APPENDIX E
MODELING COMPARISONS

E.1 INTRODUCTION

Extensive modeling of Oroville Facilities operations were performed for the Preliminary Draft Environmental Assessment (PDEA) analyses. The PDEA determined that the implementation of the Proposed Action would result in an increase in the protection and enhancement over the Existing Conditions, and an overall benefit to the *Regional Water Quality Control Plan for the Sacramento and San Joaquin River Basins* (Basin Plan) beneficial uses and coldwater fisheries resources. The following analysis demonstrates that the CEQA Proposed Project is more protective and enhancing of water quality beneficial uses and coldwater fisheries resources than the PDEA Proposed Action. The California Environmental Quality Act Guidelines (State CEQA Guidelines) do not require detailed analysis of beneficial effects; therefore, the focus of this analysis is to establish that the CEQA Proposed Project is more protective, enhancing, and overall beneficial than the PDEA Proposed Action, which resulted in a beneficial effects determination.

The purpose of the modeling comparisons between project alternatives is to determine the similarities and differences between water temperatures in the Low Flow Channel (LFC), High Flow Channel (HFC), and Thermalito Afterbay associated with the Proposed Action evaluated in the PDEA accompanying the California Department of Water Resources' (DWR's) Federal Energy Regulatory Commission (FERC) license application (DWR 2005) and the Proposed Project evaluated in this CEQA environmental impact report (EIR). This appendix presents the results of the analyses of the water temperature effects, the project's ability to meet existing and future temperature objectives in the LFC and HFC, and the relative differences in coldwater beneficial use and coldwater fisheries benefits for each of the alternatives.

As part of the Settlement Agreement (SA), which is the CEQA Proposed Project, DWR performed a Reconnaissance Study of potential future facility modifications as described in SA Section B108 designed to study ways to provide colder water to the lower Feather River for greater protection and enhancement of beneficial uses. The Reconnaissance Study was completed in December 2006 and identified a number of conceptual actions that could be further studied for feasibility, individually or in combination with one another. Development of the Reconnaissance Study is part of DWR's compliance with the SA. Further development of design concepts for potential future facilities modifications is part of a long-term study process defined in the SA; the concepts developed within the December 2006 Reconnaissance Study reflect only the first step in the ongoing planning process, and therefore are too speculative to analyze in any depth at this time. As a result, the Reconnaissance Study descriptions and preliminary modeling conducted to support that study are not included or utilized for analysis within this draft CEQA EIR document. Instead, this document analyzes the potential future facilities modifications as they were specified and approved by the collaborative participants and signatories to the SA. Any facilities modifications measures recommended for potential implementation as a result of the Feasibility Study

that will be conducted subsequent to the Reconnaissance Study would be subject to future, more detailed, CEQA analysis.

Because the FERC Staff Alternative has the same operating characteristics as the CEQA Proposed Project, the effects on water quality from the CEQA Proposed Project operations would be the same as for the FERC Staff Alternative.

E.2 MODELING ANALYSIS

The following section provides an overview of the operations modeling conducted for analysis of environmental impacts as part of the FERC Relicensing Program. The following discussion focuses on the comparison of modeling scenarios and results previously completed for the PDEA Proposed Action (hereinafter referred to as the "Proposed Action") versus the CEQA Proposed Project (hereinafter referred to as the "Proposed Project"). The Proposed Project is the same as the Settlement Agreement for Licensing of the Oroville Facilities, FERC Project No. 2100, dated March 2006 (SA), and as described in Chapter 3.0 of this document.

For the PDEA, results of the quantitative operations modeling comparison of the Existing Conditions to the Proposed Action determined that the Proposed Action was beneficial for coldwater beneficial uses and coldwater fisheries (see PDEA Section 5.4 (Water Quality) and Section 5.5 (Aquatic Resources). For the CEQA analyses, because the only difference in assumptions associated with the Existing Conditions and the No-Project Alternative are associated with the timing of flow releases, potential effects on flows and water temperatures associated with the No-Project Alternative are assumed to be equivalent to those of the Existing Conditions.

Furthermore, CEQA guidelines regarding analysis of beneficial effects of a project imply that, because previous modeling analyses showed that the Proposed Action would result in increased beneficial effects over Existing Conditions, and the Proposed Project under CEQA provides even further protections than the previously studied Proposed Action, then no further quantitative analyses of modeling comparisons would be needed to support the analysis of project effects on water quality or aquatic resources for the purposes of this EIR.

The following comparison demonstrates that potential changes in water temperatures under the Proposed Action result in beneficial impacts on the coldwater resources quantitatively evaluated, and that water temperatures would be further reduced, and thus beneficial uses further improved, with implementation of the Proposed Project. Because water temperatures that would occur in the lower Feather River with implementation of the Proposed Project are more protective of coldwater fisheries resources than the water temperatures provided by the Proposed Action, no detailed quantitative analysis utilizing model results is required for the various resource evaluations in this EIR. Specifically, because the Proposed Action was determined to have a beneficial effect on coldwater fisheries resources, and because CEQA does not require detailed analysis of beneficial project effects, no further quantitative evaluation of the colder water temperatures provided by implementation of the Proposed Project is

required. Increases in the protection and enhancement of coldwater fisheries resources included in the Proposed Project specifically protect and enhance beneficial uses of Cold Freshwater Habitat; Migration of Aquatic Organisms; and Spawning, Reproduction, and/or Early Development identified as existing and beneficial uses in the Central Valley RWQCB Basin Plan objectives (see Table 4.2-4).

For those resource areas such as surface water quantity, surface water quality, and aquatic resources, which are typically evaluated utilizing quantitative modeling comparisons, either there are beneficial effects associated with implementation of the Proposed Project (e.g., aquatic resources, as discussed in Section 5.4), no change between alternatives (e.g., surface water quantity, as discussed in Section 5.2.1), or the best available science does not support quantitative comparisons of alternatives (e.g., agricultural diversion water temperatures, as discussed below). For those resource assessments in which modeling comparisons could not be conducted or are not required, analysis of the nature of the effect and general magnitude of water temperature change are based on the qualitative water temperature evaluations discussed below.

E.2.1 Proposed Project vs. Proposed Action Water Temperature Objectives

Proposed Project water temperature objectives at the Feather River Fish Hatchery (SA Article A107) and Robinson Riffle (SA Article A108) are either the same as under the Proposed Action, or the Proposed Project is more protective of coldwater beneficial uses and coldwater fisheries, due to reduced water temperature criteria or an extension of the period during which water temperature criteria are applied. The Proposed Project also provides for more protective water temperature targets during the initial new license period (i.e., the period after the new FERC license is issued, but prior to construction of any potential future facilities modifications). These more protective water temperature targets at Robinson Riffle also would result in increased protection and enhancement of cold freshwater habitat conditions at the Project's lower FERC Project boundary relative to the Existing Conditions/No-Action Alternative as well as the Proposed Action evaluated in the PDEA.

Subsequent to construction and testing of the potential future facilities modifications that would provide improved access to coldwater pool volume in Lake Oroville or the improved "plumbing" of the Thermalito Complex to reduce water warming, additional water temperature objectives would be developed and adopted for the lower Project boundary. After the future facilities modifications, Feather River Fish Hatchery water temperature requirements also may be revised. These water temperature requirements likely would be more protective than those proposed in the SA. The potential effects of the selected facilities modifications would be subject to detailed evaluation in a subsequent environmental document prior to construction.

Comparison of the PDEA Proposed Action and the Proposed Project water temperature requirements for the Feather River Fish Hatchery in Table E.2-1 indicates that the Proposed Action water temperature requirement of "plus or minus 4^{o}F" is the same as the upper water temperature limit for the Proposed Project (SA Table 107B) "maximum"

for all periods. Managing hatchery water temperatures to daily mean targets in SA Table 107A would likely result in a reduction in hatchery water temperatures as compared to Existing Conditions. Therefore, with respect to hatchery water temperature requirements, there are no water temperature changes from the Existing Conditions/No-Project Alternative to the Proposed Action or the Proposed Project to quantitatively compare utilizing surface water modeling. Although there are no changes in the maximum allowable water temperature objectives for the hatchery, water temperature management actions taken for the hatchery could differ among alternatives. However since the water temperature maximums are the same, modeling comparisons of water temperatures at the hatchery (or due to hatchery water temperature management actions) are not needed to complete the evaluations of alternatives in this CEQA EIR.

Comparison of the Proposed Action and the Proposed Project water temperature initial new license period targets for Robinson Riffle in Table E.2-1 indicates that the Proposed Project water temperature targets under the initial new license period of the Proposed Project are more protective of coldwater fisheries and coldwater beneficial uses than the Proposed Action. The Proposed Action was quantitatively evaluated utilizing modeling results compared to Existing Conditions/No-Action Alternative and was determined to result in beneficial effects for cold freshwater beneficial uses and aquatic resources. Therefore, because the Proposed Project would result in an increased frequency, magnitude, or duration of beneficial water temperatures compared to the beneficial effects associated with implementation of the Proposed Action, conducting a detailed quantitative modeling comparison of the beneficial effects of the Proposed Project on coldwater fisheries at Robinson Riffle is not needed for this EIR.

There are no numerical water temperature targets or requirements at the lower FERC Project boundary for the Existing Conditions/No-Action Alternative or for the Proposed Action. As part of SA Article 108, and upon completion of the Feasibility Study, a plan will be developed to include mean daily temperatures for the FERC downstream Project boundary. These temperatures will replace Table 2 temperatures included in the SA and will be based on study and preliminary modeling results. The water temperature values included on Table 2 in the SA are placeholders until the Feasibility Study is conducted and a plan developed. A detailed quantitative modeling comparison of these beneficial effects is not needed for this EIR.

E.2.2 Proposed Project vs. Proposed Action Low Flow Channel Minimum Flows

In addition to the more protective water temperature objectives under the Proposed Project as compared to the Proposed Action, the Proposed Project also includes an increase in the minimum flows in the LFC. The Proposed Action minimum flows for the LFC were the same as the Existing Conditions/No-Action Alternative (i.e., 600 cubic

Table E.2-1. Proposed Action and Proposed Project daily water temperature objectives for the Feather River Fish Hatchery, Robinson Riffle, and the lower FERC Project boundary.

Feather River Fish Hatchery				Robinson Riffle			Lower FERC Project Boundary[2]		
	Proposed Action	Proposed Project[1]			Proposed Action	Proposed Project		Proposed Action	Proposed Project
Date Ranges	(+/- 4˚F)	Maximum Mean (˚F)	Maximum (˚F)	Date Ranges	Mean (˚F)	Maximum Mean (˚F)	Date Ranges	Mean (˚F)	Mean (˚F)
Apr 01– May 15	51	55	55	Apr 01– Apr 30	--	56	Apr 01– Apr 30	--	61
				May 01- May 15	--	56-63*	May 01- May 15	--	64
May 16– May 31	55	55	59	May 16– May 31	--	63	May 16– May 31	--	64
Jun 01– Jun 15	56	60	60	Jun 01– Jun 15	≤ 65	63	Jun 01– Jun 15	--	64
Jun 16– Aug 15	60	60	64	Jun 16– Aug 15	≤ 65	63	Jun 16– Aug 15	--	64
Aug 16– Aug 31	58	60	62	Aug 16– Aug 31	≤ 65	63	Aug 16– Aug 31	--	64
Sep 01– Sep 30	52	56	56	Sep 01– Sep 08	--	63-58*	Sep 01– Sep 08	--	61
				Sep 09– Sep 30	≤ 65	58	Sep 09– Sep 30	--	61
Oct 01– Nov 30	51	55	55	Oct 01– Nov 30	--	56	Oct 01– Oct 31	--	60
							Nov 01– Nov 30	--	56
Dec 01–– Mar 31	≤ 55	55	55	Dec 01– Mar 31	--	56	Dec 01– Mar 31	--	56

Table E.2-1. Proposed Action and Proposed Project daily water temperature objectives for the Feather River Fish Hatchery, Robinson Riffle, and the lower FERC Project boundary.

Feather River Fish Hatchery				Robinson Riffle			Lower FERC Project Boundary[2]		
	Proposed Action	Proposed Project[1]			Proposed Action	Proposed Project		Proposed Action	Proposed Project
Date Ranges	(+/- 4˚F)	Maximum Mean (˚F)	Maximum (˚F)	Date Ranges	Mean (˚F)	Maximum Mean (˚F)	Date Ranges	Mean (˚F)	Mean (˚F)

Notes:

** Indicates a period of transition from the first temperature to the second temperature.*

[1] From April 1 to May 31, the Feather River Fish Hatchery minimum temperature requirement is 51˚F.

[2] Lower Project boundary temperatures are to be evaluated and modified using the phased approach outlined in the SA, therefore temperature management actions will not be taken to achieve these targets.

-- Indicates not provided.

Sources: DWR 2005, 2006

feet per second (cfs). The Proposed Project LFC minimum flows (SA Article A108.1) are increased to 700 cfs from April 1 through September 14, and 800 cfs from September 15 through March 31. These increased minimum flows would increase the velocity and mass of LFC flows, resulting in the same colder water temperature being propagated farther downstream, thereby providing an increase in the quality and quantity of coldwater fisheries habitat compared to the Proposed Action, which was previously determined to result in beneficial effects on coldwater fisheries resources. Because the effect of the increase in minimum flows in the LFC is beneficial compared to a previously analyzed beneficial effect, no additional modeling comparison or further analysis of this effect is needed for this EIR.

Even though the minimum flows in the LFC are increased under the Proposed Project, the net total releases of the facilities downstream of the Thermalito Afterbay Outlet under the Proposed Project compared to the Existing Conditions/No-Project Alternative do not change. Because there are no changes in net facilities releases between the alternatives analyzed under CEQA, there are also no changes in reservoir storage to analyze. There would be no changes in net releases that could potentially influence water supply or reservoir storage. Therefore, no further consideration of model comparisons to evaluate changes in net flow releases to the lower Feather River below the Thermalito Afterbay Outlet are needed to satisfy CEQA analysis requirements. In addition, there would either be no change, or potentially only beneficial effects, under the Proposed Project as compared to the Existing Conditions/No-Project Alternative. Further discussion regarding potential changes in water quantity and additional justification regarding modeling requirements for the CEQA analysis of water quantity are addressed in Section 5.2.1.3, Surface Water Quantity Method of Analysis.

E.2.3 Future Changes in Facilities Net Flow Releases

Slight changes in net Oroville Facilities flow releases to the Feather River occur under future alternative modeling scenarios. Future project alternatives modeling is based on the Operations Criteria and Plan (OCAP) 2020 4A Scenario, which shows a slight increase in magnitude and a slight shift in export timing to earlier in the summer compared to Existing Conditions/No-Project Alternative.

CALSIM II modeling for the Oroville Facilities Project analysis used two different Levels of Development (LOD), 2001 and 2020 LODs, to represent the existing conditions and future conditions, respectively. DWR developed the 1995 and 2020 LODs through preparation of the *California Water Plan 1998 Update* (Bulletin 160-98). Demands were calculated using aggregation of historical land use surveys on the Sacramento Valley floor. For CALSIM II modeling purposes, DWR defined the 2001 LOD by using linear interpolation of the previously developed 1995 and 2020 data. The recent *California Water Plan Update 2005* did not result in any updated LODs; the associated efforts were deferred. Therefore, the currently available 2001 and 2020 LODs are the best available information for local demand projection under the existing and future conditions. The 2001 and 2020 LODs used in the CALSIM II modeling show that, on a percentage basis, the differences in net inflow-depletion between 2001 and 2020

averaged less than 1 percent, and the difference in anticipated diversion for each demand area averaged 4 percent. The maximum annual change in net inflow-depletion was 2 percent, and the maximum change in diversions was 4 percent. The minimums for each were -6 percent and 4 percent, respectively. (Reference: DWR and USBR, CALSIM II Benchmark Assumptions, 2002.) Therefore, the changes in total net releases from 2001 LOD to 2020 LOD are not substantial. These changes in release volume and timing apply equally to the Proposed Action under the PDEA and the No-Project Alternative, Proposed Project, and FERC Staff Alternative under the CEQA EIR. Exceedance plots comparing the probabilities of distribution of mean daily flows of the No-Action (PDEA) and No-Project (EIR) Alternatives (Figure E.2-1) demonstrate that, even with slight changes in the base modeling assumptions regarding Long-Term Environmental Water Account (EWA) and the Trinity River Record of Decision (Trinity ROD) that potentially affect Lake Oroville releases and lower Feather River flows, the flows below the Thermalito Afterbay Outlet (identified as HFC in the exceedance plots) have virtually the same probability distribution for each month of analysis.

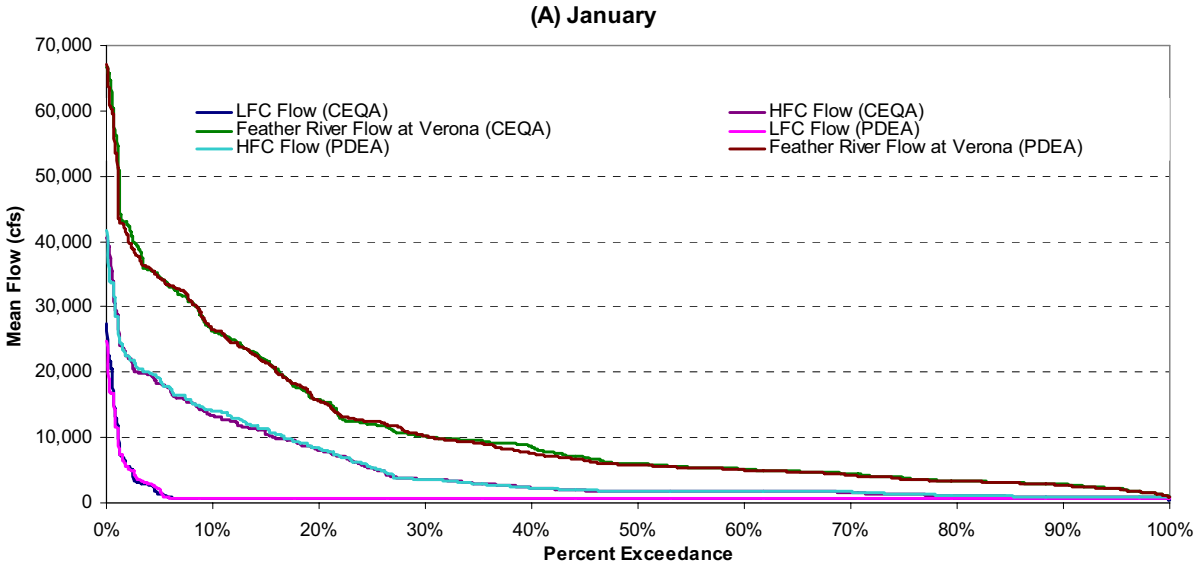
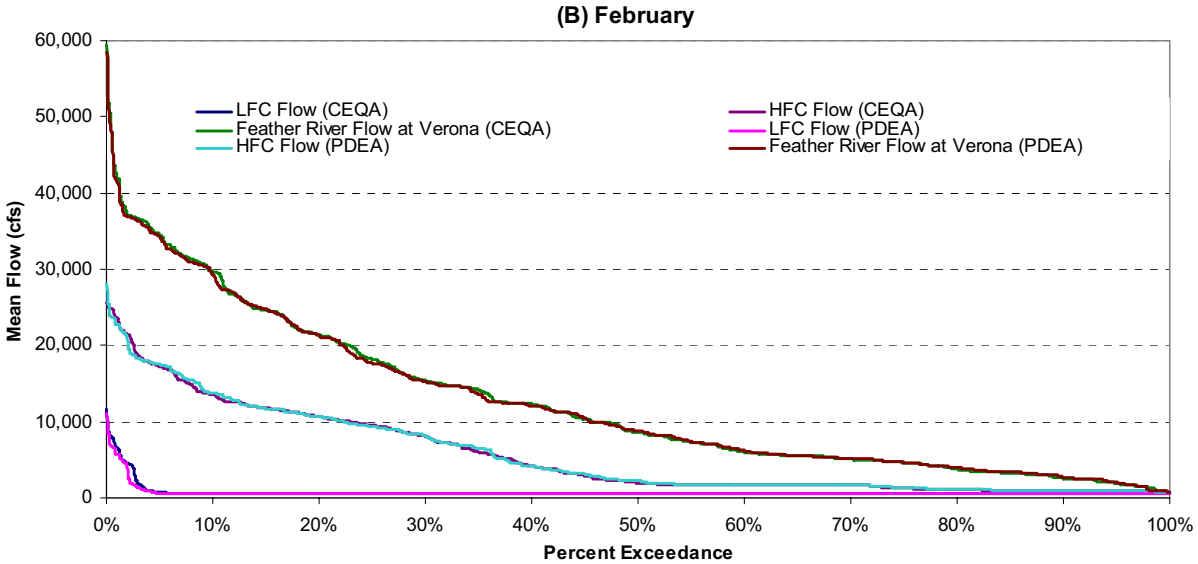


Figure E.2-1. Comparison of exceedance probabilities for simulated mean daily Feather River flow under the No-Project Alternative for CEQA and the Future No-Action Alternative for the PDEA.



