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## LIST OF ACRONYMS

| | |
|---|---|
| CFR | Code of Federal Regulations |
| FERC or Commission | Federal Energy Regulatory Commission |
| PAD | Pre-Application Document |
| Project | Kaweah Project |
| O&M | operation and maintenance |
| SCE | Southern California Edison Company |
| SD | Supporting Document |
| TSP | Technical Study Plan |
| TSR | Technical Study Report |

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# 8.0 ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION

## 8.1 INTRODUCTION

This section follows the Federal Energy Regulatory Commission's (FERC or Commission) content requirements at Title 18 of the Code of Federal Regulations (CFR) §5.18(b)(5)(ii)(B), which specify that "the applicant must present the results of its studies conducted under the approved study plan by resource area and use the data generated by the studies to evaluate the beneficial and adverse environmental effects of its proposed project. This section must also include, if applicable, a description of any anticipated continuing environmental impacts of continued operation of the project, and the incremental impact of proposed new development of projects works or changes in project operation. This analysis must be based on the information filed in the Pre-Application Document (PAD) provided for in §5.6, developed under the applicant's approved study plan, and other appropriate information, and otherwise developed or obtained by the Applicant." In addition, as required under §5.18(b), this section follows the Commission's "Preparing Environmental Documents: Guidelines for Applicants, Contractors, and Staff."

This environmental analysis is based on information included in Southern California Edison Company's (SCE) PAD for the Kaweah Project (Project); Section 7 – Affected Environment of the License Application; Technical Study Reports (TSR; Supporting Document A [SD A]); and supplemental analysis and modeling completed in Sections 8.2–8.15 of the License Application.

The following subsections include an analysis (by resource area) of ongoing and new environmental effects (beneficial and adverse) of continued operation and maintenance of the Project under the Proposed Action (Section 4). Table 8.1-1 identifies resource areas potentially affected by Project operations and maintenance under the Proposed Action. In the evaluation of incremental effects, environmental conditions under the Proposed Action were compared to the baseline environmental condition[1] in the No-Action Alternative.

The effects determination for each resource area considers new environmental measures, management and monitoring plans, and programs included under the Proposed Action. The following effects determinations were used in the analysis:

- **No Effect** – Implementation of the Proposed Action will continue to protect and maintain a resource.

- **Negligible Effect** – Implementation of the Proposed Action will have a negligible effect to a resource or the implementation of new environmental measures, plans, and/or programs reduces the effect to a negligible level.

[1] The baseline environmental condition are those that would exist for each resource area if the Project were continued to be operated and maintained according to the current FERC license.

- **Adverse Effect** – Implementation of the Proposed Action will have a significant effect to a resource that may be reduced, but not to a negligible level, through implementation of new environmental measures, plans, and/or programs.

- **Beneficial Effect (Enhancement)** – Implementation of the Proposed Action including new environmental measures, plans, and/or programs benefits the resource.

This section is organized as follows:

- 8.1 – Introduction
- 8.2 – Water Use and Hydrology Environmental Effects
- 8.3 – Water Quality Environmental Effects
- 8.4 – Fish and Aquatic Resources Environmental Effects
- 8.5 – Botanical and Wildlife Resources Environmental Effects
- 8.6 – Geology and Soils Environmental Effects
- 8.7 – Geomorphology Environmental Effects
- 8.8 – Riparian Resources Environmental Effects
- 8.9 – Land Use Environmental Effects
- 8.10 – Recreation Resources Environmental Effects
- 8.11 – Aesthetic Resources Environmental Effects
- 8.12 – Cultural Resources Environmental Effects
- 8.13 – Tribal Resources Environmental Effects
- 8.14 – Socioeconomic Environmental Effects

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## Table 8.1-1. Resource Areas Potentially Affected by Project Operation and Maintenance under the Proposed Action

| Proposed Action | | Resource Areas Potentially Affected | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Water Use and Hydrology | Water Quality | Fish and Aquatic | Botanical and Wildlife | Geology and Soils | Geomorphology | Riparian | Land Use | Recreation | Aesthetics (Visual/Noise) | Cultural (Pre-historic/Historic) | Tribal | Socioeconomics |
| FERC Project Boundary | FERC Project boundary (modified) | | | | | | | | X | | | X | | |
| Project Operations | Minimum instream flow releases (modified) | X | X | X | X | | X | X | | X | X | | | X |
| | Ramping rates (modified) | X | X | X | X | | X | X | | X | | | | |
| | Forebay spills (ongoing) | X | X | X | | X | X | | | | X | X | | |
| | Draining of flowline and forebay during Project outages[1] (ongoing) | X | X | X | | X | X | | | | | X | | |
| Project Maintenance | Powerhouse maintenance (ongoing) | | | | X | | | | | | | X | | |
| | Flowline maintenance | | | | | | | | | | | | | |
| | • Repair of flumes, canals, and support structures (ongoing) | | | | X | X | | | | X | | X | | |
| | • Repair of wildlife bridges and escape ramps (ongoing) | | | | X | | | | | | | | | |
| | • Removal of algae and large woody debris (ongoing) | | X | | | | | | | | | | | |
| | Vegetation management[2] (modified) | | X | X | X | X | | X | | | | X | X | |

| Proposed Action | | Resource Areas Potentially Affected | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Water Use and Hydrology | Water Quality | Fish and Aquatic | Botanical and Wildlife | Geology and Soils | Geomorphology | Riparian | Land Use | Recreation | Aesthetics (Visual/Noise) | Cultural (Pre-historic/Historic) | Tribal | Socioeconomics |
| Project Maintenance (continued) | Pest management (ongoing) | | | | X | | | | | | | | | |
| | Sediment management | | | | | | | | | | | | | |
| | • Sediment removal/flushing at Kaweah No. 1 Sandbox (ongoing) | | X | X | X | X | X | | | | | | | |
| | • Sediment removal/flushing at Kaweah No. 1 Forebay Tank (ongoing) | | X | X | X | X | X | | | | | X | | |
| | • Sediment removal/flushing at Kaweah No. 2 Forebay (ongoing) | | X | X | X | X | X | | | | | X | | |
| | • Sediment removal at Kaweah No. 2 Diversion Intake (ongoing) | | X | X | X | X | X | | | | | | | |
| | • Sediment removal at Kaweah No. 3 Forebay (ongoing) | | X | X | X | X | X | | | | | X | | |
| | Road and trail maintenance (modified) | | X | X | X | X | | X | | X | | X | X | |
| | Transmission, power, and communication line maintenance | | | | | | | | | | | | | |
| | • Pole maintenance and replacement (ongoing) | | | | X | | | | | | | X | X | |
| | • Vegetation clearance (ongoing) | | X | X | X | X | | X | | | | X | X | |

| Proposed Action | | Resource Areas Potentially Affected | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Water Use and Hydrology | Water Quality | Fish and Aquatic | Botanical and Wildlife | Geology and Soils | Geomorphology | Riparian | Land Use | Recreation | Aesthetics (Visual/Noise) | Cultural (Pre-historic/Historic) | Tribal | Socioeconomics |
| Recreation Enhancements | Addition of trash receptacle and Porta-Potty at Kaweah No. 2 Powerhouse River Access Parking Area (new) | | | | | | | | | X | X | X | | X |
| | Dissemination of real-time flow information on a publicly-accessible website (new) | | | | | | | | | X | | | | |
| Environmental Programs | Environmental Training Program | | | X | X | | | X | | | | X | X | |

[1] Project outage could occur as part of annual maintenance activities or due to the lack of available water for generation.

[2] This includes vegetation management at all Project facilities with the exception of transmission, power, and communication lines.

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|---|---|
| BLM | Bureau of Land Management |
| CFR | Code of Federal Regulations |
| DWR | California Department of Water Resources |
| FERC or Commission | Federal Energy Regulatory Commission |
| Project | Kaweah Project |
| MW | Megawatt |
| SCE | Southern California Edison Company |

## 8.2 WATER USE AND HYDROLOGY ENVIRONMENTAL EFFECTS

This section describes potential effects to water use and hydrology under the Proposed Action for Southern California Edison Company's (SCE) Kaweah Project (Project). Section 3.0 – No-Action Alternative provides a description of current routine operation and maintenance activities and Section 4.0 – Proposed Action identifies changes from the No-Action Alternative. Potential effects to water use and hydrology were identified based on continued operation of the Project under the Proposed Action. Effects to water use hydrology under the Proposed Action are evaluated relative to ongoing and changes in Project operations affecting:

- Hydrology in bypass reaches;
- Beneficial uses and existing water rights;
- Existing operating agreements and contracts;
- Consumptive water deliveries (existing or future) and power generation; and
- Stream gaging stations.

A discussion of the potential effects to water use and hydrology that could occur as a result of implementation of the Proposed Action, considering new environmental measures, management and monitoring plans, and programs is provided below. Unavoidable adverse effects are also discussed at the end of this section.

### 8.2.1 Hydrology

The Proposed Action results in modifications to Project operations associated with the Instream Flow Measure (IFM) new minimum instream flows (MIF) and modified ramping rates (Appendix 4-A, Section 4.1.1). In general, the Proposed Action provides higher minimum instream flows and the same down-ramping rates compared to the No-Action Alternative, but modified (faster) up-ramping rates. Flows through the powerhouses are lower (average annual generation loss) from implementation of the new minimum instream flow measure (Appendix 4-A, Section 4.1.1). The Proposed Action includes ongoing actions including forebay spills and draining of flowlines and forebays that occur during Project operations, outages, and maintenance. These activities would cause periodic changes in discharge in the Kaweah River via increased flow in natural drainage channels from the forebays.

The potential effects of changes in Project operations on hydrology in the Kaweah River and East Fork Kaweah River (bypass reaches) are described in the following sections.

#### 8.2.1.1 Minimum Instream Flows

In the Kaweah River under the Proposed Action, during dry years the MIF is doubled between December and January and in July, but remains unchanged for the remaining months of the year (Appendix 4-A, Section 4.1.1) (Table 8.2-1A). In normal years, the

MIF in the Kaweah River remains unchanged, except for near doubling during the month of September. In the event that natural inflow into the Kaweah No. 2 Diversion Pool is insufficient to meet both the minimum instream flow releases and pre-1914 consumptive water right delivery obligations (3 cubic feet per second [cfs]) into the Kaweah No. 2 Flowline, the minimum instream flow release requirement would be reduced to natural inflow minus 3 cfs. This explicitly maintains consumptive water rights deliveries, whereas, under the No-Action Alternative, temporary flow modification/variance requests were required to maintain consumptive water rights deliveries.

In the East Fork Kaweah River under the Proposed Action, during Dry Years MIF remain unchanged and during Normal Years the MIF is doubled (Appendix 4-A, Section 4.1.1) (Table 8.2-1B). In the event that natural inflow into the Kaweah No. 1 Diversion Pool is insufficient to meet both the minimum instream flow releases and pre-1914 consumptive water right delivery obligations (1 cfs) into the Kaweah No. 1 Flowline, the minimum instream flow release requirement would be reduced to natural inflow minus 1 cfs. This explicitly maintains consumptive water rights deliveries, whereas, under the No-Action Alternative, temporary flow variance requests were required to maintain consumptive water rights deliveries.

Overall, with implementation of the Proposed Action and the IFM environmental measure, the amount of flow available for diversion would be decreased during various months and water year types. The amount of decrease results in approximately 6.0%, and 0.8% decrease in power generation at the Kaweah No. 1 and Kaweah No. 2 powerhouses, respectively (Section 4.0 – Proposed Action). Conversely, the water would increase flows in the bypass reaches (Section 8.4 – Fish and Aquatic Resources). The new IFM, would preserve water for diversion for consumptive water rights explicitly (see Section 8.2.4.1); whereas, historically minimum flow modification/variances were required. The Proposed Action would generally benefit hydrology in the bypass reaches and have an adverse effect on hydrology available for generation (Section 8.2.4.2).

#### 8.2.1.2 Ramping Rates

Under the Proposed Action, down-ramping rates at both the Kaweah No. 1 and Kaweah No. 2 diversions as a result of Project diversions would be no more than 30% of the existing streamflow per hour consistent with the No-Action Alternative. At the Kaweah No. 1 Diversion, up-ramping rates as a result of Project diversions would, as a natural consequence of the maximum Kaweah No. 1 Flowline capacity (24 cfs), not increase greater than the 24 cfs per hour (Appendix 4-A). At the Kaweah No. 2 Diversion, up-ramping rates would not increase greater than 25 cfs per hour when the existing streamflow is <40 cfs and, as a natural consequence of the maximum Kaweah No. 1 Flowline capacity (87 cfs), would not increase greater than 87 cfs per hour when the existing streamflow is ≥40 cfs (Appendix 4-A). The Proposed Action would have no effect on the timing of initiation of diversions compared to the No-Action Alternative, because the same down-ramping rates are in both alternatives. The Proposed Action would require less time for SCE to shut down diversions compared to the No-Action Alternative. This change only occurs periodically during the year and only affects a few hours of flow;

therefore, Proposed Action changes to ramping rates would have negligible effects on hydrology.

#### 8.2.1.3 Forebays/Forebay Tank Spills

Under the Proposed Action, forebay spills and draining of flowlines and forebays during Project outages, maintenance, and sediment management would continue to be implemented. In the event of an unplanned powerhouse outage (i.e., unit trips), water in the flowlines continues to flow (drain) into the forebays/forebay tank until the diversion is turned out (closed). Water entering the forebays/forebay tank can either be: (1) passed through the generating units at the powerhouse (if operational); (2) released through the powerhouse bypass value (if present); or (3) released from each forebay/forebay tank via Project spillway chutes that direct the overflow into natural drainage channels for conveyance to the Kaweah River (refer to Section 7.6 – Geology and Soils). These activities would cause periodic and increases in discharge in the Kaweah River via increased flow in natural drainage channels that route spills from the forebays. These flows would only moderately increase discharge. The Proposed Action spills and draining of flowlines and forebays would not change compared to the No-Action Alternative and would have no effect on hydrology.

