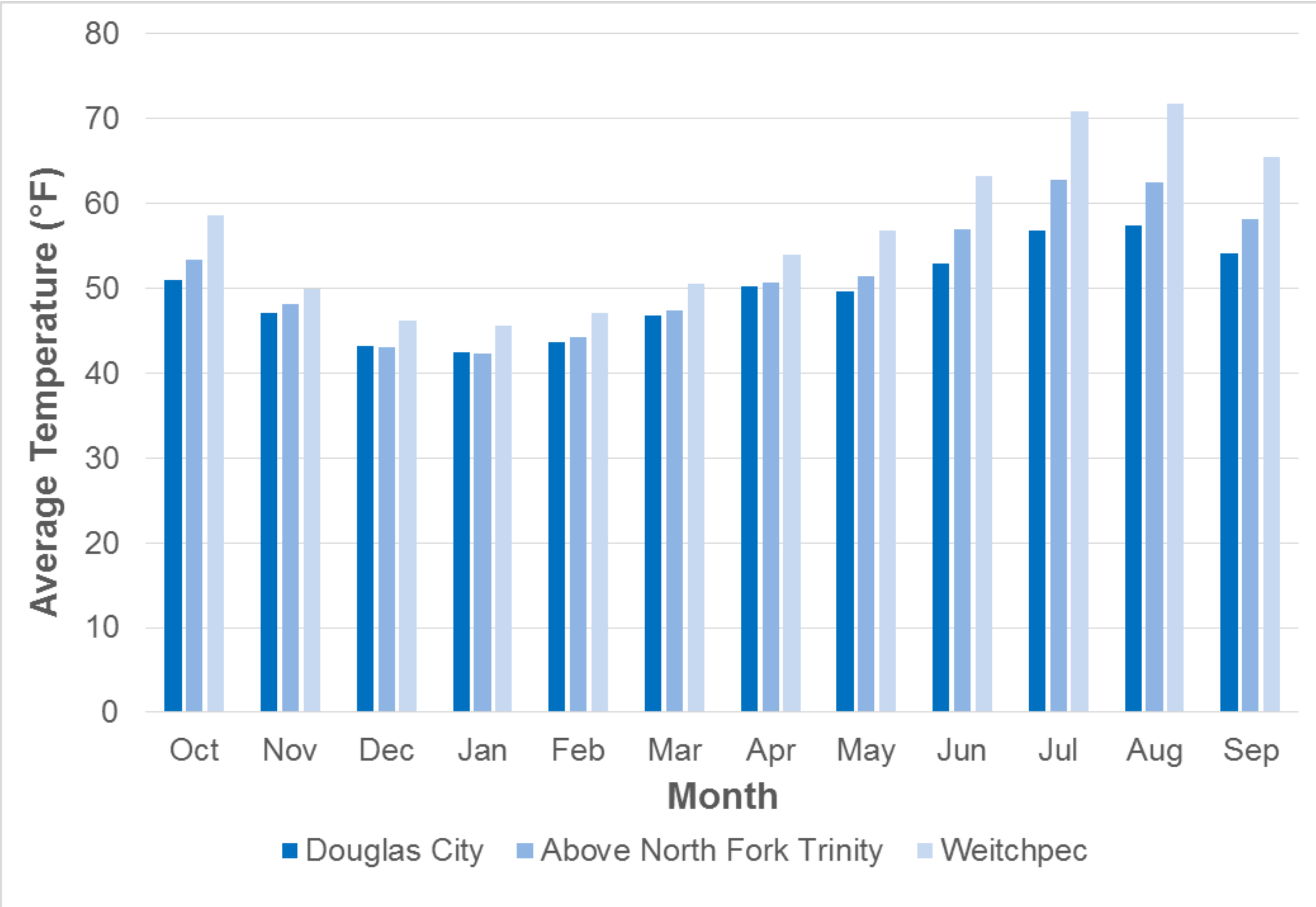
WY	WYT	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Douglas City													
2001	D	51.9	46.6	44.2	42.0	43.2	47.5	50.7	54.4	55.5	58.5	57.0	54.2
2002	N	51.0	47.7	42.7	43.1	43.8	46.6	52.5	49.4	56.1	58.9	56.2	54.4
2003	W	49.8	46.5	44.6	44.9	44.8	48.0	48.8	50.4	52.8	57.0	56.6	52.7
2004	W	51.2	46.6	43.7	41.5	43.7	47.5	51.4	50.3	51.4	54.9	56.4	53.0
2005	W	50.9	47.4	42.9	42.8	45.3	48.2	50.8	49.9	52.2	57.9	59.5	54.7
2006	EW	51.5	47.4	43.9	45.5	44.4	44.2	47.5	48.4	49.3	54.9	NA	NA
2007	D	NA	NA	43.0	39.5	43.1	48.4	52.5	47.9	55.8	58.7	57.2	54.1
2008	D	50.3	46.9	41.8	39.5	41.2	46.4	50.0	48.6	50.8	53.4	58.0	55.3
2009	D	51.4	49.3	43.5	43.0	43.4	46.8	51.7	50.9	56.6	60.5	58.1	55.9
2010	W	51.2	47.5	42.2	44.3	45.2	46.8	48.4	48.4	52.3	57.3	58.5	55.1
2011	W	51.4	46.7	44.4	42.3	42.6	45.2	48.8	47.7	50.4	54.4	57.6	53.9
2012	N	50.5	45.5	41.2	40.2	43.5	45.2	48.9	49.3	50.9	55.2	55.6	52.4
2013 – 2015	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trinity River above North Fork Trinity													
2001 – 2004	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2005	W	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	64.5	58.2
2006	EW	53.4	47.8	44.0	45.7	44.8	44.9	48.3	49.6	51.4	59.0	NA	NA
2007	D	NA	NA	42.5	39.6	43.5	48.9	53.2	49.3	59.8	65.4	63.0	58.3
2008	D	52.5	48.3	42.0	40.6	42.3	46.6	50.1	50.1	53.2	56.7	62.8	59.2
2009	D	53.3	49.6	43.0	42.5	43.4	47.0	51.8	52.6	59.7	66.0	62.9	60.0
2010	W	53.4	47.7	41.9	44.8	45.9	47.1	48.4	49.4	53.7	60.9	63.3	59.0
2011	W	53.9	47.1	45.1	43.1	43.0	45.2	45.5	NA	NA	NA	NA	NA
2012	N	52.8	46.4	40.9	39.9	43.8	45.1	49.1	50.6	53.3	59.3	60.3	55.9
2013	D	53.8	48.5	43.1	40.4	42.4	48.6	52.2	51.8	59.0	64.9	60.9	56.7
2014	CD	51.5	46.7	39.6	41.5	44.8	49.0	53.4	55.4	60.6	65.7	63.3	58.4
2015	D	55.6	51.1	47.8	44.4	47.8	51.9	55.1	53.5	62.1	66.9	60.8	57.6
Weitchpec													
2001	D	57.9	48.2	44.8	41.9	43.5	48.8	52.1	60.9	65.8	73.8	72.1	67.0
2002	N	59.3	51.2	46.0	44.7	45.8	47.4	53.9	55.9	66.1	73.6	71.1	67.2
2003	W	57.5	49.1	46.7	49.3	50.8	54.2	54.8	58.6	69.5	70.2	71.3	64.6
2004	W	59.7	50.4	46.3	45.3	46.8	53.5	58.7	56.6	62.3	70.4	72.1	64.4
2005	W	58.6	49.9	45.0	44.3	46.7	50.0	51.5	54.6	59.5	69.8	73.0	64.9
2006	EW	58.8	50.6	46.4	48.8	47.5	47.8	50.2	53.8	57.1	65.2	NA	NA
2007	D	NA	NA	47.9	44.9	48.3	52	56.2	56.3	66.6	73.2	72.6	NA
2008 – ~~2015~~ 2009	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2010	W	NA	NA	NA	NA	NA	NA	NA	58.3	58.1	68.4	70.2	65.3
2011	W	NA	NA	NA	NA	NA	NA	NA	52.0	57.8	66.0	70.9	66.5
2012	N	NA	NA	NA	NA	NA	NA	NA	55.0	60.2	68.3	70.9	64.4
2013	D	NA	NA	NA	NA	NA	NA	NA	58.0	67.2	75.2	71.3	65.2
2014	CD	NA	NA	NA	NA	NA	NA	NA	61.2	68.6	75.9	73.5	65.3

Source: DWR 2016, USFWS 2011, USFWS 2012, USFWS 2013, USFWS 2014, USFWS 2015

Note: WYT is Trinity Water Year Type.

Key:
CD = Critically Dry
D = Dry
EW = Extremely Wet
N = Normal
NA = Not Available
W = Wet
WY = Water year
WYT = Water Year Type

Page 5-15, line 1:



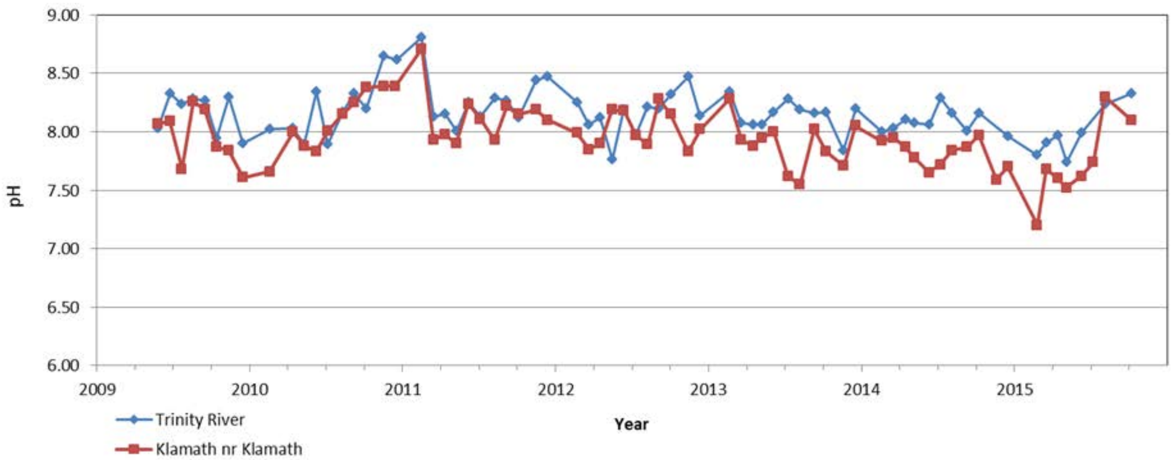
Note: This plot is based on the data from Table 5-6. The temporal range of data is different for each location.

Figure 5-1. Monthly Average of Water Temperatures Recorded at Trinity River Compliance Locations (2001-2015)

Page 5-17, line 15:

The Klamath Hydroelectric Settlement Agreement Interim Measure 15 (IM 15) - Water Quality Monitoring (funded by PacifiCorp) supports long-term baseline water quality monitoring to assist in water quality improvement activities, dam removal studies, permitting studies, and to form a long-term record to assess trends and other potential changes in the Basin (PacifiCorp 2011a, 2011b, 2012, 2013, 2014, 2015, 2016). Monitoring is performed by the Yurok Tribe, Karuk Tribe, PacifiCorp, and Reclamation. The program collects data from 254 miles of river and reservoirs from Link Dam (near Klamath Falls in Oregon) to the Klamath River Estuary in California. The program has been in place since 2009. Available field observations from the IM 15 program for pH, TN and TP for the Trinity River (above the Klamath River) and Klamath River (near Klamath) are shown in Figure 5-3 through Figure 5-5, respectively. This data is currently under review and should be considered provisional at this time.

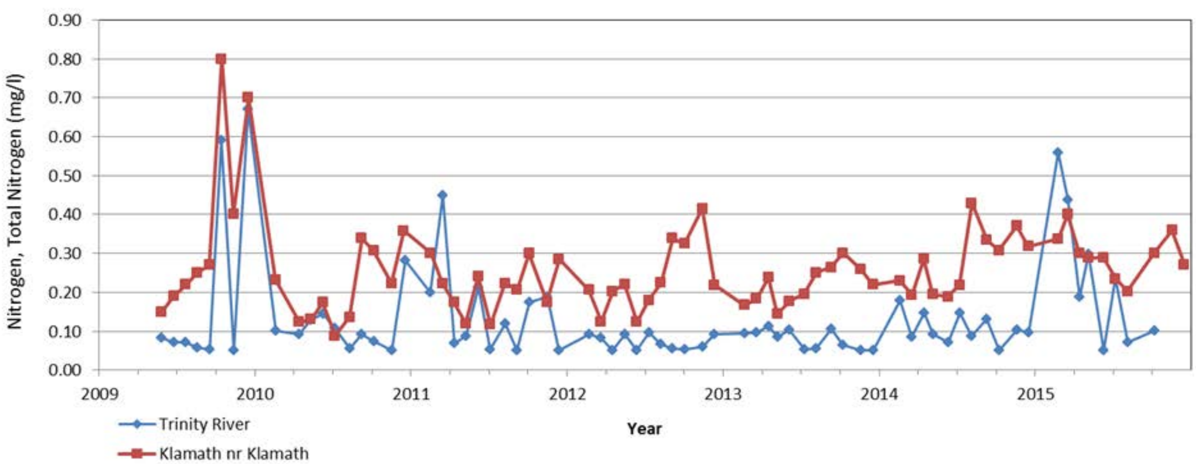
Page 5-18, line 4:



Source: PacifiCorp 2011a, PacifiCorp 2011b, PacifiCorp 2012, PacifiCorp 2013, PacifiCorp 2014, PacifiCorp 2015, PacifiCorp 2016

Figure 5-3. pH at Trinity River Above the Klamath River and Klamath River Near Klamath for 2009-2015

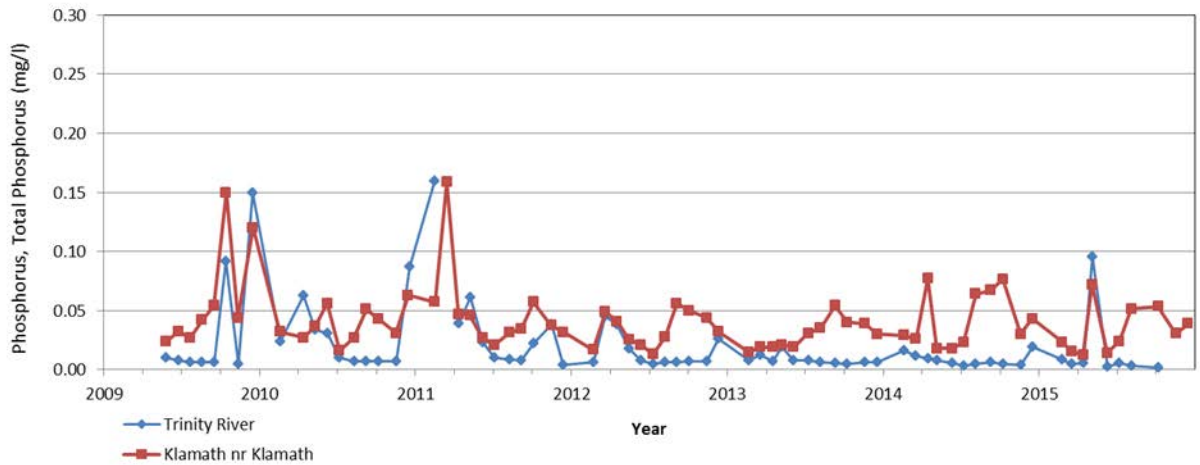
Page 5-18, line 7:



Source: PacifiCorp 2011a, PacifiCorp 2011b, PacifiCorp 2012, PacifiCorp 2013, PacifiCorp 2014, PacifiCorp 2015, PacifiCorp 2016

Figure 5-4. Total Nitrogen at Trinity River Above the Klamath River and Klamath River Near Klamath for 2009-2015

Page 5-19, line 1



Source: PacifiCorp 2011a, PacifiCorp 2011b, PacifiCorp 2012, PacifiCorp 2013, PacifiCorp 2014, PacifiCorp 2015, PacifiCorp 2016

Figure 5-5. Total Phosphorus at Trinity River Above the Klamath River and Klamath River Near Klamath for 2009-2015

Page 5-27, line 6:

Clear Creek from Whiskeytown Dam to the Confluence with the Sacramento River Lower Clear Creek (below Whiskeytown Dam) is 303(d) listed as impaired for mercury, due to mine tailings from gold mining during the 1800s. Otherwise, water quality is considered very good and supportive of all native aquatic life and recreational uses (SRWP 2016).