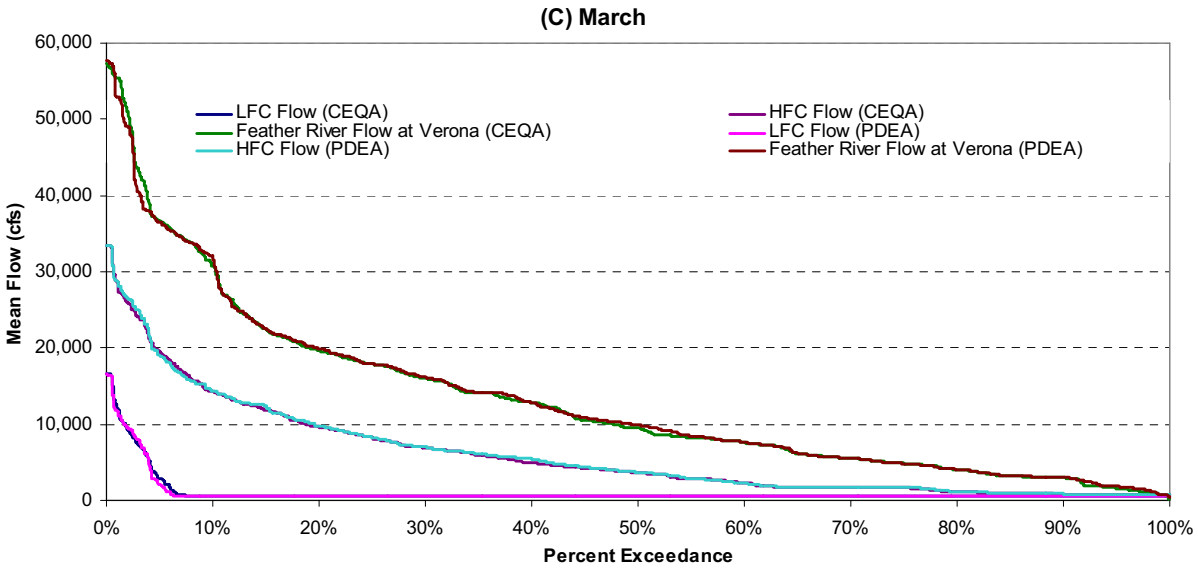


Figure E.2-1 (continued). Comparison of exceedance probabilities for simulated mean daily Feather River Flow under the No-Project Alternative for CEQA and the Future No-Action Alternative for the PDEA.

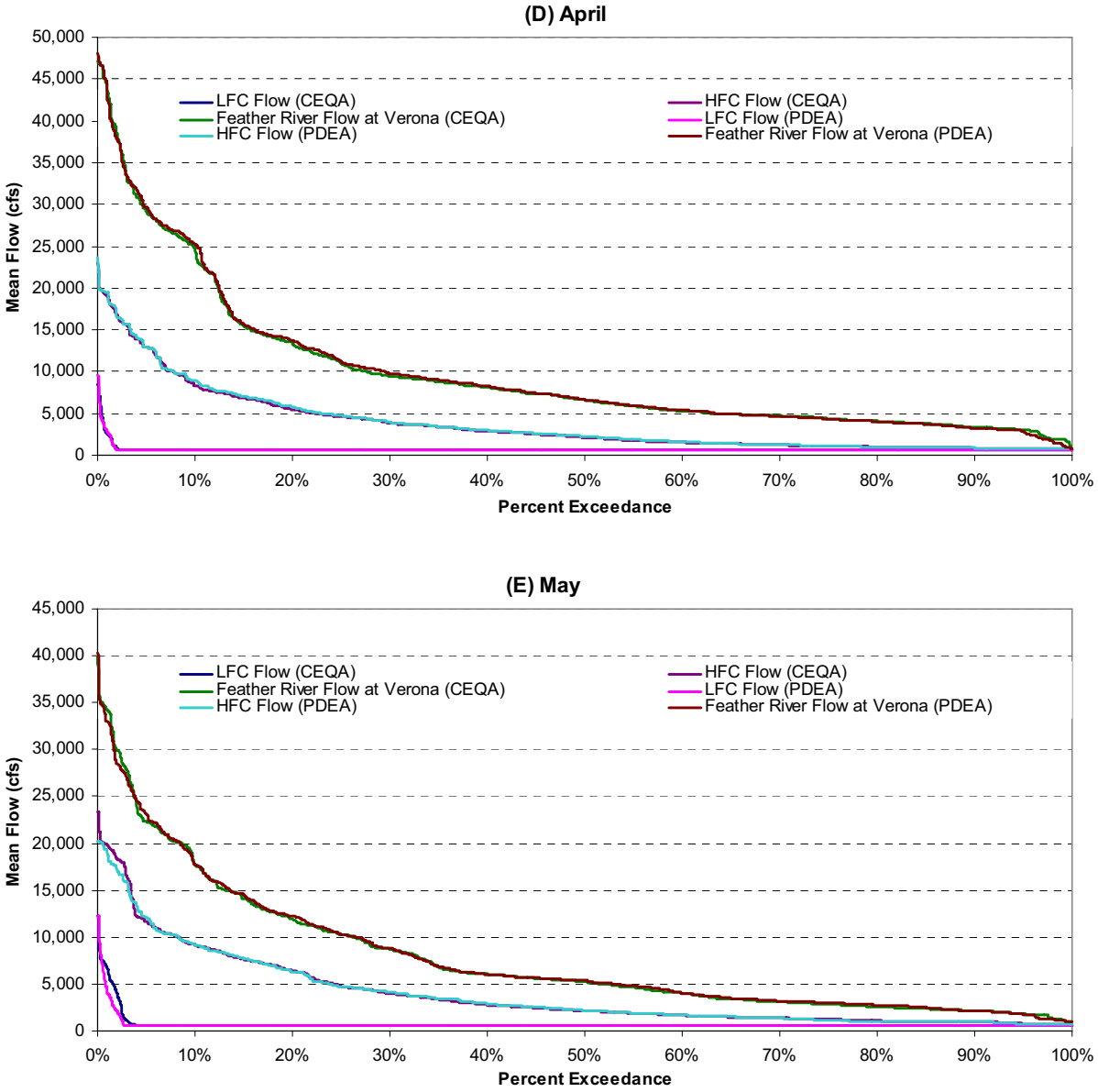


Figure E.2-1 (continued). Comparison of exceedance probabilities for simulated mean daily Feather River Flow under the No-Project Alternative for CEQA and the Future No-Action Alternative for the PDEA.

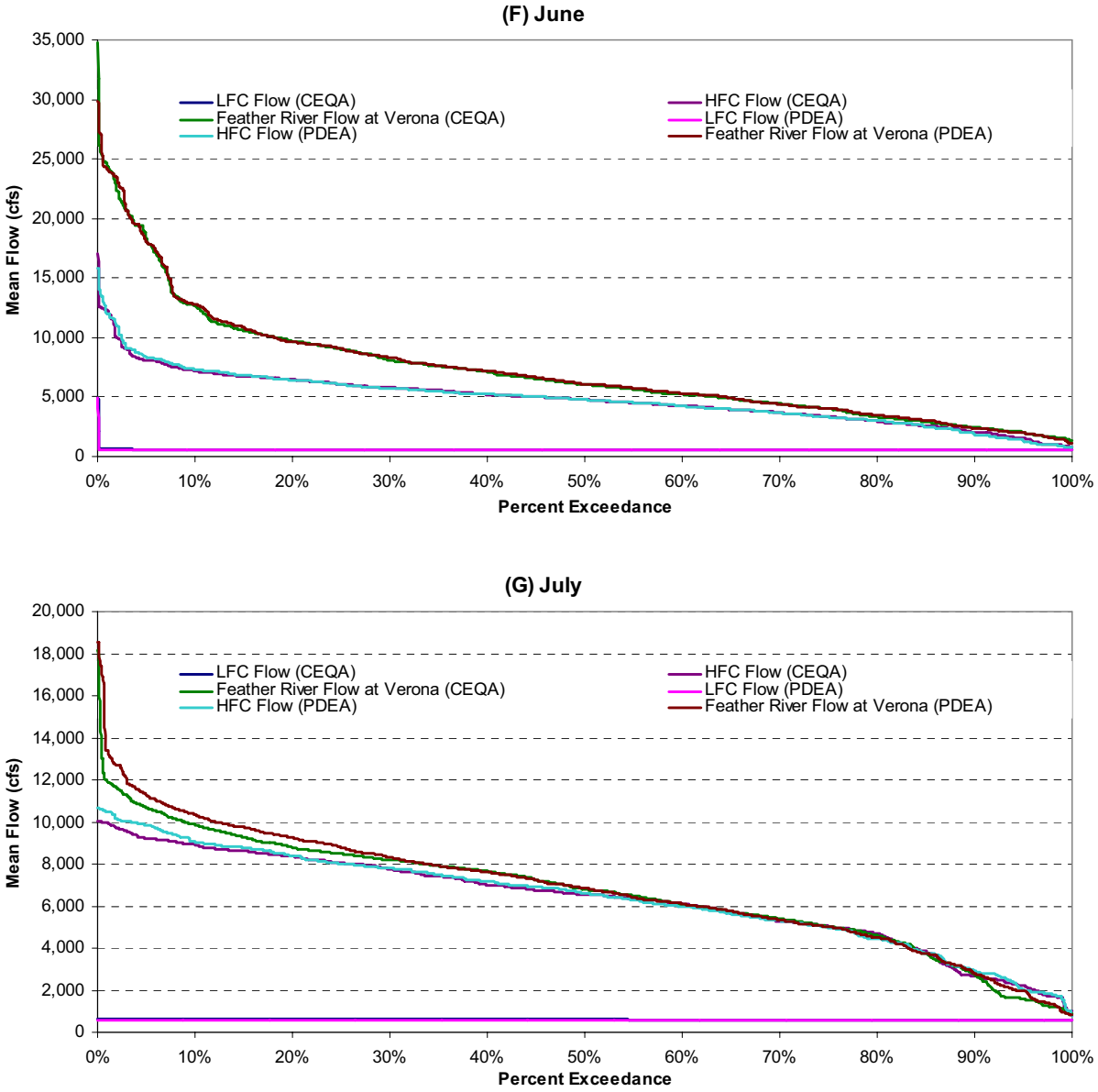


Figure E.2-1 (continued). Comparison of exceedance probabilities for simulated mean daily Feather River Flow under the No-Project Alternative for CEQA and the Future No-Action Alternative for the PDEA.

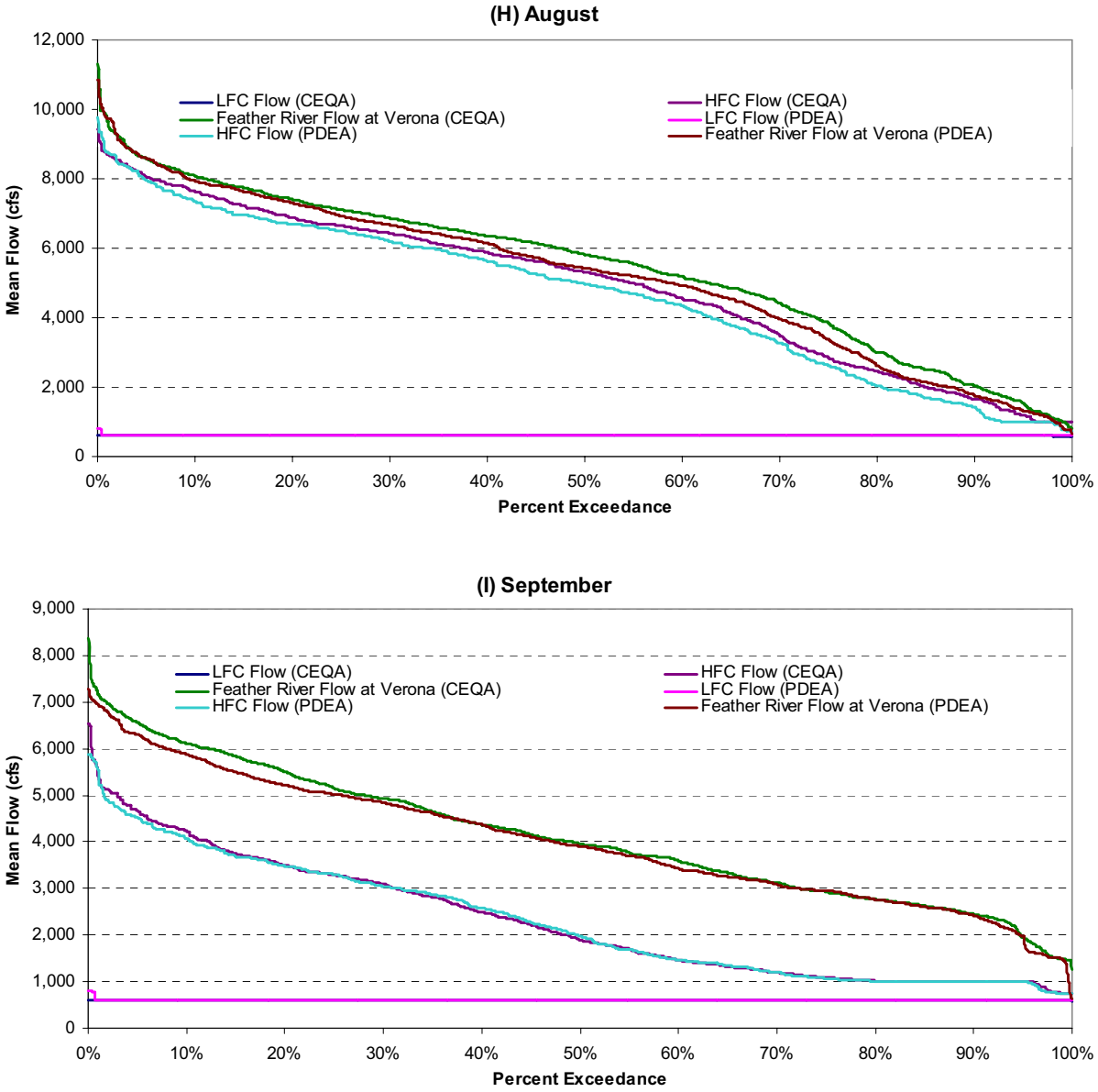


Figure E.2-1 (continued). Comparison of exceedance probabilities for simulated mean daily Feather River Flow under the No-Project Alternative for CEQA and the Future No-Action Alternative for the PDEA.

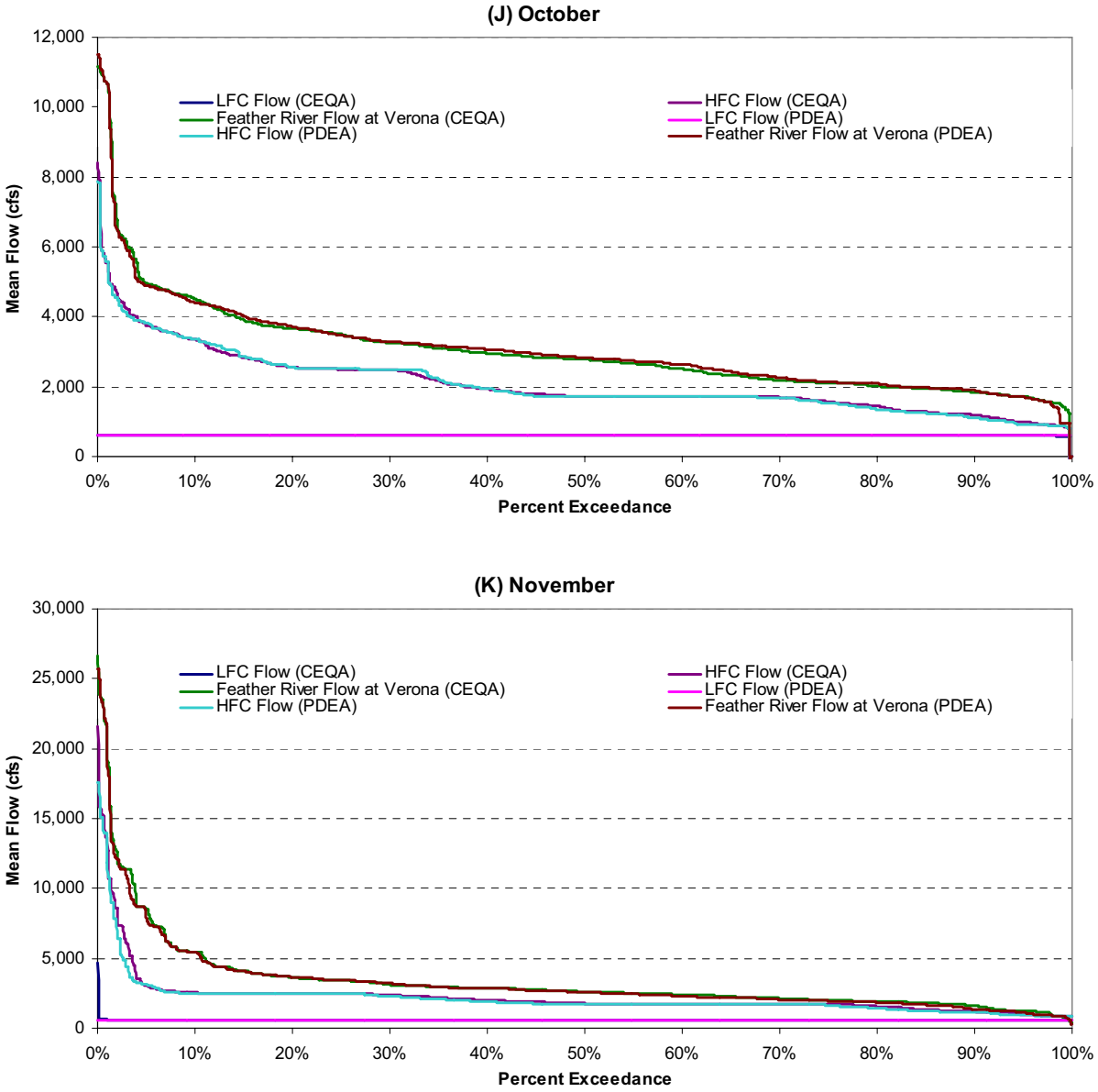


Figure E.2-1 (continued). Comparison of exceedance probabilities for simulated mean daily Feather River Flow under the No-Project Alternative for CEQA and the Future No-Action Alternative for the PDEA.