#### 8.2.1.4 Powerhouses

Under the Proposed Action, flow diverted into the Kaweah No. 1 and Kaweah No. 2 flowlines (and therefore the Kaweah No. 1 and Kaweah No. 2 Powerhouses) would be reduced to meet MIF. Pre-1914 water rights flow requirements would remain unchanged. Flow to the Kaweah No. 3 Powerhouse would not change under the Proposed Action. Flow data for the Kaweah No. 1 and No. 2 Flowlines under the No-Action and Proposed Action Alternatives are summarized in Table 8.2-2 and Figures 8.2-1A and 8.2-1B, including the average, minimum, and maximum flow and 20%, 50%, 80%, and the difference in flow exceedance by month from 1994–2018. In general, the effects on diversion flows are most prominent during periods of low flow when MIF and pre-1914 water rights flow requirements and the hydrograph begin to intersect. The average difference in diversion flow by month in the Kaweah No. 2 Flowline ranges from 3.0 to 5.7 cfs less flow diverted under the Proposed Action. Similarly, for the Kaweah No. 1 Flowline, the average difference by month in flow diverted ranges from 0.9 to 4.7 less cfs diverted under the Proposed Action. The Proposed Action would have an adverse effect on generation at Project powerhouses.

### 8.2.2 Beneficial Uses and Existing Water Rights

The Proposed Action includes modifications to Project operations that could affect beneficial uses or existing water rights. These potential effects are described below.

#### 8.2.2.1 Beneficial Uses

The Kaweah River and Project is located in the Tulare Lake Basin. Existing and potential beneficial uses that apply to surface waters within the Kaweah River Watershed are identified in Water Quality Control Plan (Basin Plan) for the Tulare Lake Basin Second Edition (Revised May 2018 [with Approved Amendments]) (CRWQCB 2018). Beneficial uses identified in the Basin Plan that pertain to the Project include: (1) municipal and domestic supply; (2) agricultural supply; (3) hydropower generation; (4) water contact recreation; (5) non-contact water recreation; (6) cold freshwater habitat; (7) warm freshwater habitat; (8) spawning, reproduction, and/or early development habitat for fisheries; and (9) wildlife habitat.

New environmental measures, management and monitoring plans, and programs included under the Proposed Action (Appendix 4-A) were specifically developed to maintain/protect municipal, domestic, agricultural water supply, water contact recreation; non-contact water recreation; and enhance cold and warm freshwater fish habitat; spawning, reproduction and/or early development habitat for fisheries; and wildlife habitat. Implementation of the Proposed Action enhances aquatic habitat (Section 8.4 Fish and Aquatic Resources) through increased instream flows; however, results in reduced power generation (Section 8.2.4.2). Overall, while the Proposed Action makes minor adjustments in some resources, beneficial uses are protected (no effect).

#### 8.2.2.2 Existing Water Rights

Under the Proposed Action, SCE would continue to operate the Project consistent with stipulations in its existing water rights (Section 3.5.2.1 – No-Action Alternative). Therefore, the Proposed Acton is consistent with existing water rights and has no effect on existing water rights.

### 8.2.3 Existing Operating and Water Delivery Agreements

Operating and water delivery agreements affecting Project operations identified under the No-Action Alternative would remain unchanged under the Proposed Action. Therefore, the Proposed Action has no effect on existing operating agreements or contracts.

### 8.2.4 Consumptive Water Deliveries and Power Generation

Changes in operations resulting from implementation of the Proposed Action have the potential to affect consumptive water deliveries and power generation. The potential effects of each of these are discussed below.

#### 8.2.4.1 Consumptive Water Deliveries

Operation of the Project is subject to reservations made in various deeds and indentures (Section 3.5.2.2 – No-Action Alternative). SCE must maintain a continuous flow up to a maximum of 1 cfs in the Kaweah No. 1 Flowline to deliver water to local users consistent with existing agreements that date back to 1898 (pre-1914 consumptive water rights). SCE must maintain a continuous flow up to a maximum of 3 cfs in the Kaweah No. 2

Flowline to deliver water to local users consistent with existing water supply agreements that date back to 1903 (pre-1914 consumptive water rights). These agreements are maintained under the Proposed Action. Specifically, the Proposed Project IFM environmental measure explicitly changes MIF requirements to stipulate that in the event that natural inflow into the Kaweah No. 1 Diversion or Kaweah No. 2 Diversion is insufficient to meet both the minimum instream flow releases and pre-1914 consumptive water right delivery obligations, the minimum instream flow release becomes the natural inflow minus the consumptive water rights amounts for each location. Under the No-Action Alternative, during dry years/months when minimum instream flows and consumptive water deliveries are potentially in conflict, SCE must obtain a flow modification/variance from FERC to maintain the consumptive water deliveries. The Proposed Action makes it easier to maintain required consumptive deliveries, which is a beneficial effect related to the process of maintaining consumptive water deliveries.

#### 8.2.4.2 Power Generation

Overall Project generation would be reduced under the Proposed Action compared to the No-Action Alternative as a result of implementation of the IFM minimum instream flow schedule. The instream flow measure affects generation at the Kaweah No. 1 and No. 2 powerhouses only. Kaweah No. 3 Powerhouse remains unchanged. Under the Proposed Action, compared to the No-Action Alternative, the Project's annual average generation (1992–2018) decreases 6.0% at Kaweah No. 1 Powerhouse and 0.8% at Kaweah No. 2 Powerhouse (Table 8.2-3). Annual average generation under the Proposed Action decreases by 664 MWh as compared to the No-Action Alternative (Table 8.2-3) and this is considered an adverse effect.

### 8.2.5 Stream Gaging Stations

The Proposed Action includes a Stream Gaging Monitoring Plan (SGMP) (Appendix 4-A, Section 4.1.2) that (1) identifies and describes Project gages used to document compliance with minimum instream flow and ramping rate requirements, pre-1914 consumptive water right delivery obligations, and dissemination of real-time flow information to the public (not present in the No-Action Alternative); (2) provides for protocols for operation and maintenance of the gages; and (3) protocols for reporting of compliance. Hence, under the Proposed Action, the SGMP would provide a beneficial effect on stream gaging used to document Project compliance.

### 8.2.6 Conclusions – Water Use

Changes in Project operations under the Proposed Action maintain current and future water use, as follows:

- Enhances Kaweah and East Fork Kaweah hydrology;
- Protects existing beneficial uses and existing water rights;
- Maintains current operating agreements and contracts;

- Protects pre-1914 consumptive water supply;
- Reduces power generation to provide environmental benefits; and
- Maintains or improves instream flow monitoring capabilities.

The Proposed Action has negligible effects on water use compared to the No-Action Alternative.

### 8.2.7 Unavoidable Adverse Effects

The Proposed Action results in unavoidable adverse effect to Project generation.

### 8.2.8 Literature Cited

CRWQCB (California Regional Water Quality Control Board) Central Valley Region. 2018. Water Quality Control Plan for the Tulare Lake Basin Second Edition. Revised May 2018. Available at: https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/tlbp_201805.pdf.

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## Table 8.2-1A. Minimum Instream Flow Schedule Under the Proposed Action for the Kaweah River Downstream of the Kaweah No. 2 Diversion

| Kaweah River Downstream of Kaweah No. 2 Diversion Dam | | |
|---|---|---|
| | Minimum Instream Flow by Water Year Type (cfs)[1] | |
| Month | Dry | Normal |
| Jan | 20 or NF - 3 cfs | 20 or NF - 3 cfs |
| Feb | 20 or NF - 3 cfs | 20 or NF - 3 cfs |
| Mar | 20 or NF - 3 cfs | 30 or NF - 3 cfs |
| Apr | 30 or NF - 3 cfs | 30 or NF - 3 cfs |
| May | 30 or NF - 3 cfs | 30 or NF - 3 cfs |
| Jun | 30 or NF - 3 cfs | 30 or NF - 3 cfs |
| Jul | 20 or NF - 3 cfs | 20 or NF - 3 cfs |
| Aug | 10 or NF - 3 cfs | 20 or NF - 3 cfs |
| Sept | 5 or NF - 3 cfs | 20 or NF - 3 cfs |
| Oct | 5 or NF - 3 cfs | 11 or NF - 3 cfs |
| Nov | 5 or NF - 3 cfs | 11 or NF - 3 cfs |
| Dec | 10 or NF - 3 cfs | 11 or NF - 3 cfs |

1. NF - 3 cfs: Natural flow to the Kaweah No. 2 Diversion Pool minus the pre-1914 consumptive water right delivery obligation of 3 cfs.

## Table 8.2-1B. Minimum Instream Flow Schedule Under the Proposed Action for the East Fork Kaweah River Downstream of the Kaweah No. 1 Diversion

| East Fork of Kaweah River Downstream of Kaweah No. 1 Diversion Dam | | |
|---|---|---|
| Month | Minimum Instream Flow by Water Year Type (cfs)[1] | |
| | Dry | Normal |
| Jan | 5 or NF - 1 cfs | 10 or NF - 1 cfs |
| Feb | 5 or NF - 1 cfs | 10 or NF - 1 cfs |
| Mar | 10 or NF - 1 cfs | 20 or NF - 1 cfs |
| Apr | 10 or NF - 1 cfs | 20 or NF - 1 cfs |
| May | 10 or NF - 1 cfs | 20 or NF - 1 cfs |
| Jun | 10 or NF - 1 cfs | 20 or NF - 1 cfs |
| Jul | 10 or NF - 1 cfs | 20 or NF - 1 cfs |
| Aug | 5 or NF - 1 cfs | 20 or NF - 1 cfs |
| Sept | 5 or NF - 1 cfs | 20 or NF - 1 cfs |
| Oct | 5 or NF - 1 cfs | 10 or NF - 1 cfs |
| Nov | 5 or NF - 1 cfs | 10 or NF - 1 cfs |
| Dec | 5 or NF - 1 cfs | 10 or NF - 1 cfs |

1. NF - 1 cfs: Natural flow to the Kaweah No. 1 Diversion Pool minus the pre-1914 consumptive water right delivery obligation of 1 cfs.

## Table 8.2-2. Flow Exceedance for the Kaweah No. 2 and No. 1 Flowlines under the No-Action and Proposed-Action and the Difference as a Result of Proposed Action Minimum Instream Flows

| Month | Daily Exceedance Flows by Month (cfs) | | | | | Maximum, Minimum, and Average Daily Flows (cfs) | | |
|---|---|---|---|---|---|---|---|---|
| | 10% | 20% | 50% | 80% | 90% | Max | Min | Avg |
| **No-Action Kaweah No. 2 Flowline (USGS Gage No. 11208570 + SCE Gage 204a) (1994-2002 and 2002-2018)** | | | | | | | | |
| Oct | 35.0 | 22.0 | 4.4 | 2.1 | 1.6 | 97.0 | 0.3 | 13.1 |
| Nov | 74.0 | 58.0 | 21.0 | 2.5 | 1.6 | 89.0 | 0.7 | 29.2 |
| Dec | 78.0 | 70.0 | 40.0 | 14.0 | 3.6 | 91.0 | 0.8 | 41.4 |
| Jan | 82.0 | 79.0 | 52.0 | 13.0 | 2.6 | 90.0 | 0.0 | 47.2 |
| Feb | 84.0 | 82.4 | 74.0 | 40.0 | 5.0 | 90.0 | 1.0 | 63.1 |
| Mar | 87.0 | 85.0 | 79.0 | 67.0 | 30.4 | 92.0 | 0.1 | 70.8 |
| Apr | 87.5 | 85.5 | 81.0 | 70.0 | 63.0 | 96.0 | 0.2 | 75.8 |
| May | 87.0 | 85.5 | 81.0 | 72.0 | 69.0 | 95.0 | 12.0 | 78.1 |
| Jun | 87.0 | 85.0 | 79.0 | 68.0 | 56.0 | 94.0 | 6.9 | 73.9 |
| Jul | 86.0 | 83.0 | 69.0 | 28.0 | 8.9 | 97.0 | 0.7 | 56.8 |
| Aug | 82.0 | 70.0 | 9.7 | 2.6 | 2.1 | 90.0 | 0.0 | 27.7 |
| Sep | 53.0 | 26.9 | 4.8 | 2.2 | 1.8 | 90.0 | 0.0 | 15.8 |
| **Proposed-Action Kaweah No. 2 Flowline (USGS Gage No. 11208570 + SCE Gage 204a) (1994-2002 and 2002-2018)** | | | | | | | | |
| Oct | 32.0 | 19.0 | 0.0 | 0.0 | 0.0 | 94.0 | 0.0 | 9.2 |
| Nov | 71.0 | 55.0 | 17.0 | 0.0 | 0.0 | 86.0 | 0.0 | 25.4 |
| Dec | 75.0 | 66.2 | 36.1 | 0.0 | 0.0 | 88.0 | 0.0 | 37.5 |
| Jan | 79.0 | 76.0 | 48.0 | 0.0 | 0.0 | 87.0 | 0.0 | 43.1 |
| Feb | 81.0 | 79.4 | 71.0 | 37.0 | 0.0 | 87.0 | 0.0 | 59.8 |
| Mar | 84.0 | 82.0 | 76.0 | 64.0 | 27.4 | 89.0 | 0.0 | 67.7 |
| Apr | 84.5 | 82.5 | 78.0 | 67.0 | 60.0 | 93.0 | 0.0 | 72.7 |
| May | 84.0 | 82.5 | 78.0 | 69.0 | 66.0 | 92.0 | 0.0 | 75.1 |
| Jun | 84.0 | 82.0 | 76.0 | 65.0 | 53.0 | 91.0 | 0.0 | 70.8 |
| Jul | 83.0 | 80.0 | 66.0 | 21.0 | 0.0 | 94.0 | 0.0 | 52.3 |
| Aug | 79.0 | 67.0 | 0.0 | 0.0 | 0.0 | 87.0 | 0.0 | 23.8 |
| Sep | 42.1 | 18.0 | 0.0 | 0.0 | 0.0 | 87.0 | 0.0 | 10.1 |
| **Flow Difference between No-Action and Proposed-Action Kaweah No. 2 Flowline** | | | | | | | | |
| Oct | -3.0 | -3.0 | -4.4 | -2.1 | -1.6 | -3.0 | -0.3 | -3.9 |
| Nov | -3.0 | -3.0 | -4.0 | -2.5 | -1.6 | -3.0 | -0.7 | -3.9 |
| Dec | -3.0 | -3.8 | -4.0 | -14.0 | -3.6 | -3.0 | -0.8 | -3.9 |
| Jan | -3.0 | -3.0 | -4.0 | -13.0 | -2.6 | -3.0 | 0.0 | -4.1 |
| Feb | -3.0 | -3.0 | -3.0 | -3.0 | -5.0 | -3.0 | -1.0 | -3.2 |