Page 5-31, line 35:

As described in the section on *Affected Environment*, there are numerous constituents of concern that have been identified in the study area. These components are not all critical in each region, and they may not all be affected by changes in CVP and SWP operations considered in the EIS alternatives. The groups of constituents that could be affected by implementation of the alternatives have been identified through consideration of constituents of concern, described in the section on *Affected Environment*, and the anticipated implementation of TMDLs by 2030. These constituents were grouped into major categories, as shown in Table 5-16. The constituents that already have approved TMDLs in certain regions are not further analyzed for those regions, as it is expected that the TMDL will be implemented by 2030. ~~A complete list of TMDLs, and their anticipated completion dates.~~

Page 5-32, line 34:

In addition, for the Trinity and lower Klamath Rivers, the number of days when temperature objectives ~~are~~ would be exceeded ~~is~~ was also analyzed. Daily results for the Sacramento River and Clear Creek ~~are~~ were not analyzed because flows in HEC-5Q in the Sacramento Basin (based on CalSim II outputs) ~~are~~ reflect monthly averages only. While meteorological conditions

~~are~~ were modeled in HEC-5Q on a sub-daily basis, the lack of daily flow patterning means that daily temperature model results will not be meaningful for assessing the frequency with which temperature objectives are met. Releases from Lewiston ~~are~~ were patterned on a daily basis, so RBM10 results ~~can be~~ were used to evaluate the number of days when temperature objectives ~~are~~ would be exceeded. The Analytical Tools Technical Appendix provides additional information on the RBM10 model, including the daily patterning of monthly CalSim II Lewiston releases prior to input into RBM10.

Page 5-42, line 1:

Potential impacts on existing temperature objectives in the Trinity River (Table 5-23) were assessed for the specific periods when objectives were applicable. A comparison of No Action versus Alternative 1 for the 1980 to 2003 RBM10 simulation period was completed to assess the frequency (number of days) of meeting temperature objectives based on daily average water temperature. In most years, temperature objectives were met throughout the designated temperature management period. However, there were periods objectives were not met, including:

- Increased frequency of meeting objectives under Alternative 1 compared to the No Action
- Decreased frequency of meeting objectives under Alternative 1 compared to the No Action Alternative ~~than Alternative 1~~
- Equal frequency of meeting objectives for both No Action Alternative and Alternative 1.

Page 5-42, line 21:

Noncompliance days for the Trinity River below North Fork Trinity River (between October 1 and December 31) are shown in Table ~~5-24~~ 5-23. Temperature objectives at this location were not met as often as at Douglas City, being further downstream and influenced by atmospheric heating and tributary inputs. Noncompliance for No Action and Alternative 1 occurred 244 and 274 days, respectively, between October 1 and December 31. The difference in non-compliance, between No Action and Alternative 1 at North Fork Trinity River, was 1 percent.

Page 5-42, line 27:

The spring time objectives from the Record of Decision (ROD) for the Trinity River Trinity River Mainstem Fishery Restoration EIS/Environmental Impact Report (EIR) were also assessed (USFWS et al. 2000; DOI and Hoopa Valley Tribe 2000). These daily average water temperature objectives are applicable to the Trinity River, from Lewiston Dam to the confluence with the Klamath River. For this analysis, the number of non-compliance days for No Action and Alternative 1 were compared for all years in the RBM10 simulation period (1980-2003). Five locations were assessed: Trinity River below Lewiston Dam, Trinity River at Douglas City, Trinity River below North Fork Trinity River, Trinity River below South Fork Trinity River, and Trinity River near Weitchpec (Table 5-24 through Table 5-28, respectively). For the Trinity River (below Lewiston Dam and at Douglas City) there were few incidences of temperatures exceeding objectives—only a few days between April 15 and May 22. At the North Fork Trinity

River the number of days increased slightly, but at the South Fork Trinity River and mouth locations, there was a high prevalence of non-compliance—with percentage of time exceeding objectives ranging from 18 percent to over 90 percent—with dry and critically dry years experiencing the highest percentages in June. However, the ~~difference~~ increase in non-compliance between the No Action and Alternative 1 was less than 1 percent in all cases, indicating that these two alternatives were nearly identical in meeting the temperature objectives ~~response~~.

Page 5-50, line 9:

Water temperatures at Klamath River (near Klamath) under Alternative 1 were similar to the No Action Alternative in most year types, and in most months, except August and September. In extremely wet and wet years, the monthly average water temperatures for Alternative 1 were within +/-0.5°F (less than 1 percent) of No Action conditions. For the normal, dry, and critically dry years, temperatures were 1.8°F (3 percent) to 4.0°F (6 percent) cooler. Temperatures in the Klamath River (~~at~~ near Klamath) did not exhibit the same magnitude of cooling as the Trinity River near Weitchpec, due to water ~~comingling~~ commingling and heating downstream from the confluence of the Trinity River ~~through to the Klamath River Estuary~~.

Page 5-52, line 14:

For the lower Klamath River, under Alternative 1, similar DO concentrations would be anticipated during August and September in comparison to the No Action Alternative. This is because mechanical reaeration maintains DO at or near saturation concentration. Because DO saturation concentration is a function of water temperature, the lower Klamath River may experience slightly ~~lower~~ higher DO concentrations during augmentation due to slightly cooler water temperatures.

Page 5-69, line 1:

At the North Fork Trinity River, South Fork Trinity River and the Trinity River's mouth at Weitchpec (Table 5-44, Table 5-45, and Table 5-46, respectively), differences in temperature for all year types, for all months, were less than +/-1°F (1 percent), with the exception of normal, dry, and critically dry year types in August and September, when temperatures were up to 4°F (6 percent), 6.3ºF (9 percent), and 6.6°F (9 percent) cooler for North Fork Trinity River, South Fork Trinity River and mouth locations, respectively. Alternative 2 daily average water temperatures were consistently cooler than No Action conditions. Decreased temperatures in August and September were because of increased flows (due to augmentation releases from Lewiston Dam that were drawn from cool, deep water releases from Trinity Reservoir), while minor increases or decreases in the other months of the year were due to changes in Trinity Lake operations, impacting storage in Trinity Lake storage or release rate and residence time in Lewiston Reservoir. An exception is June, in critically dry years, when water temperatures were warmer by 1.6°F (3 percent), 1.4°F (2 percent), and 1.3°F (2 percent) for North Fork Trinity River, South Fork Trinity River and Weitchpec, respectively. These increases in water temperature were due to reduced June flows under this alternative.

Page 5-73, line 1:

Potential impacts on existing temperature objectives in the Trinity River (Table 5-3) were assessed for the specific periods when objectives were applicable. A comparison of No Action versus Alternative 2 for the 1980 to 2003 RBM10 simulation period was completed to assess the frequency (number of days) of meeting temperature objectives based on daily average water temperature.

However, there were periods objectives were not met, including:

- Increased frequency of meeting objectives under Alternative 2 compared to the No Action
- Decreased frequency of meeting objectives under Alternative 2 compared to the No Action Alternative ~~than Alternative 1~~
- Equal frequency of meeting objectives for both No Action Alternative and Alternative 2.

The number of days that the objectives were not achieved is summarized in tabular form for the stipulated temperature objectives (i.e., temperature for each location and time period).

Page 5-76, line 1:

The springtime objectives from the ROD for the Trinity River Trinity River Mainstem Fishery Restoration EIS/EIR (DOI and Hoopa Valley 2000) were also assessed. These daily average water temperature objectives are applicable to the Trinity River, from Lewiston Dam to its confluence with the Klamath River. For this analysis, the number of non-compliance days for No Action and Alternative 2 were compared for all years in the RBM10 simulation. Five locations were assessed: Trinity River below Lewiston Dam, Trinity River at Douglas City, Trinity River below North Fork Trinity River, Trinity River below North Fork Trinity River, and Trinity River near Weitchpec (Table 5-49 through Table 5-53, respectively). For the Trinity River (below Lewiston Dam and at Douglas City) there were few incidences of temperatures exceeding objectives—only a few days between April 15 and May 22. At the North Fork Trinity River the number of days increased slightly, but at the South Fork Trinity River and mouth locations, there was a high prevalence of non-compliance—with percentage of time exceeding objectives ranging from 18 percent to 99 percent—with dry and critically dry years experiencing the highest percentages in June. There was no difference between the No Action and Alternative 2 below Lewiston Dam and Douglas City. At the North Fork Trinity River, dry and critically dry year types increased in non-compliance from 6 to 10 days in June—less than 1 percent of all days—for Alternative 2 versus No Action. At the South Fork Trinity and mouth locations, Alternative 2 indicated more days of non-compliance during all three temperature compliance periods (4/15 to 5/22, 5/23 to 6/4, and 6/5 to 6/15 (critically dry and dry) and 6/5 to 7/9 (normal, wet, extremely wet)). For all periods except 6/5 to 6/15 in dry and critically dry years, increases ranged from approximately 1 percent to 4 percent. For the 6/5 to 6/15 period in dry and critically dry years, increased in non-compliance increased approximately 5 percent to 7 percent. These results indicate that these two alternatives were similar in meeting temperature objectives ~~temperature response~~, with the exception of critically dry and dry years in early June.

Page 5-82, line 8:

Water temperatures at Klamath River (near Klamath) under Alternative 2 were similar to the No Action Alternative in most all year types, and in most months, except August and September. In extremely wet and wet years, the monthly average water temperatures for Alternative ~~1~~ 2 were within +/-0.5ºF (less than 1 percent) of No Action conditions. For the normal, dry, and critically dry years temperatures were 1.9ºF (3 percent) to 4.0ºF (6 percent) cooler. Temperatures in the Klamath River (~~at~~ near Klamath) did not exhibit the same magnitude of cooling as the Trinity River near Weitchpec, due to water commingling ~~comingling~~ and heating downstream from the confluence of the Trinity River ~~through to the Klamath River Estuary~~.

Page 5-84, line 23:

For the lower Klamath River, under Alternative 2, similar DO concentrations would be anticipated during August and September in comparison to the No Action Alternative. This is because mechanical reaeration maintains both rivers at or near saturation concentration. Because DO saturation concentration is a function of water temperature, the lower Klamath River may experience slightly ~~lower~~ higher DO concentrations during augmentation due to slightly cooler water temperatures.

Page 5-104, line 14:

DOI and DFG. (U.S. Department of the Interior and California Department of Fish and Game). 2012. Klamath Facilities Removal Final EIS/EIR. Chapter 3.

Page 5-104, line 18:

DWR (California Department of Water Resources). 2007. Oroville Facilities Relicensing FERC Project No. 2100. Draft EIR. May, 2007. Chapter 4 (Sections 4.2 and 4.4).

Page 5-104, line 25:

DWR et al. (California Department of Water Resources, U.S. Department of the Interior, Bureau of Reclamation, U.S. Fish and Wildlife Service, and National Marine Fisheries Service). 2013. Draft Environmental Impact Report/Environmental Impact Statement for the Bay-Delta Conservation Plan. November. Chapter 8 (p. 8-11).

Page 105, line 17:

NCRWQCB (North Coast Regional Water Quality Control Board). 2010. Final Staff Report for the Klamath River Total Maximum Daily Loads (TMDLs) Addressing Temperature, Dissolved Oxygen, Nutrient, and Microcystin Impairments in California; the Proposed Site Specific Dissolved Oxygen Objectives for the Klamath River in California; and the Klamath River and Lost River Implementation Plans. March 2010. Chapters 1 through 6.

Page 5-106, line 22:

____. 2015. Coordinated Long-Term Operation of the Central Valley Project and State Water Project, ~~.~~ Final Environmental Impact Statement. November. ~~July 2015.~~ Chapter 9.

Page 5-108, line 30:

_____. 2011. The Influence of Lewiston Dam Releases on Water Temperatures of the Trinity and Klamath Rivers, CA. April to October, 2010. Arcata Fisheries Data Series Report Number DS 2011-22. https://www.fws.gov/arcata/fisheries/activities/waterQuality/reports/TrinityRiver/Water%20Temperature%20Monitoring/TR%20WATER%20TEMP%20RPT%202010.pdf.

_____. 2012. The Influence of Lewiston Dam Releases on Water Temperatures of the Trinity and Klamath Rivers, CA. April to October, 2011. Arcata Fisheries Data Series Report Number DS 2012-24. https://www.fws.gov/arcata/fisheries/activities/waterQuality/reports/TrinityRiver/Water%20Temperature%20Monitoring/TR%20WATER%20TEMP%20RPT%202010.pdf

_____. 2013. The Influence of Lewiston Dam Releases on Water Temperatures of the Trinity and Klamath Rivers, CA. April to October, 2012. Arcata Fisheries Data Series Report Number DS 2013-30. https://www.fws.gov/arcata/fisheries/reports/dataSeries/TR%202012%20WATER%20TEMP%20RPT%20Final.pdf

_____.2014. The Influence of Lewiston Dam Releases on Water Temperatures of the Trinity and Klamath Rivers, CA. April to October, 2013. Arcata Fisheries Data Series Report Number DS 2014-36. https://www.fws.gov/arcata/fisheries/reports/dataSeries/TR%202013%20WATER%20TEMP%20RPT%20FINAL%206-27-14.pdf

_____.2015. The Influence of Lewiston Dam Releases on Water Temperatures of the Trinity and Klamath Rivers, CA. April to October, 2014. Arcata Fisheries Data Series Report Number DS 2015-41. https://www.fws.gov/arcata/fisheries/reports/dataSeries/TR%202014%20WATER%20TEMP%20RPT.pdf

USFWS (U.S. Department of the Interior, U.S. Fish and Wildlife Service), Reclamation (U.S. Department of the Interior, Bureau of Reclamation), Hoopa Valley Tribe, and Trinity County). 2000. Trinity River Mainstem Fishery Restoration Environmental Impact Statement/Report. October. Final – Executive Summary, Chapter 1, Chapter 2 and Appendix C. Draft – Chapter 2 (pp. 2-1 to 2-31).

Chapter 6, “Groundwater Resources/Groundwater Quality”

Page 6-3, line 7:

Several communities use near-surface groundwater via intake galleries adjacent to the Trinity River (NCRWQCB et al. 2009). The systems using this include the Lewiston Community Services District, Weaverville Community Services District ~~Lewiston Valley Water Company~~, and Lewiston Park Mutual Water Company.

Page 6-17, line 28:

____. 2015. Coordinated Long-Term Operation of the Central Valley Project and State Water Project, Final Environmental Impact Statement. November. Chapter 6 and Chapter 7.

Page 6-17, line 30:

Reclamation et al. (Bureau of Reclamation, Bureau of Land Management, Trinity County Planning Department). 2006. Indian Creek Rehabilitation Site: Trinity River Mile 93.7 to 96.5, Environmental Assessment/Draft Environmental Impact Report. July. Chapter 3 (p. 3.4-5).

Chapter 7, “Biological Resources – Fisheries”

Page 7-1, line 13:

Federal or State regulations relevant to implementation of the alternatives evaluated in this EIS for fisheries resources include:

- **Endangered Species Act –** The Federal Endangered Species Act (ESA) applies to proposed Federal, State, and local projects that may result in the “take” of a fish or wildlife species that is Federally listed as threatened or endangered and to actions that are proposed to be authorized, funded, or undertaken by a Federal agency and that may jeopardize the continued existence of any Federally~~-~~listed fish, wildlife, or plant species or which may adversely modify or destroy designated critical habitat for such species.

Page 7-2, line 5:

Many fish and aquatic species use the project area during all or some portion of their lives; however, certain fish and aquatic species were selected to be the focus of the analysis of alternatives considered in this EIS based on their sensitivity and their potential to be affected by augmenting flows in the lower Klamath River through operational changes of the TRD, as summarized in Table 7-1. Fish are evaluated both at the species level, and at the Evolutionarily Significant Unit (ESU) or distinct population segment (DPS), where relevant. An ESU is “a population (or group of populations) that (1) is substantially reproductively isolated from other conspecific population units, and (2) represents an important component in the evolutionary legacy of the species” (Waples 1995). A DPS is a population (or group of populations) that is discrete from other populations of the species, and significant in relation to the entire species (NMFS 2016).

Page 7-5, line 9:

Sacramento River Winter-run Chinook Salmon ESU Critical Habitat The Sacramento River winter-run Chinook Salmon ESU consists of only one population confined to the upper Sacramento River. This ESU includes all fish spawning naturally in the Sacramento River and its tributaries, as well as fish that are propagated at the Livingston Stone National Fish Hatchery (NFH), operated by USFWS (NMFS 2005a). Critical habitat was delineated as the Sacramento River from Keswick Dam to Chipps Island at the westward margin of the Sacramento-~~SanJaoquin~~ San Joaquin River Delta (Delta); all waters from Chipps Island westward to the Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and the Carquinez Strait; all waters of San Pablo Bay westward of the Carquinez Bridge; and all waters of San Francisco Bay (north of the San Francisco-Oakland Bay Bridge) to the Golden Gate Bridge (58 FR 33212).