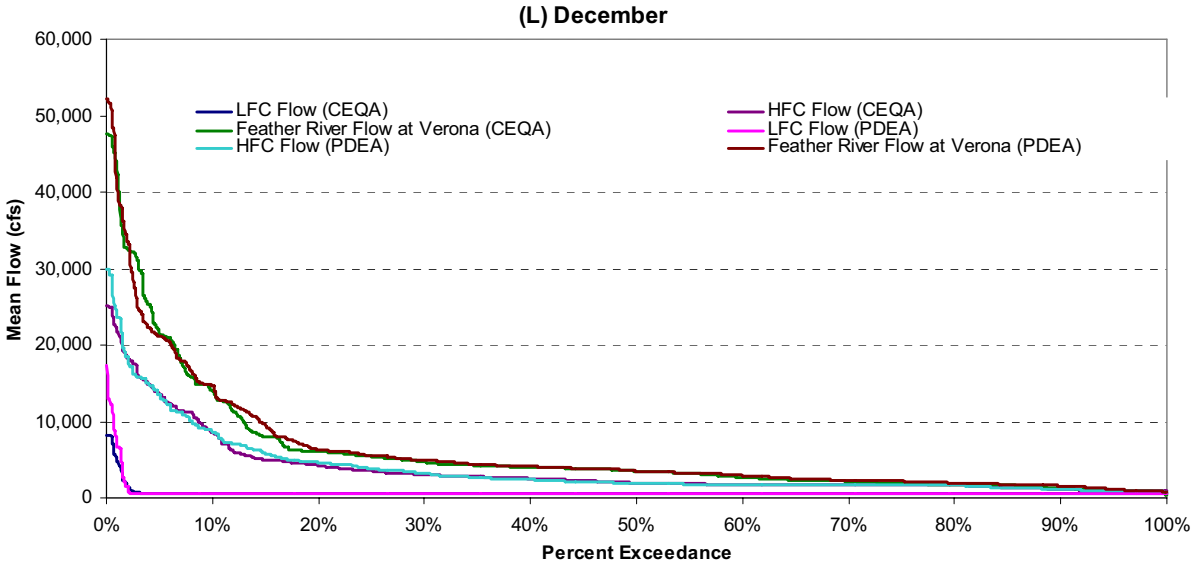


Figure E.2-1 (continued). Comparison of exceedance probabilities for simulated mean daily Feather River Flow under the No-Project Alternative for CEQA and the Future No-Action Alternative for the PDEA.

Since the exceedance plots comparing mean daily flows under the Future No-Action Alternative (PDEA) and No-Project Alternative (EIR) indicate little to no change in net flow releases, it is expected that there would be little to no flow-related water temperature changes as well. Evaluation of water temperature changes comparing mean daily flows under the Future No-Action Alternative (PDEA) and No-Project Alternative (EIR) are included in Section E.2.5.1.

E.2.4 Proposed Project vs. Proposed Action Water Temperature Modeling Results

Water temperature modeling of the Proposed Project was conducted to demonstrate the beneficial effects of the Proposed Project compared to the previously studied Proposed Action (refer to Section 5.4 of the PDEA for further discussion). As a result of the beneficial effects of the Proposed Project demonstrated by these modeling results, modeling comparisons between the alternatives are not necessary to satisfy CEQA analysis requirements. It should be noted that not all of the Project assumptions between the Proposed Action and Proposed Project are the same for each model simulation. The differences in modeling assumptions and the relative potential magnitude of these differences on the results and interpretation of the comparison of the alternatives are discussed in the following section entitled “Proposed Project vs. Proposed Action Modeling Assumption Differences.”

Because the Proposed Action was determined to have beneficial effects relative to the Existing Conditions/No-Action Alternative after an extensive modeling comparison in the PDEA, and the Proposed Project has demonstrated additional protection and

enhancement of the coldwater beneficial uses and aquatic resources compared to the Proposed Action in the preceding analysis, no additional modeling comparison between the alternatives is required.

E.2.5 Proposed Project vs. Proposed Action Modeling Assumption Differences

The differences in the modeling assumptions included in the PDEA modeling analysis versus those applicable to the CEQA modeling analysis are documented in the following section. The primary difference is the use of OCAP Study 4 for the future alternative modeling scenario in the PDEA versus the use of OCAP Study 4A for the future alternative modeling scenario for the CEQA EIR. Another difference in the modeling assumptions occurs because of the difference in reasonably foreseeable future projects related to the Long-Term EWA and Trinity River ROD. See modeling assumption summary comparison Table E.2-2.

Although the inclusion of these reasonably foreseeable projects differs between the PDEA modeling assumptions and the CEQA modeling assumptions, both of these future projects would have relatively minor effects on Feather River flows and Oroville Facilities operations. Therefore, as demonstrated in the following section, the modeling results between the Proposed Action and the Proposed Project remain reasonably and functionally comparable.

Table E.2-2. Summary of assumptions for CALSIM II modeling.

	PDEA Alternatives		CEQA Alternatives	
	Existing Conditions	**Future No-Action and Proposed Action Conditions [2]**	**Existing Conditions**	**No-Project and Proposed Project Conditions**
Period of Simulation	73 years (1922–1994)	Same	Same	Same
Simulation Basis	OCAP Study 3	OCAP Study 4	OCAP Study 3 (modified)[1]	OCAP Study 4a
HYDROLOGY				
Level of Development (Land Use)	2001 level, DWR Bulletin 160-98 [2]	2020 level, DWR Bulletin 160-98	2001 level, DWR Bulletin 160-98 [2]	2020 level, DWR Bulletin 160-98
DEMANDS				
North of Delta (except American River)				
CVP	Land use based, limited by full contract	Same	Same	Same
SWP (Feather River Service Area [FRSA])	Land use based, limited by full contract	Same	Same	Same
Nonproject	Land use based	Same	Same	Same
CVP Refuges	Firm level 2	Same	Same	Same
American River Basin				
Water rights	Fixed annual demands	Fixed annual demands as projected for 2020 by Water Forum analysis	Fixed annual demands	Fixed annual demands as projected for 2020 by Water Forum analysis
CVP	Fixed annual demands	Fixed annual demands as projected for 2020 by Water Forum analysis, but modified with 35 thousand acre-feet (taf) CVP contract supply for the Placer County Water Agency (PCWA) diverted at the new PCWA American River pump station	Fixed annual demands	Fixed annual demands as projected for 2020 by Water Forum analysis, but modified with 35-taf CVP contract supply for PCWA diverted at the new PCWA American River pump station

Table E.2-2. Summary of assumptions for CALSIM II modeling.

	PDEA Alternatives		CEQA Alternatives	
	Existing Conditions	Future No-Action and Proposed Action Conditions [2]	Existing Conditions	No-Project and Proposed Project Conditions
San Joaquin River Basin				
Friant Unit	Regression of historical	Same	Same	Same
Lower Basin	Fixed annual demands	Same	Same	Same
Stanislaus River Basin	New Melones Interim Operations Plan	Same	Same	Same
South of Delta				
CVP	Full contract	Same	Same	Same
Contra Costa Water District	124,000 acre-feet per year (afy) [3]	Same	Same	Same
SWP (w/North Bay Aqueduct)	3.0–4.1 million acre-feet per year (maf/yr)	Same	Same	Same
SWP Article 21 Demand	Metropolitan Water District of Southern California (MWD) up to 50,000 month/month, Dec-Mar; others up to 84,000 month/month	Same	Same	Same
FACILITIES				
Freeport Regional Water Project	None	Included[3]	None	Included [4]
Banks Pumping Capacity	6,680 cfs	8,500 cfs	6,680 cfs	6,680 cfs
Tracy Pumping Capacity	4,200 cfs + deliveries upstream of Delta-Mendota Canal constriction	4,600 cfs w/intertie	4,200 cfs + deliveries upstream of Delta-Mendota Canal constriction	4,600 cfs w/intertie
OPERATIONS CONSTRAINTS AND CRITERIA				
Trinity River				
Minimum Flow below Lewiston Dam	368,600–452,600 afy	Trinity ROD Flows (368,600–815,000 afy)	Trinity ROD Flows (368,600–815,000 afy)	Trinity ROD Flows (368,600–815,000 afy)
Trinity Reservoir End-of-September Minimum Storage	Trinity export-to-inflow Preferred Alternative (600,000 af as able)	Same	Same	Same

Table E.2-2. Summary of assumptions for CALSIM II modeling.

	PDEA Alternatives		CEQA Alternatives	
	Existing Conditions	Future No-Action and Proposed Action Conditions [2]	Existing Conditions	No-Project and Proposed Project Conditions
Clear Creek				
Minimum Flow below Whiskeytown Dam	Downstream water rights, 1963 U.S. Bureau of Reclamation (USBR) proposal to the U.S. Fish and Wildlife Service (USFWS) and the National Park Service, and USFWS use of Central Valley Project Improvement Act (CVPIA) Section 3406(b)(2) water	Same	Same	Same
Upper Sacramento River				
Shasta Lake End-of-September Minimum Storage	State Water Resources Control Board (SWRCB) 1993 Biological Opinion for winter-run Chinook salmon (1.9 maf)	Same	Same	Same
Minimum Flow below Keswick Dam	Flows for SWRCB 1990 Order 90-5 and 1993 Biological Opinion on temperature control for winter-run Chinook salmon, and USFWS use of CVPIA Section 406(b)(2) water	Same	Same	Same
Feather River				
Minimum Flow below Thermalito Diversion Dam	1983 DWR/California Department of Fish and Game (DFG) agreement (600 cfs)	Same	Same	Same
Minimum Flow below Thermalito Afterbay Outlet	1983 DWR/DFG agreement (1,000–1,700 cfs)	Same	Same	Same

Table E.2-2. Summary of assumptions for CALSIM II modeling.

	PDEA Alternatives		CEQA Alternatives	
	Existing Conditions	Future No-Action and Proposed Action Conditions [2]	Existing Conditions	No-Project and Proposed Project Conditions
American River				
Minimum Flow below Nimbus Dam	SWRCB Decision 893 (D-893) and USFWS use of CVPIA Section 3406(b)(2) water	Same	Same	Same
Minimum Flow at H Street Bridge	SWRCB D-893	Same	Same	Same
Lower Sacramento River				
Minimum Flow near Rio Vista	SWRCB D-1641	Same	Same	Same
Mokelumne River				
Minimum Flow below Camanche Dam	FERC 2916-029, 1996 (joint settlement agreement) (100–325 cfs)	Same	Same	Same
Minimum Flow below Woodbridge Diversion Dam	FERC 2916-029, 1996 (joint settlement agreement) (25–300 cfs)	Same	Same	Same
Stanislaus River				
Minimum Flow below Goodwin Dam	1987 USBR/DFG agreement, and USFWS use of CVPIA Section 406(b)(2) water	Same	Same	Same
Minimum Dissolved Oxygen	SWRCB D-1422	Same	Same	Same
Merced River				
Minimum Flow below Crocker-Huffman Diversion Dam	Davis-Grunsky (180–220 cfs, Nov–Mar), and Cowell Agreement	Same	Same	Same
Minimum Flow at Shaffer Bridge	FERC 2179 (25–100 cfs)	Same	Same	Same

Table E.2-2. Summary of assumptions for CALSIM II modeling.

	PDEA Alternatives		CEQA Alternatives	
	Existing Conditions	Future No-Action and Proposed Action Conditions [2]	Existing Conditions	No-Project and Proposed Project Conditions
Tuolumne River				
Minimum Flow at Lagrange Bridge	FERC 2299-024, 1995 (settlement agreement) (94,000–301,000 afy)	Same	Same	Same
San Joaquin River				
Maximum Salinity near Vernalis	SWRCB D-1641	Same	Same	Same
Minimum Flow near Vernalis	SWRCB D-1641, and Vernalis Adaptive Management Program per San Joaquin River Agreement	Same	Same	Same
Sacramento–San Joaquin River Delta				
Delta Outflow Index (Flow and Salinity)	SWRCB D-1641	Same	Same	Same
Delta Cross Channel Gate Operation	SWRCB D-1641	Same	Same	Same
Delta Exports	SWRCB D-1641, USFWS use of CVPIA Section 3406(b)(2) water	Same	Same	Same
OPERATIONS CRITERIA				
SUBSYSTEM				
Upper Sacramento River				
Flow Objective for Navigation (Wilkins Slough)	3,250–5,000 cfs based on Lake Shasta storage condition	Same	Same	Same
American River				
Folsom Dam Flood Control	Sacramento Area Flood Control Agency, Interim Reoperation of Folsom Dam, Variable 400/670 (without outlet modifications)	Same	Same	Same

Table E.2-2. Summary of assumptions for CALSIM II modeling.

	PDEA Alternatives		CEQA Alternatives	
	Existing Conditions	Future No-Action and Proposed Action Conditions [2]	Existing Conditions	No-Project and Proposed Project Conditions
Flow below Nimbus Dam	Operations criteria corresponding to SWRCB D-893 required minimum flow	Same	Same	Same
Sacramento Water Forum Mitigation Water	None	Sacramento Water Forum (up to 47,000 afy in Water Forum Agreement drier and driest years) [5]	None	Sacramento Water Forum (up to 47,000 afy in Water Forum Agreement drier and driest years) [5]
Feather River				
Flow at Mouth	Maintain the DFG/DWR flow target above Verona or 2,800 cfs for April–September dependent on Oroville inflow and FRSA allocation	Same	Same	Same
Stanislaus River				
Flow below Goodwin Dam	1997 New Melones Interim Operations Plan	Same	Same	Same
San Joaquin River				
Flow near Vernalis	San Joaquin River Agreement in support of the Vernalis Adaptive Management Program	Same	Same	Same
SYSTEM-WIDE				
CVP Water Allocation				
CVP Settlement and Exchange	100% (75% in Shasta critical years)	Same	Same	Same
CVP Refuges	100% (75% in Shasta critical years)	Same	Same	Same
CVP Agriculture	100%–0% based on supply	Same	Same	Same
CVP Municipal & Industrial	100%–50% based on supply	Same	Same	Same

Table E.2-2. Summary of assumptions for CALSIM II modeling.

	PDEA Alternatives		CEQA Alternatives	
	Existing Conditions	Future No-Action and Proposed Action Conditions [2]	Existing Conditions	No-Project and Proposed Project Conditions
SWP Water Allocation				
North of Delta (FRSA)	Contract specific	Same	Same	Same
South of Delta	Based on supply; Monterey Agreement	Same	Same	Same
CVP/SWP Coordinated Operations				
Sharing of Responsibility for In-Basin-Use	1986 Coordinated Operations Agreement	Same	Same	Same
Sharing of Surplus Flows	1986 Coordinated Operations Agreement	Same	Same	Same
Sharing of Restricted Export Capacity	Equal sharing of export capacity under SWRCB D-1641; use of CVPIA Section 3406(b)(2) only restricts CVP exports; EWA use restricts CVP and/or SWP exports as directed by CALFED Bay-Delta Program (CALFED) fisheries agencies	Same	Same	Same
Transfers				
Dry Year Program	None	Same	Same	Same
Phase 8	None	Same	Same	Same
MWD/CVP Settlement Contractors	None	Same	None	Same
CVP/SWP Integration				
Dedicated Conveyance at Banks	None	SWP to convey 100,000 af of Level 2 refuge water each year at Banks Pumping Plant	None	None

Table E.2-2. Summary of assumptions for CALSIM II modeling.

	PDEA Alternatives		CEQA Alternatives	
	Existing Conditions	Future No-Action and Proposed Action Conditions [2]	Existing Conditions	No-Project and Proposed Project Conditions
North of Delta Accounting Adjustments	None	CVP to provide the SWP a maximum of 75,000 af of water to meet in-basin requirements through adjustments in Coordinated Operations Agreement accounting	None	None
CVPIA Section 3406(b)(2)	U.S. Department of the Interior 2003 decision	Same	Same	Same
Allocation	800,000 afy, 700,000 afy in 40-30-30 dry years, and 600,000 afy in 40-30-30 critical years	Same	Same	Same
Actions	1995 Water Quality Control Plan for the San Francisco Bay/San Joaquin Delta Estuary, fish flow objectives (Oct–Jan); Vernalis Adaptive Management Plan (VAMP) (Apr 15–May 16) CVP export restriction; 3,000-cfs CVP export limit in May and June (D-1485 striped bass continuation); post-VAMP (May 16-31) CVP export restriction; ramping of CVP export (Jun); upstream releases (Feb–Sep)	Same	Same	Same

Table E.2-2. Summary of assumptions for CALSIM II modeling.

	PDEA Alternatives		CEQA Alternatives	
	Existing Conditions	**Future No-Action and Proposed Action Conditions [2]**	**Existing Conditions**	**No-Project and Proposed Project Conditions**
Accounting Adjustments	Per May 2003 Interior decision, no limit on responsibility for D-1641 requirements, no reset with the storage metric and no offset with the release and export metrics	Same	Same	Same
CALFED Environmental Water Account	None	None	None	None

Notes:

[1] Trinity ROD flow requirements added to OCAP Study 3.

[2] 2000 level of development defined by linearly interpolated values from the 1995 level of development and 2020 level of development from DWR Bulletin 160-98.

[3] Delta diversions include operations of Los Vaqueros Reservoir and represent average annual diversion.

[4] Includes modified East Bay Municipal Utility District operations of the Mokelumne River.

[5] This is implemented only in the PCWA Middle Fork Project releases used in defining the CALSIM II inflows to Folsom Lake.

Source: 2004 CVP/SWP OCAP Biological Assessment, except for CEQA Existing Conditions, which has been updated to reflect the July 2004 Trinity River Record of Decision

E.2.5.1 Effects on Modeling Results

Exceedance plots were developed to enable comparison of the probabilities of mean daily flows exceeding specific flow values under the No-Action Alternative included in the PDEA and the No-Project Alternative evaluated in this CEQA EIR. Those exceedance plots demonstrate that, even with slight changes in the base modeling assumptions regarding the future alternative modeling scenarios (i.e., OCAP Study 4 compared to Study 4A) and two of the reasonably foreseeable projects (i.e., SDIP and CVP/SWP Integration; see above section discussion), and their influence on future alternative modeling scenarios, very little change would occur in either the timing and magnitude of Feather River flows below Thermalito Afterbay Outlet, or operation of the Oroville Facilities.

Additionally, even with changes in assumptions that potentially affect Oroville Facilities releases, river flows below the Thermalito Afterbay Outlet (identified as HFC in the exceedance plots) are virtually the same for each month of analysis (see Figure E.2-1). As previously noted, future changes in net project releases apply equally to all project alternatives. Therefore, based on no net changes in potential future flow impacts, a comparison between the CEQA alternatives was not needed for this EIR.