| Month | Daily Exceedance Flows by Month (cfs) | | | | | Maximum, Minimum, and Average Daily Flows (cfs) | | |
|---|---|---|---|---|---|---|---|---|
| | 10% | 20% | 50% | 80% | 90% | Max | Min | Avg |
| Mar | -3.0 | -3.0 | -3.0 | -3.0 | -3.0 | -3.0 | -0.1 | -3.1 |
| Apr | -3.0 | -3.0 | -3.0 | -3.0 | -3.0 | -3.0 | -0.2 | -3.1 |
| May | -3.0 | -3.0 | -3.0 | -3.0 | -3.0 | -3.0 | -12.0 | -3.0 |
| Jun | -3.0 | -3.0 | -3.0 | -3.0 | -3.0 | -3.0 | -6.9 | -3.1 |
| Jul | -3.0 | -3.0 | -3.0 | -7.0 | -8.9 | -3.0 | -0.7 | -4.5 |
| Aug | -3.0 | -3.0 | -9.7 | -2.6 | -2.1 | -3.0 | 0.0 | -3.9 |
| Sep | -10.9 | -8.9 | -4.8 | -2.2 | -1.8 | -3.0 | 0.0 | -5.7 |
| **No-Action Kaweah No. 1 Flowline (USGS Gage No. 11208720 and SCE Gage 202) (WY 1994-2002 and 2002-2018)** | | | | | | | | |
| Oct | 18.9 | 13.8 | 4.0 | 0.8 | 0.2 | 26.0 | 0.0 | 6.8 |
| Nov | 19.0 | 16.6 | 11.0 | 1.0 | 0.7 | 23.3 | 0.0 | 10.0 |
| Dec | 21.2 | 19.6 | 13.0 | 4.7 | 0.5 | 24.0 | 0.0 | 12.3 |
| Jan | 22.0 | 21.2 | 16.0 | 6.2 | 0.8 | 24.0 | 0.0 | 14.0 |
| Feb | 22.3 | 21.5 | 19.0 | 13.0 | 5.7 | 24.0 | 0.0 | 16.6 |
| Mar | 23.0 | 22.0 | 19.0 | 13.0 | 4.3 | 25.0 | 0.0 | 16.9 |
| Apr | 23.5 | 22.9 | 19.0 | 16.0 | 8.1 | 24.4 | 0.0 | 18.1 |
| May | 23.8 | 23.0 | 19.0 | 16.0 | 13.4 | 24.7 | 0.0 | 18.4 |
| Jun | 23.6 | 23.0 | 19.1 | 12.0 | 3.3 | 25.1 | 0.0 | 17.2 |
| Jul | 22.8 | 21.0 | 17.0 | 7.6 | 0.7 | 26.0 | 0.0 | 14.7 |
| Aug | 21.0 | 20.0 | 11.0 | 2.5 | 0.7 | 24.0 | 0.0 | 11.6 |
| Sep | 20.7 | 18.3 | 6.8 | 0.6 | 0.4 | 24.0 | 0.0 | 9.1 |
| **Proposed-Action Kaweah No. 1 Flowline (USGS Gage No. 11208720 and SCE Gage 202) (WY 1994-2002 and 2002-2018)** | | | | | | | | |
| Oct | 17.5 | 12.0 | 0.0 | 0.0 | 0.0 | 25.0 | 0.0 | 5.1 |
| Nov | 18.0 | 15.0 | 8.5 | 0.0 | 0.0 | 22.3 | 0.0 | 8.3 |
| Dec | 20.0 | 18.1 | 10.7 | 3.7 | 0.0 | 23.0 | 0.0 | 10.9 |
| Jan | 21.0 | 20.1 | 14.4 | 5.2 | 0.0 | 23.0 | 0.0 | 12.8 |
| Feb | 21.3 | 20.5 | 18.0 | 11.8 | 4.7 | 23.0 | 0.0 | 15.6 |
| Mar | 22.0 | 21.0 | 18.0 | 12.0 | 3.3 | 24.0 | 0.0 | 16.0 |
| Apr | 22.5 | 21.9 | 18.0 | 15.0 | 7.1 | 23.4 | 0.0 | 17.1 |
| May | 22.8 | 22.0 | 18.0 | 15.0 | 12.4 | 23.7 | 0.0 | 17.5 |
| Jun | 22.6 | 22.0 | 18.1 | 11.0 | 0.0 | 24.1 | 0.0 | 16.3 |
| Jul | 21.7 | 20.0 | 16.0 | 3.0 | 0.0 | 25.0 | 0.0 | 12.9 |
| Aug | 19.8 | 17.9 | 4.6 | 0.0 | 0.0 | 23.0 | 0.0 | 7.5 |
| Sep | 17.4 | 10.6 | 0.0 | 0.0 | 0.0 | 23.0 | 0.0 | 4.4 |

| Month | Daily Exceedance Flows by Month (cfs) | | | | | Maximum, Minimum, and Average Daily Flows (cfs) | | |
|---|---|---|---|---|---|---|---|---|
| | 10% | 20% | 50% | 80% | 90% | Max | Min | Avg |
| **Flow Difference between No-Action and Proposed-Action Kaweah No. 1 Flowline** | | | | | | | | |
| Oct | -1.4 | -1.8 | -4.0 | -0.8 | -0.2 | -1.0 | 0.0 | -1.7 |
| Nov | -1.0 | -1.6 | -2.5 | -1.0 | -0.7 | -1.0 | 0.0 | -1.7 |
| Dec | -1.2 | -1.5 | -2.3 | -1.0 | -0.5 | -1.0 | 0.0 | -1.4 |
| Jan | -1.0 | -1.1 | -1.6 | -1.0 | -0.8 | -1.0 | 0.0 | -1.2 |
| Feb | -1.0 | -1.0 | -1.0 | -1.2 | -1.0 | -1.0 | 0.0 | -1.0 |
| Mar | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | 0.0 | -1.0 |
| Apr | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | 0.0 | -1.0 |
| May | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 | 0.0 | -0.9 |
| Jun | -1.0 | -1.0 | -1.0 | -1.0 | -3.3 | -1.0 | 0.0 | -0.9 |
| Jul | -1.1 | -1.0 | -1.0 | -4.6 | -0.7 | -1.0 | 0.0 | -1.8 |
| Aug | -1.2 | -2.1 | -6.4 | -2.5 | -0.7 | -1.0 | 0.0 | -4.1 |
| Sep | -3.3 | -7.6 | -6.8 | -0.6 | -0.4 | -1.0 | 0.0 | -4.7 |

## Table 8.2-3. Change in Net Generation at the Kaweah No. 1, No. 2, and No. 3 Powerhouses as a Result of Reduced Diversion due to MIF and Pre-1914 Water Rights Flow Requirements

| Year | Net Generation (MWh) | | | |
|---|---|---|---|---|
| | Powerhouse | | | Project Total |
| | Kaweah No. 1 | Kaweah No. 2 | Kaweah No. 3 | |
| Average Annual Generation, No-Action (1992–2018) | 9,732 | 10,236 | 19,156 | 39,124 |
| Average Annual Generation, Proposed Action | 9,149 | 10,155 | 19,156 | 38,460 |
| Generation Loss | -583 (6.0%) | -81 (0.8%) | 0 (0%) | -664 (1.7%) |

# FIGURES

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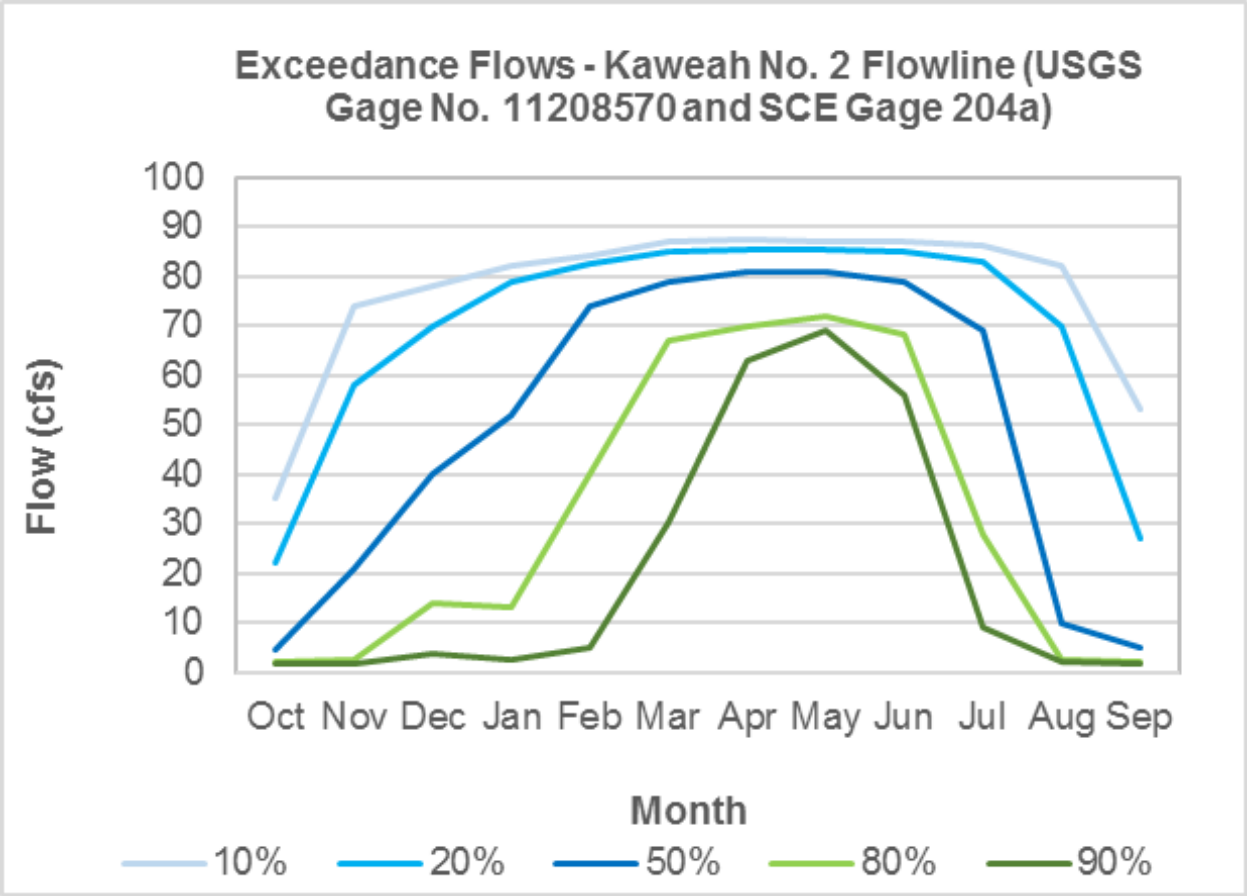


**Figure 8.2-1 A-1. Monthly Exceedance Flows (10%, 20%, 50%, 80%, and 90%) in the Kaweah No. 2 Flowline (WY 1994-2018) Under the No-Action Alternative.**

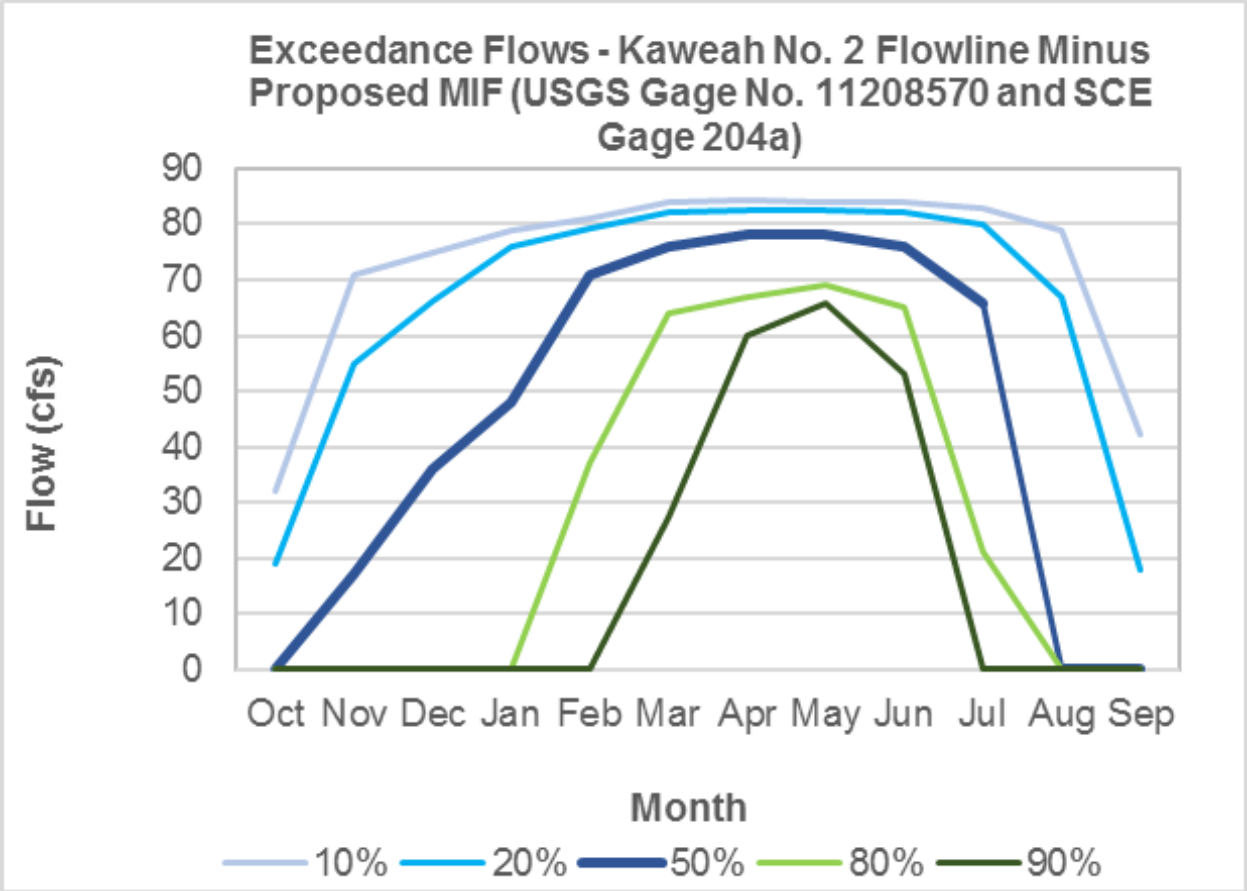


**Figure 8.2-1 A-2. Monthly Exceedance Flows (10%, 20%, 50%, 80%, and 90%) in the Kaweah No. 2 Flowline (WY 1994-2018) Under the Proposed Action Alternative.**