Page 7-9, line 4:

Trinity Lake and Lewiston Reservoir

Trinity Lake is created by Trinity Dam and is considered relatively unproductive with low-standing crops of phytoplankton and zooplankton (USFWS et al. 2004). The fish in Trinity Lake include cold-water and warm-water species. Trinity Lake supports a trophy Smallmouth Bass fishery and provides substantial sport fishing for Largemouth Bass, Rainbow and Brown Trout, and Kokanee Salmon (landlocked Sockeye Salmon). Other fish species in Trinity Lake include Speckled Dace, Klamath Smallscale Sucker, ~~Coast Range~~ Coastrange Sculpin, and the nonnative Green Sunfish, Yellow Perch, and Brown Bullhead.

Page 7-9, line 28:

The ongoing Trinity River Restoration Program includes specific dedicated instream water volumes that vary by water year type (as described in Chapter 4, “Surface Water Supply and Management”); mechanical channel rehabilitation; fine and coarse sediment management; watershed restoration; infrastructure improvement; and adaptive management components (NCRWQCB et al. 2009, USFWS and Hoopa Valley Tribe 1999). The mechanical channel rehabilitation includes construction of bar surfaces, floodplain lowering and reconnection, side channel construction, and removal of fossilized riparian berms that had been anchored by extensive woody-vegetation root systems that confined the river. Following mechanical rehabilitation, the altered areas have been re-vegetated to support native vegetation. Sediment management activities include introduction of coarse sediment at locations to support spawning and other aquatic life stages. In areas closer to Lewiston Dam with limited gravel supply, gravel/cobble point bars are being rebuilt to increase gravel storage and improve channel dynamics. Riparian vegetation is planted on restored floodplains and flows are managed to encourage natural riparian growth on the floodplain and limit encroachment on the newly formed gravel bars. Some improvement projects have been completed and others are under construction or in the planning phase. These restoration actions are occurring in the 40-mile restoration reach between Lewiston Dam and the confluence with the North Fork Trinity River (TRRP 2014). Any potential instream effects associated with these ongoing activities would be the responsibility of the project proponents, and would include consideration of elevated water levels during the project period.

Page 7-10, line 3:

Lower Klamath River from Trinity River to Pacific Ocean
The lower Klamath River begins ~~where~~ at its confluence with the Trinity River ~~flows into it~~ near Weitchpec, located about 43 miles upstream from the Pacific Ocean. The Trinity River is the largest tributary of the Klamath River and makes a substantial contribution to the flows in the lower Klamath River. This section of the Klamath River serves primarily as a migration corridor for salmonids, with most spawning and rearing upstream of its confluence with the Trinity River or in the larger tributaries (e.g., Blue Creek) to the mainstem Klamath River.

Page 7-11, line 1:

The run-size estimates for Coho Salmon have ranged from 852 fish in 1994 to 59,079 fish in 1987. Both intra- and inter-specific redd superimposition on the spawning grounds can affect salmon reproductive success and the spawning areas downstream of Lewiston Dam are likely near carrying capacity (NMFS 2014a).

Page 7-12, line 4:

Southern Oregon/Northern California Coast Chinook Salmon The SONCC Chinook Salmon ESU includes all naturally-spawned Chinook salmon in the lower Klamath River downstream from its confluence with the Trinity River. In 1999, NMFS determined that this ESU did not warrant listing, nor did they identify the SONCC Chinook Salmon as a species of concern. Their life history traits are similar to the Upper Klamath and Trinity River Chinook Salmon. They are principally a late fall-run Chinook Salmon, entering the rivers to spawn between September and December. Spawning takes place between October and February. These ocean-type ~~fish~~ salmon ~~remain~~ rear as juveniles in fresh water for four to six months before migrating back out to sea.

Page 7-12, line 12:

Klamath Mountains Province Steelhead Steelhead (*O. mykiss*) in the Klamath and Trinity Rivers ~~River~~ exhibit two primary life history strategies: a summer-run that is stream maturing and a winter-run that is ocean maturing. ~~The winter-run is considered by some to be composed of a fall-run and a winter-run based upon the timing of the adult migration.~~ A fall-run of steelhead that migrates upriver from August through October (Hill 2010) is considered by NMFS and CDFW to be a phenotypic component of the summer-run race (Busby et al. 1994); however, the fall-run is sometimes also classified as an early winter-run component by others (NRC 2004). Natural-spawning ~~Summer~~ summer-run steelhead occur in the north and south forks of the Trinity River and in the New River and Canyon Creek tributaries (BLM 1995).

Page 7-12, line 17:

Adult summer-run steelhead enter the Trinity River from April through ~~September~~ October and over-summer in deep pools in the mainstem and large tributaries. Some enter the smaller tributary streams of the Trinity River during the first November rains (Hill 2010), with most fish spawning in both the mainstem and tributaries from February through April (USFWS et al. 2004). Summer-run steelhead spawner escapements for the Trinity River upstream of Lewiston Dam prior to its construction were estimated to average 8,000 adults annually. Comprehensive synoptic, post-dam surveys of Trinty basin-wide summer steelhead populations have not been regularly compiled; however, numbers of over-summering adult steelhead in the North Fork Trinity River from 1990-97 ranged from 20 to 1,037 (Everest 1997). Additionally, redd surveys (during and after spawning by both summer and fall runs) in a number of other tributaries of the Trinity River, including the South Fork Trinity River, suggests populations within the same range for populations in other tributaries (Hill 2008, 2010).

Page 7-12, line 38:

~~Fall-run and winter~~ Winter-run steelhead also are widely distributed throughout the Trinity River. ~~Adult fall-run steelhead enter the Klamath River system in September and October (Hill 2010) and likely spawn in tributaries such as the Trinity River from January through April.~~ Adult winter-run steelhead begin their upstream migration in the Klamath River from November through March (USFWS 1997). Winter-run steelhead primarily spawn in Klamath River tributaries (including the Trinity River) from January through April (USFWS 1997), with peak spawn timing in February and March (NRC 2004). Since 1980, run-size estimates have ranged from 2,972 in 1998 to 53,885 in 2007. The estimated abundance of steelhead in 2013 was 8.4 percent above the average since 1980 (CDFW 2014).

Page 7-13, line 24:

Pacific Lamprey Pacific Lamprey (*Entosphenus tridentatus*) are the only anadromous lamprey species in the Trinity River Basin. This species is important to local tribes and supports subsistence fisheries on the Klamath River and lower Trinity River. Although no systematic distribution surveys are available for the Trinity River Basin, they are expected to have a distribution similar to anadromous salmonids that use the mainstem Trinity River and accessible reaches of larger tributaries. ~~No current status assessments are available for Pacific Lamprey in the Trinity River, but information from tribal fishermen who catch lampreys in the lower Klamath River suggests a decline that mirrors what has been observed across the species' range (Petersen Lewis 2009).~~ The status of Pacific Lampreys throughout their range, including the Klamath and Trinity Rivers was completed in 2012 under the Pacific Lamprey Conservation Initiative (Goodman and Reid 2012). Although data is limited, available records and anecdotal observations of tribal and recreational fishers and fishery biologists are consistent in suggesting that populations of Pacific Lamprey throughout the Klamath-Trinity River Basin are much reduced compared to historical abundance. Primary factors and threats affecting the status of Pacific Lampreys in the Klamath-Trinity River Basin include large and small dams blocking access to upstream habitats, water withdrawal diversions, legacy alteration of streambeds, and predation from non-native Brown Trout in the Trinity River and marine mammals in the Klamath River estuary (Goodman and Reid 2012).

Page 7-14, line 34:

Ceratomyxosis, caused by *C. shasta* infections, has been the most significant disease for juvenile salmon in the Klamath River Basin (Bartholomew and Foott 2010). This pathogen is particularly abundant in the Klamath River from Iron Gate Dam to Seiad Creek (river mile [RM] 190 – 141). Favorable conditions for its intermediate host polychaete worm occur in this reach of the Klamath River, including relatively low-velocity habitats with a silty, detrital river bottom and abundant filamentous green algae that supports dense and persistent populations of *M. speciosa* (Bartholomew and Foott 2010). Additionally, relatively high densities of returning adult salmon in this reach and high abundance of juveniles released from Iron Gate Hatchery are thought to facilitate the parasite's life cycle and contribute to particularly high concentrations of infective stages of both *C. shasta* and *P. minibicornus* (True et al. 2012). Despite the resistance to *C. shasta* generally exhibited by native sympatric salmonid populations in the Klamath Basin, including Redband Trout from the upper basin and anadromous salmonids, juvenile salmon exposed to high levels of the parasite, particularly at high temperatures, appear to be more susceptible to the disease (Bartholomew and Foott 2010). Many juvenile salmonids originating in upstream reaches of the Klamath River pass through the reach favoring the *C. shasta* life cycle during their spring outmigration at a time when *C. shasta* infectivity appears to be high and are reported to have ~~a high incidence of infection~~ an incidence of infection of over 90 percent in 2015[1] by *C. shasta* and *P. minibicornis* ~~(10 to 70 percent)~~, with disease-related mortality rates as high as 35 to 70 percent (Nichols and Foott 2005, Beeman et al. 2008, True et al. 2016).

[3] The incidence of infection of over 90 percent in 2015 was observed following consecutive dry and critically dry years that were not anticipated in the 2013 Biological Opinion on the Effects of Klamath Project Operations from May 31, 2013, through March 31, 2023, on Five Federally Listed Threatened and Endangered Species.

Page 7-15, line 9:

The nature and agents of disease in adult salmon returning to the Klamath River Basin are different than that described for juvenile salmon, and disease outbreaks and mortality have generally been less frequent in adult salmon (DFG 2004). Ich and columnaris disease are commonly reported diseases in adult salmon returning to the Klamath River and other rivers along the Pacific Coast and are often associated with pre-spawning mortality of salmon (Fagerlund et al. 1995, DFG 2004). The two pathogens that cause these diseases are widespread, regularly occur on healthy fish (though not at levels causing disease), and typically become lethal ~~only~~ when fish experience high degrees of stress[~~3~~ 4] (Fagerlund et al. 1995, Winton 2001, DFG 2004). Crowding may be considered one factor that elicits a stress response in fish and contributes to efficient transmission of pathogens from one fish to another (Guillen 2003, DFG 2004).

[~~3~~ 4] Stress as used here refers to a state produced by any environmental factor that alters the normal behavioral and physiological adaptive responses of an animal to such an extent that the chances of survival are significantly reduced.

Page 7-15, line 20:

As described and reviewed by DFG (2004) and Strange (2010~~a~~, 2015), the life cycle of the Ich pathogen, *I. multifilii*s, is direct (with no intermediate host). The parasitic stage of Ich is called the trophont and resides on the fish. After feeding, the parasite drops off the fish as a tomont, attaches to substrate where it encysts, and replicates many tomites. The cyst bursts and releases many short lived theronts which must successfully invade and attach to fish host tissue to continue the life cycle. The rate of infection is temperature dependent and increases at temperatures from 55 degrees Fahrenheit (°F) and warmer (Traxler et al. 1998, Winton 2001, DFG 2004). The efficacy of attachment of the free-swimming infectious theronts to fish is also affected by water velocity/turnover rates, with lower water velocities/turnover rates facilitating successful transmission and infection of fish by the Ich parasite (Bodensteiner et al 2000, Strange 2015). At optimal temperatures of 68 to 73.4°F, which are common in the lower Klamath River during the late summer, the entire Ich life cycle may take from four to seven days, with the trophonts residing on fish for three to five days, tomonts drop off and divide into many tomites in less than one to two days, and the released free-swimming, infectious theronts must find a fish host within about 24 hours. The cycle can be completed more quickly at warmer temperatures, but requires two weeks at 59°F, more than five weeks at 50°F, and months at lower temperatures (Post 1987, Winton 2001).

Page 7-16, line 5:

The primary factors currently thought to contribute to infection dynamics and outbreaks of Ich disease in adult salmon returning to the Klamath River are:

- A background presence and reservoir of Ich parasites carried by the resident freshwater fishes of the lower Klamath River, primarily Speckled Dace (*Rhinichthys osculus*) and, perhaps other fish species including Klamath Smallscale Sucker (*Catostomous rimiculus*), with background levels varying from year-to-year but may be higher in years following large-scale outbreaks of Ich, even when disease or pre-spawning mortality of salmon does not result (Belchik 2015, Strange 2015, Foott et al. 2016).

- When ~~High~~ high water temperatures occur in the lower Klamath River, ≥73.4°F, during late summer, ~~into early fall that can result in~~ thermal barriers ~~that slow or~~ can delay migration of adult salmon. ~~Salmon that arrive from the ocean and encounter these elevated temperatures can~~ In these conditions, adult salmon will congregate in limited thermal refuge habitats, further slowing migration through the lower Klamath River, as they experience elevated physiological stress~~,~~ from high water temperatures and crowded conditions. Crowding and high temperatures contribute ~~contributing~~ to high replication rates of the Ich parasites (Guillen 2003, DFG 2004, ~~Strange 2010a, 2010b and 2012,~~ USFWS and NMFS 2013, Belchik 2015).

- Low-flow conditions which are often associated with high water temperatures~~, can result in limited areas of holding habitat and slowed migration for adult salmon in the lower Klamath River, where they stage until conditions for continuing migration improve, leading to abundant congregations of fish in these limited staging areas, especially near cooler temperature refuges at the mouths of tributaries~~ during the beginning of the fall Chinook Salmon spawning run in the late-summer, creates conditions which can favor the transmission of the short-lived, free-swimming infectious life stage of Ich. Higher fish abundances and densities are thought to increase the risk of disease transmission under such conditions (DFG 2004, Strange 2010 and 2015 ~~2012,~~ Belchik 2015).

- Presence of adult salmon in the lower Klamath River. In particular, large run size ~~and~~ or high abundance of fall-run Chinook Salmon in the lower Klamath River generally increases the density of holding fish in the lower river that, in turn, can favor transmission and infectivity of the Ich parasite due to the close proximity of fish in limited holding habitats, leading to outbreaks of infection. However, adult salmon tend to congregate in close proximity to each other (schooling behavior) even with smaller runs or low fish abundance, and outbreaks can still occur during smaller run sizes if other variables are favorable to Ich transmission (Foott 2003, DFG 2004, Belchik 2015~~, Strange 2015~~).

Page 7-16, line 35:

The combination and convergence of these factors contribute to prime conditions for infections and transmission of the Ich parasite between fish. When densities of the host fish are high and water velocities and turnover rates are low, or both, the likelihood of the infectious tomite stage finding a host is high. When the temperature is high, parasite reproduction rate is increased and heavy parasite loads and burdens in fish can result. This may or may not result in fish mortality; for example, in 2014, infection rates were reported to be relatively high, without significant adult ~~moratlity~~ mortality (Belchik 2015). Gill epithelia damaged by heavy parasite loads exacerbates the fishes' ability to obtain oxygen from water that may already be depressed in oxygen by warm water temperature and crowded holding pools where dissolved oxygen levels can be reduced due to respiration by the mass of fish inhabiting the pools (CDFW 2004). Accordingly, management measures that have been applied since the 2002 fish die-off in the lower Klamath River, as described in Chapter 1 "Introduction" and that are further considered and evaluated in this Draft EIS, focus on alleviating one or more of the contributing factors and disrupting the life cycle of the Ich parasite that may cause disease and potentially lead to pre-spawning mortality of adult salmon (USFWS and NMFS 2013, Reclamation 2016).

Page 7-17, line 9:

Studies have shown that altering river flows or water velocity can work towards reducing an epizootic by 1) eliminating a migratory barrier and allowing fish to disperse, and 2) increasing water velocity which is thought to reduce the ability of the parasite to encounter a host. This strategy has been successfully applied in fish culture facilities (Bodensteiner et al. 2000, Hetrick et al. 2016).

Page 7-18, Line 7:

Whiskeytown Lake

Water is diverted from the Trinity River at Lewiston Dam and discharged via the Clear Creek Tunnel into Whiskeytown Lake on Clear Creek. From Whiskeytown Lake, water is released into the lower portion of Clear Creek via Whiskeytown Dam and into Keswick Reservoir through the Spring Creek Tunnel. There are two temperature control curtains in Whiskeytown Lake: Oak Bottom and Spring Creek (Reclamation 2008~~a~~). The Oak Bottom temperature control curtain was replaced in 2016 and serves as a barrier to prevent warm water in the reservoir from mixing with cold water from Lewiston Lake entering through the Carr Powerhouse. The Spring Creek temperature control curtain was replaced in 2011 and aids cold-water movement into the underwater intake for the Spring Creek Tunnel.

Page 7-21, line 28:

Spawning Habitat Availability Winter-run Chinook Salmon spawning in the upper reaches of the Sacramento River ~~is~~ are affected by releases from Keswick Dam, tributary inflow, and large diversions. Both the Keswick Dam releases and tributary inflow significantly affect water temperature, which has been shown to be very important to spawning and incubating winter-run Chinook Salmon. Because winter-run Chinook Salmon currently only occur in the upper Sacramento River, a change in flow or water temperature can have substantial effects on the population.