Because the net flow releases of the Oroville Facilities do not change between the Proposed Action Alternative included in the PDEA and the Proposed Project Alternative evaluated in this CEQA EIR, potential changes in water temperatures due to water temperature objectives contained in the alternatives can be evaluated at three key project locations. Water temperatures at the Feather River Fish Hatchery represent the source water temperatures for the water going both through the Thermalito Complex as well as the water released down the LFC. The Feather River Fish Hatchery is also a water temperature compliance point for the 1983 DFG Operating Agreement and the EIR Proposed Project (SA Article 107.1) and is therefore an important location to evaluate potential water temperature changes comparing between the PDEA Proposed Action and the EIR Proposed Project. Robinson Riffle is also an important water temperature compliance point for both the Proposed Action and the Proposed Project from SA Article 108.1. The third key location for evaluation of water temperatures to compare the Proposed Action and the Proposed Project is downstream of the Thermalito Afterbay Outlet in the HFC. This location is not a water temperature compliance point,. Changes in water temperatures in this location will propagate downstream, so this location is indicative of the nature and magnitude of water temperature changes comparing the Proposed Action and the Proposed Project.

Exceedance plots of mean daily average water temperatures comparing the Proposed Project and the Proposed Action (see Figure E.2-2) demonstrate that water temperatures at the Feather River Fish Hatchery are the same water temperatures or cooler under the Proposed Project for the months of January, February, August, and September for 100 percent of the cumulative probability distribution. Water temperatures at the Feather River Fish Hatchery are the same water temperatures or cooler under the Proposed Project for the months of March, May, June, July, October,

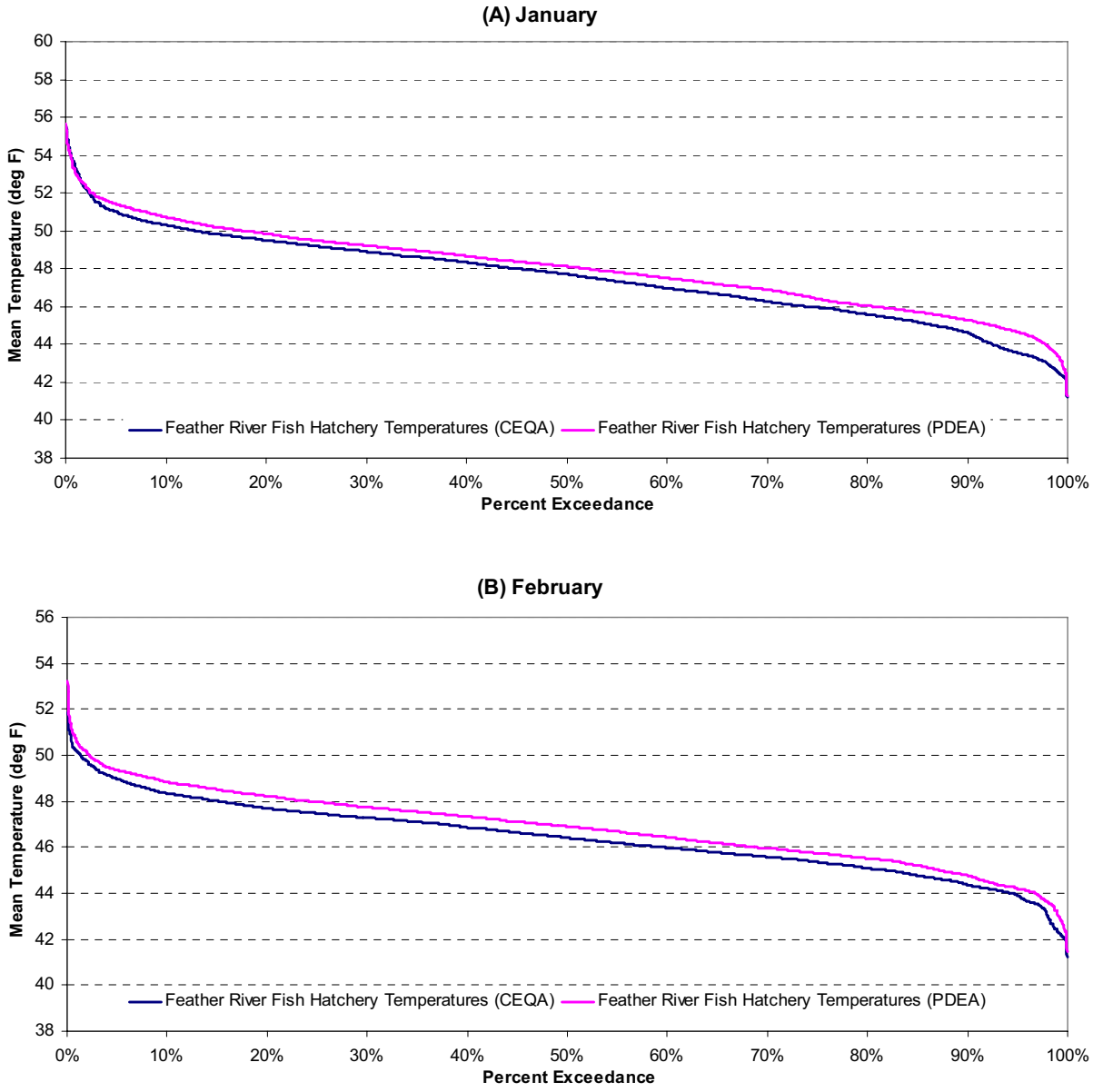
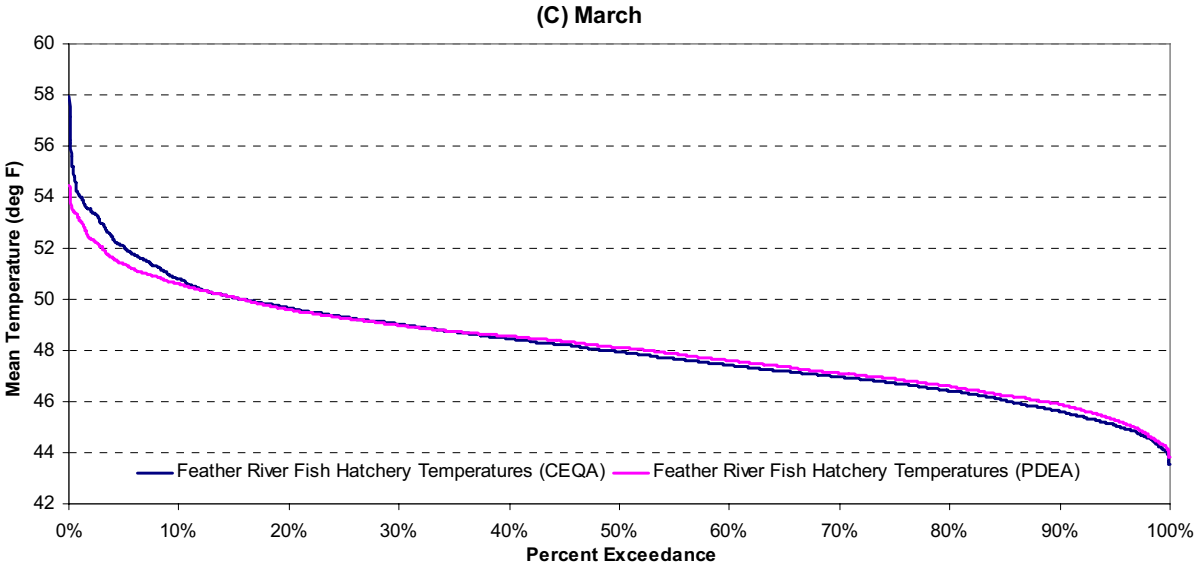


Figure E.2-2. Comparison of exceedance probabilities for simulated mean daily water temperatures at the Feather River Fish Hatchery under the Proposed Project Alternative for CEQA and the Proposed Action Alternative for the PDEA.



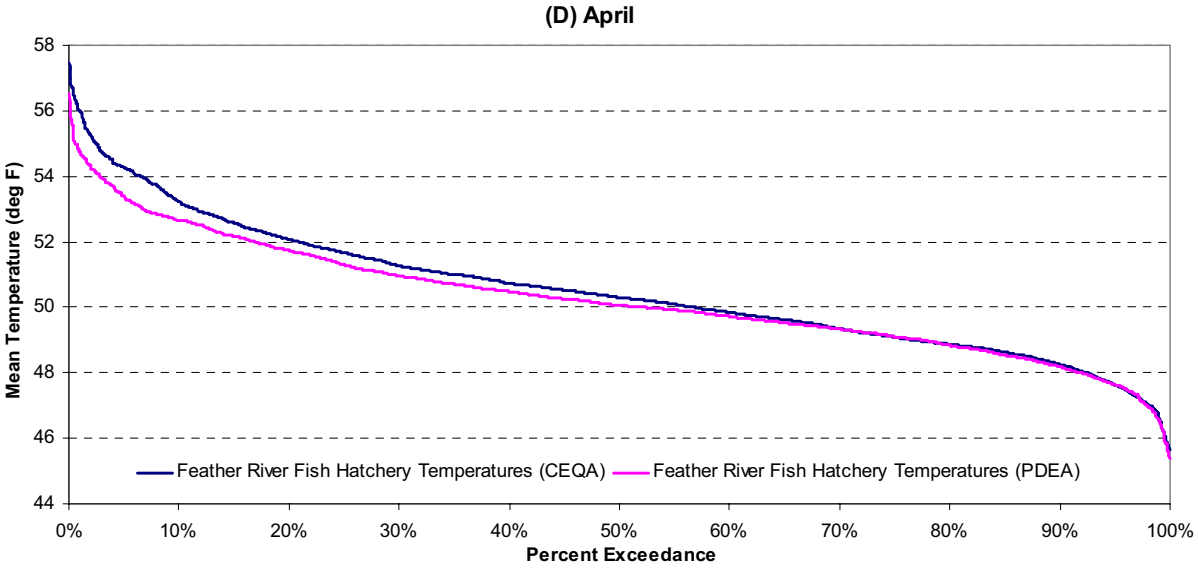
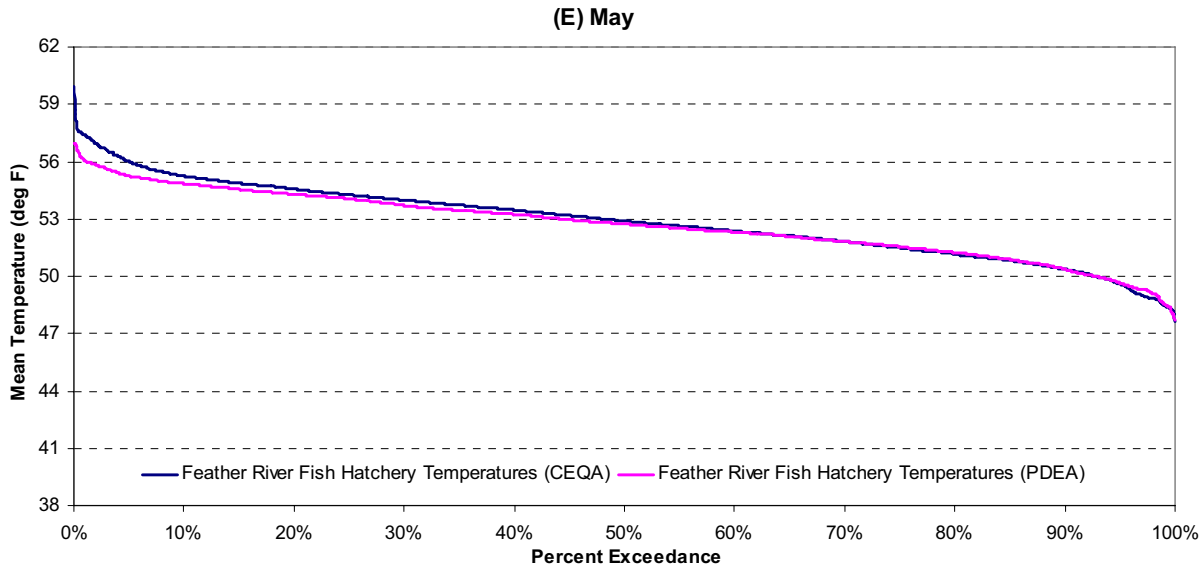


Figure E.2-2 (continued). Comparison of exceedance probabilities for simulated mean daily water temperatures at the Feather River Fish Hatchery under the Proposed Project Alternative for CEQA and the Proposed Action Alternative for the PDEA.



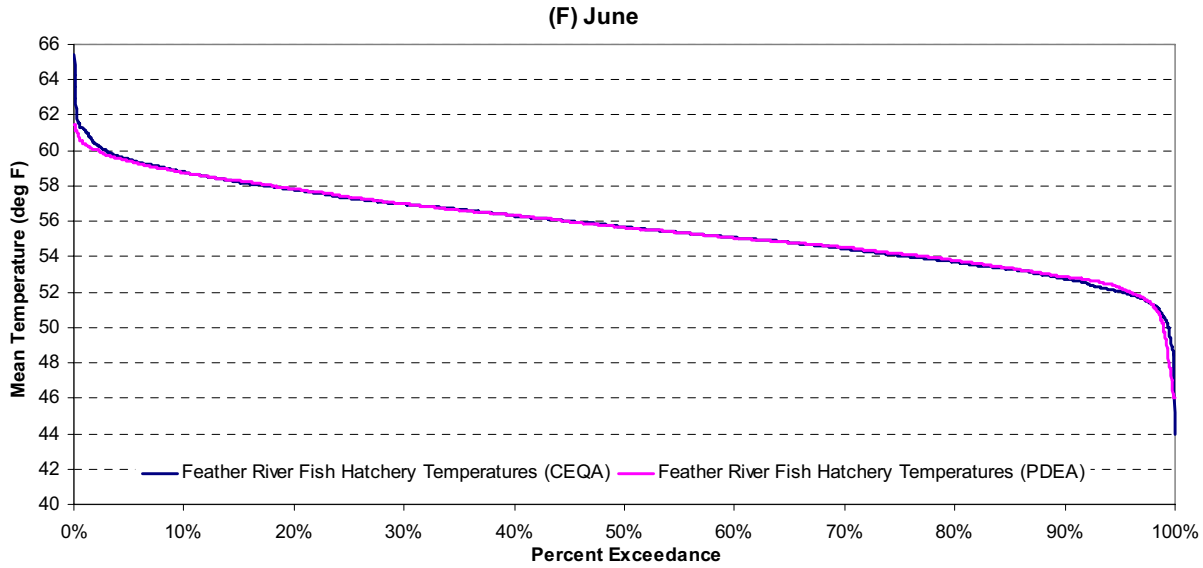
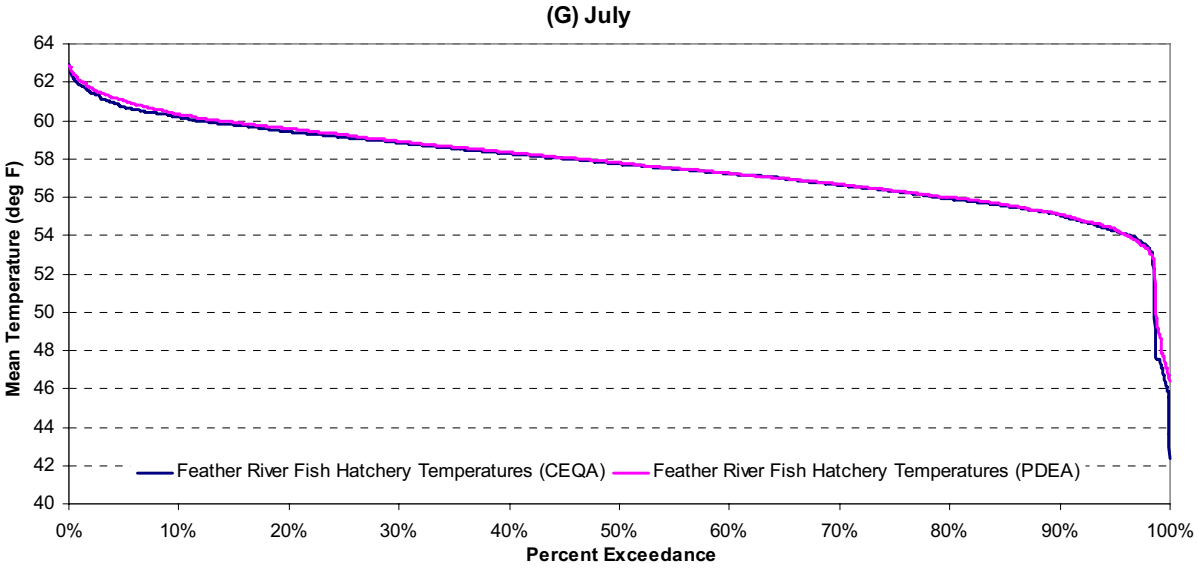


Figure E.2-2 (continued). Comparison of exceedance probabilities for simulated mean daily water temperatures at the Feather River Fish Hatchery under the Proposed Project Alternative for CEQA and the Proposed Action Alternative for the PDEA.



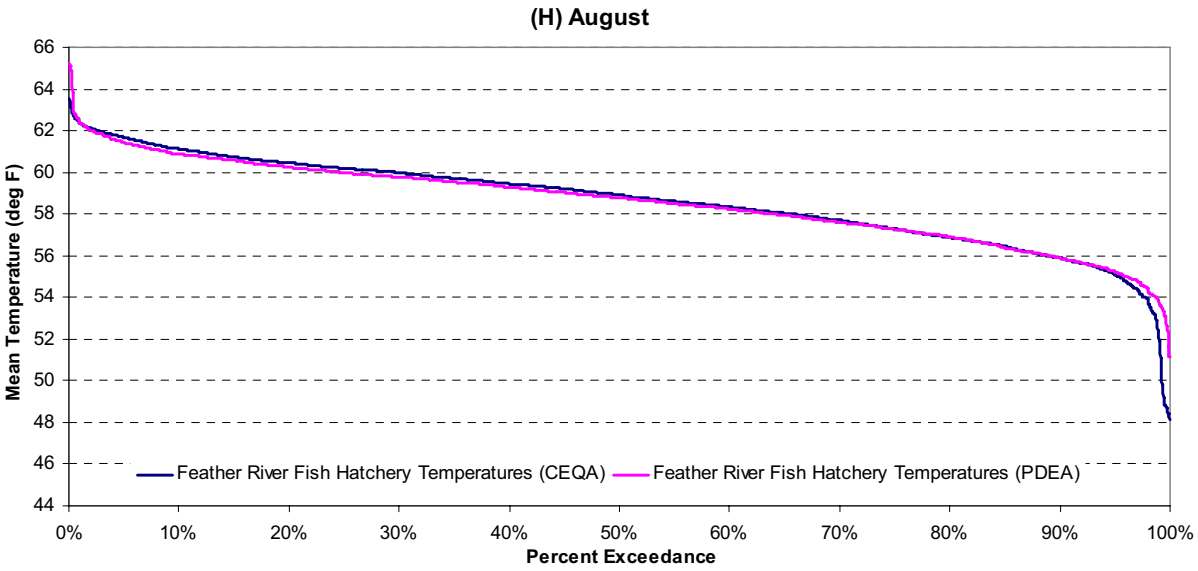
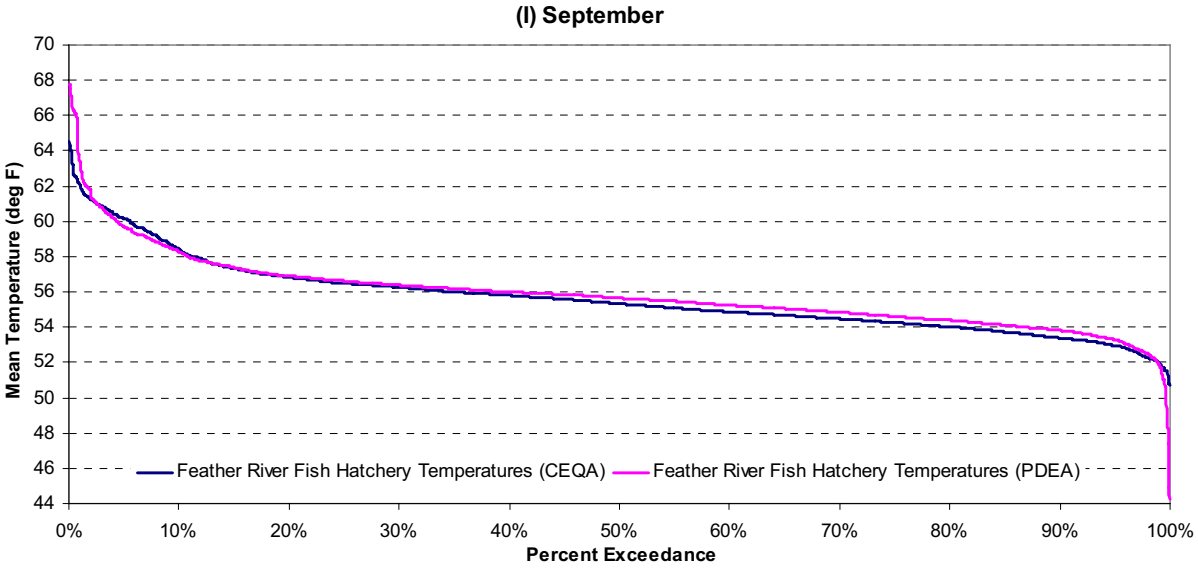


Figure E.2-2 (continued). Comparison of exceedance probabilities for simulated mean daily water temperatures at the Feather River Fish Hatchery under the Proposed Project Alternative for CEQA and the Proposed Action Alternative for the PDEA.