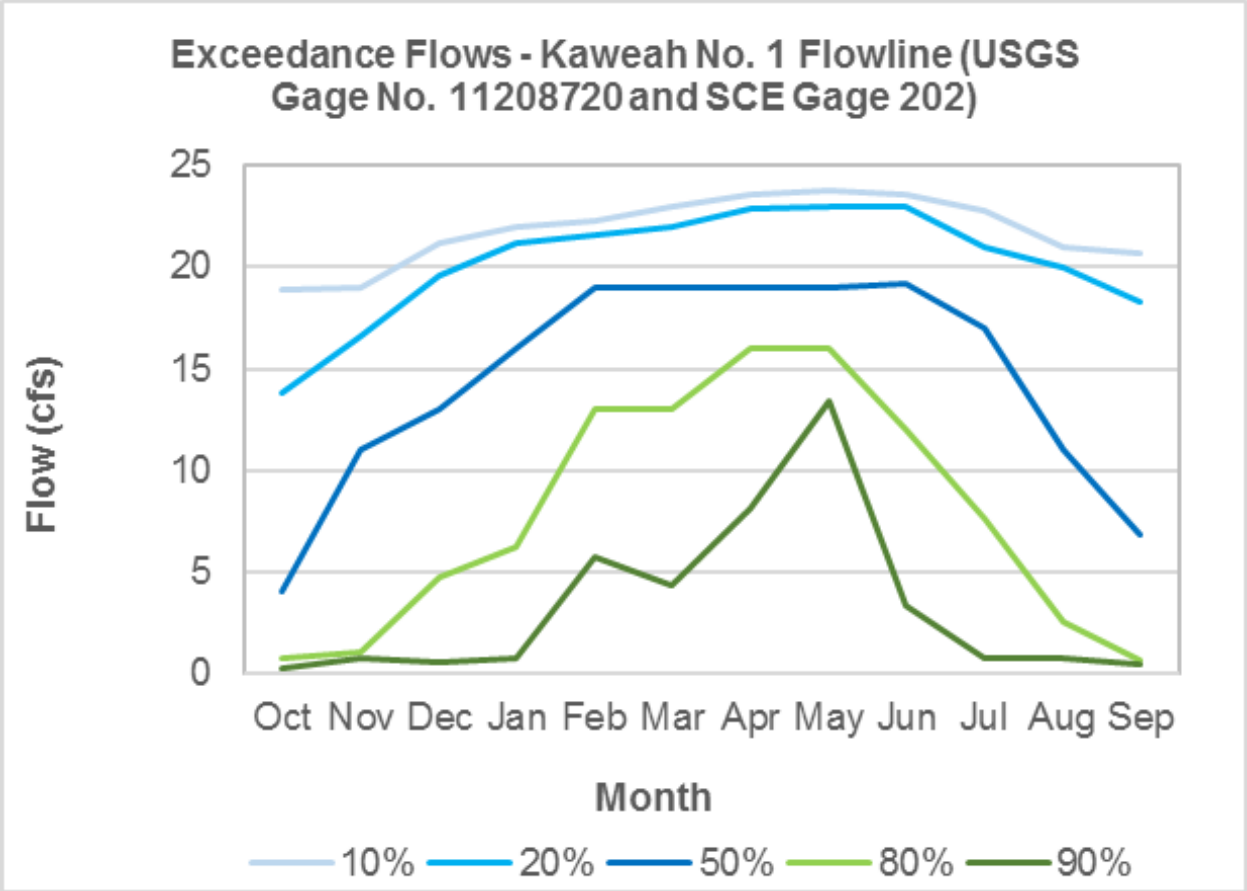


**Figure 8.2-1 B-1. Monthly Exceedance Flows (10%, 20%, 50%, 80%, and 90%) in the Kaweah No. 1 Flowline (WY 1994-2018) Under the No-Action Alternative.**

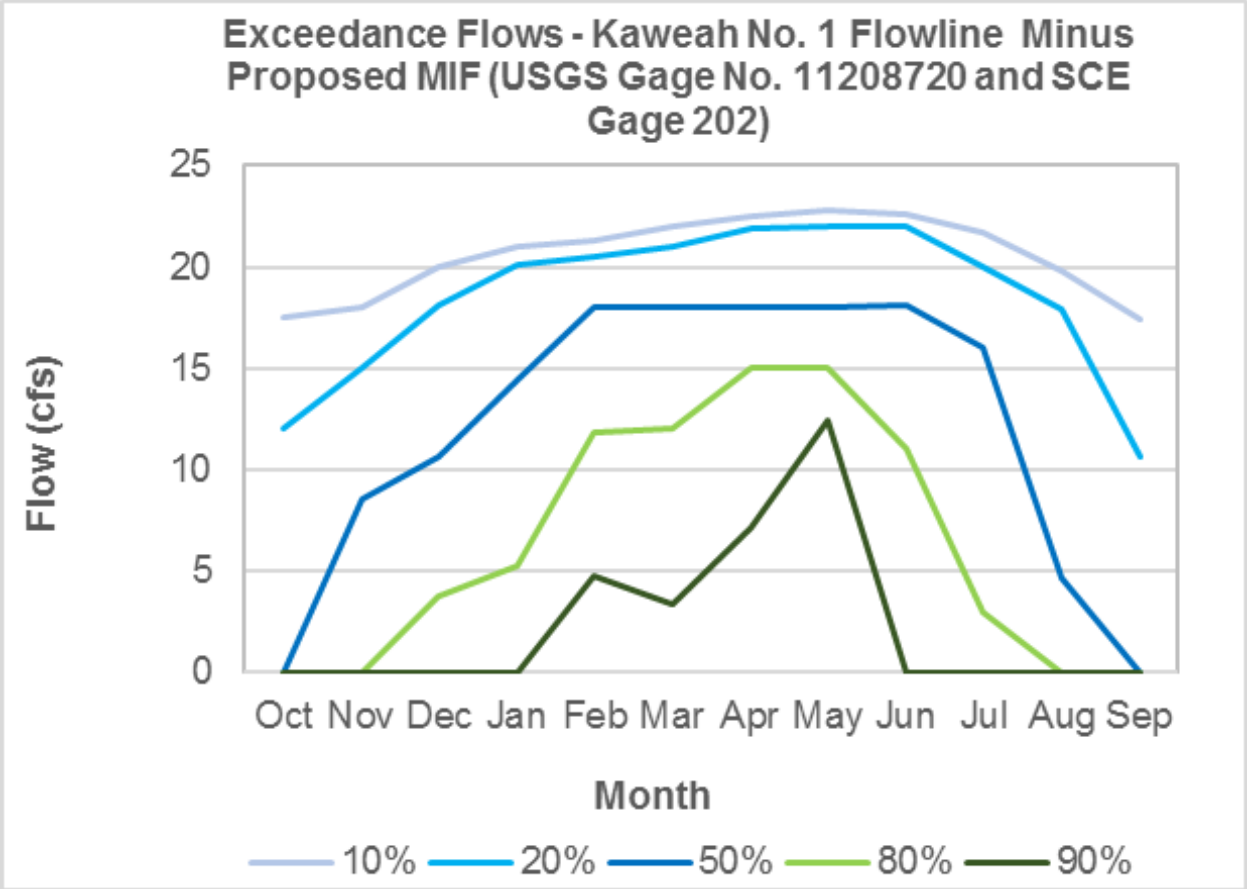


**Figure 8.2-1 B-2. Monthly Exceedance Flows (10%, 20%, 50%, 80%, and 90%) in the Kaweah No. 1 Flowline (WY 1994-2018) Under the Proposed Action Alternative.**

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## LIST OF ACRONYMS

| | |
|---|---|
| BLM | Bureau of Land Management |
| cfs | cubic feet per second |
| FERC or Commission | Federal Energy Regulatory Commission |
| IFM | Instream Flow Measure |
| Project | Kaweah Project |
| RTMP | Road and Trail Management Plan |
| SCE | Southern California Edison Company |
| SMECP | Sediment Management and Erosion Control Plan |
| VIPMP | Vegetation and Integrated Pest Management Plan |

| | |
|---|---|
| WQMP | Water Quality Monitoring Plan |
| WTMP | Water Temperature Monitoring Plan |

## 8.3 WATER QUALITY ENVIRONMENTAL EFFECTS

This section describes potential effects to water quality under the Proposed Action for Southern California Edison Company's (SCE) Kaweah Project (Project). Section 3.0 – No-Action Alternative provides a description of current routine operations and maintenance activities and Section 4.0 – Proposed Action identifies Proposed Action changes from the No-Action Alternative. Potential effects to water quality were identified based on continued operation and maintenance of the Project under the Proposed Action.

Potential effects to water quality are evaluated for the following components of the Proposed Action:

- Project Operations
    - Minimum instream flow releases and ramping rates
    - Forebay spills and draining of flowlines and forebays during Project outages
- Project Maintenance
    - Algae and large woody debris removal
    - Vegetation management
    - Sediment at Project facilities
    - Road and trail maintenance

A description of potential effects to water quality from implementation of the Proposed Action, considering new environmental measures; management and monitoring plans; and programs, is provided below. Unavoidable adverse effects are also discussed at the end of this section.

Appendix 4-A includes a detailed description of new environmental measures; management and monitoring plans; and environmental programs included under the Proposed Action to address potential effects to aquatic resources, including:

- Instream Flow Measure (IFM) (Appendix 4-A, Section 4.1.1)
- Sediment Management and Erosion Control Plan (SMECP) (Appendix 4-A, Section 4.1.3)
- Water Temperature Monitoring Plan (WTMP) (Appendix 4-A, Section 4.1.6)
- Water Quality Monitoring Plan (WQMP) (Appendix 4-A, Section 4.1.7)

- Vegetation and Integrated Pest Management Plan (VIPMP) (Appendix 4-A, Section 4.5.2)

- Project Road and Trail Management Plan (RTMP) (Appendix 4-A, Section 4.3.1)

## 8.3.1 Project Operations

### 8.3.1.1 Instream Flows and Ramping Rates

Under the Proposed Action, maximum diversion of water from the Kaweah River and East Fork Kaweah River would be the same as the No-Action Alternative (diversions of up to 87 cubic feet per second [cfs] at Kaweah No. 2 Diversion and 24 cfs at Kaweah No. 1 Diversion). The Proposed Action IFM provides higher minimum instream flows (Figure 8.3-1) in the bypass reaches (Table 8.3-1) during some select dry months and water year types. As a result of the increased minimum instream flows in the Proposed Action, less water would be diverted and more water would remain in the Kaweah River and East Fork Kaweah River. The modified minimum instream flows would slightly improve summer/fall low flow season water temperatures in the Kaweah River and East Fork Kaweah River compared to existing conditions (No-Action Alternative). These effects are discussed in Section 8.4 (Fish and Aquatic Resources).

The increased minimum instream flows during low-flow periods may also slightly benefit water quality. Section 7.3.4.2 showed that under existing conditions water quality is good and meets all applicable water quality standards in the bypass reaches except that during the high-flow season, several water quality samples in the Kaweah River bypass reaches and comparison reaches exhibited low alkalinity (<20 mg/L). This appears to be a natural condition of the Watershed during spring high-flow conditions when snowmelt and rainfall runoff have little opportunity to pick up calcium carbonate from the basin geology. Also, there were three ammonia samples in bypass reaches during the summer low-flow sampling period that exceeded water quality criteria. Because the Project does not have operations that would typically affect ammonia, the source could potentially be septic systems from homes along the river (Section 7.3 Water Quality). The increased minimum instream flows may slightly improve water quality in the low-flow periods through dilution. The Proposed Action also includes implementation of water temperature (WTMP) and water quality (WQMP) monitoring plans. Implementation of the Proposed Action, which includes the IFM (i.e., increased minimum instream flows), WTMP, and WQMP would have a small beneficial effect on water quality in the bypass reaches.

Under the Proposed Action, instream flow up-ramping rates would be changed compared to the No-Action Alternative. The Proposed Action IFM modified up-ramping rates, however, would make essentially no change to daily average flows, but rather to a few hours of hourly flows periodically when flowline diversions are modified. It is anticipated that the Proposed Action, which includes the IFM modified up-ramping rates, WTMP, and WQMP would have no effect on water quality in the bypass reaches with respect to up-ramping rates.

#### 8.3.1.2 Forebay Spills and Flowline/Forebay Draining

Under the Proposed Action, SCE would continue to implement ongoing Project operations that have the potential to affect water quality in the Kaweah River or East Fork Kaweah River as a result of spills from the Kaweah No 1, No. 2, and No. 3 forebays or releases from gates on the Kaweah No. 1, No. 2, and No. 3 flowlines. These activities could cause erosion to occur in natural drainage channels associated with these facilities and transport of sediment and turbidity from these channels into the Kaweah River, as described below.

Forebay spills and draining of flowlines and forebays during planned Project outages would continue to occur as described under the No-Action Alternative. In the event of an unplanned powerhouse outage (i.e., unit trips), water in the flowlines continues to flow (drain) into the forebays until the diversion is turned out (closed). Water entering the forebays can either be: (1) passed through the generating units at the powerhouse (if operational); (2) released through the powerhouse bypass valve (if present); or (3) released from each forebay via Project spillways/spillway chutes that direct the overflow into natural drainage channels for conveyance to the Kaweah River (refer to Section 7.6 – Geology and Soils).

Use of these concrete lined spill chutes and natural drainage channels during spills and opening low-level outlets to drain flowlines and forebays has occurred for decades. Initial scour to bedrock (removal of fine sediments) in these channels has long since stabilized the channels, including vegetation, and the stable channels are not likely to change in the future. Because of the stable nature of the channels, little if any sediment or turbidity is mobilize during these routine operational events. Any sediment or turbidity mobilized during spills and operations activities is very small relative to background in the Kaweah River during most times of the year. Furthermore, the volume of sediment or turbidity to reach the river channel is localized to a specific river section. A smaller amount of sediment or turbidity mobilized, if any, actually enters the main river due to deposition in low gradient or slow velocity portions of the natural channels or margin of the river channel. Also, typically the relative volume of water spilled is small compared to the river flow.

Drainage of the largest forebay, Kaweah No. 3 Forebay, could result in entrainment of sediment that has settled in the forebay. To prevent any entrainment of sediment and turbidity, the SMECP requires that water drained from the forebay would be slowly metered to minimize sediment disturbance in the forebay pool and minimize the rate of water discharge to the natural drainage channel and the Kaweah River.