Winter-run Chinook Salmon are affected by the operations of the seasonal Anderson-Cottonwood Irrigation District (ACID) diversion dam, which involves placement of flashboards in the river between April and May. Flows in the river vary with the operation of the diversion dam and releases of water from Shasta Lake into the river.

Page 7-22, line 12:

USFWS (2005a) conducted limiting life-stage analyses for winter-, fall- and ~~latefall-run~~ late-fall run Chinook Salmon in the Sacramento River upstream of the Battle Creek confluence and found that in most cases, juvenile habitat was limiting. In some cases (fall- and late-fall ~~-~~ run in between the ACID intake and Cow Creek), spawning habitat may have been limiting at higher flows.

Page 7-23, line 26:

Vogel (2011) suggested that the mainstem Sacramento River may not provide adequate rearing areas for fry-stage anadromous salmonids, as evidenced by rapid displacement of fry from upstream to downstream areas and into nonnatal tributaries during increased flow events. Underwater observations of salmon fry in the mainstem Sacramento River suggest that optimal habitats for rearing may be limited at higher flows (Vogel 2011). USFWS (2005a) conducted limiting life-stage analyses for winter-, fall-, and ~~latefall-run~~ late-fall run Chinook Salmon in the Sacramento River above Battle Creek and found that in most cases, juvenile habitat was limiting. An important limitation of this analysis was that it did not take into account fry and juvenile rearing habitat below Battle Creek or in the Delta.

Page 7-28, line 23:

A portion of fish that enter the CVP C.W. Jones Pumping Plant approach channel and the SWP Clifton Court Forebay are salvaged at screening and fish salvage facilities, transported downstream by trucks, and released. NMFS (2009a) estimates that the direct loss of fish from the screening and salvage process is in the range of 65 to 83.5 percent for fish from the point they enter Clifton Court Forebay or encounter the trash racks at the CVP facilities. Additionally, mark-recapture experiments indicate that ~~most~~ fish are ~~probably~~ subject to increased predation risks prior to reaching the fish salvage facilities (e.g., in Clifton Court Forebay) (Gingras 1997, Castillo et al. 2012). Aquatic organisms (e.g., phytoplankton and zooplankton) that serve as food for fish also are entrained and removed from the Delta (Jassby et al. 2002, Kimmerer et al. 2008).

Page 7-29, Line 10:

Disease Preliminary results of several histopathological studies have found evidence of significant disease in Delta fish species (Reclamation 2008~~a~~). For example, massive intestinal infections with an unidentified myxosporean were found in yellowfin goby collected from Suisun Marsh (Baxa et al. 2013). Studies by Bennett (2005) and Bennett et al. (2008) show that exposure to toxic chemicals may cause liver abnormalities and cancerous cells in Delta Smelt, and stressful summer conditions, warm water, and lack of food may result in liver glycogen depletion and liver damage. Studies of Sacramento Splittail suggest that liver abnormalities in this species are more linked to health and nutritional status than to pollutant exposure (Greenfield et al. 2008).

Page 7-29, line 19:

Nonnative Invasive Species Nonnative invasive species influence the Delta ecosystem by increasing competition and predation on native species, reducing habitat quality (as result of invasive aquatic macrophyte growth), and reducing food supplies by altering the aquatic food web. Not all nonnative species are considered invasive.[~~4~~ 5] Some introduced species have minimal ability to spread or increase in abundance. Others have commercial or recreational value (e.g., Striped Bass, American Shad and Largemouth Bass).

[~~4~~ 5] DFG (2008) defines *invasive species* as “species that establish and reproduce rapidly outside of their native range and may threaten the diversity or abundance of native species through competition for resources, predation, parasitism, hybridization with native populations, introduction of pathogens, or physical or chemical alteration of the invaded habitat.”

Page 7-33, line 10:

In fresh water, juvenile spring-run Chinook Salmon rear in natal tributaries, the Sacramento River mainstem, and nonnatal tributaries to the Sacramento River (DFG 1998b). Outmigration timing is highly variable, as they may migrate downstream as the young-of-the-year (YOY) or as juveniles or yearlings. The outmigration period for spring-run Chinook Salmon extends from November to early May, with up to 69 percent of the YOY fish outmigrating through the lower Sacramento River and Delta during this period (DFG 1998b). Migratory cues, such as increased flows, increasing turbidity from runoff, changes in day length, or intraspecific competition from other fish in their natal streams, may spur outmigration of juveniles from the upper Sacramento River basin when they have reached the appropriate stage of maturation (NMFS 2009).

Page 7-35, Line 27:

Southern DPS of the North American Green Sturgeon The Sacramento River provides habitat for Green Sturgeon spawning, adult holding, foraging, and juvenile rearing. Suitable spawning temperatures and spawning substrate exist for Green Sturgeon in the Sacramento River upstream and downstream of RBPP (Reclamation 2008~~a~~, Poytress et al. 2015). Although the upstream extent of historical Green Sturgeon spawning in the Sacramento River is unknown, the observed distribution of sturgeon eggs, larvae, and juveniles indicates that spawning occurs from Hamilton City to as far upstream as Ink’s Creek confluence (between Jellys Ferry and Bend Bridge) and possibly up to the Cow Creek confluence (Brown 2007, Poytress et al. 2015). Based on the distribution of sturgeon eggs, larvae, and juveniles in the Sacramento River, DFG (2002) indicated that Green Sturgeon spawn in late spring and early summer. Peak spawning is believed to occur between April and June.

Page 7-36, Line 15:

Empirical estimates of Green Sturgeon abundance are not available for the Sacramento River population or any west coast population (Reclamation 2008~~a~~), and the current population status is unknown (Beamesderfer et al. 2007, Adams et al. 2007). NMFS (2009b) noted that, similar to winter-run Chinook Salmon, the restriction of spawning habitat for Green Sturgeon (to only one reach of the Sacramento River) increases the vulnerability of this spawning population to catastrophic events. This was one of the primary reasons that the Southern DPS of Green Sturgeon was Federally listed as a threatened species in 2006.

Page 7-38, Line 36:

Juvenile steelhead can be found in all waterways of the Delta, but particularly in the main channels leading from their natal river systems (NMFS 2009). Juvenile steelhead are recovered in trawls from October through July at Chipps Island and at Mossdale. Chipps Island catch data indicate there is a difference in the outmigration timing between wild and hatchery-reared steelhead smolts from the Sacramento and eastside tributaries. Hatchery fish are typically recovered at Chipps Island from January through March, with a peak in February and March corresponding to the schedule of hatchery releases of steelhead smolts from the Central Valley hatcheries (Nobriga and Cadrett 2001, Reclamation 2008~~a~~). The timing of wild (unmarked) steelhead outmigration is more spread out, and based on salvage records at the CVP and SWP fish collection facilities, outmigration occurs over approximately 6 months with the highest levels of recovery in February through June (Aasen 2011, 2012).

Page 7-41, Line 24:

Longfin Smelt larvae are most abundant in the water column usually from January through April (Reclamation 2008~~a~~). In the Bay-Delta, the geographic distribution of Longfin Smelt larvae is closely associated with the position of X2; the center of distribution varies with outflow conditions, but not with respect to X2 (Dege and Brown 2004). This pattern is consistent with juveniles migrating downstream to low-salinity, brackish habitats for growth and rearing. Larger Longfin Smelt feed primarily on opossum shrimps and other invertebrates (Feyrer et al. 2003). Copepods and other crustaceans also can be important food items, especially for smaller fish (Reclamation 2008~~a~~).

Page 7-44, line 22:

The portions of the Sacramento River, Trinity River, and lower Klamath River that could be affected by the proposed action alternatives are part of designated critical habitats for the fish species listed under the ESA inhabiting these rivers, as well as being recognized as providing EFH for Pacific salmon under the Magnuson-Stevens Fishery Conservation and Management Act. The effects on habitat for each of these Federally~~-~~listed fish species inhabiting the Sacramento, Trinity and Klamath Rivers described in the following sections, applies to the effects of the proposed action alternatives on designated critical habitat for the Federally~~-~~listed fish species, and on EFH for Pacific salmon in each of these rivers.

Page 7-52, line 1:

Table 7-3. Water Temperature Objectives

Compliance Location	Year Types	Dates	Temperature Objective (°F)[a]	Purpose
Trinity River				
Lewiston Dam to Douglas City[1~~,2~~]	All Year Types	July 1 – September 15	< 60	Spring-run Chinook Salmon holding
		September 16 – September 30	≤ 56	Spring-run Chinook Salmon spawning
Lewiston Dam to North Fork Trinity River Confluence[~~2~~ 1]	All Year Types	October 1 – December 31	< 56	Spring-run and fall-run Chinook Salmon spawning
Lewiston Dam to Weitchpec[3]	Normal, Wet, Extremely Wet	April 15 – May 22 May 23 – June 4 June 5 – July 9	≤ 55.4 ≤ 59 ≤ 62.6	Salmonid smolt outmigration
	Dry, Critically Dry	April 15 – May 22 May 23 – June 4 June 5 – June 15	≤ 59 ≤ 62.6 ≤ 68	Salmonid smolt outmigration[b]
Clear Creek				
Igo[4]	All Year Types	June 1 – September 15	60	Spring-run Chinook Salmon holding and rearing
		September 15 – October	56	Spring-run and fall-run Chinook Salmon spawning and egg incubation
Sacramento River				
Clear Creek[2] Balls Ferry[2] Jellys Ferry[2]	All Year Types	May – October	56	Winter- and spring-run Chinook Salmon spawning and egg incubation
Bend Bridge[2]	All Year Types	May – October	56	Winter- and spring-run Chinook Salmon spawning and egg incubation
			63	Green Sturgeon spawning, incubation, and rearing
Feather River				
Robinson Riffle[2]	All Year Types	September – April	56	Spring-run Chinook Salmon and steelhead spawning and incubation
		May – August	63	Spring-run Chinook Salmon and steelhead rearing
American River				
Watt Avenue Bridge[2]	All Year Types	May – October	65	Juvenile steelhead rearing

Sources:

[1] NCRWQCB 2011

[2] SWRCB Water Rights Order 90-5

[3] DOI and Hoopa Valley 2000; USFWS et al. 2000

[4] NMFS 2009

Notes:

[a] Criteria are daily average temperatures

[b] Facilitate early outmigration by allowing gradual warming to at least marginal temperatures throughout smolt outmigration for juvenile salmonids

Key:
°F = degrees Fahrenheit
< = less than
≤ = less than or equal to

Page 7-54, line 25:

Old and Middle River (OMR) reverse flows occur as the rate of water diverted at the CVP and SWP export facilities exceeds tidal and downstream flows within the central region of the Delta. These reverse flows have been identified as a potential cause of fish mortality at the CVP and SWP fish facilities (USFWS 2008, Mount et al. 2012). The most biologically sensitive period when the effects of reverse flows could affect multiple Delta species, including Chinook Salmon and Delta Smelt, extends from late winter through early summer (December through June) (USFWS 2008, Zeug and Cavallo 2014). Changes in OMR flows to exceed -5,000 are used as an indicator of project effects.[~~5~~ 6]

[~~5~~ 6] Results of analyses of the relationship between the magnitude of reverse flows in OMR and salvage of adult Delta Smelt in the late winter shows a substantial increase in salvage as reverse flows increase (i.e., become more negative), and exceed approximately -5,000 cfs.

Page 7-56, line 25:

Although the potential risk, frequency, and magnitude of future fish die-offs occurring in the lower Klamath River during the late-summer under the No Action Alternative cannot be ~~predicted with certainty~~ quantified, at this time, it is currently thought that low flows and warm water temperatures in the lower Klamath River—combined with high densities of adult salmon and steelhead in the river during August and September—contributes to the risk of disease outbreaks that could cause large-scale mortality of salmon (DFG 2004, Strange 2010~~a~~ and 2015, USFWS and NMFS 2013). It is more certain that a large level of pre-spawning salmon mortality can potentially have a disproportionate effect on sub-basin stocks, which, in fact, occurred for Trinity River Hatchery fall-run Chinook Salmon in the 2002 event (DFG 2004). High levels of pre-spawning mortality, including that caused by disease epizootics, can affect salmon reproduction levels and, consequently, the age-class structure of subsequent generations for a number of years beyond the year in which the mortality event occurs. Any disproportionate effects of future fish die-offs, from any cause, on Trinity River salmon stocks would impact natural and hatchery spawning escapement goals for the TRRP, as well as commercial, sport, and tribal harvest allocations. Under the No Action Alternative, there would be a continued risk of Ich epizootics and related fish mortality due to lower summer flows and warm water temperatures, and the frequency of conditions associated with such disease outbreaks could increase with Klamath River Basin hydrologic responses to climate change.

Page 7-62, line 4:

Flow rates less than 1,000 cfs typically would not be expected to overtop berms, many of which have been removed by the Trinity River Restoration Program in the last decade as part of extensive channel rehabilitation projects (Hoopa Valley Tribe et al. 2011, TRRP SAB 2014 ~~2013~~, ~~TRRP 2014~~)[~~6~~ 7]. Some high-flow side channels and floodplain areas adjacent to the summer baseflow channel, that get inundated by the additional late-summer augmentation release flows, would allow juvenile fish to temporarily distribute along and use these areas for rearing until flows are returned to summer baseflow, when they will move with receding flows back to summer flow channel habitat. However, most juvenile Coho Salmon, Chinook Salmon, and steelhead rearing in the Trinity River during August and September are at a larger parr or pre-smolt size and generally prefer deeper, swifter habitats than fry-sized fish, which would likely minimize numbers of salmon and steelhead parr moving up onto shallower areas inundated at the higher stage extents of augmentation flows.

~~6~~ 7 More than half of the 44 original channel rehabilitation sites (nearly 15 miles of the 40 mile upper Trinity River Restoration reach) have had channel rehabilitation treatments (TRRP SAB 2014 ~~2013~~; TRRP 2014).

Page 7-62, line 16:

Flows greater than about 2,000 cfs associated with preventative and emergency pulse flow components of the proposed action alternatives have the potential to minimally affect juvenile Coho Salmon and steelhead rearing in the river in August and September by stranding them in side- and off-channel areas inundated by the high pulse flows once flows are reduced back to the summer baseflow of 450 cfs. Ramping rates for both the ascending and receding flows associated with these pulse flows are designed to minimize public and environmental impacts, including stranding fish. Given that channel rehabilitation over the last decade has reduced the number of areas in the upper Trinity River where stranding is likely to occur and the conservative ramping rates that would be implemented for the proposed action (Chamberlain 2003),[~~7~~ 8] the proportion of rearing juvenile salmonids that may be vulnerable to stranding is anticipated to be small and would not be expected to impact overall production.

~~7~~ 8 Chamberlain (2003) reported that stranding potential of juvenile salmonids was less at pilot channel restoration sites than at sites with riparian encroachment berms.

Page 7-63, line 5:

Trinity River spring-run Chinook Salmon begin spawning by about the third week in September in most years (USFWS and Hoopa Valley Tribe 1999). However, the timing and down-ramping pattern of late-summer augmentation releases during the third week of September is designed to avoid and minimize effects on spawning spring run salmon. Chamberlain and Hetrick (2013) reported that reduction of flows in September 2013 from 900 cfs to 450 cfs did not dewater ~~up to~~ any of the 65 spring-run Chinook Salmon redds completed during the period of elevated flows, through September 19 that year. In the case where an emergency pulse flow action is required at the end of the preventative baseflow period, a small number of spring-run Chinook Salmon that begin to construct redds and spawn during this period may experience a disruption of spawning activites or, in the worst case, completed or partially-completed redds could be dewatered (Gaeuman, pers. com. 2016). However, this effect is expected to be infrequent and minimal.

Page 7-67, line 16:

The mean and range of DATs during the spring/early-summer period at the North Fork Trinity River confluence ~~(~~downstream to Weitchpec~~)~~ are similar between Alternative 1 and the No Action Alternative (Tables 7-6 and 7-7), with a potential for only a minor increase of one or two days additional exceedances of temperature criteria in June and July, primarily during multiple consecutive dry water years. Given the similarity in spring/early-summer flows and water temperatures throughout the Trinity River between Alternative 1 and the No Action Alternative, habitat conditions for juvenile Chinook Salmon, Coho Salmon, and steelhead growth and outmigration survival would be expected to be similar.