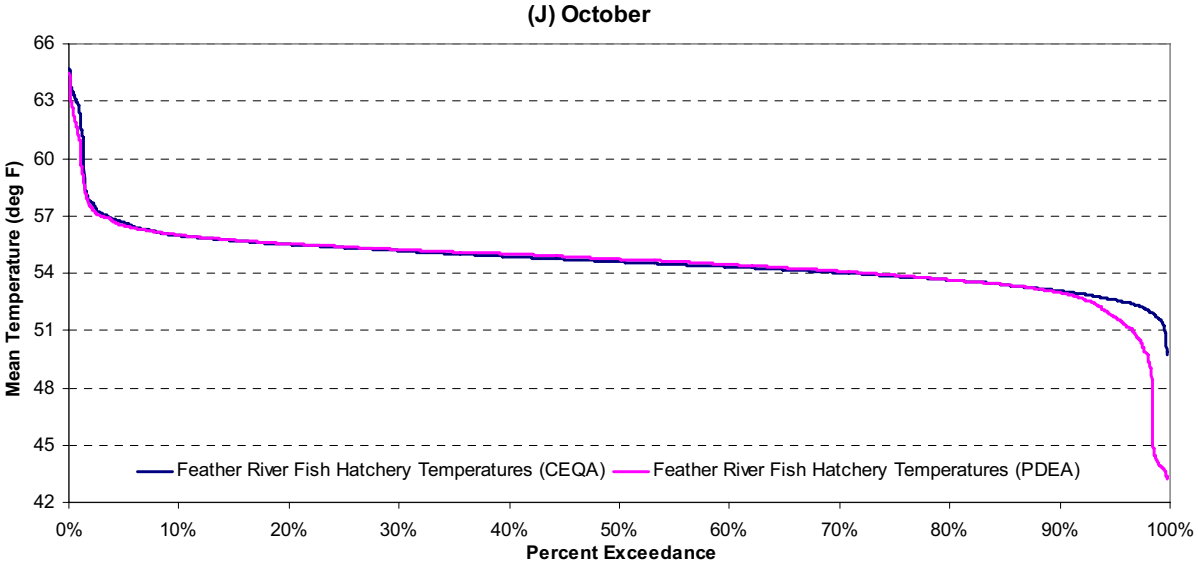


Figure E.2-2 (continued). Comparison of exceedance probabilities for simulated mean daily water temperatures at the Feather River Fish Hatchery under the Proposed Project Alternative for CEQA and the Proposed Action Alternative for the PDEA.

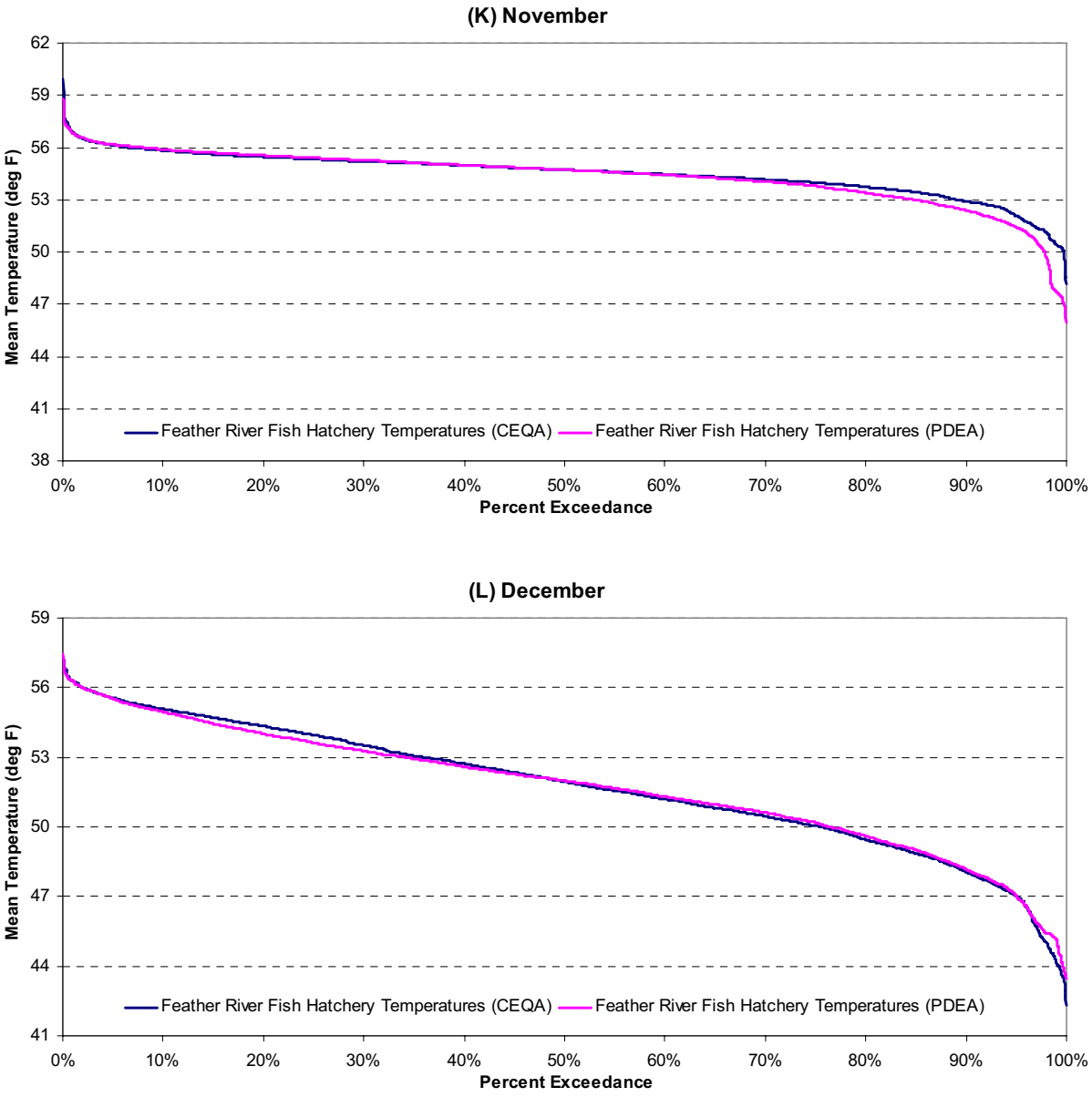


Figure E.2-2 (continued). Comparison of exceedance probabilities for simulated mean daily water temperatures at the Feather River Fish Hatchery under the Proposed Project Alternative for CEQA and the Proposed Action Alternative for the PDEA.

November, and December for 90 percent of the cumulative probability distribution. The exceedance plots show that the water temperatures from the Proposed Project are the same as the Proposed Action for 50 percent of the cumulative probability distribution and warmer than the Proposed Action for 50 percent of the cumulative probability distribution for the month of April. Therefore, the exceedance plot comparison of the Proposed Project vs. the Proposed Action in Figure E.2-2 demonstrates that the

Proposed Project results in an increased percentage probability of water temperature compliance and increased protection of coldwater fisheries resources at the Feather River Fish Hatchery under almost all conditions and months as compared to the Proposed Action.

Exceedance plots of mean daily average water temperatures comparing the Proposed Project and the Proposed Action (see Figure E.2-3) demonstrate that water temperatures at Robinson Riffle are the same water temperature or cooler under the Proposed Project for each month of analysis over 100 percent of the cumulative probability distribution from January through September. In October and November, the Proposed Action has a few percent (less than 10 percent) probability of exceedance of water temperatures cooler than the Proposed Project; however, in all of those probabilities, the water temperatures for both the Proposed Project and the Proposed Action are several degrees below the water temperature objectives at Robinson Riffle. The December exceedance plot shows that the Proposed Project cumulative probability distribution of mean average daily water temperatures is the same or cooler than the Proposed Action. Therefore, the exceedance plot comparison of the Proposed Project vs. the Proposed Action in Figure E.2-3 demonstrates that the Proposed Project results in an increased percentage probability of water temperature compliance and increased protection of coldwater fisheries resources at Robinson Riffle under almost all conditions and months as compared to the Proposed Action.

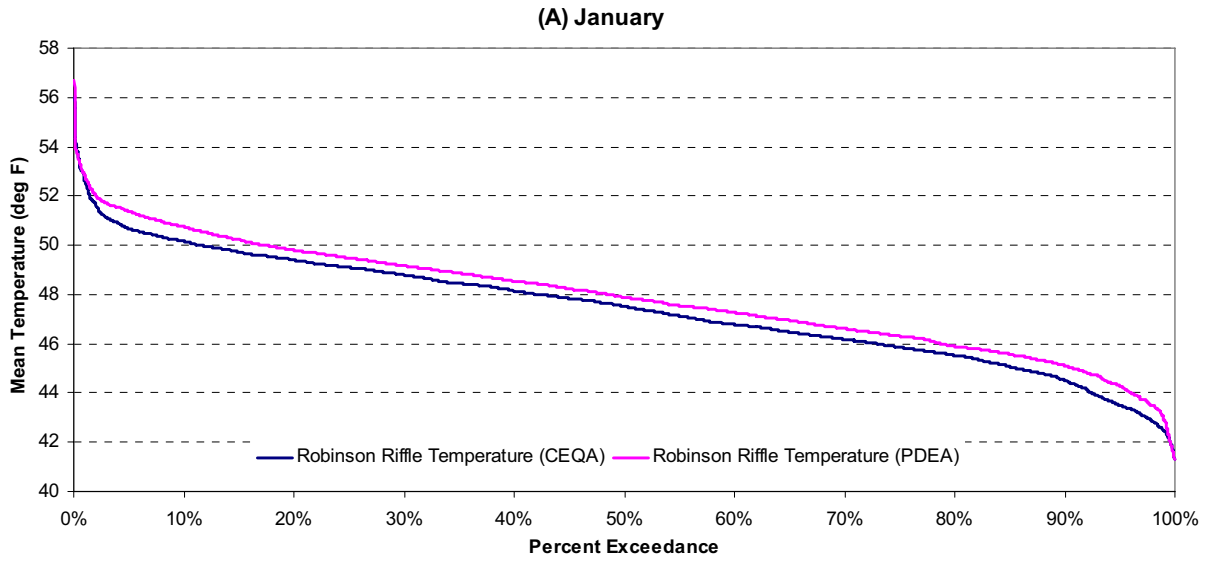


Figure E.2-3. Comparison of exceedance probabilities for simulated mean daily water temperatures at Robinson Riffle under the Proposed Project Alternative for CEQA and the Proposed Action Alternative for the PDEA.

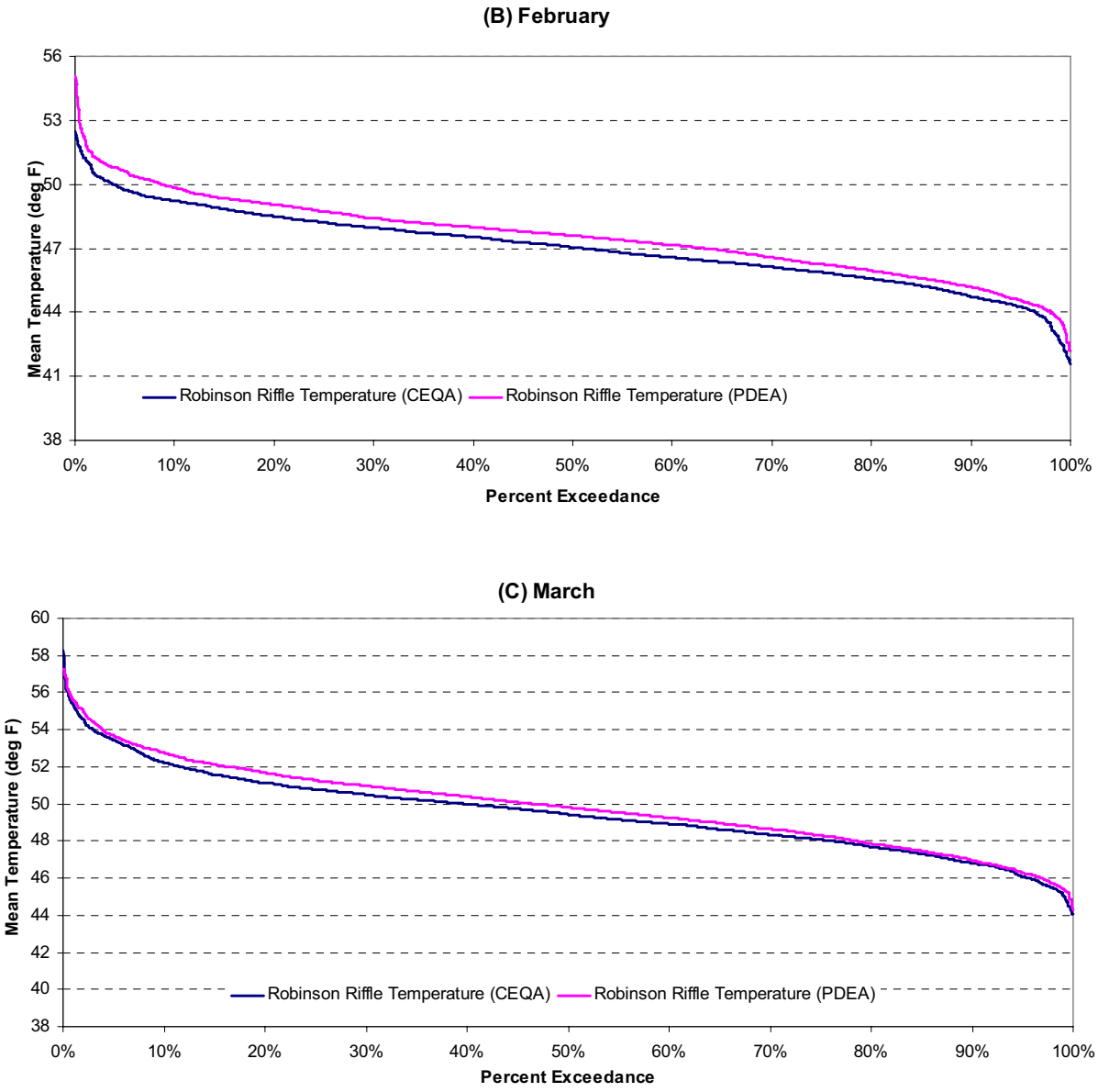
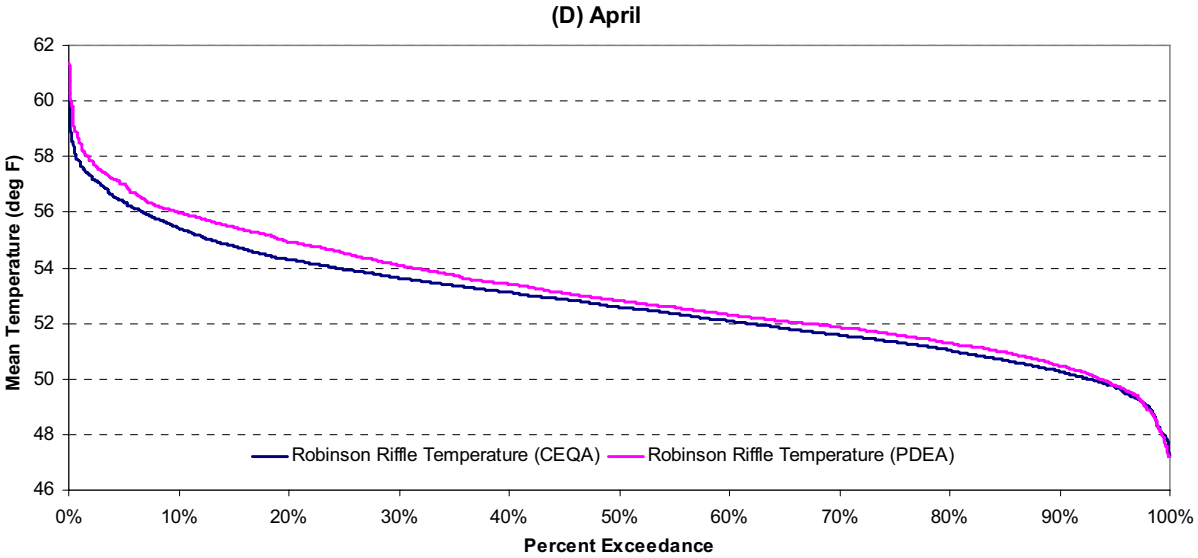


Figure E.2-3 (continued). Comparison of exceedance probabilities for simulated mean daily water temperatures at Robinson Riffle under the Proposed Project Alternative for CEQA and the Proposed Action Alternative for the PDEA.