Under the Proposed Action, forebay spills and draining of flowlines and forebays would continue to be implemented as described in the SMECP (Appendix 4-A, Section 4.1.3). This plan memorializes existing operations and sediment management activities, including methods to minimize erosion and sediment/turbidity entrainment in the natural drainage channels. Therefore, continued use of natural drainage channels for Project operations that would be implemented under the Proposed Action would have a negligible effect on water quality, particularly turbidity.

### 8.3.2 Project Maintenance

#### 8.3.2.1 Flowline Maintenance (Algae and Woody Debris)

As part of routine operation of the Project, SCE conducts physical structure inspections of all flowlines up to three times per year (spring, summer, and fall) and after large storm events. Operational inspections are completed monthly to look for leakage and debris build-up (i.e., woody debris and algae). Flowline maintenance and repairs are made on an as-needed basis and include removal of woody debris and use of a mechanical machine with brushes for removal of algae on Kaweah No. 1 Flowline. Algae can build up in the Kaweah No. 1 Flowline causing water to be displaced and damage the facility. The mechanical machine with brushes is inserted at the top of the flowline (or other appropriate location along the flowline depending on build-up) and removed at the forebay tank. Algae sticks to the brush as it moves through the flowline. The brush is power washed following removal and reused, as needed. Potentially, the algae and/or woody debris removal could affect water quality.

The brushing of algae at the Kaweah No. 1 Flowline happens periodically and the algae that is brushed either sticks to the brush and is later removed or moves along the flowline and enters the forebay tank and spills and/or goes through the powerhouse into the river. The algae is natural material similar to that that grows in the Kaweah River or East Fork Kaweah River and is “alive” and represents no biological oxygen demand such as might occur with dead/extensively decomposed organic material. The large woody debris that is removed is small material that can enter the flowline through the intake trash rack or debris that falls from adjacent vegetation along the flowline. It is not large woody debris of the nature that provides habitat in the Kaweah River or East Fork Kaweah River and the removal would not affect water quality. Implementation of the Proposed Action, including ongoing flowline maintenance operations would have negligible effect on water quality.

#### 8.3.2.2 Vegetation and Pest Management

SCE would implement the VIPMP to maintain access to and protect Project facilities; and provide for worker/public health and safety. Vegetation management includes application of herbicides.

Application of herbicides has the potential to adversely affect water quality in the Kaweah River and East Fork Kaweah River if these chemicals enter the water. However, implementation of the measures in the VIPMP, such as avoiding herbicide use within 50 feet of streams or drainages; avoiding herbicide use when there is a 50% or greater chance of precipitation within 48 hours; and avoiding herbicide use when winds are greater than 5 mile per hour would prevent adverse effects to water quality. Implementation of the Proposed Action, including the VIPMP, would have negligible effect on water quality.

### 8.3.2.3 Sediment Management

Under the Proposed Action, SCE would continue to conduct sediment management activities at the Kaweah No. 1 Intake Sandbox, Kaweah No. 1 Forebay Tank, Kaweah No. 2 Intake, Kaweah No. 2 Forebay, and Kaweah No. 3 Forebay. Methods for sediment removal and disposition are designed to be protective of water quality and downstream aquatic resources. Sediment management activities at each location and their potential effects on water quality are discussed in the following sections.

#### Sediment Removal and Flushing at Kaweah No. 1 Intake Sandbox and Kaweah No. 2 Intake

Under the Proposed Action, sediment management activities would continue to be implemented at Project facilities to prevent deposits of sediment from building up or blocking Project flowlines and intakes as described under the No-Action Alternative. Sediment management activities include sediment removal/flushing at the Kaweah No. 1 Intake Sandbox and sediment removal at the Kaweah No. 2 Intake. These activities could affect water quality, particularly turbidity, in the bypass reaches.

As described in the SMECP, at the Kaweah No. 1 Intake Sandbox, the low-level outlet would be routinely opened during high flows to minimize accumulation of sand/fine sediment and transport it back into the active stream channel. If larger substrate becomes trapped in the sandbox, it would be removed by hand and placed along the margin of the active channel during the fall maintenance outage where it can be entrained into the channel during high-flow events. At the Kaweah No. 2 Intake, during high-flow events, large boulders and rocks accumulate on the intake grate obstructing flow into the intake and, at times, allowing sediment to build up near the intake. When necessary, this rock debris would be removed and placed downstream of the diversion structure to improve flow into the intake and prevent facility damage.

Sediment management at the intake structures and sand trap would generally occur during high flows when natural sediment transporting processes are typically occurring. The amount of sediment/turbidity removed from the Kaweah No. 1 Intake Sandbox would be very small compared to the natural sediment transport in the East Fork Kaweah River and the turbidity would be similar to that in the East Fork Kaweah River (the sand deposited in the sand trap and flushed would produce very limited turbidity). Removed sediment at the Kaweah No. 2 Intake would be placed adjacent to the natural channel to allow for routing during high flows. The relatively small amount of coarse material cleared would produce very limited turbidity (temporally and spatially).

With implementation of the Proposed Action, which includes the SMECP to protect facilities and environmental resources, sediment management activities at the Kaweah No. 1 Intake Sandbox and Kaweah No. 2 Intake would have a negligible effect on water quality.

### Kaweah No. 1, No. 2, and No. 3 Forebay Sediment Removal

Under the Proposed Action, sediment management activities would continue to be implemented at Project facilities to prevent deposits of sediment from building in the Kaweah No. 1 and No. 2 forebays as described under the No-Action Alternative. Sediment management activities include routinely opening low-level outlets in the forebay to minimize any sediment build-up and draining water from the forebay prior to sediment removal. These activities could affect water quality, particularly turbidity, in the bypass reaches.

As described in the SMECP, the low-level outlet in the Kaweah No. 1 Forebay Tank would be routinely opened during routine operations to minimize accumulations of sand/fine sediment in the bottom of the tank and transport it into an adjacent natural drainage channel. Any large materials remaining in the bottom of the tank would be removed by hand during the fall maintenance outage and placed in the adjacent natural drainage channel where it would be transported during storm events.

Several low-level outlets in the Kaweah No. 2 Forebay would be routinely opened during routine operations to minimize accumulation of sand/fine sediment from the bottom of the forebay and transport it into natural drainages. Any large build-up of material would be removed by hand during the fall maintenance outage and placed in the adjacent natural drainage channel where it would be transported during storm events.

Accumulated sediment in the Kaweah No. 3 Forebay would be removed with heavy equipment approximately every five years, or as needed. Prior to sediment removal, water in the forebay would be lowered, first by passing water via the penstock through the Kaweah No. 3 Powerhouse. As the forebay water level approaches the elevation of the intake structure, diversion through the powerhouse would be discontinued and the remainder of the water would be released through the forebay's low-level outlet. The outlet would be opened no more 15% of its operating range to allow water to slowly drain from the forebay and minimize entrainment of the sediment deposit near the drain. The water released from the low-level outlet enters a short concrete chute that discharges into an adjacent natural drainage. Sediment removal with heavy equipment would occur once the sediment in the bottom of the forebay dries. Disposition of removed sediment would be identified in consultation with the Bureau of Land Management (BLM).

Sediment removal at the forebays has the potential to affect water quality through released of water that includes sediment/turbidity via Project low-level outlets that direct water into natural drainage channels for conveyance to the Kaweah River (refer to Section 7.6 – Geology and Soils). The amount of sediment/turbidity released from the forebays is anticipated to be small (i.e., routine release frequency). In addition, as discussed in Section 8.3.2.2, use of the concrete-lined chutes and natural drainage channels during opening of low-level outlets at the forebays has occurred for decades. Initial scour to bedrock (removal of fine sediments) in these channels has long since stabilized the channels, including vegetation, and the stable channels are not likely to change in the future. Because of the stable nature of the channels, little if any sediment or turbidity is mobilize during these routine operational events. Any sediment or turbidity

mobilized during these routine operation activities is very small relative to background in the Kaweah River during most times of the year. Furthermore, the volume of sediment or turbidity to reach the river channel is localized to a specific section of river. A smaller amount of sediment or turbidity mobilized, if any, actually enters the main river due to deposition in low gradient or slow velocity portions of the discharge channels or margin of the river channel. Also, typically the relative volume of water spilled is small compared to the river flow.

Under the Proposed Action, forebay releases of water and sediment would continue to be implemented as described in the SMECP (Appendix 4-A, Section 4.1.3). This plan memorializes existing operations and sediment management activities, including methods to minimize erosion within the natural drainage channels. Therefore, continued release of flows into the natural drainage channels for Project sediment maintenance implemented under the Proposed Action would have a negligible effect on water quality, particularly turbidity.

#### 8.3.2.4 Road and Trail Maintenance

SCE would implement a Project RTMP to maintain access to Project facilities, protect worker/public health and safety, and minimize erosion and sedimentation. Project road maintenance includes inspection of Project roads during routine operation and maintenance of Project facilities to identify the need for minor or major road maintenance. Minor road maintenance includes debris removal; basic repairs, including filing of potholes; maintenance of erosion control features such as culverts, drains, ditches, and water bars; repair, replacement, or installation of access control features such as posts, cables, rails, gates, and barrier rock; bridge deck replacement; and repair and replacement of signage. Major road maintenance includes installation or replacement of culverts and other drainage features; grading; sealing; and resurfacing. Project trail maintenance consists of inspection of Project trails during routine operation and maintenance of Project facilities, including debris removal; repairs of the trail surface, minor brushing; maintenance of erosion control features; repair, replacement, or installation of access control structures; and repair and replacement of signage.

Road and trail maintenance activities have the potential to adversely affect water quality in the Kaweah River and East Fork Kaweah River if the activities disturb soils or if spilled chemicals associated with the work enter the water. However, implementation of the measures in the RTMP, such as adhering to the Tulare County or BLM standards; consulting Tulare County or BLM, as appropriate, to review and modify proposed best management practices and environmental measures; and obtaining all necessary permits and approvals prior to work, would prevent adverse effects to water quality. The Proposed Action would have negligible effect on water quality in the Kaweah River and East Fork Kaweah River.

### 8.3.3 Conclusions – Water Quality

Implementataion of the Proposed Action, including the IFM, SMECP, WTMP, WQMP, VIPMP, and RTMP would have beneficial effects on water quality due to increased minimum instream flows; no effect on water quality due to ramping rates; and negligible effects on water quality with respect to forebay spills and flowline/forebay draining, flowline maintenance, vegetation and pest management, sediment management, and road and trail maintenance.

### 8.3.4 Unavoidable Adverse Effects

There are no unavoidable adverse effects to water quality under the Proposed Action.

### 8.3.5 Literature Cited

No Literature Cited

# FIGURES

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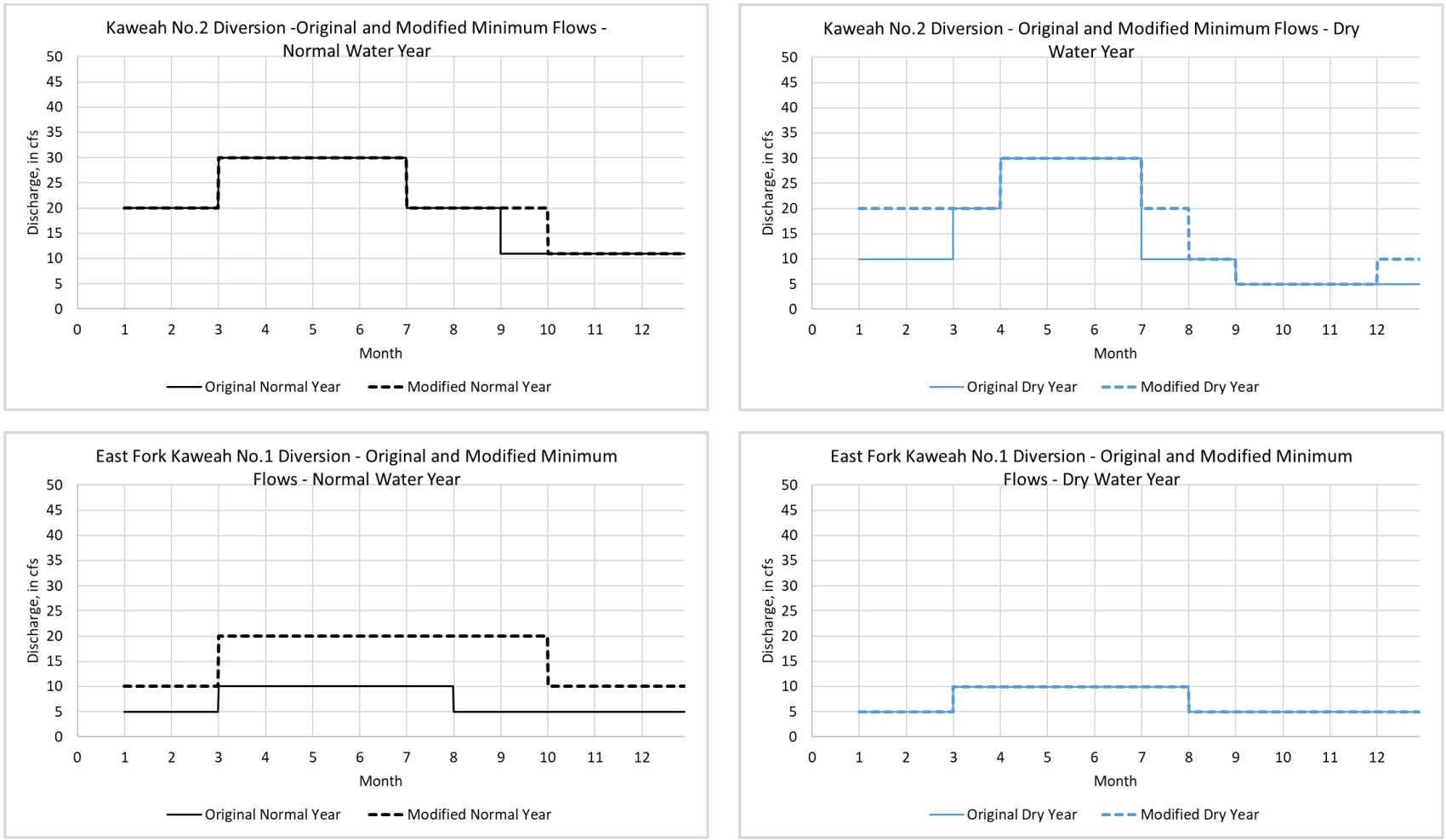


**Figure 8.3-1. Comparison of Kaweah No. 2 Diversion (top) and East Fork Kaweah No. 1 Diversion (bottom) original (No-Action Alternative) and Proposed Action modified minimum flows (cfs) (left – normal water year, right – dry water year)**

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| CTR | California Toxics Rule |
| EPA | Environmental Protection Agency |
| ESM | Entrainment study Measure |
| ETP | Environmental Training Program |
| FERC or Commission | Federal Energy Regulatory Commission |
| FPMP | Fish Population Monitoring Plan |
| FYLF | Foothill Yellow-Legged Frog |
| IBI | Index of Biotic Integrity |
| IFM | Instream Flow Measure |
| MIF | Minimum instream flow |
| Project | Kaweah Project |
| RTMP | Road and Trail Management Plan |
| SCE | Southern California Edison Company |
| SMECP | Sediment Management and Erosion Control Plan |
| TPCLMM | Transmission, Power, and Communication Line Maintenance Measure |
| TSP | Technical Study Plan |
| TSR | Technical Study Report |
| VIPMP | Vegetation and Integrated Pest Management Plan |
| WPT | Western Pond Turtle |
| WQMP | Water Quality Monitoring Plan |
| WTMP | Water Temperature Monitoring Plan |

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## 8.4 FISH AND AQUATIC RESOURCES ENVIRONMENTAL EFFECTS

This section describes potential effects to fish and aquatic resources under the Proposed Action for Southern California Edison Company's (SCE) Kaweah Project (Project). Section 3.0 – No-Action Alternative provides a description of current routine operation and maintenance activities. Section 4.0 – Proposed Action identifies changes from the No-Action Alternative, including new environmental measures; management and monitoring plans; and environmental programs. Potential effects to fish and aquatic resources are identified based on operation and maintenance of the Project under the Proposed Action compared to the No-Action Alternative.