Page 7-69, line 1:

Table 7-6. Change in Daily Average Water Temperatures ~~Compared to Spring-Time Temperature Objectives~~ Near the North Fork Trinity River Confluence Under the No Action Alternative and Alternative 1 Compared to Trinity River ROD Spring-Time Temperature Objectives

		4/15 to 5/22 ≤ 55.4° for N, W, & EW ≤ 59°F for D & CD WYs Average; (Range); [# days]		5/23 to 6/4 ≤ 59°F for N, W, & EW ≤ 62.6°F for D, CD Average; (Range); [# days]		6/5 to 7/9 ≤ 62.6°F for N, W, & EW Average; (Range); [# days]	6/5 to 6/15 ≤ 62.6°F for D, CD
Year	**Water Year Type**	**No Action**	**Alternative 1**	**No Action**	**Alternative 1**	**No Action**	**Alternative 1**
1980	W	51 (47-56) [2]	51 (47-56) [2]	48 (46-51) [0]	48 (46-51) [0]	55 (49-57) [0]	55 (49-57) [0]
1981	**D**	**52 (49-57) [0]**	**52 (49-57) [0]**	**58 (54-60) [0]**	**58 (54-60) [0]**	**60 (57-62) [1]**	**60 (57-62) [1]**
1982	EW	51 (45-53) [0]	51 (45-53) [0]	47 (46-48) [0]	47 (46-48) [0]	52 (47-56) [0]	52 (47-56) [0]
1983	EW	49 (45-56) [1]	49 (45-56) [1]	53 (51-55) [0]	53 (51-54) [0]	55 (52-58) [0]	55 (52-58) [0]
1984	W	51 (47-54) [0]	51 (47-54) [0]	51 (49-53) [0]	51 (49-53) [0]	57 (51-60) [0]	57 (51-60) [0]
1985	**D**	**53 (50-57) [0]**	**53 (50-57) [0]**	**55 (52-57) [0]**	**55 (52-57) [0]**	**61 (56-65) [0]**	**61 (56-65) [0]**
1986	**W**	**50 (46-55) [0]**	**50 (46-55) [0]**	**51 (48-55) [0]**	**51 (48-55) [0]**	**56 (53-58) [0]**	**56 (53-58) [0]**
1987	**D**	**54 (49-60) [1]**	**54 (49-60) [1]**	**56 (53-59) [0]**	**56 (53-59) [0]**	**60 (58-62) [0]**	**60 (58-62) [0]**
1988	**D**	**52 (47-57) [0]**	**52 (47-57) [0]**	**56 (53-58) [0]**	**56 (53-58) [0]**	**55 (51-62) [2]**	**55 (51-62) [2]**
1989	**N**	**52 (49-59) [7]**	**52 (49-59) [7]**	**52 (48-56) [0]**	**52 (48-56) [0]**	**58 (53-59) [0]**	**58 (53-59) [0]**
1990	**D**	**53 (50-58) [0]**	**53 (50-58) [0]**	**52 (49-56) [0]**	**52 (49-56) [0]**	**60 (56-62) [0]**	**60 (56-62) [0]**
1991	**CD**	**54 (49-58) [0]**	**54 (49-58) [0]**	**58 (53-60) [0]**	**58 (53-61) [0]**	**63 (60-65) [0]**	**63 (60-65) [0]**
1992	**D**	**53 (50-58) [0]**	**53 (50-58) [0]**	**59 (55-63) [1]**	**59 (55-63) [1]**	**61 (55-63) [3]**	**61 (55-63) [3]**
1993	W	50 (47-53) [0]	50 (47-53) [0]	49 (48-50) [0]	49 (48-50) [0]	56 (49-59) [0]	56 (49-59) [0]
1994	**CD**	**56 (50-60) [7]**	**56 (50-60) [7]**	**59 (58-61) [0]**	**59 (58-61) [0]**	**60 (56-63) [0]**	**60 (55-63) [0]**
1995	**EW**	**49 (45-53) [0]**	**49 (45-53) [0]**	**48 (48-50) [0]**	**48 (47-49) [0]**	**53 (48-59) [0]**	**53 (48-59) [0]**
1996	**W**	**51 (47-55) [0]**	**51 (47-55) [0]**	**51 (47-54) [0]**	**51 (47-54) [0]**	**57 (53-60) [0]**	**57 (53-60) [0]**
1997	**W**	**52 (47-55) [0]**	**52 (47-55) [0]**	**50 (47-54) [0]**	**50 (47-53) [0]**	**56 (53-58) [0]**	**56 (53-58) [0]**
1998	EW	51 (46-55) [0]	51 (46-55) [0]	48 (45-53) [0]	48 (45-53) [0]	55 (52-57) [0]	55 (52-57) [0]
1999	W	51 (48-56) [3]	51 (48-56) [3]	52 (50-53) [0]	52 (50-53) [0]	56 (52-60) [0]	56 (52-60) [0]
2000	**W**	**51 (47-55) [0]**	**51 (47-55) [0]**	**52 (51-53) [0]**	**52 (51-53) [0]**	**57 (52-60) [0]**	**57 (52-60) [0]**
2001	**D**	**55 (49-60) [3]**	**55 (49-60) [3]**	**59 (57-63) [0]**	**59 (57-63) [0]**	**60 (58-62) [0]**	**60 (58-62) [0]**
2002	**N**	**51 (47-57) [3]**	**51 (47-57) [3]**	**53 (50-57) [0]**	**53 (50-57) [0]**	**57 (55-59) [0]**	**57 (55-59) [0]**
2003	**EW**	**50 (46-53) [0]**	**50 (46-53) [0]**	**49 (48-51) [0]**	**49 (48-51) [0]**	**54 (50-58) [0]**	**54 (50-58) [0]**

Page 7-70, line 1:

Table 7-6. Change in Daily Average Water Temperatures ~~Compared to Spring-Time Temperature Objectives~~ Near the North Fork Trinity River Confluence Under the No Action Alternative and Alternative 1 Compared to Trinity River ROD Spring-Time Temperature Objectives (contd.)

Summary of Differences	4/15 to 5/22		5/23 to 6/4		6/5 to 7/9	
	Difference in DAT Mean (Range)	Difference in Number of Exceedances	Difference in DAT Mean (Range)	Difference in Number of Exceedances	Difference in DAT Mean (Range)	Difference in Number of Exceedances
Flow Augmentation Years	0°F (0 to -0.1°F)	0	0°F (0 to -0.2°F)	0	0°F (0.1 to -0.1°F)	0
Non-Augmentation Years	0°F (0 to -0.1°F)	0	0°F (0 to -0.1°F)	0	0°F (0.1 to 0°F)	0

Notes:

Averages are calculated for a 24-year period for the critical spring and early summer rearing and outmigration periods for Trinity River anadromous salmonids

Water temperature management objectives for the Trinity River from Lewiston Dam to Weitchpec for protection of anadromous salmon freshwater life stages are shown for each period.

Years in bold font indicate representative years modeled with augmentation of late-summer flows for Alternative 1

Key:
CD = critically dry water year
D = dry water year
DAT = daily average temperature
EW = extremely wet water year
N = normal water year
W = wet

Page 7-71, line 1:

Table 7-7. Change in Daily Average Water Temperatures ~~Compared to Spring-Time Temperature Objectives for Lewiston Dam to~~ at Weitchpec Under the No Action Alternative and Alternative 1 Compared to Trinity River ROD Spring-Time Temperature Objectives

		4/15 to 5/22 ≤ 55.4° for N, W, & EW ≤ 59°F for D & CD WYs Average; (Range); [# days]		5/23 to 6/4 ≤ 59°F for N, W, & EW ≤ 62.6°F for D, CD Average; (Range); [# days]		6/5 to 7/9 ≤ 62.6°F for N, W, & EW Average; (Range); [# days]	6/5 to 6/15 ≤ 62.6°F for D, CD
Year	**Water Year Type**	**No Action**	**Alternative 1**	**No Action**	**Alternative 1**	**No Action**	**Alternative 1**
1980	W	55 (51-60) [24]	55 (51-60) [24]	52 (49-55) [0]	52 (49-55) [0]	61 (54-64) [10]	61 (54-64) [10]
1981	**D**	**56 (52-60) [4]**	**56 (52-60) [4]**	**63 (58-66) [8]**	**63 (58-66) [8]**	**65 (62-67) [0]**	**65 (62-67) [0]**
1982	EW	55 (47-58) [23]	55 (47-58) [23]	52 (50-54) [0]	52 (50-54) [0]	59 (51-63) [1]	59 (51-63) [1]
1983	EW	52 (47-61) [7]	52 (47-61) [7]	59 (57-61) [8]	59 (57-61) [7]	61 (58-64) [3]	61 (58-64) [3]
1984	W	53 (50-59) [4]	53 (50-59) [4]	56 (53-59) [0]	56 (53-59) [0]	63 (55-68) [24]	63 (55-68) [24]
1985	**D**	**56 (51-62) [4]**	**56 (51-62) [4]**	**60 (57-62) [0]**	**60 (57-62) [0]**	**67 (61-72) [5]**	**67 (61-72) [5]**
1986	**W**	**53 (50-58) [7]**	**53 (50-58) [7]**	**57 (51-61) [4]**	**57 (51-61) [4]**	**63 (60-65) [20]**	**63 (60-65) [20]**
1987	**D**	**59 (53-64) [18]**	**59 (53-64) [18]**	**61 (57-67) [3]**	**61 (57-67) [3]**	**68 (66-70) [4]**	**68 (66-70) [4]**
1988	**D**	**55 (49-62) [3]**	**55 (49-62) [3]**	**60 (57-64) [2]**	**60 (57-64) [2]**	**58 (55-66) [0]**	**58 (55-66) [0]**
1989	**N**	**57 (52-64) [19]**	**57 (52-64) [19]**	**57 (52-63) [3]**	**56 (52-63) [3]**	**64 (58-66) [30]**	**64 (58-66) [32]**
1990	**D**	**57 (53-62) [9]**	**57 (53-62) [9]**	**54 (53-58) [0]**	**54 (53-58) [0]**	**64 (58-65) [0]**	**64 (58-65) [0]**
1991	**CD**	**56 (52-60) [1]**	**56 (52-60) [1]**	**61 (58-63) [2]**	**61 (58-63) [2]**	**67 (63-69) [4]**	**67 (63-69) [5]**
1992	**D**	**58 (56-62) [10]**	**58 (56-62) [10]**	**65 (60-70) [12]**	**65 (60-70) [12]**	**67 (60-70) [7]**	**67 (60-70) [7]**
1993	W	54 (51-57) [10]	54 (51-57) [10]	55 (54-57) [0]	55 (54-57) [0]	63 (54-66) [23]	63 (54-67) [23]
1994	**CD**	**59 (53-65) [18]**	**59 (53-65) [18]**	**65 (61-66) [12]**	**65 (61-66) [12]**	**66 (62-70) [4]**	**66 (62-70) [4]**
1995	**EW**	**53 (47-58) [5]**	**53 (47-58) [5]**	**54 (53-55) [0]**	**54 (52-55) [0]**	**59 (53-67) [14]**	**59 (52-67) [14]**
1996	**W**	**54 (49-59) [14]**	**54 (49-59) [14]**	**55 (52-60) [1]**	**55 (52-60) [1]**	**63 (59-67) [20]**	**63 (59-67) [20]**
1997	**W**	**57 (52-62) [28]**	**57 (52-62) [29]**	**54 (51-59) [1]**	**54 (51-59) [0]**	**62 (57-65) [16]**	**62 (57-65) [16]**
1998	EW	55 (47-60) [18]	55 (47-60) [18]	51 (47-57) [0]	51 (47-57) [0]	61 (57-65) [5]	61 (57-65) [5]
1999	W	54 (49-60) [10]	54 (49-60) [10]	58 (55-59) [2]	58 (55-59) [2]	62 (55-66) [20]	62 (55-66) [20]
2000	**W**	**54 (50-57) [8]**	**54 (50-57) [8]**	**57 (55-58) [0]**	**57 (55-58) [0]**	**63 (58-67)[20]**	**63 (58-67) [20]**
2001	**D**	**58 (52-65) [13]**	**58 (52-65) [13]**	**65 (63-67) [13]**	**65 (63-67) [13]**	**65 (63-68) [0]**	**65 (63-68) [0]**
2002	**N**	**54 (51-60) [12]**	**54 (51-60) [12]**	**59 (54-62) [6]**	**59 (54-62) [6]**	**64 (61-66) [30]**	**64 (61-66) [30]**
2003	**EW**	**52 (48-55) [0]**	**52 (48-55) [0]**	**54 (52-56) [0]**	**54 (52-56) [0]**	**60 (55-65) [12]**	**60 (55-65) [12]**

Page 7-72, line 1:

Table 7-7. Change in Daily Average Water Temperatures ~~Compared to Spring-Time Temperature Objectives for Lewiston Dam to~~at Weitchpec Under the No Action Alternative and Alternative 1 Compared to Trinity River ROD Spring-Time Temperature Objectives (contd.)

Summary of Differences	4/15 to 5/22 Difference in DAT Mean (Range)	4/15 to 5/22 Difference in Number of Exceedances	5/23 to 6/4 Difference in DAT Mean (Range)	5/23 to 6/4 Difference in Number of Exceedances	6/5 to 7/9 Difference in DAT Mean (Range)	6/5 to 7/9 Difference in Number of Exceedances
Flow Augmentation Years	0°F (--)	+1	0°F (0 to -0.1°F)	0	0°F (0.1 to -0.1°F)	+3
Non-Augmentation Years	0°F (0 to -0.1°F)	0	0°F (--)	-1	0°F (0.1 to 0°F)	0

Notes:

Averages are calculated for a 24-year period for the critical spring and early summer rearing and outmigration periods for Trinity River anadromous salmonids

Water temperature management objectives for the Trinity River from Lewiston Dam to Weitchpec for protection of anadromous salmon freshwater life stages are shown for each period.

Years in bold font indicate representative years modeled with augmentation of late-summer flows for Alternative 1

Key:
CD = critically dry water year
D = dry water year
DAT = daily average temperature
EW = extremely wet water year
N = normal water year
W = wet

Page 7-82, line 1:

Table 7-13. Juvenile Chinook Salmon Production Based on SALMOD Results for Alternative 1

Water Year Type	No Action Alternative (Average Production)	Alternative 1 (Difference from No Action)	Alternative 1 (Percent Change)
Fall-Run Chinook Salmon			
Critical	13,058,552	-745,197	-5.7
Dry	29,967,217	36,551	0.1
Below Normal	30,112,903	-194,033	-0.6
Above Normal	30,324,698	45,599	0.2
Wet	29,159,993	66,118	0.2
All Water Years	27,275,865	-99,746	-0.4
Late Fall-Run Chinook Salmon			
Critical	5,245,425	-114,999	-2.2
Dry	5,648,977	-42,391	-0.8
Below Normal	5,787,938	-5,749	-0.1
Above Normal	5,929,655	-22,349	-0.4
Wet	5,868,372	-11,305	0.0
All Water Years	5,720,957	-35,135	-0.2
Winter-Run Chinook Salmon			
Critical	2,382,579	-44,027	-1.8
Dry	3,327,324	-522	0.0
Below Normal	3,250,781	2,641	0.1
Above Normal	3,149,290	11,693	0.4
Wet	3,139,415	371	0.0
All Water Years	3,090,275	-4,441	-0.1
Spring-Run Chinook Salmon			
Critical	68,168	3,499	5.1
Dry	416,959	1,725	0.4
Below Normal	447,950	-1,628	-0.4
Above Normal	465,691	-574	-0.1
Wet	467,027	-739	-0.2
All Water Years	392,786	401	0.1

Note: Spring-run Chinook Salmon starting population designated in SALMOD was 489 individuals, however, confidence in results are reduced when spawning populations are less than 500. SALMOD is the only model currently available that evaluates all four runs of Chinook Salmon for the Sacramento River.

Page 7-85, line 8:

Changes in Exceedances of Water Temperature Thresholds Average monthly water temperatures from May through October under both the No Action Alternative and Alternative 1 would exceed the water temperature threshold of 56°F in the Sacramento River below Clear Creek less than 14 percent of the time. In the Sacramento River at Balls Ferry for winter-run and spring-run Chinook Salmon spawning and egg incubation, the water temperature threshold would be exceeded by 22 percent of the time under both the No Action Alternative and Alternative 1. Water temperature thresholds would be exceeded nearly 40 percent of the months with designated thresholds under the No Action Alternative and Alternative 1 at Jellys Ferry. At Bend Bridge, the frequency of exceedances would be similar under Alternative 1 (62 percent) to the No Action Alternative (61 percent). The difference between the No Action Alternative and Alternative 1 is less than 1 percent. While there are minimal differences in meeting the water temperature thresholds, the slight increase in water ~~temparture~~ temperature exceedence is sufficient to result in the differences shown for the modeling results in SALMOD and IOS.

Page 7-85, line 21:

Average monthly water temperatures in Clear Creek at Igo between June and September would exceed the 60°F threshold under both the No Action Alternative and Alternative 1, less than 1 percent of the time. The September to October threshold of 56°F would be exceeded by 12 percent under the No Action Alternative, and less than 10 percent under Alternative 1.