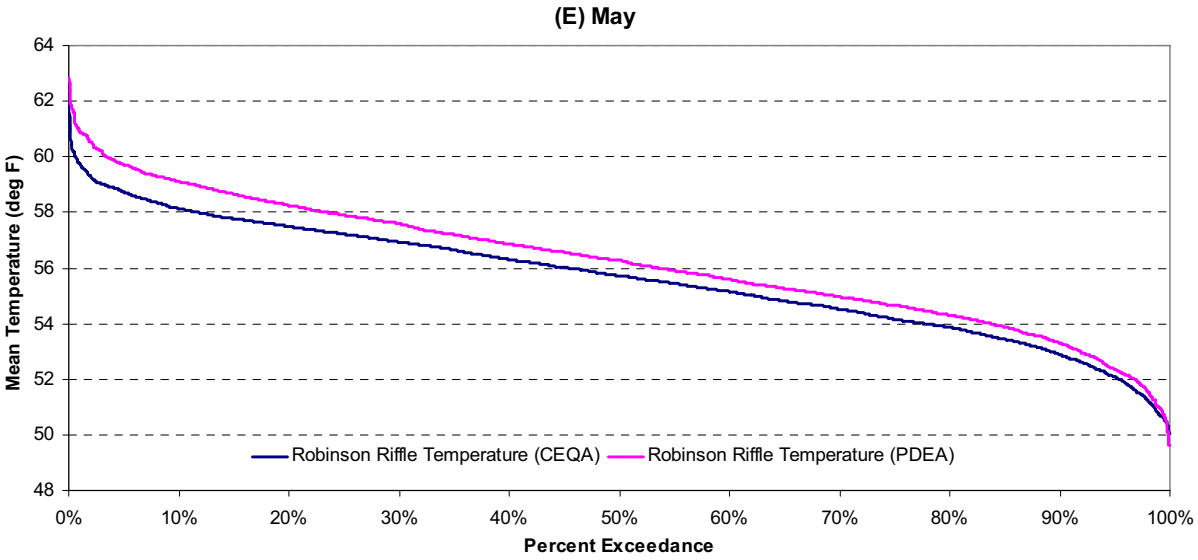


Figure E.2-3 (continued). Comparison of exceedance probabilities for simulated mean daily water temperatures at Robinson Riffle under the Proposed Project Alternative for CEQA and the Proposed Action Alternative for the PDEA.

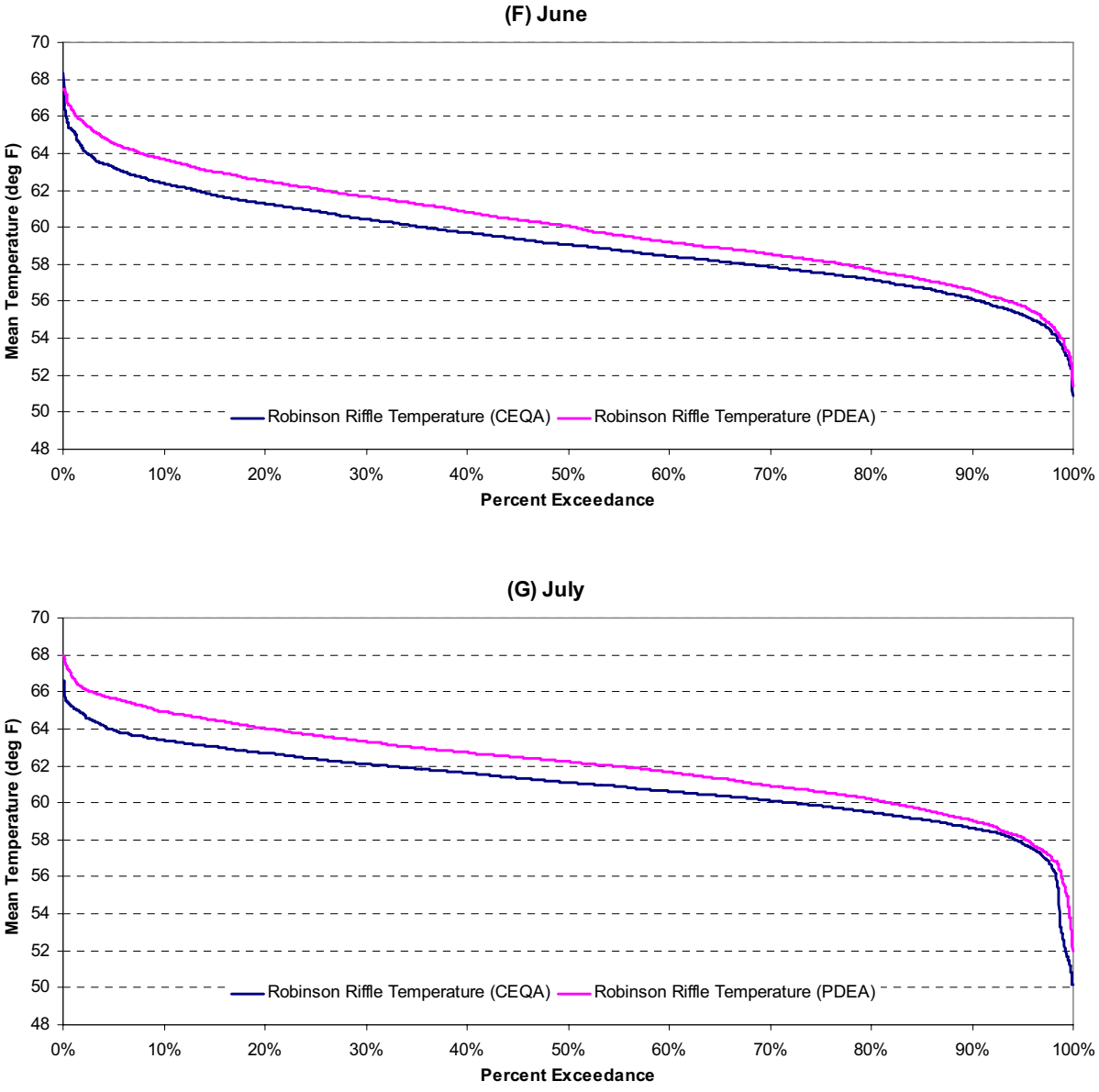
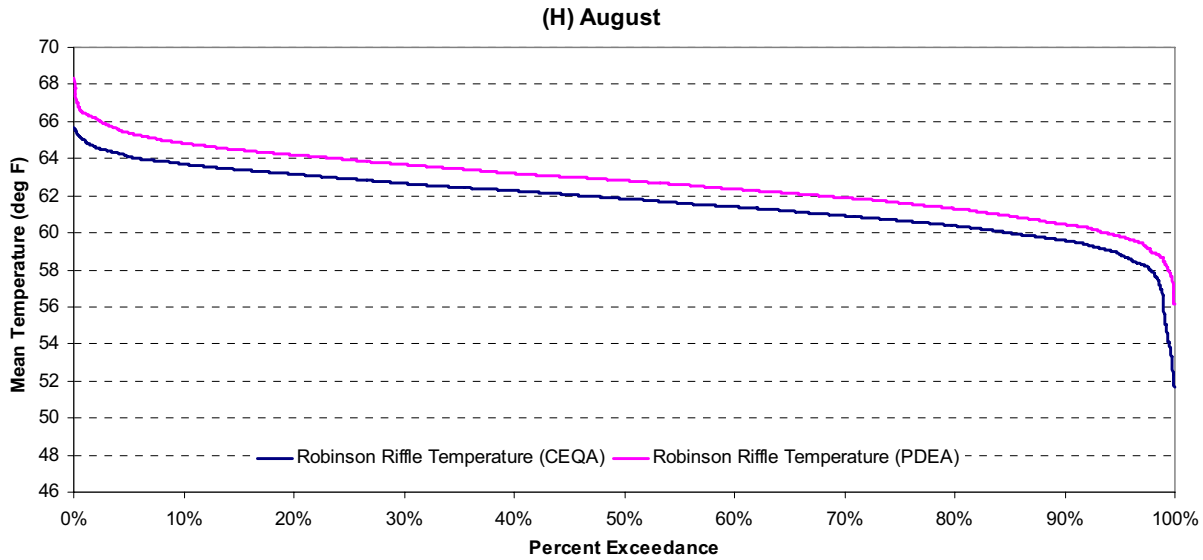


Figure E.2-3 (continued). Comparison of exceedance probabilities for simulated mean daily water temperatures at Robinson Riffle under the Proposed Project Alternative for CEQA and the Proposed Action Alternative for the PDEA.



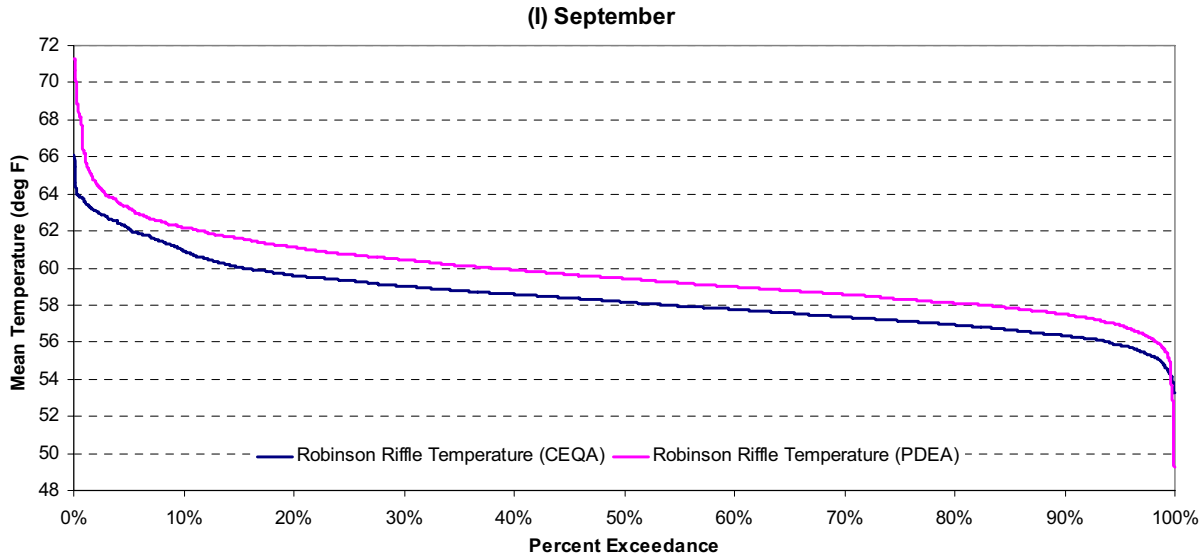
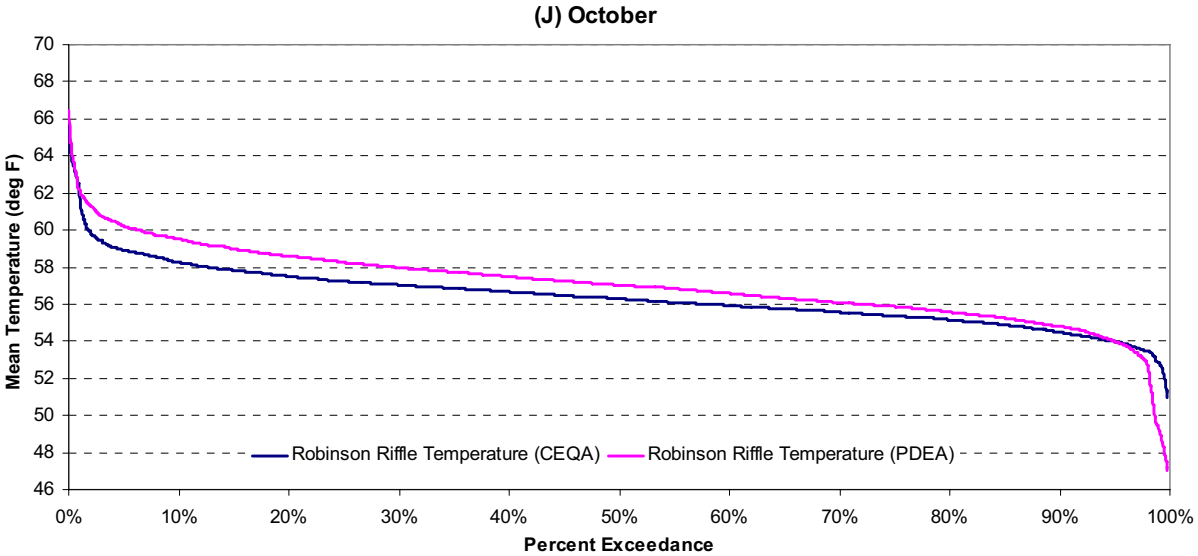


Figure E.2-3 (continued). Comparison of exceedance probabilities for simulated mean daily water temperatures at Robinson Riffle under the Proposed Project Alternative for CEQA and the Proposed Action Alternative for the PDEA.



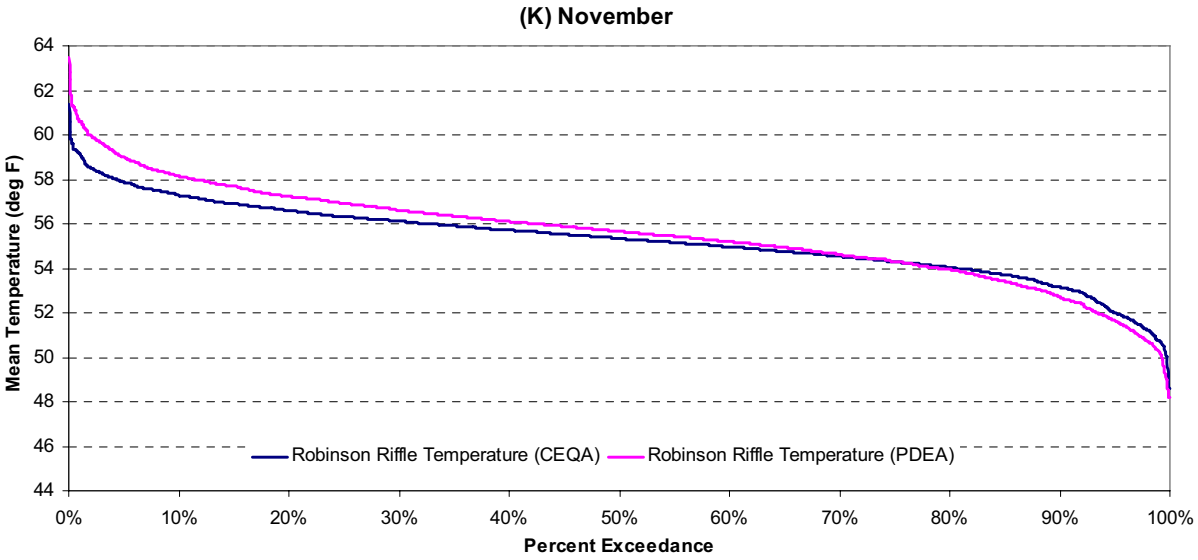


Figure E.2-3 (continued). Comparison of exceedance probabilities for simulated mean daily water temperatures at Robinson Riffle under the Proposed Project Alternative for CEQA and the Proposed Action Alternative for the PDEA.

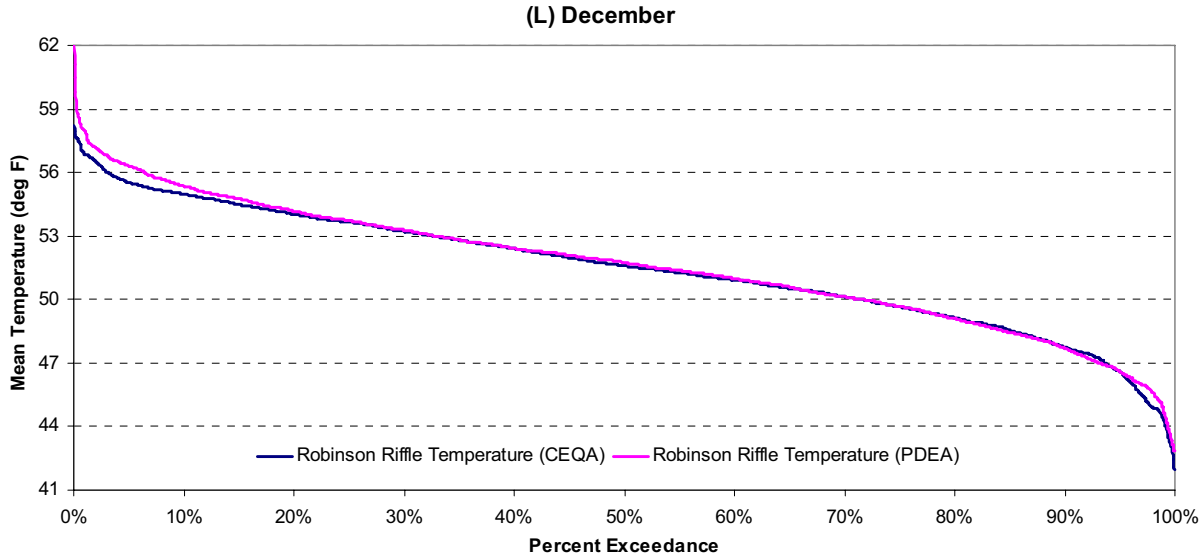


Figure E.2-3 (continued). Comparison of exceedance probabilities for simulated mean daily water temperatures at Robinson Riffle under the Proposed Project Alternative for CEQA and the Proposed Action Alternative for the PDEA.

Exceedance plots of mean daily average water temperatures comparing the Proposed Project and the Proposed Action (see Figure E.2-4) demonstrate that water temperatures in the lower Feather River below the Thermalito Afterbay Outlet are the same water temperatures or cooler under the Proposed Project for the months of January, February, March, April, July, and September for 100 percent of the cumulative probability distribution. Water temperatures in the lower Feather River below the Thermalito Afterbay Outlet are the same water temperatures or cooler under the Proposed Project for the months of May, June, August, and December for 95 percent of the cumulative probability distribution. The exceedance plots show that the water temperatures from the Proposed Project are the same as the Proposed Action for 50 percent of the cumulative probability distribution in the month of November and the same or cooler than the Proposed Action for 20 percent of the cumulative probability distribution for the month of October. Therefore, the exceedance plot comparison of the Proposed Project vs. the Proposed Action in Figure E.2-4 demonstrates that the Proposed Project results in an increased percentage probability of water temperature compliance and increased protection of coldwater fisheries resources in the lower Feather River below the Thermalito Afterbay Outlet under most conditions and months as compared to the Proposed Action.