Potential effects to fish and aquatic resources, which consists of (1) riverine physical habitat (e.g., depth, velocity, water temperature), (2) riverine aquatic community (algae, macroinvertebrates), (3) riverine fish, and (4) special status-species, are evaluated for the following (Table 8.4-1):

- Project Operations
  - Minimum instream flow (MIF) releases
  - Ramping rates
  - Forebay spills
  - Draining of flowlines and forebays during Project outages
  - Diversions and power generation
- Project Maintenance
  - Vegetation management
  - Pest management
  - Sediment Management at Project facilities
  - Road and trail maintenance
  - Transmission, power, and communication line vegetation clearance
- Environmental Program
  - Environmental Training Program

A discussion of potential effects to fish and aquatic resources (riverine habitat, riverine aquatic community, riverine fish, and special-status species) from implementing the Proposed Action, which includes new environmental measures; management and monitoring plans; and environmental programs, is provided below. Unavoidable adverse effects are also discussed at the end of this section.

Appendix 4-A includes a detailed description of new environmental measures; management and monitoring plans; and environmental programs included under the Proposed Action to address potential effects to aquatic resources, including:

- Instream Flow Measure (IFM) (Appendix 4-A, Section 4.1.1)
- Sediment Management and Erosion Control Plan (SMECP) (Appendix 4-A, Section 4.1.3)
- Fish Population Monitoring Plan (FPMP) (Appendix 4-A, Section 4.1.4)
- Entrainment Study Measures (ESM) (Appendix 4-A, Section 4.1.5)
- Water Temperature Monitoring Plan (WTMP) (Appendix 4-A, Section 4.1.6)
- Water Quality Monitoring Plan (WQMP) (Appendix 4-A, Section 4.1.7)
- Vegetation and Integrated Pest Management Plan (VIPMP) (Appendix 4-A, Section 4.5.2)
- Environmental Training Program (ETP) (Appendix 4-A, Section 4.6.1)

## 8.4.1 Effects to Riverine Aquatic Habitat

### 8.4.1.1 Project Activities that May Affect Riverine Aquatic Habitat

Under the Proposed Action, the following Project activities may affect riverine aquatic habitat (Table 8.4-1):

- Project Operations
    - Minimum Instream Flows – Modified instream flow could affect the hydrology, water temperature / water quality, channel geomorphology / sediment, and riparian vegetation that provide aquatic habitat for aquatic species.
    - Ramping Rates – Modified ramping rates could affect the hydrology and riparian vegetation that provide aquatic habitat for aquatic species.
    - Forebay Spills – Ongoing forebay spills could affect water quality (turbidity) in the bypass reaches that provides aquatic habitat.
    - Draining of Flowlines and Forebays during Project Outages – Ongoing drainage of flowlines and forebays during Project outages could affect water quality, algae and benthic macroinvertebrates, and fish.
    - Diversions and Generation – Modified water diversion and generation could affect hydrology, water temperature, water quality, riparian vegetation, algae,

benthic macroinvertebrates, bypass reach wetted perimeter / productivity, bypass reach fish physical habitat, entrainment, and special-status species.

- Project Maintenance
  - Vegetation Management – Modified vegetation management through the direct removal of vegetation or herbicide application at Project facilities and as a part of power line or communication line maintenance could affect the abundance of riparian vegetation, water quality, and potentially aquatic habitat and species.
  - Sediment Management – Ongoing sediment management at the Kaweah No. 1 Diversion Sandbox, Kaweah No. 1 Forebay, Kaweah No. 2 Diversion Intake and Forebay, and at the Kaweah No. 3 Forebay, could affect water quality in the bypass reaches and aquatic species.
- Environmental Programs
  - Environmental Training Program – The environmental training program to educate Licensee personnel and contractors (as appropriate) about special-status biological species could affect special-status aquatic species.

#### 8.4.1.2 Effects Analysis for Riverine Aquatic Habitat

### Hydrology

Under the Proposed Action, maximum diversion of water from the Kaweah River and East Fork Kaweah would be the same as the No-Action Alternative (diversions of up to 87 cubic feet per second [cfs] at Kaweah No. 2 Diversion and 24 cfs at Kaweah No. 1 Diversion). The Proposed Action IFM provides higher minimum instream flows (Table 8.4-2; Figure 8.4-1) that would result in increased flows in the bypass reaches (Table 8.4-3) during some select dry months and water year types. In the East Fork Kaweah, minimum instream flows are increased in all months in normal water year types, but remain unchanged in dry water year types. In the Kaweah River, minimum instream flows are modified in select months in both dry and normal water year types. Figures 8.4-2, 8.4-3, 8.4-4, and 8.4-5 show flow exceedance plots for each month in each of the bypass reaches for existing (No-Action Alternative), unimpaired, and modified (Proposed Action) hydrology. The Proposed Action IFM modified ramping rates would make essentially no change to daily average flows, but rather it would make minor changes to hourly flows when flowline diversions are modified. The Proposed Action hydrology effects on aquatic species habitat are addressed below in Sections 8.4.2 Effects on Riverine Aquatic Community and Section 8.4.3 Effects on Riverine Fish. Implementation of the Proposed Action, which includes the modified IFM environmental measure with increases in minimum instream flows and modified ramping rates would have a beneficial effect on hydrology in the bypass reaches.

## Water Temperature and Water Quality

The bypass reaches are relatively short (Kaweah River 4.1 miles, East Fork Kaweah River 4.7 miles) and all of the diverted water for Project generation re-enters the rivers downstream of each powerhouse. In addition, during most dry water years, diversions are turned off during the warmest water temperature months (July, August, September). At that time, water temperature is naturally warm (>70 °F) and generally suitable for warm water fish (Figure 7.4-7 and 7.4-9). During the winter and spring/early summer water temperatures are cold and/or flows are higher and the Project doesn't affect water temperature. In a dry year like 2018, the modeled (AQ 4 – Water Temperature Technical Study Report [TSR] [SCE 2019a; SD A]) existing temperature conditions, are nearly identical to the unimpaired temperature conditions (Figures 8.4.6a-b) . The Proposed Action also includes the IFM environmental measure with modified instream flows (increases in flow).

There is limited opportunity for the Project to affect water temperature. The only time the Proposed Action has the potential to affect water temperature in the bypass reaches is during the summer / early winter season in years when air temperatures are warm and inflows to the Project are high enough to allow diversion of flow from the bypass reaches. Water temperature modeling using the 2018 calibrated water temperature model (AQ 4 – Water Temperature TSR [SCE 2019a; SD A]) with flows like those that occurred in 2003, when July through December diversions were occurring (a drier Normal water year type) indicates that almost no change occurred in the Kaweah River bypass reaches, except a small amount of warming in November/December, compared to unimpaired conditions. In the East Fork Kaweah River a very small amount of warming occurred August through December (<0.5°C) under existing conditions compared to unimpaired conditions (Figure 8.4-6b). With implementation of the IFM in the Proposed Action, however, the water temperatures cool a small amount compared to existing (No-Action) (Figure 8.4-6c) and are very close to unimpaired conditions. Implementation of the Proposed Action and IFM (increased minimum flows) would result in a small beneficial effect to water temperature (cooler water temperature) in the bypass reaches compared to existing conditions (No-Project Alternative).

With respect to water quality, under existing conditions water quality is good and meets all applicable water quality standards except that during the high flow season, several water quality samples in the Kaweah River bypass reaches and comparison reaches exhibited low alkalinity (<20 mg/L). This appears to be a natural condition of the Watershed during spring high flow conditions when snowmelt and rainfall runoff have little opportunity to pick up calcium carbonate from the basin geology. Also, there were three ammonia samples in bypass reaches during the summer low-flow sampling that exceeded water quality criteria. Because the Project does not have operations that would typically affect ammonia, the source could potentially be septic systems from homes along the river (Section 7.3 Water Quality).

The Proposed Action includes the SMECP that maintains sediment and erosion practices to insure that turbidity from sediment management does not affect water quality in the bypass reaches. Under the Proposed Action, therefore, water quality is expected to be

similar to existing conditions or slightly improved as a result of the increased minimum flows during the low flow months due to the IFM environmental measure.

Overall, implementation of the Proposed Action, which includes increased instream flows as a result of the IFM environmental measure, implementation of the SMECP, and implementation of the water temperature and water quality monitoring plans (WTMP, WQMP) that require periodic water temperature and water quality monitoring, would result in a beneficial effect (enhancement) of water temperature and water quality in the bypass reaches.

**Channel Geomorphology and Sediment**

Under existing conditions, which includes activities in the SMECP, the channel geomorphology and sediment transport conditions in the bypass reaches are similar to unimpaired conditions (Section 7.4.5.3). The Proposed Action would not affect either beneficially or negatively the range of flows that affect channel geomorphology or sediment transport conditions. Existing spawning gravels are suitably clean of fine sediment to provide high quality spawning and pools have limited buildup of fine sediment and would continue similarly under the Proposed Action. High flow channel maintenance flows would continue to occur in the bypass reaches. With implementation of the Proposed Action, including the SMECP, there would be no effect on channel geomorphology and sediment in the bypass reaches.

**Riparian Vegetation**

The hydrology, minimum instream flows and down ramping rates (IFM), under the Proposed Action would maintain and provide greater protection to riparian resources in the bypass reaches associated with the Project. Implementation of the avoidance and protection measures in the VIPMP, SMECP, Project Road and Trail Management Plan (RTMP), and Transmission, Power, and Communication Line Maintenance Measure (TPCLMM) and the environmental training program (ETP) under the Proposed Action provide for enhanced management of and protection of riparian resources and wetland habitat during maintenance activities. Overall the Proposed Action with implementation of the IFM, VIPMP, SMECP, RTMP, TPCLMM, and ETP would benefit riparian vegetation and wetland habitat along approximately 8.8 miles of rivers associated with the Project (Section 8.8.3 Riparian Resource Environmental Effects).

### 8.4.1.3 Conclusion – Riverine Aquatic Habitat

The Proposed Action would maintain and/or enhance (beneficially effect) the riverine aquatic habitat (hydrology, water temperature and water quality, channel geomorphology and sediment, and riparian vegetation) in the bypass reaches.

## 8.4.2 Effects to the Riverine Aquatic Community

### 8.4.2.1 Project Activities that May Affect the Riverine Aquatic Community

Under the Proposed Action, the operations and maintenance activities that may potentially affect the riverine aquatic community are the same as those discussed in Section 8.4.1.1 related to riverine aquatic habitat (hydrology, water temperature and water quality, channel geomorphology and sediment, and riparian vegetation) (Table 8.4-1). Overall, it was found in Section 8.4.1.4 that the Proposed Action would maintain and/or enhance (beneficially effect) the riverine aquatic habitat (hydrology, water temperature and water quality, channel geomorphology and sediment, and riparian vegetation) in the bypass reaches.

### 8.4.2.2 Effects Analysis for the Riverine Aquatic Community

#### Algae and Benthic Macroinvertebrates

Under existing conditions (No-Action Alternative) algae abundance was moderate and nuisance algae were not observed. There was no obvious difference between algae coverage in the bypass reaches and the comparison reaches (Section 7.4.7). Average summer/fall drift density of benthic macroinvertebrates was similar between comparison and bypass reaches as were benthic macroinvertebrate sampling metric results and IBI scores. The Proposed Action, including implementation of the IFM, SMECP, WTMP, WQMP, VIPMP, and ETP would benefit riverine aquatic habitat compared to existing conditions (Section 8.4.1.4) (also see Bypass Reach Wetted Perimeter below); therefore, the Proposed Action would maintain and/or have a beneficial effect on algae and benthic macroinvertebrates.

#### Bypass Reach Wetted Perimeter

Implementation of the Proposed Action, which includes the modified IFM environmental measure with increases in minimum instream flows would have a beneficial effect on hydrology in the bypass reaches. Appendix A shows the monthly exceedance plots for wetted perimeter for each month in the bypass reaches for existing (No-Action Alternative), unimpaired, and modified (Proposed Action) hydrology. Figures 8.4-7, 8.4-8, 8.4-9, and 8.4-10 show percent of unimpaired flow exceedance plots for wetted perimeter for each month in the bypass reaches for the modified (Proposed Action) hydrology. The percent of unimpaired wetted perimeter for the Proposed Action hydrology is approximately 80% (or greater). With the modified IFM environmental measure the Proposed Action has improved wetted perimeter in the upper Kaweah River reach (KR DS PH3) during the months of January, February, July, September, and December compared to existing conditions (No-Action Alternative). In the downstream reach above Kaweah No. 1 Powerhouse (KR US PH1) the Proposed Action has increased wetted perimeter during the months of January, February, July, August, September, November and December compared to existing (No-Action Alternative) and in the farthest downstream reach (KR US PH2) there is an improvement January, July and September. In the East Fork Kaweah River, wetted perimeter has increased under

the Proposed Action during January, February, July, August, September, November and December. The Proposed Action would have a beneficial effect on wetted perimeter, which provides habitat for benthic species (algae and macroinvertebrates).