Page 7-93, line 1:

Table 7-17. Change in Daily Average Water Temperatures ~~Compared to Spring-Time Temperature Objectives~~ Near the North Fork Trinity River Confluence Under the No Action Alternative and Alternative 2 Compared to Trinity River ROD Spring-Time Temperature Objectives

		4/15 to 5/22 ≤ 55.4° for N, W, & EW ≤ 59°F for D & CD WYs Average; (Range); [# days]		**5/23 to 6/4 ≤ 59°F for N, W, & EW ≤ 62.6°F for D, CD Average; (Range); [# days]**		**6/5 to 7/9 ≤ 62.6°F for N, W, & EW Average; (Range); [# days]**	**6/5 to 6/15 ≤ 62.6°F for D, CD**
Year	**Water Year Type**	**No Action**	**Alternative 2**	**No Action**	**Alternative 2**	**No Action**	**Alternative 2**
1980	W	51 (47-56) [2]	51 (47-56) [2]	48 (46-51) [0]	48 (46-51) [0]	55 (49-57) [0]	55 (51-57) [0]
1981	**D**	**52 (49-57) [0]**	**53 (49-57) [0]**	**58 (54-60) [0]**	**58 (54-61) [0]**	**60 (57-62) [1]**	**60 (58-62) [1]**
1982	EW	51 (45-53) [0]	51 (45-53) [0]	47 (46-48) [0]	47 (46-48) [0]	52 (47-56) [0]	52 (47-56) [0]
1983	EW	49 (45-56) [1]	49 (45-56) [1]	53 (51-55) [0]	53 (51-54) [0]	55 (52-58) [0]	55 (51-58) [0]
1984	W	51 (47-54) [0]	51 (47-54) [0]	51 (49-53) [0]	51 (49-53) [0]	57 (51-60) [0]	57 (51-60) [0]
1985	**D**	**53 (50-57) [0]**	**53 (50-58) [0]**	**55 (52-57) [0]**	**56 (52-58) [0]**	**61 (56-65) [0]**	**61 (56-66) [1]**
1986	**W**	**50 (46-55) [0]**	**50 (46-55) [0]**	**51 (48-55) [0]**	**51 (48-55) [0]**	**56 (53-58) [0]**	**56 (53-58) [0]**
1987	**D**	**54 (49-60) [1]**	**55 (49-60) [1]**	**56 (53-59) [0]**	**56 (53-59) [0]**	**60 (58-62) [0]**	**60 (58-63) [0]**
1988	**D**	**52 (47-57) [0]**	**52 (47-58) [0]**	**56 (53-58) [0]**	**56 (53-58) [0]**	**55 (51-62) [2]**	**55 (51-62) [3]**
1989	**N**	**52 (49-59) [7]**	**52 (49-59) [7]**	**52 (48-56) [0]**	**53 (48-57) [0]**	**58 (53-59) [0]**	**58 (53-59) [0]**
1990	**D**	**53 (50-58) [0]**	**54 (50-58) [0]**	**52 (49-56) [0]**	**52 (49-56) [0]**	**60 (56-62) [0]**	**60 (56-62) [0]**
1991	**CD**	**54 (49-58) [0]**	**54 (49-59) [0]**	**58 (53-60) [0]**	**60 (55-62) [0]**	**63 (60-65) [0]**	**66 (62-68) [0]**
1992	**D**	**53 (50-58) [0]**	**54 (50-58) [0]**	**59 (55-63) [1]**	**60 (56-64) [2]**	**61 (55-63) [3]**	**61 (56-64) [5]**
1993	W	50 (47-53) [0]	50 (47-53) [0]	49 (48-50) [0]	49 (48-51) [0]	56 (49-59) [0]	56 (49-59) [0]
1994	**CD**	**56 (50-60) [7]**	**56 (50-60) [7]**	**59 (58-61) [0]**	**62 (59-65) [5]**	**60 (56-63) [0]**	**63 (57-66) [0]**
1995	**EW**	**49 (45-53) [0]**	**49 (45-53) [0]**	**48 (48-50) [0]**	**48 (47-49) [0]**	**53 (48-59) [0]**	**53 (48-59) [0]**
1996	**W**	**51 (47-55) [0]**	**51 (47-55) [0]**	**51 (47-54) [0]**	**51 (47-55) [0]**	**57 (53-60) [0]**	**57 (53-60) [0]**
1997	**W**	**52 (47-55) [0]**	**52 (47-55) [0]**	**50 (47-54) [0]**	**50 (47-54) [0]**	**56 (53-58) [0]**	**56 (53-58) [0]**
1998	EW	51 (46-55) [0]	51 (46-55) [0]	48 (45-53) [0]	48 (45-53) [0]	55 (52-57) [0]	55 (53-57) [0]
1999	W	51 (48-56) [3]	51 (48-56) [3]	52 (50-53) [0]	52 (50-53) [0]	56 (52-60) [0]	57 (52-60) [0]
2000	**W**	**51 (47-55) [0]**	**51 (47-55) [0]**	**52 (51-53) [0]**	**52 (51-53) [0]**	**57 (52-60) [0]**	**57 (52-60) [0]**
2001	**D**	**55 (49-60) [3]**	**55 (49-60) [3]**	**59 (57-63) [0]**	**60 (57-63) [1]**	**60 (58-62) [0]**	**60 (58-63) [0]**
2002	**N**	**51 (47-57) [3]**	**51 (47-57) [3]**	**53 (50-57) [0]**	**54 (50-58) [0]**	**57 (55-59) [0]**	**57 (55-59) [0]**
2003	**EW**	**50 (46-53) [0]**	**50 (46-53) [0]**	**49 (48-51) [0]**	**49 (48-51) [0]**	**54 (50-58) [0]**	**54 (51-58) [0]**

Page 7-94, line 1:

Table 7-17. Change in Daily Average Water Temperatures ~~Compared to Spring-Time Temperature Objectives~~ Near the North Fork Trinity River Confluence Under the No Action Alternative and Alternative 2 Compared to the Trinity River ROD Temperature Objectives (contd.)

Summary of Differences	4/15 to 5/22 Difference in DAT Mean (Range)	4/15 to 5/22 Difference in Number of Exceedances	5/23 to 6/4 Difference in DAT Mean (Range)	5/23 to 6/4 Difference in Number of Exceedances	6/5 to 7/9 Difference in DAT Mean (Range)	6/5 to 7/9 Difference in Number of Exceedances
Flow Augmentation	0.2°F (0.5 to 0°F)	0	0.6°F (2.8 to -0.1°F)	+7	0.5°F (2.5 to 0°F)	+4
No Flow Augmentation	0°F (--)	0	0.1°F (0.2 to 0°F)	0	0°F (03 to -0.3°F)	0

Notes:

Averages are calculated for a 24-year period for the critical spring and early summer rearing and outmigration periods for Trinity River anadromous salmonids

Water temperature management objectives for the Trinity River from Lewiston Dam to Weitchpec for protection of anadromous salmon freshwater life stages are shown for each period.

Years in **bold** font indicate representative years modeled with augmentation of late-summer flows for Alternative 1

Key:

CD = critically dry water year
D = dry water year
DAT = daily average temperature
EW = extremely wet water year
N = normal water year
W = wet

Page 7-95, line 1:

Table 7-18. Change in Daily Average Water Temperatures ~~Compared to Spring-Time Temperature Objectives for Lewiston Dam to~~at Weitchpec Under the No Action Alternative and Alternative 2 Compared to Trinity River ROD Spring-Time Temperature Objectives

Year	Water Year Type	4/15 to 5/22 ≤ 55.4° for N, W, & EW ≤ 59°F for D & CD WYs Average; (Range); [# days]		5/23 to 6/4 ≤ 59°F for N, W, & EW ≤ 62.6°F for D, CD Average; (Range); [# days]		6/5 to 7/9 ≤ 62.6°F for N, W, & EW Average; (Range); [# days]	6/5 to 6/15 ≤ 62.6°F for D, CD
		No Action	Alternative 2	No Action	Alternative 2	No Action	Alternative 2
1980	W	55 (51-60) [24]	55 (51-60) [24]	52 (49-55) [0]	52 (49-56) [0]	61 (54-64) [10]	61 (55-64) [10]
1981	D	56 (52-60) [4]	56 (53-60) [4]	63 (58-66) [8]	64 (59-67) [9]	65 (62-67) [0]	66 (62-67) [0]
1982	EW	55 (47-58) [23]	55 (47-58) [23]	52 (50-54) [0]	52 (50-54) [0]	59 (51-63) [1]	59 (51-63) [1]
1983	EW	52 (47-61) [7]	52 (47-61) [7]	59 (57-61) [8]	59 (57-61) [8]	61 (58-64) [3]	61 (57-64) [3]
1984	W	53 (50-59) [4]	53 (50-59) [4]	56 (53-59) [0]	57 (53-59) [1]	63 (55-68) [24]	63 (55-68) [24]
1985	D	56 (51-62) [4]	56 (51-63) [6]	60 (57-62) [0]	61 (57-64) [5]	67 (61-72) [5]	68 (61-72) [5]
1986	W	53 (50-58) [7]	53 (50-58) [7]	57 (51-61) [4]	57 (51-62) [5]	63 (60-65) [20]	63 (60-65) [20]
1987	D	59 (53-64) [18]	60 (53-64) [19]	61 (57-67) [3]	61 (58-67) [3]	68 (66-70) [4]	69 (67-71) [6]
1988	D	55 (49-62) [3]	56 (49-63) [3]	60 (57-64) [2]	61 (57-64) [5]	58 (55-66) [0]	59 (55-65) [0]
1989	N	57 (52-64) [19]	57 (52-64) [19]	57 (52-63) [3]	57 (52-63) [3]	64 (58-66) [30]	64 (58-66) [32]
1990	D	57 (53-62) [9]	57 (53-62) [9]	54 (53-58) [0]	54 (53-58) [0]	64 (58-65) [0]	64 (58-66) [0]
1991	CD	56 (52-60) [1]	56 (52-61) [1]	61 (58-63) [2]	62 (60-64) [3]	67 (63-69) [4]	69 (64-71) [7]
1992	D	58 (56-62) [10]	59 (56-62) [17]	65 (60-70) [12]	66 (61-70) [12]	67 (60-70) [7]	68 (61-71) [7]
1993	W	54 (51-57) [10]	54 (51-57) [10]	55 (54-57) [0]	55 (54-57) [0]	63 (54-66) [23]	63 (54-66) [23]
1994	CD	59 (53-65) [18]	60 (53-65) [19]	65 (61-66) [12]	67 (62-69) [12]	66 (62-70) [4]	69 (64-72) [7]
1995	EW	53 (47-58) [5]	53 (47-58) [5]	54 (53-55) [0]	54 (53-55) [0]	59 (53-67) [14]	59 (53-67) [14]
1996	W	54 (49-59) [14]	54 (49-59) [14]	55 (52-60) [1]	55 (52-60) [1]	63 (59-67) [20]	63 (59-67) [20]
1997	W	57 (52-62) [28]	57 (52-62) [28]	54 (51-59) [1]	55 (51-59) [1]	62 (57-65) [16]	62 (58-65) [16]
1998	EW	55 (47-60) [18]	55 (47-60) [18]	51 (47-57) [0]	51 (47-57) [0]	61 (57-65) [5]	61 (57-65) [6]
1999	W	54 (49-60) [10]	54 (49-60) [10]	58 (55-59) [2]	58 (56-59) [3]	62 (55-66) [20]	62 (55-66) [23]
2000	W	54 (50-57) [8]	54 (50-57) [8]	57 (55-58) [0]	57 (55-58) [0]	63 (58-67)[20]	63 (58-67) [20]
2001	D	58 (52-65) [13]	58 (52-66) [15]	65 (63-67) [13]	66 (64-68) [13]	65 (63-68) [0]	66 (64-69) [0]
2002	N	54 (51-60) [12]	54 (51-60) [12]	59 (54-62) [6]	59 (54-63) [6]	64 (61-66) [30]	64 (61-66) [32]
2003	EW	52 (48-55) [0]	52 (48-55) [0]	54 (52-56) [0]	54 (52-56) [0]	60 (55-65) [12]	60 (56-65) [13]

Page 7-96, line 1:

Table 7-18. Change in Daily Average Water Temperatures ~~Compared to Spring-Time Temperature Objectives for Lewiston Dam to~~at Weitchpec under the No Action Alternative and Alternative 2 Compared to Trinity River ROD Spring-Time Temperature Objectives (contd.)

Summary of Differences	4/15 to 5/22		5/23 to 6/4		6/5 to 7/9	
	Difference in DAT Mean (Range)	**Difference in Number of Exceedances**	**Difference in DAT Mean (Range)**	**Difference in Number of Exceedances**	**Difference in DAT Mean (Range)**	**Difference in Number of Exceedances**
Flow Augmentation	0.2°F (0.5 to 0°F)	+13	0.5°F (2.2 to 0°F)	+10	0.5°F (2.4 to 0°F)	+13
No Flow Augmentation	0°F (--)	0	0.1°F (0.2 to 0°F)	+2	0.1°F (0.2 to -0.2°F)	+4

Notes:

Averages are calculated for a 24-year period for the critical spring and early summer rearing and outmigration periods for Trinity River anadromous salmonids

Water temperature management objectives for the Trinity River from Lewiston Dam to Weitchpec for protection of anadromous salmon freshwater life stages are shown for each period.

Years in **bold** font indicate representative years modeled with augmentation of late-summer flows for Alternative ~~1~~ 2

Key:

CD = critically dry water year
D = dry water year
DAT = daily average temperature
EW = extremely wet water year
N = normal water year
W = wet

Page 7-104, line 1:

Table 7-24. Juvenile Chinook Salmon Production Based on SALMOD Results for Alternative 2

Water Year Type	No Action Alternative (Average Production)	Alternative 2 (Difference from No Action)	Alternative 2 (Percent Change)
Fall-Run Chinook Salmon			
Critical	13,058,552	-309,976	-2.4
Dry	29,967,217	6,406	0.0
Below Normal	30,112,903	5,401	0.0
Above Normal	30,324,698	-10,254	0.0
Wet	29,159,993	-3,425	0.0
All Water Years	27,275,865	-46,226	-0.2
Late Fall-Run Chinook Salmon			
Critical	5,245,425	-17,793	-0.3
Dry	5,648,977	-31,007	-0.5
Below Normal	5,787,938	-3,483	-0.1
Above Normal	5,929,655	-20,597	-0.3
Wet	5,868,372	1,558	0.0
All Water Years	5,720,957	-13,095	-0.2
Winter-Run Chinook Salmon			
Critical	2,382,579	19,855	0.8
Dry	3,327,324	-2,652	-0.1
Below Normal	3,250,781	-461	0.0
Above Normal	3,149,290	9,195	0.3
Wet	3,139,415	-396	0.0
All Water Years	3,090,275	3,459	-0.1
Spring-Run Chinook Salmon			
Critical	68,168	-83	-0.1
Dry	416,959	1,040	0.2
Below Normal	447,950	-1,818	-0.4
Above Normal	465,691	-453	-0.1
Wet	467,027	-605	-0.1
All Water Years	392,786	-264	-0.1

Note:

Spring-run Chinook Salmon starting population designated in SALMOD was 489 individuals, however, confidence in results are reduced when spawning populations are less than 500. SALMOD is the only model currently available that evaluates all four runs of Chinook Salmon.

Page 7-107, line 18:

Table 7-26. Comparison of Action Alternatives to No Action Alternative (contd.)

Alternative	Potential Change	Consideration for Mitigation Measures
Alternative 1 (contd.)	***Lower Klamath River*** Coho Salmon, Spring-run and Fall-run Chinook Salmon, Steelhead, Pacific Lamprey The risk of Ich infection epizootic events, and fish die-offs would be reduced compared to the No Action Alternative through increased habitat area, increased water velocities, improved migration cues, and a decrease in frequency of water temperatures exceeding 73.4°F.	None needed
	Eulachon Effects to flows in the lower Klamath River and Estuary would be similar between Alternative 1 and the No Action Alternative.	None needed
	Central Valley and Bay-Delta Region	
	Chinook Salmon and Steelhead SALMOD results indicate some critical years may result in decreased production of Chinook compared with the No Action Alternative. Overall averages show similar production levels (less than 3%) for all runs of Chinook Salmon (and through similar life stages, steelhead), except for fall-run Chinook which experience a higher potential mortality rate in critical water years, averaging 6% reduced survival and spring-run, which experience a greater than 5% increase in survival in critical water years.	Reclamation will consult with fisheries agencies consistent with the 2009 NMFS BO RPAs and coordinate with resource agencies
	IOS results indicate winter-run Chinook Salmon would experience reduced survival during several critical water years, resulting in a less than 1% average reduction in spawning escapement, a 9% reduction in fry-to-smolt survival and 5% reduction in smolt production under Alternative 1. However, the average overall affects to winter-run Chinook salmon are similar, with a less than 1% reduction in spawning escapement to the No Action Alternative.	Reclamation will consult with fisheries agencies consistent with the 2009 NMFS BO RPAs and coordinate with resource agencies
	Water temperatures would be generally similar at compliance locations in the upper Sacramento River under Alternative 1 compared to the No Action Alternative except in some critical water years in the Sacramento River below Clear Creek, Balls Ferry, and Jellys Ferry. Water temperature thresholds for spawning and incubation in the Sacramento River would be met similarly between the Alternative 1 and the No Action Alternative, with differences of less than, or equal to, 1%. The number of times the temperature thresholds are exceeded increases as the water flows downstream, but the changes in exceedence between the No Action Alternative and Alternative 1 remain generally similar (less than 1%). The WUA in the Sacramento, Feather and American Rivers and Clear Creek for Chinook Salmon and steelhead spawning, fry rearing, and juvenile rearing would be generally similar (less than 1% change) for suitable habitat to the No Action Alternative. The Delta hydrodynamics (outflow, X2, OMR reverse flows) would be generally similar between Alternative 1 and the No Action Alternative. This would result in similar levels of entrainment between the No Action Alternative and Alternative 1.	None needed

Table 7-26. Comparison of Action Alternatives to No Action Alternative (contd.)