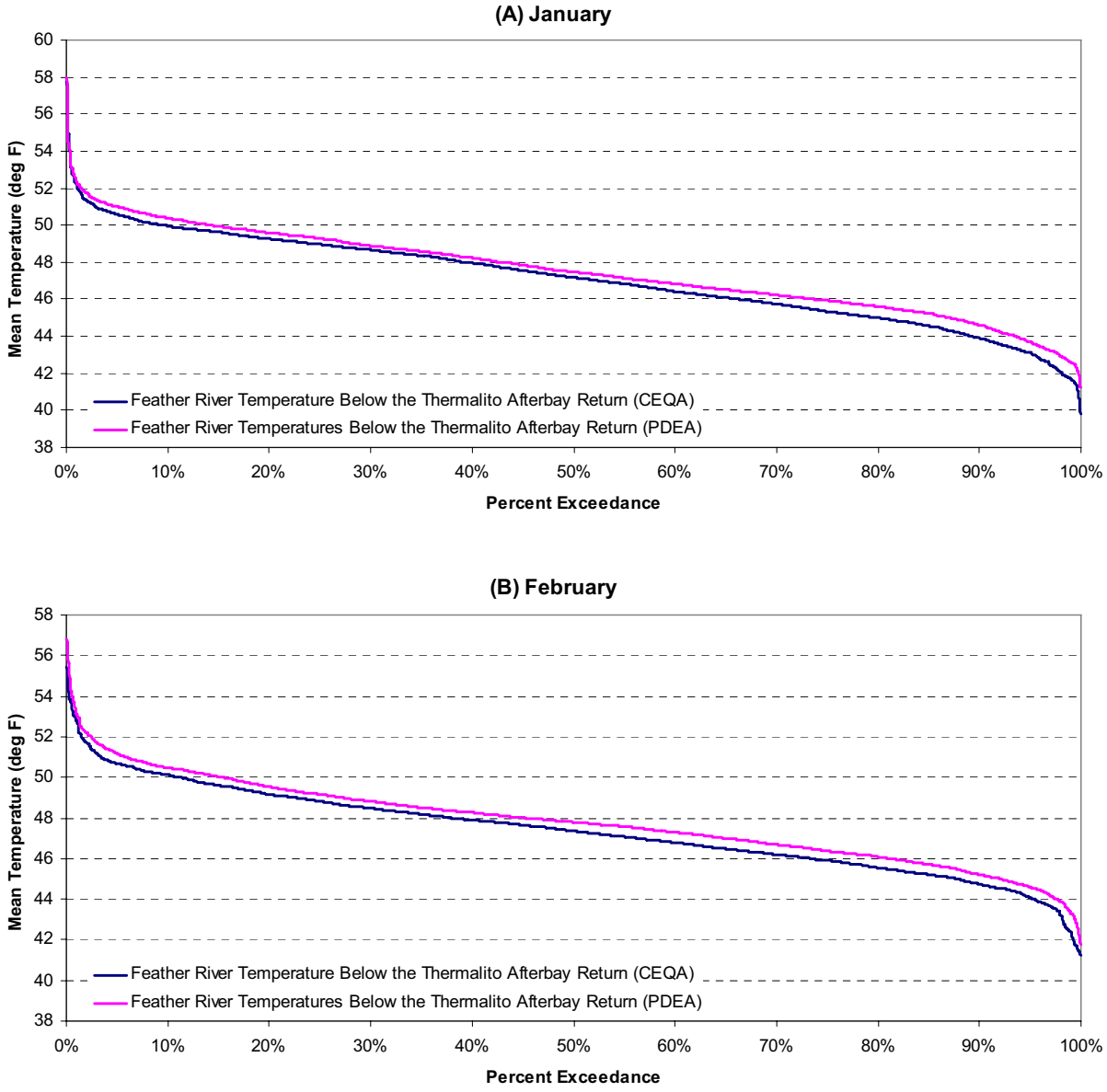


Figure E.2-4. Comparison of exceedance probabilities for simulated mean daily water temperatures below the Thermalito Afterbay return under the Proposed Project Alternative for CEQA and the Proposed Action Alternative for the PDEA.

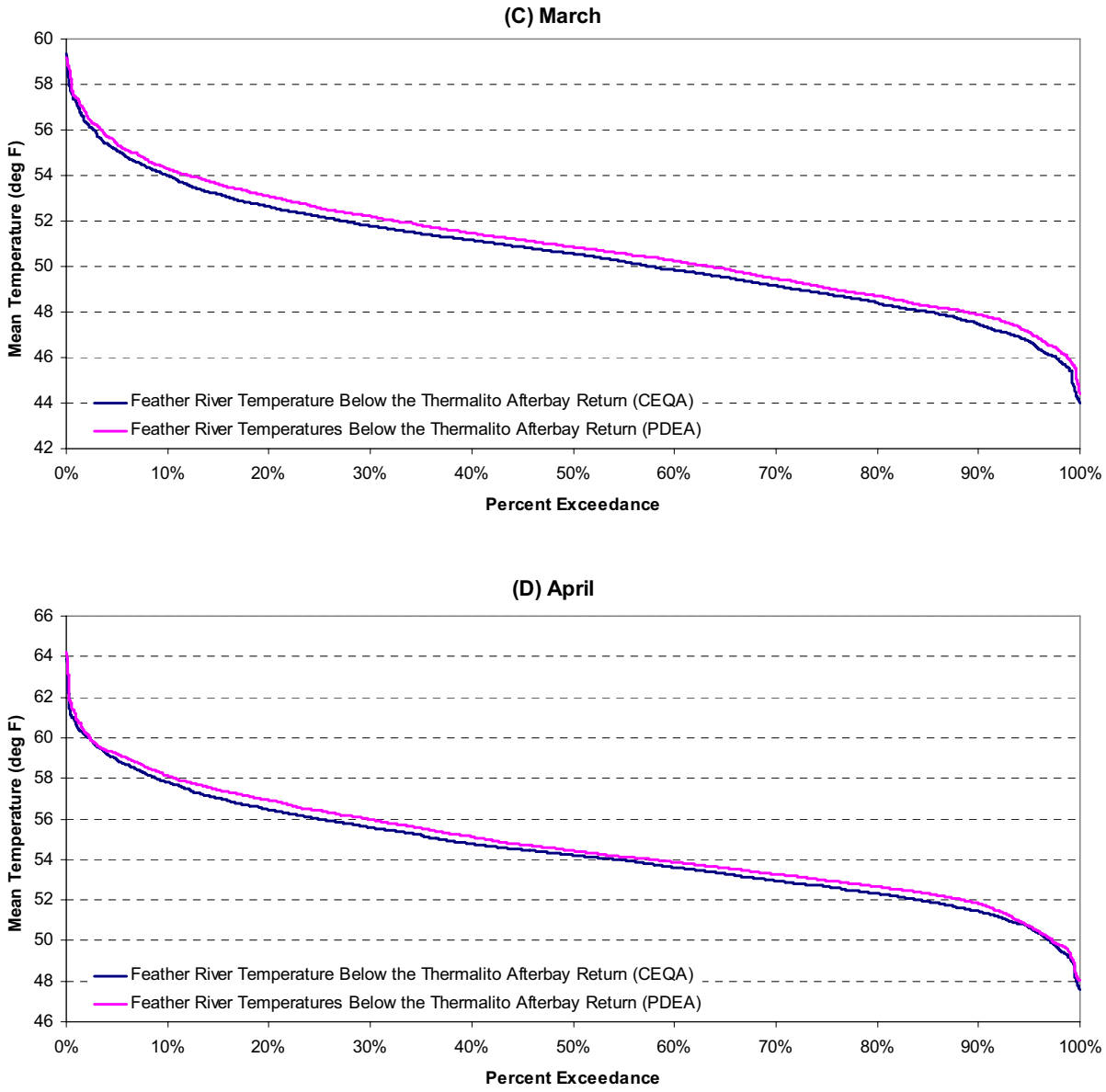


Figure E.2-4 (continued). Comparison of exceedance probabilities for simulated mean daily water temperatures below the Thermalito Afterbay return under the Proposed Project Alternative for CEQA and the Proposed Action Alternative for the PDEA.

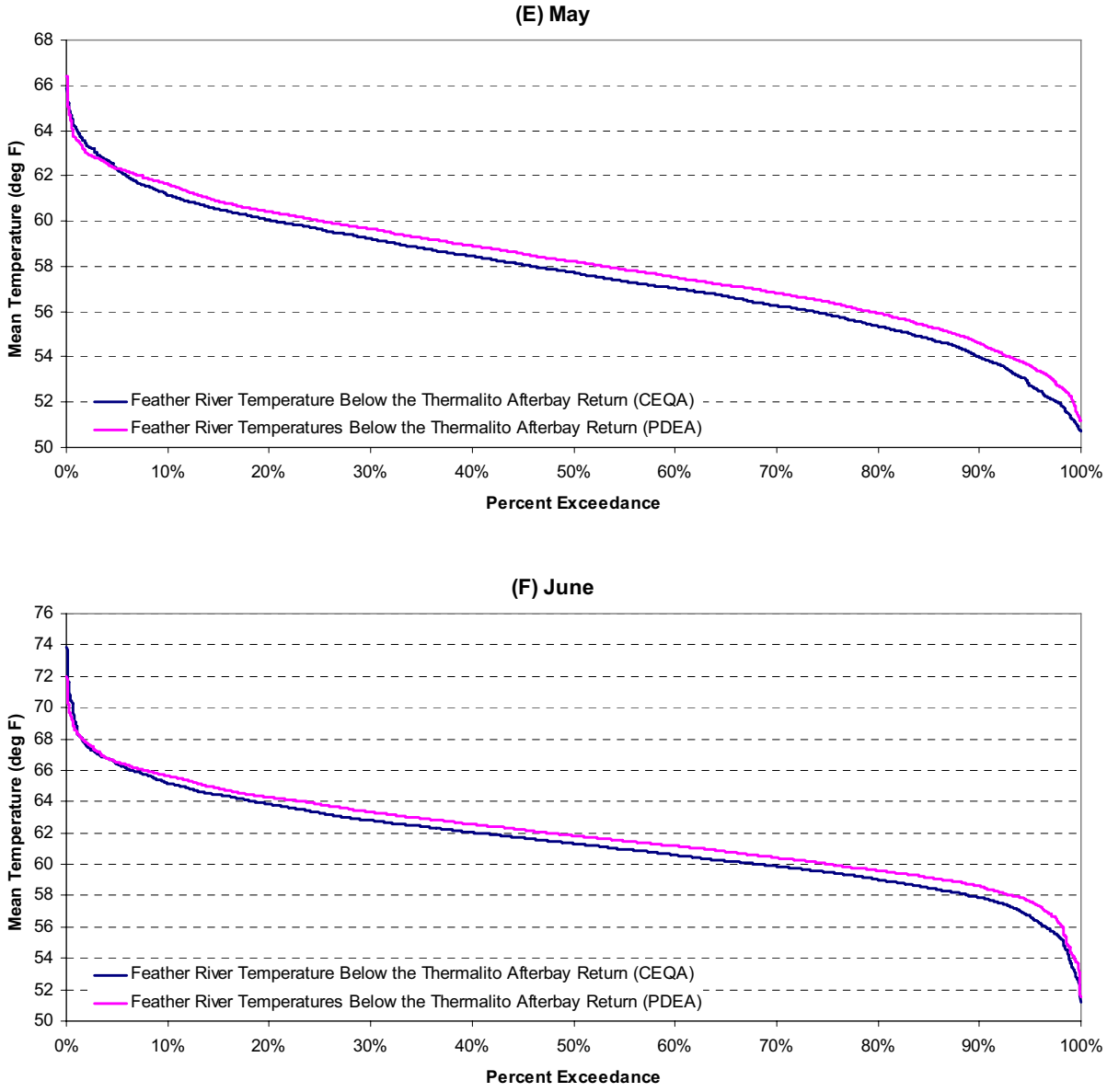


Figure E.2-4 (continued). Comparison of exceedance probabilities for simulated mean daily water temperatures below the Thermalito Afterbay return under the Proposed Project Alternative for CEQA and the Proposed Action Alternative for the PDEA.

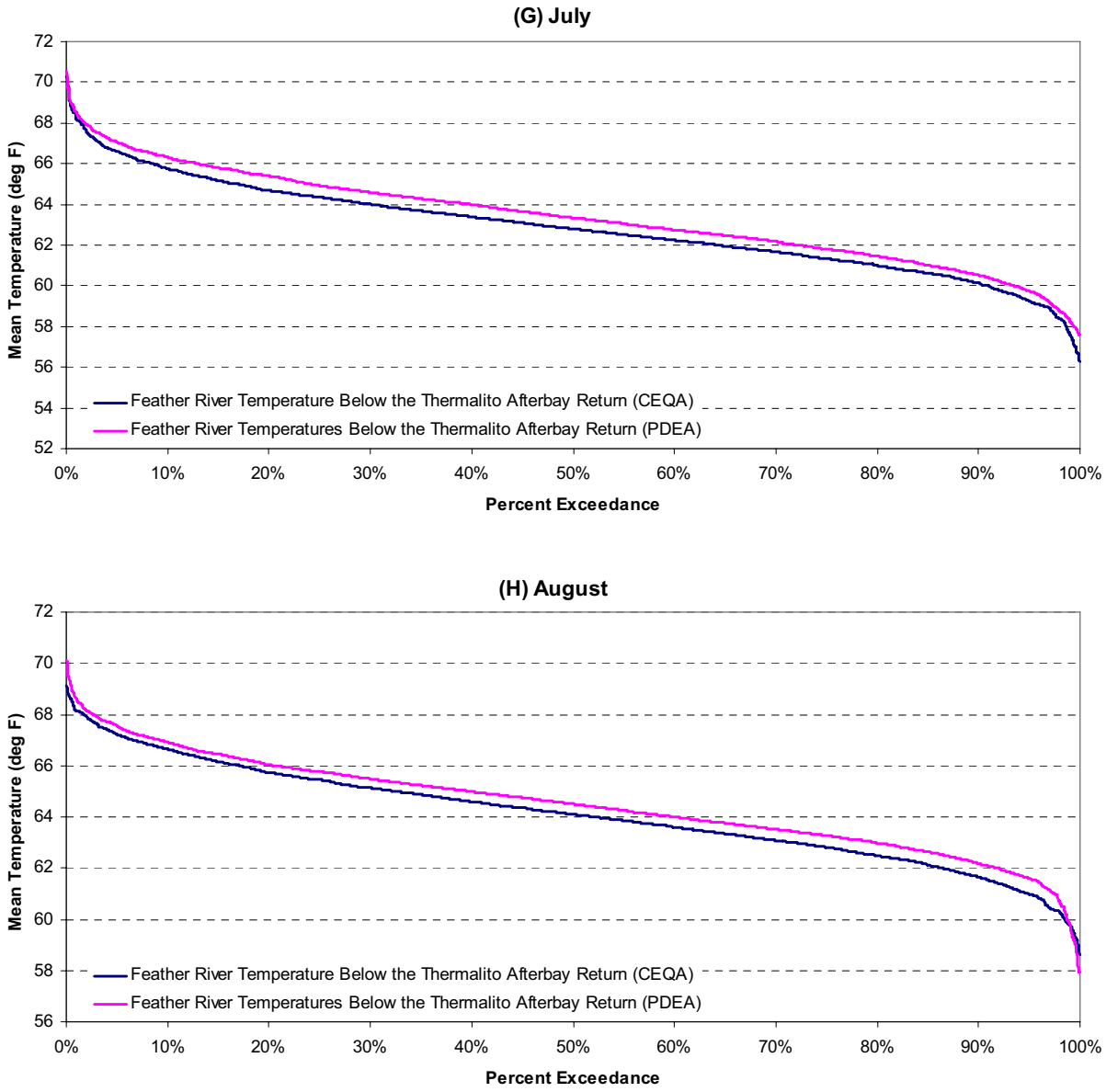


Figure E.2-4 (continued). Comparison of exceedance probabilities for simulated mean daily water temperatures below the Thermalito Afterbay return under the Proposed Project Alternative for CEQA and the Proposed Action Alternative for the PDEA.

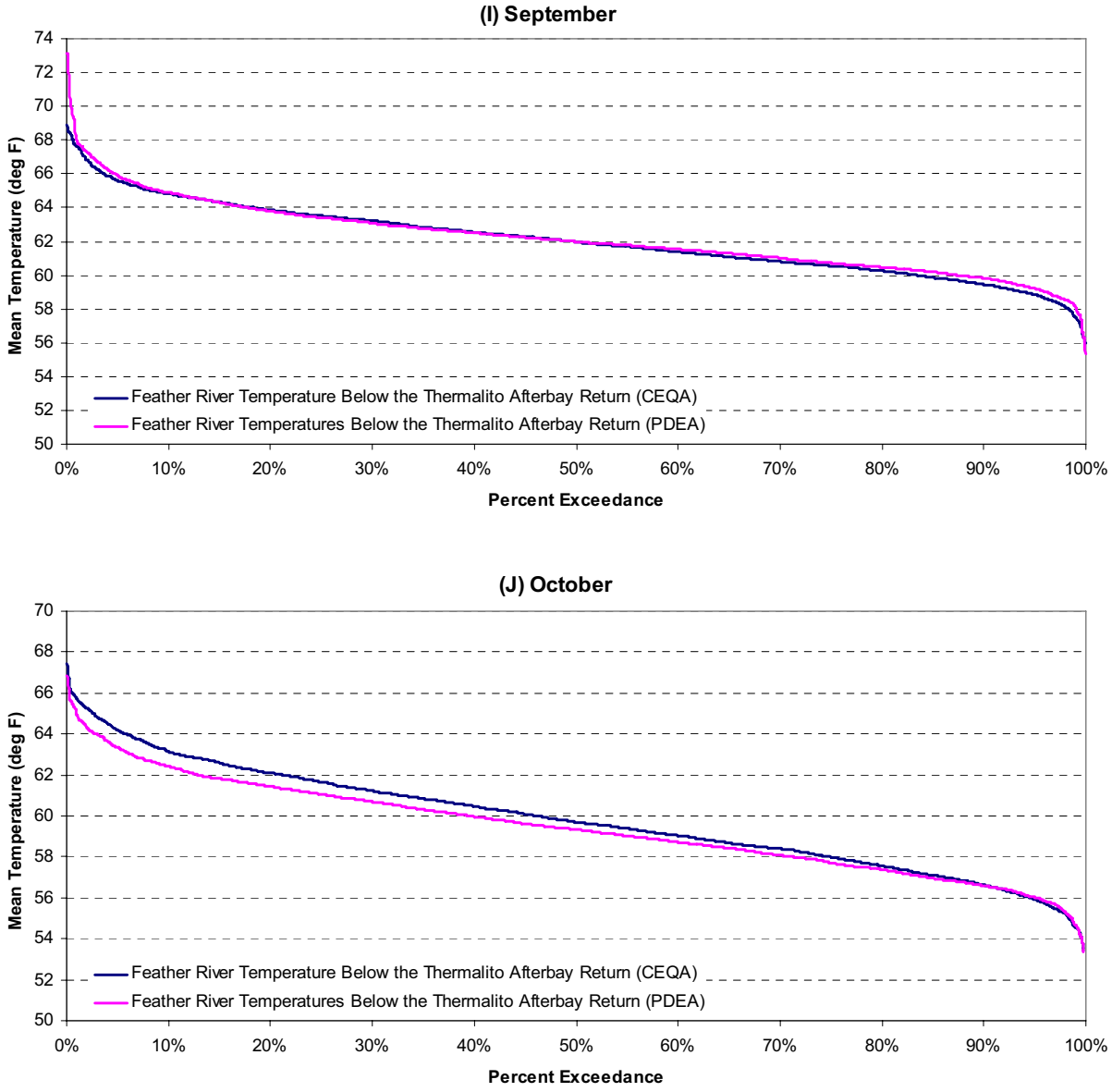


Figure E.2-4 (continued). Comparison of exceedance probabilities for simulated mean daily water temperatures below the Thermalito Afterbay return under the Proposed Project Alternative for CEQA and the Proposed Action Alternative for the PDEA.