#### 8.4.2.3 Conclusion – Riverine Aquatic Community

The Proposed Action, including implementation of the IFM, SMECP, WTMP, WQMP, VIPMP, and ETP, would have a beneficial effect on the Riverine Aquatic Community (algae, benthic macroinvertebrates, wetted perimeter) in the bypass reaches.

### 8.4.3 Effects to Riverine Fish

#### 8.4.3.1 Project Activities that May Affect Riverine Fish

Under the Proposed Action, the operations and maintenance activities that may potentially affect the riverine fish are the same as those discussed in Section 8.4.1.1 related to riverine aquatic habitat (Table 8.4-1). Overall, it was found in Section 8.4.1.4 that the Proposed Action would maintain and/or enhance (beneficially effect) the riverine aquatic habitat (hydrology, water temperature and water quality, channel geomorphology and sediment, and riparian vegetation) in the bypass reaches.

#### 8.4.3.2 Effects Analysis for Riverine Fish

**Distribution and Diversity**

The Proposed Action would maintain the existing (No-Action Alternative) spatial distribution of fish species in the bypass reaches. The existing distribution of minnow species (Sacramento pikeminnow, hardhead), Sacramento suckers, rainbow trout and other species is primarily determined by water temperature and physical barriers in the study area (e.g., natural barriers in the East Fork Kaweah River) (Section 7.4.9.1; Table 7.4-1; AQ 2 – Fish Population TSR [SCE 2019b; SD A]). Hardhead and Sacramento pikeminnow were captured at all sampling sites in the Kaweah River and at the lowest elevation sampling site on the East Fork Kaweah River. It is likely that natural barriers limit the upstream distribution of these species in the East Fork Kaweah River. Sacramento suckers were found throughout the Kaweah and East Fork Kaweah River sampling sites. Rainbow trout were only found in the upper three sampling sites on the Kaweah River, and at all of the East Fork Kaweah River study sites. Likely warm summer water temperature due to the low elevation of the bypass reaches limits the downstream trout distribution in the Kaweah River and affects the abundance in other reaches. Smallmouth bass were found in the lower three Kaweah River sites and lower East Fork Kaweah River site. California roach were found at the two upper sites on the Kaweah River and the two lower sites on the East Fork Kaweah River. The Proposed Action would have limited effect on water temperature (Section 8.4.1.3) and would not affect barriers; therefore, the Proposed Action would have no effect on the distribution and diversity of riverine fishes in the bypass reaches.

## Growth / Condition/ Abundance/ Timing

Fish growth and condition in the bypass reaches is primarily determined by water temperature/quality and food availability (productivity). Abundance is primarily controlled by food availability and the availability of physical habitat. Life history timing is primarily controlled by water temperature. The Proposed Action enhances productivity potential (Section 8.4.2.3) and essentially maintains water temperature and water quality (Section 8.4.1.3). Rearing habitat availability in all river reaches is enhanced under the Proposed Action (see below). Therefore, under the Proposed Action, the growth, condition, and abundance of fish would be enhanced in the bypass reaches and the timing of life history functions would remain unchanged.

Down ramping rates, if extreme could affect abundance of fish via stranding of fish or dewatering of redds. There is very little down ramping that occurs as a result of the Project with respect to temporal frequency or flow magnitude. Periodically, when flowline diversions are increased during the year (Kaweah No. 1 and No.2 Diversions), flows would decrease in the bypass reaches. The Proposed Action IFM environmental measure requires, however, that ramping in the river, as a result of diversion, is limited to 30% or less of the stream flow per hour. This causes a change in stage of <0.1 to 0.3 ft/hr feet per hour in the range of flows that the Project can operate (87 cfs at Kaweah No. 2 Diversion and 24 cfs at Kaweah No. 1 Diversion) (Section 7.4.5.1). This down-ramping rate is protective of fish and would avoid redd stranding. The Proposed Action also includes the FPMP, SMECP, WTMP, WQMP, and ETP that would require monitoring of fish populations, sediment management, water temperature monitoring, water quality monitoring, and environmental training. Overall, implementation of the Proposed Action would have a beneficial effect on fish growth, condition, and abundance and no effect on life history timing.

## Bypass Reach Physical Habitat

Habitat versus flow relationships for each of the bypass reaches and each species and life stage are discussed in Section 7.4.9.6. A habitat time series analyses (1994 to 2018) of existing (No-Action Alternative), unimpaired flow, and modified conditions (Proposed Action) is provided here for each of the bypass reaches to show the difference between the Proposed Action and existing (No-Action Alternative) and/or natural habitat potential (unimpaired habitat). Figures 8.4-11, 8.4-12, and 8.4-13 show percent of unimpaired hardhead and Sacramento pikeminnow adult habitat exceedance plots for each month in each of the Kaweah River bypass reaches. Figure 8.4-14 shows the percent of unimpaired habitat exceedance plots for the combined Kaweah River bypass reaches. Figure 8.4-15 shows the percent of unimpaired habitat exceedance plots for the East Fork Kaweah River bypass reach. For the combined Kaweah River bypass reaches and for the East Fork Kaweah bypass reach, the Proposed Action percent of unimpaired habitat is approximately 80% or greater in the warm water temperature months (June, July, August, September, October) and generally 70% or greater in the cool water temperature months (November through May). In addition, the amount of Proposed Action habitat is greater than under existing conditions (No-Project) (compare Figures 8.4-11 through 8.4-15 to Figures 7.4.-30 through 7.4-34) due to the enhanced minimum instream flows

in the IFM environmental measure. Implementation of the Proposed Action, including the IFM environmental measure, would have a beneficial effect on adult hardhead and Sacramento pikeminnow physical habitat in the bypass reaches.

Table 8.4-4 and Appendix B show the effect of the Proposed Action on physical habitat for all species and life stages compared to the existing conditions. In general, habitat is increased for all species and life stages during several or all of the drier months July through February. Implementation of the Proposed Action, including the IFM environmental measure, would have a beneficial effect on the physical habitat of other fish species (Sacramento sucker, rainbow trout) and life stages in the bypass reaches.

**Entrainment**

Potential entrainment of fish into the Kaweah No.1 and No. 2 Flowlines and Kaweah No. 1, No. 2, and No.3 powerhouses is discussed in Section 7.4.11.3. The AQ 9 – Entrainment Technical Study, see the ESM environmental measure in Section 8.4.1.2, is currently being conducted. Sampling to date has shown very little entrainment (one 200 mm pikeminnow has been captured) and anecdotal information from maintenance workers and field biologists observations indicate that entrainment is likely very low. The Proposed Action does not change the diversions or diversion timing and does not change the diversions amounts appreciably (slight decrease due to the IFM); therefore, the Proposed Action would have no effect on entrainment of fish compared to existing conditions (No-Action Alternative).

#### 8.4.3.3 Conclusion – Riverine Fish

The Proposed Action, including implementation of the IFM, SMECP, WTMP, WQMP, VIPMP, ETP, FPMP, and ESM would have a beneficial effect on riverine fish in the bypass reaches.

### 8.4.4 Effects to Special-Status Species

#### 8.4.4.1 Project Activities that May Affect Special-Status Species

Under the Proposed Action, the operations and maintenance activities that potentially could affect the special-status species are generally the same as those discussed in Section 8.4.1.1 related to riverine aquatic habitat (Table 8.4-1). Overall, it was found in Section 8.4.1.4 that the Proposed Action would maintain and/or enhance (beneficially effect) the riverine aquatic habitat (hydrology, water temperature and water quality, channel geomorphology and sediment, and riparian vegetation) in the bypass reaches.

### 8.4.4.2 Effects Analysis for Special-Status Species

#### Hardhead

Hardhead distribution and abundance in the study area was discussed in Sections 7.4.9.1 and 7.4.9.4, respectively and Section 7.4.12.1. The Proposed Action effects on fish in general, and hardhead in particular, are discussed in Section 8.4.3. During Project sampling, hardhead were present in low to moderate abundance in the bypass and comparison reaches on the Kaweah River (KR US PH3, KR DS PH3, KR US PH1, KR US PH2, KR DS PH2) and in the lowest reach of the East Fork Kaweah River (EF US Confl). The Proposed Action, including implementation of the IFM, SMECP, WTMP, WQMP, VIPMP, ETP, FPMP and ESM, would have a beneficial effect on Riverine Aquatic Habitat (Section 8.4.1.3), the Riverine Aquatic Community (Section 8.4.2.3), and Riverine Fish, particularly hardhead and hardhead habitat (Section 8.4.3), compared to the existing conditions (No-Action Alternative).

#### Foothill-Yellow Legged Frog

Historical data and extensive FYLF sampling as part of AQ 7 – Special-Status Amphibians and Aquatic Reptiles TSR (SCE 2019c; SD A) are discussed in Sections 7.4.10 and 7.4.12.2. FYLF were not observed during the surveys conducted in the study area. In the reaches where FYLF might have been expected to be present based on physical habitat, bullfrogs were found (competitors/predators of FYLF). It is highly unlikely that FYLF exist in the study area (or Kaweah River watershed), given the dominance of bullfrogs in the lower elevation reaches, the absence of permanently flowing tributaries in the higher elevation study reaches, and the position of the Watershed downwind of areas in the Central Valley where pesticide use is heavy (Sections 7.4.10 and 7.4.12.2). FYLF are not known to be extant in the Kaweah River watershed (Sections 7.4.10). The Proposed Action would generally improve aquatic habitat in the bypass reaches; however, because FYLF are not extant in the Watershed, the Proposed Action would have no effect on FYLF.

#### Western Pond Turtle

WPT are discussed in Section 7.4.12.3. Study sites (AQ 7 – Special-Status Amphibians and Aquatic Reptiles TSR [SCE 2019c; SD A]; Section 7.4.10) were surveyed for WPT and potential sightings of WPT during implementation of other aquatic technical studies were recorded (AQ 1 – Instream Flow TSR mesohabitat mapping and field data collection [SCE 2019d; SD A], AQ 2 – Fish Population TSR [SCE 2019b; SD A], and the AQ 3 – Benthic Macroinvertebrate TSR [SCE 2019e; SD A]). No WPT were encountered either in the water or on land during the three surveys conducted by the amphibian / reptile surveyors. No incidental observations of WPT occurred during the other aquatic studies. There are, however, recent observations of WPT near the study area from two locations in Sequoia National Park. One population occupies pools in the permanently flowing reaches of the North Fork Kaweah near the confluence with Yucca Creek approximately 12 kilometers (km) upstream of the study area. The other is in Sycamore Creek, an

intermittent tributary of the Middle Fork Kaweah approximately 1 km from the study area (see Section 7.4.12.3).

GIS analysis indicates that potential WPT nesting habitat exists in a narrow patchy corridor along the Kaweah River and East Fork Kaweah River corridors. During field studies, no evidence of nesting activity was observed in the study area. Near Project facilities, we did identify potential nesting habitat with suitable substrate on the North side of the river upstream of the Kaweah No. 2 Diversion. There is also potential nesting habitat with suitable substrate on the north side of the river near the Kaweah No. 2 Powerhouse. The Proposed Action SMECP and ESM would protect these areas from unnecessary disturbance during Project maintenance. The Proposed Action, including the IFM, SMECP, WTMP, WQMP, VIPM, and ETP, would generally improve aquatic habitat in the bypass reaches, however, it is anticipated that the Proposed Action would have negligible effect on WPT compared to existing conditions (No-Project Alternative).

#### 8.4.4.3 Conclusion – Special-Status Species

The Proposed Action, including implementation of the IFM, SMECP, WTMP, WQMP, VIPMP, and ETP would have a beneficial effect on hardhead in the bypass reaches, no effect on FYLF (not extant), and negligible effect on WPT compared to existing conditions (No-Action Alternative).

### 8.4.5 Unavoidable Adverse Effects

There are no unavoidable adverse effects to fish and aquatic resources associated with implementation of the Proposed Action.

### 8.4.6 Literature Cited

SCE. 2019a. AQ 4 – Water Temperature Technical Study Report. Available in Supporting Document A

SCE. 2019b. AQ 2 – Fish Population Technical Study Report. Available in Supporting Document A

SCE. 2019c. AQ 2 – Special-status Amphibians and Aquatic Reptiles Technical Study Report. Available in Supporting Document A

SCE. 2019d. AQ 1 – Instream Flow Technical Study Report. Available in Supporting Document A

SCE. 2019e. AQ 3 – Geomorphology Technical Study Report. Available in Supporting Document A

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# TABLES

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## Table 8.4-1. Fish and Aquatic Resources Potentially Affected by Ongoing and Modified Project Operation and Maintenance under the Proposed Action

| Proposed Action | | Fish and Aquatic Species | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Riverine Physical Habitat | | | | Riverine Aquatic Community | | Riverine Fish | | | | Special-Status Species | | |
| | | Hydrology | Water Temperature and Water Quality | Channel Geomorphology and Sediment | Riparian Vegetation | Algae and Benthic Macroinvertebrates | Bypass Reach Wetted Perimeter Productivity | Distribution and Diversity | Growth / Condition / Abundance / Timing | Bypass Reach Physical Habitat | Entrainment | Hardhead | Foothill Yellow-legged Frog | Western Pond Turtle |
| Project Operations | Minimum instream flows (modified) | X | X | X | X | X | X | X | X | X | | X | X | X |
| | Ramping rates (modified) | X | | | X | X | | | X | | | X | X | X |
| | Forebay spills (ongoing) | | X | | | X | | | X | | | X | | |
| | Draining of flowlines and forebays during Project outages[1] (ongoing) | | X | | | X | | | X | | | X | | |
| | Diversions and Generation (ongoing) | X | X | | X | X | X | | | X | X | X | X | X |
| Project Maintenance | Vegetation management[2] (modified) | | X | | X | X | | | | | | X | X | X |
| | Sediment removal/flushing at Kaweah No. 1 Sandbox (ongoing) | | X | | | X | | | X | | | X | X | X |
| | Sediment removal/flushing at Kaweah No. 1 Forebay Tank (ongoing) | | X | | | X | | | X | | | X | X | X |
| | Sediment removal/flushing at Kaweah No. 2 Forebay (ongoing) | | X | | | X | | | X | | | X | X | X |
| | Sediment removal/flushing at Kaweah No. 2 Diversion Intake (ongoing) | | X | | | X | | | X | | | X | X | X |
| | Sediment removal at Kaweah No. 3 Forebay (ongoing) | | X | | | X | | | X | | | X | X | X |
| | Road and trail maintenance (modified) | | X | | | X | | | | | | | | |
| | Line Maintenance Vegetation clearance (modified) | | | | X | | | | X | | | X | X | X |
| Environmental Programs | Environmental Training Program (modified) | | | | | | | | | | | X | X | X |

## Table 8.4-2. Existing (No-Action Alternative) Minimum Flow Requirements Versus the Modified Minimum Flow Requirements (Proposed Action)

| Month | Existing (No-Action Alternative) | | Modified (Proposed Action Alternative) | |
|---|---|---|---|---|
| | Normal Year (cfs) | Dry Year (cfs) | Normal Year (cfs) | Dry Year (cfs) |
| **Kaweah River** | | | | |
| January | 20 | 10 | 20 | 20 |
| February | 20 | 10 | 20 | 20 |
| March | 30 | 20 | 30 | 20 |
| April | 30 | 30 | 30 | 30 |
| May | 30 | 30 | 30 | 30 |
| June | 30 | 30 | 30 | 30 |
| July | 20 | 10 | 20 | 20 |
| August | 20 | 10 | 20 | 10 |
| September | 11 | 5 | 20 | 5 |
| October | 11 | 5 | 11 | 5 |
| November | 11 | 5 | 11 | 5 |
| December | 11 | 5 | 11 | 10 |
| **East Fork Kaweah River** | | | | |
| January | 5 | 5 | 10 | 5 |
| February | 5 | 5 | 10 | 5 |
| March | 10 | 10 | 20 | 10 |
| April | 10 | 10 | 20 | 10 |
| May | 10 | 10 | 20 | 10 |
| June | 10 | 10 | 20 | 10 |
| July | 10 | 10 | 20 | 10 |
| August | 5 | 5 | 20 | 5 |
| September | 5 | 5 | 20 | 5 |
| October | 5 | 5 | 10 | 5 |
| November | 5 | 5 | 10 | 5 |
| December | 5 | 5 | 10 | 5 |

Note that minimum instream flows are as shown above *or* Natural Flow - 3 cfs, whichever is lower. A total of 3 cfs is required to meet SCE's pre-1914 consumptive water right delivery obligation.