Alternative	Potential Change	Consideration for Mitigation Measures
Alternative 1 (contd.)	Green Sturgeon Water temperatures would be generally similar at compliance locations in the upper Sacramento River under Alternative 1 compared to the No Action Alternative. Water temperature thresholds for Green Sturgeon in the Sacramento River would be met similarly between Alternative 1 and the No Action Alternative, with differences of less than or equal to 1%. The number of times the temperature thresholds are exceeded increases as the water flows downstream, but the changes in exceedence between the No Action Alternative and Alternative 1 remain generally similar (less than 1% difference). The Delta hydrodynamics would be generally similar between Alternative 1 and the No Action Alternative. This would result in similar levels of entrainment of Green Sturgeon between the No Action Alternative and Alternative 1.	None needed
	Delta Smelt and Longfin Smelt The Delta hydrodynamics would be generally similar between Alternative 1 and the No Action Alternative. This would result in similar levels of entrainment of Delta Smelt between the No Action Alternative and Alternative 1.	None needed
	Reservoir Fishes There would be similar reservoir fish habitat conditions (less than 1% change) for cold water fishes from a change in storage in Whiskeytown Lake, Shasta Lake, Oroville Lake and Folsom Lake. Black bass nesting success would be similar (less than 1% difference) between Alternative 1 and the No Action Alternative in Whiskeytown Lake, Shasta Lake, Oroville Lake and Folsom Lake.	None needed
Alternative 2	**Klamath and Trinity River Region**	
	Trinity River Coho Salmon, Spring-run Chinook Salmon, Fall-run Chinook Salmon, and Steelhead *Pulse Flows: Coho Salmon, Spring-run Chinook Salmon, Steelhead* Late-summer preventive and emergency pulse flows may be high enough to overtop berms along the river channel, potentially increasing risk of stranding juvenile salmon upon reduction of the pulse flows back to the baseflow. Gradual ramping rates are intended to minimize this risk. *Late Summer Augmentation: Spring-run Chinook Salmon* Late-summer augmentation release operations could interrupt or dewater redds of spring-run Chinook Salmon, which may begin spawning in early- to mid-September, before releases are returned to baseflow.	None needed

Table 7-26. Comparison of Action Alternatives to No Action Alternative (contd.)

Alternative	**Potential Change**	**Consideration for Mitigation Measures**
Alternative 2 (contd.)	Coho Salmon, Spring-run Chinook Salmon, Fall-run Chinook Salmon, and Steelhead *Fall Temperature Objectives: Coho Salmon, Spring-run Chinook Salmon, Fall-run Chinook Salmon, Steelhead* Water temperatures meet the temperature objectives in a similar pattern as the No Action Alternative, with the difference in the number of days exceeding the objectives at less than 2%. Spawning and adult migration would not be affected by changes in fall temperatures under Alternative 2. *Spring Temperature Objectives: Coho Salmon, Spring-run Chinook Salmon, Fall-run Chinook Salmon, Steelhead* Water temperatures in the spring/early-summer (May-June) meet the temperature objectives at all locations in a similar pattern as the No Action Alternative, with the difference in the number of days exceeding the objectives at less than 5%. ~~Juvenile rearing and outmigration would not be affected by changes in the spring water temperatures under Alternative 2.~~ Suitable and marginally-suitable thermal conditions for juvenile rearing and outmigration would be of shorter duration under Alternative 2, especially in dry and critically dry years. Maximum differences between Alternative 2 and the No Action Alternative during periods when exceedances occur could be up to 3°F at the North Fork Trinity confluence and about 2°F at Weitchpec. *Alluvial Bar Habitat in the Spring: Coho Salmon, Spring-run Chinook Salmon, Fall-run Chinook Salmon, Steelhead* Habitat availability high up on alluvial bars used by fry and juvenile salmonids for rearing would be similar to the No Action Alternative, except for about two weeks during May and June in critically dry years. Low recession rates would remain gradual enough to allow for fish to move from side-channels and off-channel areas into the main river channel as flow decline. *July to Mid-September Temperature Objectives: Spring-run Chinook Salmon* Water temperatures between July and mid-September meet the temperature objectives at all locations in a similar pattern as the No Action Alternative, with the difference in the number of days exceeding the objectives less than 1% of the time. Adult holding would not be affected by changes in the spring water temperatures under Alternative 2.	None needed

Table 7-26. Comparison of Action Alternatives to No Action Alternative (contd.)

Alternative	Potential Change	Consideration for Mitigation Measures
Alternative 2 (contd.)	*Late Summer Flow Release: Coho Salmon, Steelhead* Additional Lewiston Dam late-summer flow releases, which will extend cooler water temperatures to the confluence, are expected to provide suitable water temperatures for rearing juveniles	None needed
	Pacific Lamprey Increased late-summer augmentation flows may cause increased water velocities and disturbance of fine sediments along the summer baseflow channel where lamprey ammocoetes are living. Because the range of augmentation flows would be within the typical range of annual fluctuations in the upper Trinity River, which lampreys experience over their freshwater juvenile life stage, it is expected that juvenile lampreys will redistribute to other areas of suitable habitat over the course of the augmentation flow cycle, if disturbed by higher water velocities.	None needed
	Reservoir Fishes Black bass nesting success is slightly higher under Alternative 2 compared to the No Action Alternative.	None needed
	Lower Klamath River Coho Salmon, Spring-run and Fall-run Chinook Salmon, Steelhead, Pacific Lamprey The risk of Ich infection, epizootic events, and fish die-offs would be reduced compared to the No Action Alternative through increased habitat area, increased water velocities, improved migration cues, and a decrease in frequency of water temperatures exceeding 73.4°F.	None needed
	Eulachon Affects to flows in the lower Klamath River and Estuary would be similar between Alternative 2 and the No Action Alternative.	None needed
	Central Valley and Bay-Delta Region	
	Chinook Salmon and Steelhead SALMOD results indicate some critical years may result in decreased production of Chinook Salmon compared with the No Action Alternative, however, the overall averages show similar production levels (less than 3% reduction) for all four runs of Chinook Salmon (and through similar life stages, steelhead). IOS results indicate winter-run Chinook Salmon would experience reduced survival during several critical water years, but the overall spawning escapement in critical water years would increase by about 2%. The average overall affects to winter-run Chinook salmon are similar with a less than 1% reduction in spawning escapement to the No Action Alternative.	None needed

Table 7-26. Comparison of Action Alternatives to No Action Alternative (contd.)

Alternative	Potential Change	Consideration for Mitigation Measures
Alternative 2 (contd.)	Water temperatures would be generally similar at compliance locations in the upper Sacramento River under Alternative 2 compared to the No Action Alternative. Water temperature thresholds for spawning and incubation in the Sacramento River would be met similarly between the Alternative 2 and the No Action Alternative, with differences of less than or equal to 1%. The number of times the temperature thresholds are exceeded increases as the water flows downstream, but the changes in exceedence between the No Action Alternative and Alternative 2 remain generally similar (less than 1% difference). The WUA in the Sacramento, Feather and American Rivers and Clear Creek for Chinook Salmon and steelhead spawning, fry rearing, and juvenile would be generally similar (less than 1% change) for suitable habitat to the No Action Alternative. The Delta hydrodynamics would be generally similar between Alternative 2 and the No Action Alternative. This would result in similar levels of entrainment between the No Action Alternative and Alternative 2.	
	<u>Green Sturgeon</u> Water temperatures would be generally similar (less than 0.5ºF) at compliance locations in the upper Sacramento River under Alternative 2 compared to the No Action Alternative. Water temperature thresholds for Green Sturgeon in the Sacramento River would be met similarly between Alternative 2 and the No Action Alternative, with differences of less than, or equal to, 1%. The number of times the temperature thresholds are exceeded increases as the water flows downstream, but the changes in exceedence between the No Action Alternative and Alternative 2 remain generally similar (less than 1% difference). The Delta hydrodynamics (outflow, X2, OMR reverse flows) would be generally similar between Alternative 2 and the No Action Alternative. This would result in similar levels of entrainment of Green Sturgeon between the No Action Alternative and Alternative 2.	None needed
	<u>Delta Smelt and Longfin Smelt</u> The Delta hydrodynamics (outflow, X2, OMR reverse flows) would be generally similar between Alternative 2 and the No Action Alternative. This would result in similar levels of entrainment of Delta Smelt between the No Action Alternative and Alternative 2.	None needed
	<u>Reservoir Fishes</u> There would be similar reservoir fish habitat conditions (less than 1% change) for cold water fishes from a change in storage in Whiskeytown Lake, Shasta Lake, Oroville Lake and Folsom Lake between Alternative 2 and the No Action Alternative.	None needed

Key:
°F = degrees Fahrenheit
% = percent
cfs = cubic feet per second
OMR = Old and Middle River

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Chapter 8, "Biological Resources – Terrestrial"

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Chapter 9, "Hydropower Generation"

Page 9-1, line 21:

Hydropower is an important source of renewable energy, and supplies between 11 and 28 percent of California's electricity, depending upon the water-year type (HWG 2014). Between 1982 and 2012, approximately 33,927 gigawatt-hours (GWh) were generated annually, on average, in California by hydropower, including approximately 4,810 GWh on average generated by the CVP (HWG 2014). Power generated by the CVP is transmitted by Western Area Power Administration (Western) to CVP facilities. Power that exceeds CVP needs is marketed by Western to electric utilities, government and public installations, and commercial "preference" customers who have 20-year contracts (Reclamation 2013a). Power generated by the SWP is transmitted by Pacific Gas and Electric Company, Southern California Edison, and California Independent System Operator through other facilities (DWR 2013a, 2013b). The SWP also markets energy in excess of the SWP demands to utility companies and members of the Western Systems Power Pool.

Page 9-3, line 2:

The CVP power facilities include 11 hydroelectric powerplants, and have a total maximum-generating capacity of 2,053 megawatts (MW), as presented in Table 9-1. Hydrology can vary significantly from year to year, which then affects the hydropower production. Typically, in an average water year, approximately 4,500 GWh of energy is produced by CVP power facilities (Reclamation 2013a). Major factors that influence powerplant operations include required downstream water releases, electric system needs, and project-use demand. The power generated from CVP powerplants is dedicated to first meeting the requirements of the CVP facilities. The remaining energy is marketed by Western to preferred customers in northern California.

Page 9-4, line 1:

Sacramento River Powerplants The Shasta Powerplant is a peaking powerplant located downstream from Shasta Dam along the Sacramento River (Reclamation 2013a, 2016d). Until the early 1990s, concerns with downstream temperatures resulted in the bypasses of outflows around the powerplant, and lost hydropower generation. Installation of the Shasta Temperature Control Device enabled operators to decide the depth of the reservoir from which the water feeding into the penstocks originates. The system has shown significant success in controlling the water temperature of powerplant releases through Shasta Dam. The Shasta Powerplant also provides water supply for the Livingston Stone National Fish Hatchery.

Page 9-7, line 10:

Table 9-3. Hydropower Generation and Energy Use by the CVP

Calendar Year	Water Year Type[1]	Net CVP Hydropower Generation (Gigawatt-hours)	Energy Used CVP Facilities (Gigawatt-hours)
2000	AN	5,701 ~~5,667~~	--
2001	D	4,169 ~~4,107~~	957
2002	D	4,378 ~~4,322~~	1,090
2003	AN	~~5,483~~ 5,484	1,170
2004	BN	~~5,186~~ 5,187	1,172
2005	AN	4,599	1,150
2006	W	7,285 ~~7,284~~	1,037
2007	D	4,276	1,064
2008	C	3,673 ~~3,659~~	923
2009	D	3,392 ~~3,560~~	803
2010	BN	4,118 ~~3,624~~	1,001
2011	W	5,629 ~~5,469~~	1,276
2012	BN	4,423 ~~4,849~~	990
2013	D	4,314	--
2014	C	2,751	--
2015	C	2,471	--
2016[2]	BN	3,327	--

Source: Reclamation 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013b, 2014, 2015a, 2015b, 2016l

~~Note~~ Notes:

[1] Water Year Type based on Sacramento Valley 40-30-30 Index, as described in Chapter 4, "Surface Water Supply and Management"

[2] Data available through 12/9/2016

Key:
AN = Above Normal
BN = Below Normal
C = Critically Dry
CVP = Central Valley Project
D = Dry
W = Wet

Page 9-18, line 7:

Reclamation (U.S. Department of the Interior, Bureau of Reclamation). 2000. Mid-Pacific Region, Central Valley Project Annual Power System Generation Summary.

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____. 2013b. Mid-Pacific Region, Central Valley Project Annual Power System Generation Summary.

____. 2014. Mid-Pacific Region, Central Valley Project Annual Power System Generation Summary.

____. 2015a. Coordinated Long-Term Operation of the Central Valley Project and State Water Project, Final Environmental Impact Statement. November. Chapter 8 (p. 8-8).

____. 2015b. Mid-Pacific Region, Central Valley Project Annual Power System Generation Summary.

Page 9-20, line 1:

____. 2016l. Mid-Pacific Region, Central Valley Project Annual Power System Generation Summary.

Chapter 10, "Air Quality, Greenhouse Gas Emissions, and Global Climate Change"

Page 10-3, line 10:

California Assembly Bill 32, Global Warning Solutions Act of 2006 and Senate Bill 32

Page 10-3, line 20:

AB 32 ~~establishes~~ established the California cap-and-trade program which included a mass emissions threshold of 25,000 metric tons (MT) of carbon dioxide equivalent (CO_2e) per year for mandatory emissions reporting and participation in the cap-and-trade regulatory program for covered entities in California.

Page 10-3, line N/A: (new sentence after line 22)

On September 8, 2016, Senate Bill 32 was passed, requiring that statewide GHG emissions be reduced to 40 percent below the 1990 levels by 2030.

Page 10-3, line 24:

RPS was established in 2002, under Senate Bill (SB) 1078. The RPS has since been accelerated in 2006, under SB 107, and expanded in 2011, under SB 2. The California Public Utilities Commission (CPUC) and the California Energy Commission jointly implement the RPS program. The RPS program requires investor-owned utilities, electricity providers, and community-choice aggregators to increase procurement from eligible renewable energy resources to 33 percent of total procurement by 2020 (CPUC 2016). Further, in October 2015, SB 350 was signed, which increased the 2020 RPS target to 50 percent by 2030.

Page 10-3, line 30:

A hydroelectric generation facility of over 30 megawatts (MW) would not be considered an eligible renewable energy resource under SB 1078. Nearly all CVP and SWP facilities discussed in this analysis produce over 30 MW per year and; thus, would not be considered renewable energy resources in the context of compliance with RPS targets (i.e., 2020 and 2030).

Page 10-3, line 35:

On December 11, 2008, pursuant to AB 32, ARB adopted the Climate Change Scoping Plan which was updated in 2014. This plan outlines how emissions reductions would be achieved from significant sources of GHGs via regulations, market mechanisms, and other actions. Various key elements, outlined in the plan, are identified to achieve emissions reduction targets. Of these, achieving a statewide renewable energy mix of 33 percent through implementation of RPS was identified. In addition, the 2014 Scoping Plan accounted for reductions in GHG emissions associated with decreasing the cap established by the cap-and-trade program. Stationary sources not subject to cap-and-trade would not conflict with the Scoping Plan goals.

Page 10-3, line 40:

Further, this plan also recommended 39 measures that were developed to reduce GHG emissions from key sources and activities while improving public health, promoting a cleaner environment, preserving our natural resources, and ensuring that the impacts of the reductions are equitable and do not disproportionately impact low-income and minority communities. These measures also put the State on a path to meet the long-term 2050 goal of reducing California's GHG emissions to 80 percent below 1990 levels. ARB is currently working on an update to this plan. However, at this time the 2014 Scoping Plan and established annual limit of 25,000 MT CO_2e per year under the cap-and-trade program are the applicable regulations that pertain to this analysis.