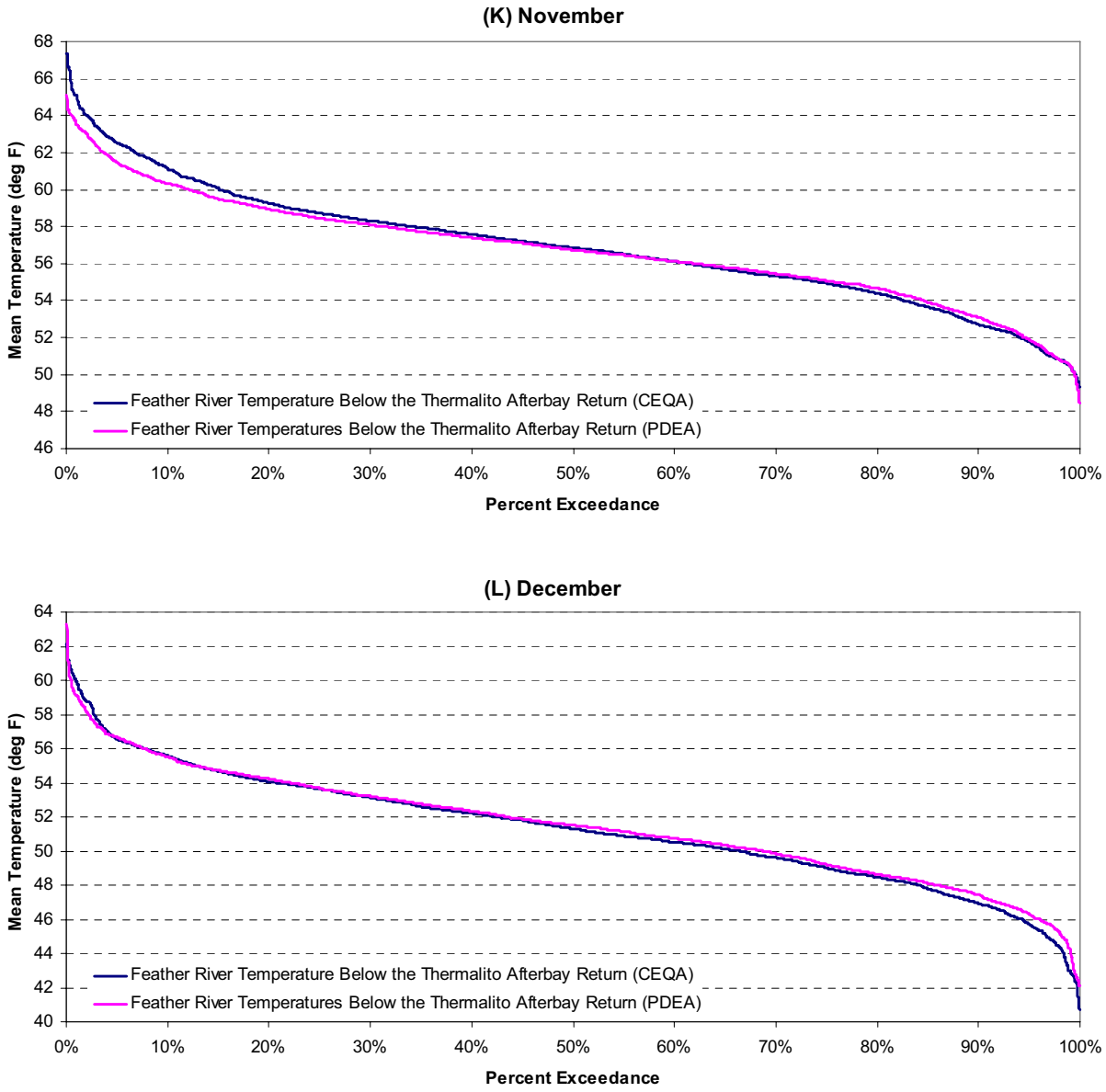


Figure E.2-4 (continued). Comparison of exceedance probabilities for simulated mean daily water temperatures below the Thermalito Afterbay return under the Proposed Project Alternative for CEQA and the Proposed Action Alternative for the PDEA.

The exceedance plots demonstrate that the Proposed Project results in a reduction in the water temperature conditions in all three key water temperature evaluation locations under most conditions in all months as compared to the Proposed Action. Therefore, overall, the Proposed Project as compared to the Proposed Action results in either a reduction or the same water temperature under most conditions and months as compared to the Proposed Action.

The differences in modeling assumptions between modeling conducted for the PDEA and EIR appear to have little to no effect on modeled water temperature results. Therefore, the comparison of Proposed Action and the Proposed Project water temperatures appears to be valid and not materially affected by the differences in the modeling assumptions between these scenarios.

E.2.6 Coldwater Pool Availability

The following section addresses the ability of the Proposed Project to meet the more protective water temperature targets during the initial new license period, compared to either the Existing Conditions/No-Action Alternative or the Proposed Action. The ability of the project to meet the initial new license period water temperature targets is determined by evaluating changes in two water temperature management factors. First, in over 45 percent of the 73-year period of simulated hydrology modeled (see Figure E.2-5), there would be an accessible coldwater pool at the end of the water temperature management season under the Proposed Action. During those years when additional coldwater pool volume is accessible by the current facilities, the more protective water temperature targets of the Proposed Project during the initial new license period would result in additional coldwater fisheries benefits. Second, even in years when additional coldwater pool volume was not accessible, conditions achieved would still be enhanced compared to either the Existing Conditions/No-Action Alternative or the Proposed Action due to the increased efficiency of use of the limited coldwater pool through improved coldwater pool conservation water temperature control actions (TCAs) included in the Proposed Project.

Figure E.2-5 shows that under all probabilities of cumulative distribution in the 73-year model comparison period, the Proposed Project at the end of the water temperature control season has over 100,000 acre-feet more accessible coldwater pool volume than the Proposed Action, even after meeting the more protective water temperature standards included in the Proposed Action. This exceedance plot demonstrates that the Proposed Project has an enhanced ability to meet the more protective water temperature management standards, without increased frequency of use of the river valves, than the less protective standards of the Proposed Action. Therefore, the Proposed Project would provide additional enhancement of coldwater beneficial uses and coldwater fisheries resources than the Proposed Action, but would be more reliably protective as well.

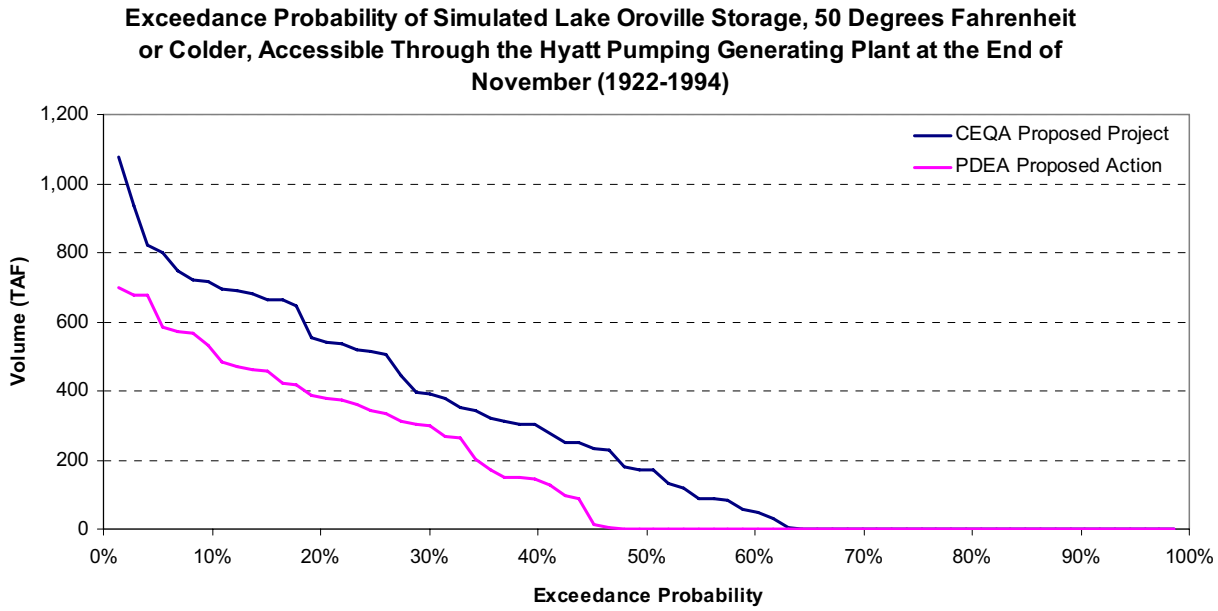


Figure E.2-5. Exceedance plot comparing the Proposed Project to the Proposed Action coldwater pool volume accessible through the Hyatt Intake at the end of the water temperature management season.

For the purposes of this analysis, November is the end of the water temperature management season because (1) water temperature exceedances have occurred in November in the past; (2) significant inflows resulting from precipitation events typically do not occur by the end of November; and (3) reservoir turnover typically occurs in December or later. Therefore, the month of November is most representative of the coldwater pool resource available to manage water temperatures downstream of Oroville Reservoir.

E.2.7 Temperature Control Action Sequence

The Proposed Project changes the sequence of TCAs compared to the Existing Conditions/No-Action Alternative and the Proposed Action evaluated in the PDEA. As demonstrated by Figure E.2-5, the Proposed Project TCA sequence is more efficient at preserving coldwater pool reserves in Lake Oroville. The new TCA sequence enables the Proposed Project to achieve a more rapid response to temperature control management needs than the previous TCA sequence used for the Existing Conditions/No-Action Alternative or Proposed Action modeling in the PDEA.

The TCAs used in all model runs included:

- *Cut pumpback operations*. The Hyatt Pumping-Generating Plant and the Thermalito Pumping-Generating Plant are capable of reversing direction, and

pumping water from the Thermalito Afterbay, through the Thermalito Forebay and Diversion Pool, into Lake Oroville. The decision to pump back or not to pump back is made based on the value of power at a particular time, and the required volume for release from the Oroville Facilities. The typical effect of this operation is a warming of the water around the Hyatt Pumping-Generating Plant Intake in Lake Oroville, and warming the releases from the Thermalito Diversion Pool to the Feather River Fish Hatchery and LFC. By stopping pumpback operations, the Thermalito Diversion Pool and Lake Oroville are not warmed up, thus slightly cooling flows to the Feather River Fish Hatchery and the LFC.

- *Redirecting flow from the Thermalito Afterbay to the LFC*. Heat gain in the low flow channel can be reduced by increasing the releases from the Thermalito Diversion Dam to the LFC, and reducing the diversions into the Thermalito Afterbay. Since the combined outflow from the Thermalito Afterbay and the LFC is consistent, routing flow from the Thermalito Afterbay to the LFC does not affect the water supply of the system. However, increased LFC flow reduces the generation from the Thermalito Pumping-Generating Plant and increases the residence time for storage in the Thermalito Afterbay, potentially warming the Thermalito Afterbay releases to the Feather River and at the agricultural diversions to the Feather River Service Area.

- *Remove shutters*. By removing shutters from the Hyatt Intake towers, water from a lower elevation was released to the river. There are 13 shutters in each intake tower; for purposes of modeling, it was assumed that a shutter from each intake tower would be removed at the same time as needed.

- *Use the river valves*. The river valves at the base of Oroville Dam can release water from near the bottom of Lake Oroville, and have access to substantially more coldwater than the Hyatt Pumping-Generating Plant, which has a higher intake level. While the flow through the river valves is limited to 1,500 cfs due to concerns about valve reliability, releases from the river valves are typically colder than releases through the Hyatt Pumping-Generating Plant. Since no generation is available on releases through the river valves, they are used only as the last resort for making coldwater releases from Lake Oroville to manage water temperature objectives at the Feather River Fish Hatchery.

- As previously described, the sequence of TCA implementation was different for the PDEA and CEQA modeling. The TCA sequences used for each environmental document for temperature management at the Feather River Fish Hatchery and Robinson Riffle are described in Table E.2-3.

Table E.2-3. Temperature control action implementation sequences for the PDEA Proposed Action and the CEQA Proposed Project.

Location	PDEA	CEQA
Feather River Fish Hatchery	Remove Shutters Eliminate Pumpback Use River Valve	Eliminate Pumpback Remove Shutters Use River Valve
Robinson Riffle	Remove Shutters Eliminate Pumpback Redirect Flow to 800 cfs	Eliminate Pumpback Redirect Flow to 1,000 cfs Remove Shutters Redirect Flow to 1,500 cfs

The primary difference between the PDEA and CEQA TCA sequences is the reversal of the order of removing shutters and eliminating pumpback. Modeling for the CEQA scenarios placed a higher value on preserving the coldwater volume in response to the year-around temperature requirements at Robinson Riffle for the Proposed Project. The resulting TCA sequence sacrificed power generation, in the form of opportunities to pumpback and re-release, for greater access to coldwater in the latter months of the year. SA Article A108 does not specify the sequence of TCAs and provides DWR latitude to utilize these TCAs singularly or in combination.

More efficient TCAs that preserve coldwater pool resources allow reliable achievement of more protective water temperature objectives under the Proposed Project that were not feasible with the previous TCA sequence under either the Existing Conditions/No-Action Alternative or the Proposed Action. Overall, the improved sequence of TCAs under the Proposed Project versus the Proposed Action would result in more reliable and more protective water temperature management under the Proposed Project relative to the Proposed Action.

E.2.8 Water Temperature Effects of Potential Future Facilities Modifications

The potential future facilities modifications under SA Article A108.4 have the designed intent to increase the volume of accessible coldwater pool in Lake Oroville, minimize heat gains from the point of release to locations farther downstream in the Feather River, and/or to reduce cold and warmwater mixing in the Thermalito Afterbay. The potential future facilities modifications would be evaluated, defined, and refined through the Feasibility study, as defined in the SA. Because of the design intent, it is reasonably certain that the water temperature objectives in the lower Feather River established after the new facilities testing period defined in Article A108.5 would be even more protective and would further enhance the coldwater fisheries resources than the conditions resulting from the implementation of the initial new license period Proposed Project water temperature management measures. Water temperature changes resulting under the initial new license period of the Proposed Project would result in positive effects for cold freshwater fisheries resources beneficial uses as compared to both the Existing Conditions/No-Action Alternative and the Proposed Action under the PDEA. Furthermore, water temperature targets after the facilities modification period of the Proposed Project would be more protective of coldwater fisheries and cold

freshwater habitat beneficial uses than with implementation of the initial actions of the Proposed Project defined under SA Articles A108.1 and A108.2.

The current descriptions of the potential facilities modifications in the SA lack design specifics and operational characteristics of any future facilities modifications that would be required to support a modeling comparison. This DEIR only evaluates what is currently known regarding these potential facilities modifications. The evaluation utilizes a qualitative approach to assess the general nature and relative magnitude of expected effects on surface water temperatures. Plans for these facilities would not be prepared for several years after the new license acceptance and actual facilities would not be constructed for at least 10 years. Therefore, additional modeling at this time to evaluate effects of the potential future facilities modifications would be premature. . Because the Future Condition modeling scenario for the PDEA evaluation was based on a year 2020 projection of project operations, any "future" scenario modeling comparison of modified facilities would not be appropriate until a more meaningful "future" project scenario is developed and accepted by FERC for modeling. The process for this future evaluation is fully defined in Article A108 of the SA. Any future facilities modifications would be subjected to detailed evaluation in a subsequent CEQA analysis and environmental document prior to construction.

E.2.9 Thermalito Afterbay Agricultural Diversion Modeling

The dynamic nature of Thermalito Afterbay (e.g., variable Thermalito Afterbay outlet and agricultural diversion volumes, peaking and pump-back operations, Thermalito Afterbay storage drawdown or filling, current and flow mixing patterns, climate, and wind effects) and short period of available water temperature records at the agricultural diversions (approximately 4 years) does not support development, testing, or calibration of detailed quantitative modeling of Thermalito Afterbay agricultural diversion water temperatures. Because the best available water temperature modeling does not support predictive or comparative estimates of water temperatures at the Thermalito Afterbay agricultural diversions, analysis of the Proposed Project and the potential effects of water temperature changes associated with the implementation of the initial new license period actions of the Proposed Project (i.e., flow and operational changes only) as well as the potential effects of future facilities modifications, were conducted utilizing a qualitative analysis approach.

E.2.10 Global Climate Change

Modeling comparison of potential effects of global climate change would be speculative for the CEQA analysis because no generally accepted standards exist regarding the assumptions required to model the effects of potential global climate change. Any climate change would likely equally affect each of the project alternatives because there are no changes in net releases from the facilities with the implementation of any of the project alternatives. In the event of any future, substantial change in climate occurring that affects the ability of the facilities to meet water temperature management requirements, the Oroville Facilities and many other projects would be subject to future

revisions in water temperature management goals, and potential additional facilities or operational modifications to adapt to the new climate and hydrologic conditions.

E.3 CONCLUSIONS

In the preceding sections, the Proposed Project has been compared to both the Existing Conditions/No-Action Alternative and the Proposed Action defined in the PDEA. These comparisons demonstrate that either there are no changes to the project to evaluate under CEQA or that flow and habitat conditions are enhanced or more protected under the Proposed Project, both during the initial new license period and after any post-license issuance facilities modifications are implemented. The results supporting this conclusion are summarized as follows:

- Quantitative modeling comparisons performed previously for the PDEA supporting the FERC license application determined that the Proposed Action would result in beneficial cold freshwater beneficial uses and cold freshwater fisheries effects.

- The Proposed Action and Proposed Project water temperature requirements for the Feather River Fish Hatchery are similar. There are no changes in the maximum allowable water temperature objectives for the hatchery. However, water temperature management actions taken for the hatchery could differ among alternatives..

- The Proposed Project water temperature objectives for Robinson Riffle are more protective with respect to Basin Plan beneficial uses and coldwater fisheries resources than all other project alternative water temperature objectives.

- Increased minimum flows in the LFC during the new license period under the Proposed Project would result in improved water temperatures and improved coldwater pool utilization efficiency, and therefore would result in positive effects on Basin Plan beneficial uses and coldwater fisheries resources.

- No changes in net facilities releases would occur (other than future allocation timing, which is equally applicable to all future project alternatives).

- No net flow release change would result in no flow-related water temperature changes to quantitatively analyze below the Thermalito Afterbay Outlet in the lower Feather River.

- Comparison of water temperature modeling results for the Proposed Project versus the Proposed Action demonstrated that water temperature objectives under the initial new license period of the Proposed Project enhances cumulative probability distribution of coldwater temperatures under almost all conditions.

- The differences in the modeling assumptions included in the PDEA versus those in the EIR are fairly minor, and model results were reasonably and functionally comparable.

- Results of SP-E-7A (Oroville Reservoir Coldwater Pool Availability Analysis) confirmed the ability of the Proposed Project to meet the more protective, enhanced surface water temperature conditions prior to any future facilities modifications through increased use of the accessible coldwater pool and more efficient use of coldwater pool reserves through improved TCAs.

- Potential future facilities modifications that either increase access to coldwater pool volume or reduce water warming opportunities would result in even more protective, enhanced, and beneficial uses related to coldwater fisheries habitat conditions as compared to the beneficial effects from the initial new license period of the Proposed Project.

In summary, this appendix to the EIR has demonstrated that the Proposed Action previously analyzed in the PDEA would result in beneficial effects on beneficial uses, that implementation of the initial actions (i.e. increased minimum flow releases and operational enhancement through modified TCAs) under the Proposed Project would result in either no change or a beneficial change compared to the Proposed Action, and that any future facilities modifications included in the Proposed Project would result in further enhancements to the conditions and level of protection of beneficial uses compared to implementation of the initial actions under the Proposed Project. Therefore, because all facets of the Proposed Project that could be evaluated utilizing modeling comparisons would demonstrably indicate no change or only beneficial effects, further detailed analysis is not required under CEQA guidelines.

E.4 REFERENCES

DWR (California Department of Water Resources). 2005. Application for New License Before the Federal Energy Regulatory Commission, Oroville Facilities Project No. 2100. Volume III: Preliminary Draft Environmental Assessment. January 2005.

DWR (California Department of Water Resources). 2006. Settlement Agreement for Licensing of the Oroville Facilities. Signed March 21, 2006.

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