Page 10-18, line 18:

____. 2014. Climate Change 2014 Synthesis Report: Approved Summary for Policymakers. November. (pp. 10 to 13).

Page 10-18, line 24:

____. 2016b. SECURE Water Act Section 9503(c) – Reclamation Climate Change and Water. March. Chapter 5 and Chapter 8.

Chapter 11, "Agricultural Resources"

Page 11-2, line 3:

Central Valley agriculture is highly productive due to favorable climate, adequate supplies of good quality irrigation water, and deep, fertile soils. Most of the Central Valley receives rainfall in the late fall through the winter months. Very little of the annual rainfall occurs during the peak agricultural irrigation season, which extends from early spring through fall. The seasonality of rainfall in the Central Valley is important for agricultural resources, as the timing of precipitation does not reliably support dryland (non-irrigated) farming. Lower value over-winter, non-irrigated crops (e.g., winter wheat) can be grown economically in many years, but higher value row crops and permanent crops require substantial supplemental irrigation ~~(DWR 2009)~~. Irrigation water provided by the CVP and SWP, local surface water, and groundwater have transformed lands in the Central Valley into some of the most productive and diverse agricultural lands in the United States (Reclamation 2015).

Page 11-15, line 2:

~~DWR (California Department of Water Resources). 2009. California Water Plan, Update 2009, Integrated Water Management. December.~~

Page 11-15, line 4:

Reclamation (U.S. Department of the Interior, Bureau of Reclamation). 2015. Coordinated Long-Term Operation of the Central Valley Project and State Water Project, Final Environmental Impact Statement. November. Chapter 12 (p.12-2 and 12-16).

Chapter 12, "Socioeconomics"

Page 12-23, line 9:

California Coastal Trail. ~~2014~~ 2016. Welcome to California Coastal Trail.info. Site accessed September 22, 2016. http://www.californiacoastaltrail.info/cms/pages/main/index.html.

Page 12-23, line 14:

DOI and DFG (Department of the Interior and California Department of Fish and Game [now known as Department of Fish and Wildlife]). 2012. Klamath Facilities Removal Final Environmental Impact Statement/Environmental Impact Report. December. Chapter 3 (pp. 3.20-23 to 3.20-25).

Page 12-23, line 17:

EDD (California Employment Development Department). 2016a. Local Area Profile - Trinity County Profile. Site accessed December 28, 2016. ~~September 22, 2016a.~~ http://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/localAreaProfileQSResults.asp?selectedarea=Trinity+County&selectedindex=53&menuChoice=localAreaPro&state=true&geogArea=0604000105&countyName=. ~~http://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/localAreaProfileQSResults.asp?selectedarea=&selectedindex=&menuChoice=&state=true&geogArea=0604000105&co1untyName=~~

Page 12-24, line 3:

EDD (California Employment Development Department). 2016b. Del Norte County Profile. Site accessed December 28, 2016 ~~September 22, 2016b.~~ ~~http://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/localAreaProfileQSResults.asp?selectedarea=Del+Norte+County&selectedindex=8&menuChoice=localareapro~~ http://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/localAreaProfileQSResults.asp?selectedarea=Del+Norte+County&selectedindex=8&menuChoice=localAreaPro&state=true&geogArea=0604000015&countyName=.

Chapter 13, "Indian Trust Assets"

Page 13-2, Line 5:

Multiple court rulings have established the important "Indian purpose" for the Hoopa Valley Indian Reservation and Yurok Indian Reservation. In addition, the Yurok Indian Reservation is to reserve tribal rights to harvest fish from the Klamath and Trinity Rivers. The Hoopa Valley Indian Reservation is located on the Trinity River. The Yurok Indian Reservation is on the Klamath River, extending from two miles upstream of the ~~at its~~ confluence with the Trinity River to the Pacific Ocean. Numerous and varied trust assets exist in the vicinity of the action alternatives, including fish, riparian plants, and wildlife. While the Hoopa and Yurok Tribes are described here, there are also others within the region including, but not limited to, the Karuk and Klamath tribes, Resighini Rancheria, and Quartz Valley Indian Tribe, as shown in Figure 13-1.

Page 13-14, Line 9:

U.S. Department of the Interior and California Department of Fish and Game. 2012. Klamath Facilities Removal Final Environmental Impact Statement/Environmental Impact Report. December. Chapter 3, Section 3.12.

Page 13-14, line 17:

USFWS (U.S. Department of the Interior, U.S. Fish and Wildlife Service), Reclamation (U.S. Department of the Interior, Bureau of Reclamation), Hoopa Valley Tribe, and Trinity County). 2000. Trinity River Mainstem Fishery Restoration Environmental Impact Statement/Report. October. Chapter 3, Section 3.6.

Chapter 14, "Environmental Justice"

No corrections or clarifications have been made to the Draft EIS text for Chapter 14, "Environmental Justice."

Chapter 15, "Consultation, Coordination and Compliance"

No corrections or clarifications have been made to the Draft EIS text for Chapter 15, "Consultation, Coordination and Compliance."

Chapter 16, "Distribution of Draft EIS"

No corrections or clarifications have been made to the Draft EIS text for Chapter 16, "Distribution of Draft EIS."

Chapter 17, "List of Preparers"

No corrections or clarifications have been made to the Draft EIS text for Chapter 17, "List of Preparers."

Chapter 18, "Index"

No corrections or clarifications have been made to the Draft EIS text for Chapter 18, "Index."

Glossary Appendix

Page 12:

temperature stratification	Also known as thermal stratification. The physical thermodynamic process that occurs in lakes, whereby vertical temperature gradients (stratification) of water layers with differing temperatures, setting up seasonally in response to the solar heating of surface waters and the limited mixing of surface and deep-water layers that are affected by differences in temperature-dependent water densities.

Analytical Tools Technical Appendix

Page 1-6, line 5:

IPCC (Intergovernmental Panel on Climate Change). 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Edited by S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Averyt, M. Tignor, and H. L. Miller. Cambridge University Press, Cambridge, United Kingdom, and New York, NY, USA. ~~996 pp.~~ Chapters 3-5.

Page 2-21, line 15:

Table 2-5. Ich Monitoring Results for Years When Flow Augmentation Actions Occurred (or Would Have Occurred Under the Action Alternatives)

Augmentation Year	Ich Counts[d]	Preventive Pulse Triggered (Y/N)	Data Source
2002[a]	Likely	Y	Guillen (2003); DFG (2004 ~~2003~~); YTFP (2004)
2003	Counts > 50 observed; weekly average as high as 24/gill arch	Y	Foott (2003)
2004[b]	0[b]	N	YTFP (2005)
2007	0	N	YTFP (2008)
2008	0	N	YTFP (2009)
2009	0	N	YTFP (2010)
2012	0	N	YTFP (2013)
2013	0	N	YTFP (2014)
2014	Counts > 600 observed	Y	YTFP (2015)
2015[c]	Average counts > 20 week of Aug 17. Max counts > 600	Y	YTFP (In progress); CDFW 2016
Events		4	
Sample size		10	
Frequency (%)		40	

Notes:
[a] Assumption made that Ich counts would have met the criterion.
[b] 2004 monitoring mentioned in a Yurok Tribe report on 2005 monitoring, but full 2004 results not reported.
[c] The first year that a preventive pulse flow was formally implemented.
[d] Counts are qualified by criteria as defined by Reclamation (2015b), where low level infection (less than 30 Ich trophonts per gill arch) occur in the first two weeks of September on three adult salmon in one day.
Key: % = percent
CDFW = California Department of Fish and Wildlife (formerly California Department of Fish and Game)
DFG = California Department of Fish and Game
YTFP = Yurok Tribe Fisheries Program

Page 2-29, line 2:

DFG (California Department of Fish and Game). 2004 ~~2003~~. September 2002 Klamath River Fish- Kill: Final Analysis of Contributing Factors and Impacts. CDFG Northern California-North Coast Region. July.

Page 2-29, line 8:

DWR (California Department of Water Resources), Bureau of Reclamation, U.S. Fish and Wildlife Service, and National Marine Fisheries Service. 2013. Environmental Impact Report/Environmental Impact Statement for the Bay Delta Conservation Plan. Draft. December. Chapter 5, Appendix 3D and Appendix 5A, Sections A, B and D.

Page 2-29, line 33:

____. 2015a. Coordinated Long-Term Operation of the Central Valley Project and State Water Project Final Environmental Impact Statement. Appendix 5A Section A ~~Calsim II and DSM2 Modeling~~ and Appendix 5A Section B.

Page 2-30, line 18:

USFWS et al. (U.S. Fish and Wildlife Service, U.S. Department of the Interior, Bureau of Reclamation, Hoopa Valley Tribe, and Trinity County). 2000. Trinity River Mainstem Fishery Restoration Environmental Impact Statement / Environmental Impact Report. Final – Executive Summary, Chapter 1, Chapter 2 and Appendix C. Draft – Chapter 2 (pp. 2-1 to 2-31).

Page 3-10, line 14:

Reclamation (U.S. Department of the Interior, Bureau of Reclamation). 2015. Coordinated Long-Term Operation of the Central Valley Project and State Water Project Final Environmental Impact Statement. Appendix 5A Section A ~~Calsim II and DSM2 Modeling~~, Appendix 5A Section B, Appendix 6B Section A and Appendix 6B Section C.

Page 4-5, line 28:

Reclamation (U.S. Department of the Interior, Bureau of Reclamation). 2014. Shasta Lake Water Resources Investigation Final Environmental Impact Statement. December. Chapter 11 (pp. 11-50 to 11-64) and Modeling Appendix Chapter 5.

Page 6-1, line 25:

DSM2 v8.0.6 was used in modeling of all alternatives in this EIS using a period of simulation consistent with the CalSim II model - water years 1922 to 2003. The model was modified to include the 2030 level of climate change by incorporating the 15-cm sea level rise consistent with the 2030 level climate change assumption (Reclamation 2015). This is also consistent with the delta salinity ANN used in the CalSim II model for inclusion of in-Delta response to operational and stream flow changes of the alternatives.

Page 6-2, line 23:

Reclamation (U.S. Department of the Interior, Bureau of Reclamation). 2015. Coordinated Long-Term Operation of the Central Valley Project and State Water Project Final Environmental Impact Statement. Appendix 5A Section A and Appendix 5A Section B.

Page 7-4, line 7:

This section is a non-technical overview of the underlying assumptions and inputs of the SWAP model. It is important to note that SWAP, like any model, is a representation of a complex system and requires assumptions and simplifications to be made. All analyses using SWAP should be explicit about the assumptions and provide sensitivity analysis where appropriate.

More detailed assumptions regarding calibration using mathematical programming, crop demand functions, water supply and groundwater pumping, ~~and more~~ see Reclamation 2012 and Reclamation 2015.

Page 7-13, line 29:

Reclamation (U.S. Department of the Interior, Bureau of Reclamation). 2015. Coordinated Long-Term Operation of the Central Valley Project and State Water Project Final Environmental Impact Statement. Appendix 12A.

Reclamation and USFWS (U.S. Department of the Interior, Bureau of Reclamation and U.S. Fish and Wildlife Service). 1999. *Central Valley Project Improvement Act Programmatic Environmental Impact Statement*. Draft CVPM M/M. Chapter 1.

Attachment 1 – Selection of Analytical Tools Analytical Tools Technical Appendix

Page 14, line 9:

____. 2010. Los Vaqueros Reservoir Expansion Environmental Impact Statement/Environmental Impact Report. March. (p. 4.2-31).

Page 14, line 11:

____. 2014a. Upper San Joaquin River Basin Storage Investigation Environmental Impact Statement. August. Modeling Appendix Chapter 2.

Page 14, line 13:

____. 2014b. Shasta Lake Water Resources Investigation Final Environmental Impact Statement. December. Modeling Appendix Chapter 2, Chapter 5, Chapter 6 and Chapter 7.

Page 14, line 15:

____. 2015. Coordinated Long-Term Operation of the Central Valley Project and State Water Project Final Environmental Impact Statement. November. Appendix 5A Section A, Appendix 6B Section A, Appendix 8A, Appendix 9D, Appendix 9H and Appendix 12A.

Page 14, line 17:

Reclamation and DWR (U.S. Department of the Interior, Bureau of Reclamation and California Department of Water Resources). 2012. San Joaquin River Restoration Program Final Program Environmental Impact Statement/Report. July. Final—Chapter 4. Draft – Modeling Appendix Chapter 2.

Biological Resources – Terrestrial Technical Appendix

No corrections or clarifications have been made to the Draft EIS text for the Biological Resources – Terrestrial Technical Appendix.

Cumulative Effects Technical Appendix

Page 2-4, line 11:

On April 6, 2016, the U.S. Department of the Interior, U.S. Department of Commerce, PacifiCorp, and the states of Oregon and California signed an agreement that, following a process administered by Federal Energy Regulatory Commission (FERC), is expected to remove the Four Facilities on the Klamath River by 2020. The amended dam removal agreement, which uses existing non-Federal funding and follows the same timeline as the original 2010 Klamath Hydroelectric Settlement Agreement, ~~will be~~ was filed with FERC for consideration under their established processes. Under the agreement, dam owner PacifiCorp will transfer its license to operate the Klamath River dams to a private company known as the Klamath River Renewal Corporation. This company will oversee the dam removal in 2020. PacifiCorp will continue to operate the dams until they are decommissioned.

Page 2-6, line 5:

DOI (U.S. Department of the Interior) and California Department of Fish and Game. 2012. Klamath Facilities Removal Final EIS/EIR. December. Chapter 2 and Chapter 3.

Page 2-6, line 7:

FERC (Federal Energy Regulatory Commission). 2007. Final Environmental Impact Statement for Hydropower License, Oroville Facilities, FERC Project No. 2100-052, California. Chapter 2, Chapter 3, Chapter 4 and Chapter 5.

Page 2-6, line 9:

____. 2014. Final Environmental Impact Statement for Hydropower License for Upper Drum-Spaulding Hydroelectric Project, No. 2310-193, Lower Drum Hydroelectric Project, Project No. 14531-000, Deer Creek Hydroelectric Project, Project No. 14530-000, and Yuba-Bear Hydroelectric Project, Project No. 2266-102. California. Chapter 2, Chapter 3, Chapter 4 and Chapter 5.

Page 2-6, line 13:

____. 2015. Final Environmental Impact Statement for Hydropower Licenses Merced River Hydroelectric Project, FERC Project No. 2179-043, and California Merced Falls Hydroelectric Project, FERC Project No. 2467-020, California. Chapter 2, Chapter 3, Chapter 4 and Chapter 5.

Statutory Authority Appendix

No corrections or clarifications have been made to the Draft EIS text for the Statutory Authority Appendix.

Chapter 5
Distribution List

Elected officials and representatives, government agencies, private organizations, businesses, and individual members of the public received a copy of this Final Environmental Impact Statement (EIS) or a notification of the document's availability. This section presents the distribution list for the Final EIS. The public distribution of this Final EIS emphasizes the use of electronic media to ensure cost-effective, broad availability to the public and interested parties. This Final EIS is available for viewing on the U.S. Department of the Interior, Bureau of Reclamation website at http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=22021.

Distribution List

Over 2,800 individuals, agencies, and organizations were informed by e-mail or mail of the availability of, and locations to obtain, the Final EIS.

Parties listed below received an electronic copy of this Final EIS.

Federal Agencies

- U.S. Department of Commerce, National Marine Fisheries Service
- U.S. Department of the Interior, Bureau of Indian Affairs
- U.S. Department of the Interior, Fish and Wildlife Service
- U.S. Environmental Protection Agency (eNEPA electronic filing system and Region IX[1])

State Agencies

- California Department of Fish and Wildlife
- State Water Resources Control Board

Regional and Local Entities

- Humboldt County
- San Luis & Delta-Mendota Water Authority

Tribal Interests

- Hoopa Valley Tribe

[1] As requested, the U.S. Environmental Protection Agency Region IX received a hard copy of the Final EIS.

- Karuk Tribe
- Klamath Tribes
- Yurok Tribe

Libraries

U.S. Department of the Interior, Bureau of Reclamation Library
2800 Cottage Way
Sacramento, California 95825

U.S. Department of the Interior, Bureau of Reclamation
Northern California Area Office
16349 Shasta Dam Boulevard
Shasta Lake, California 96019

Chiloquin Branch Library
104 South 1st Avenue
Chiloquin, Oregon 97624

Humboldt County Library
1313 3rd Street
Eureka, California 95501

Klamath County Library
126 South 3rd Street
Klamath Falls, Oregon 97601

Los Banos Public Library
1312 South 7th Street
Los Banos, California 93635

Shasta County Public Library
Redding Library
1100 Parkview Avenue
Redding, California 96001

Trinity County Library
351 Main Street
Weaverville, California 96093

Trinity River Restoration Program
1313 Main Street
Weaverville, California 96093