## Table 8.4-3. Bypass and Comparison Reaches in the Study Area

| Study Reach | Site ID | Bypass Reaches | Comparison Reaches (upstream or downstream of the Project) |
|---|---|---|---|
| Kaweah River Upstream of Kaweah No. 3 Powerhouse | KR US PH3 | | X |
| Kaweah River Downstream of Kaweah No. 3 Powerhouse and Upstream of the East Fork Kaweah River Confluence | KR DS PH3 | X | |
| Kaweah River Downstream of East Fork Kaweah Confluence and Upstream of Kaweah No. 1 Powerhouse | KR US PH1 | X | |
| Kaweah River Downstream of Kaweah No. 1 Powerhouse and Upstream of Kaweah No. 2 Powerhouse | KR US PH2 | X | |
| Kaweah River Downstream of Kaweah No. 2 Powerhouse | KR DS PH2 | | X |
| East Fork Kaweah River Upstream of the Kaweah No. 1 Diversion | EF US K1 Div | | X |
| East Fork Kaweah River Downstream of the Kaweah No. 1 Diversion | EF DS K1 Div | X | |
| East Fork Kaweah River Upstream of Confluence with Kaweah River | EF US Confl | X | |

## Table 8.4-4. Changes in Fish Species / Lifestage Physical Habitat in each Bypass Reach under the Proposed Action Compared to Existing Conditions (No-Action Alternative)

| Month / Reach | Species / Life Stage | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | HHAD | HHJUV | SSAD | SSJUV | RBAD | RBJUV | RBFRY | RBSPAWN |
| **Kaweah River Downstream of Powerhouse No. 3 (KR DS PH3)** | | | | | | | | |
| January | + | + | + | + | + | + | | |
| February | + | + | + | | + | + | | |
| March | | | | | | | | |
| April | | | | | | | | |
| May | | | | | | | | |
| June | | | | | | | | |
| July | + | + | + | + | + | + | small + | |
| August | | | | | + | | | |
| September | + | + | + | + | + | + | | |
| October | | | | | | | | |
| November | | | | | | | small + | |
| December | + | + | + | + | + | + | small + | |
| **Kaweah River Upstream of Powerhouse No. 1 (KR US PH1)** | | | | | | | | |
| January | + | + | + | + | + | + | | |
| February | + | + | + | | + | + | | |
| March | | | | | | | | |
| April | | | | | | | | |
| May | | | | | | | | |
| June | | | | | | | | |
| July | + | + | + | + | + | + | | |
| August | + | + | + | | + | + | -- | |
| September | + | + | + | + | + | + | -- | |
| October | | | | | + | + | | |
| November | + | + | + | + | + | + | | |
| December | + | + | + | + | + | + | | |
| **Kaweah River Upstream of Powerhouse No. 2 (KR US PH2)** | | | | | | | | |
| January | + | + | + | + | + | + | | |
| February | | | | | | | | |
| March | | | | | | | | |
| April | | | | | | | | |
| May | | | | | | | | |
| June | | | | | | | | |
| July | + | | + | + | + | + | small + | |
| August | | | | + | | | small + | |

| Month / Reach | Species / Life Stage | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | HHAD | HHJUV | SSAD | SSJUV | RBAD | RBJUV | RBFRY | RBSPAWN |
| September | + | + | + | | + | + | small + | |
| October | | | | | | | | |
| November | | | | | | | | |
| December | | | | + | | | | |
| **East Fork Kaweah River Upstream of Confluence with Kaweah River (EF US CONFL KR)** | | | | | | | | |
| January | + | + | + | + | + | + | | |
| February | + | | | | + | + | | |
| March | | | | | | | | small + |
| April | | | | | | | | |
| May | | | | | | | | |
| June | | | | | | | | |
| July | + | + | + | + | + | + | | |
| August | + | + | + | + | + | + | + | |
| September | + | + | + | + | + | + | + | |
| October | + | + | + | + | + | + | + | |
| November | + | + | + | + | + | + | | |
| December | + | + | + | + | + | + | | |

+ = increase, – = decrease, blank = no change

HHAD = Hardhead Adult

HHJUV = Hardhead Juvenile

RBAD = Rainbow Trout Adult

RBFRY = Rainbow Fry

RBJUV = Rainbow Trout Juvenile

RBSPAWN = Rainbow Trout Spawning.

SSAD = Sacramento Sucker Adult

SSJUV = Sacramento Sucker Juvenile

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# FIGURES

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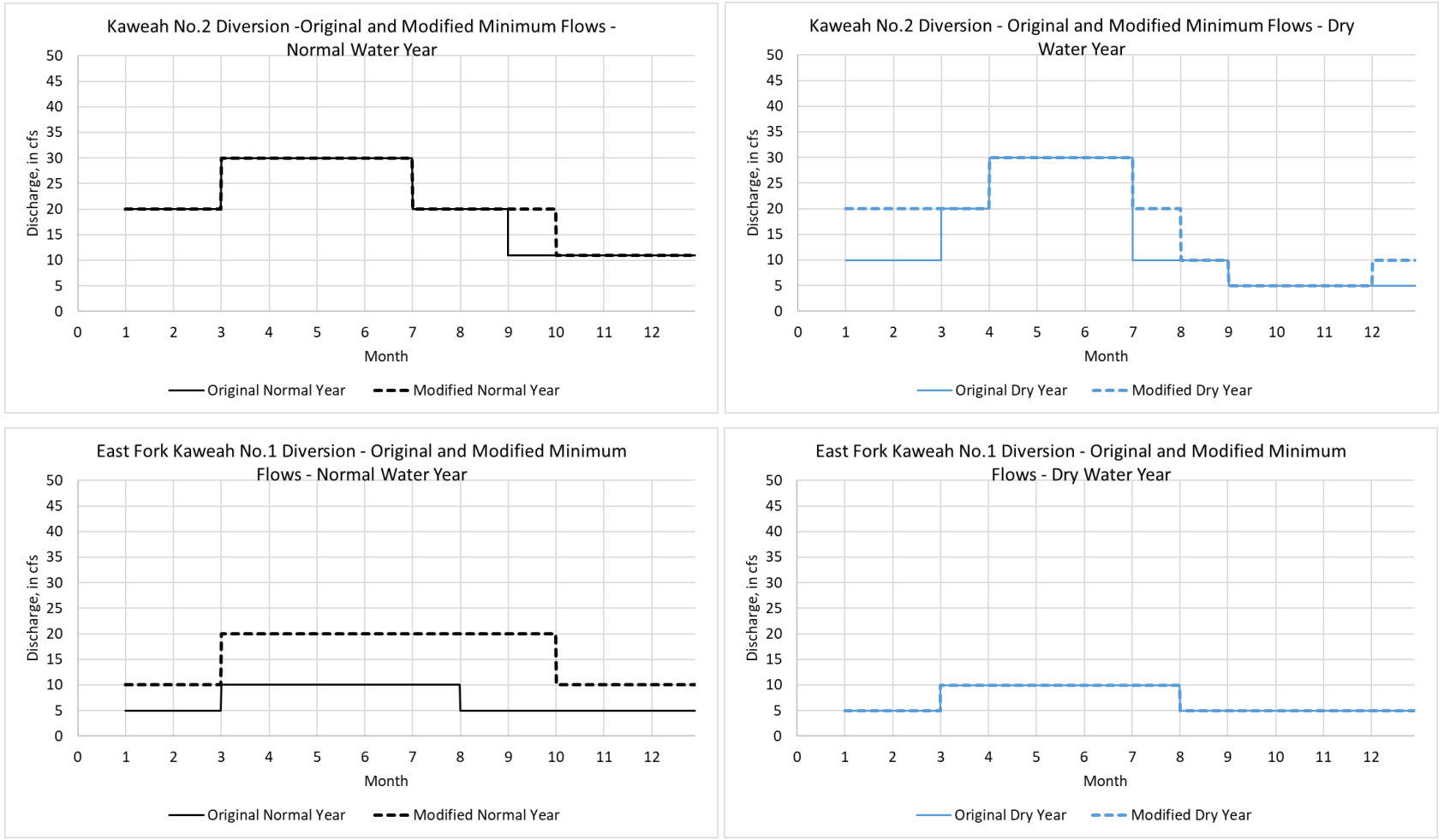


**Figure 8.4-1. Comparison of Kaweah No. 2 Diversion (top) and East Fork Kaweah No. 1 Diversion (bottom) existing (No-Action Alternative) and modified minimum flows (cfs) (Proposed Action Alternative) (left – normal water year, right – dry water year)**

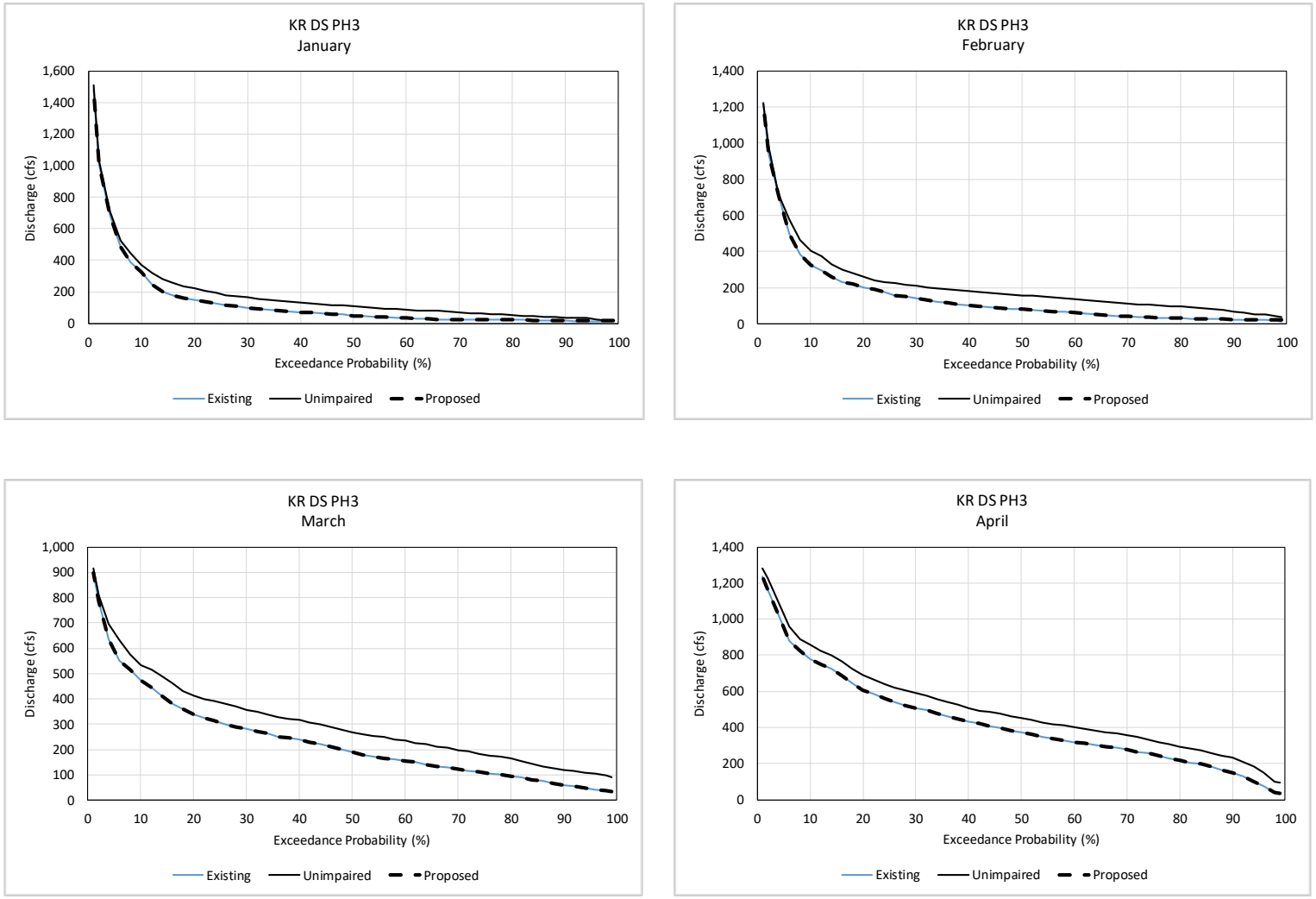


**Figure 8.4-2. Kaweah River Downstream of Kaweah No. 3 Powerhouse and Upstream of the East Fork Kaweah River Confluence Flow Exceedance Plots (1994-2018) Comparing Existing, Unimpaired, and Proposed Flows**

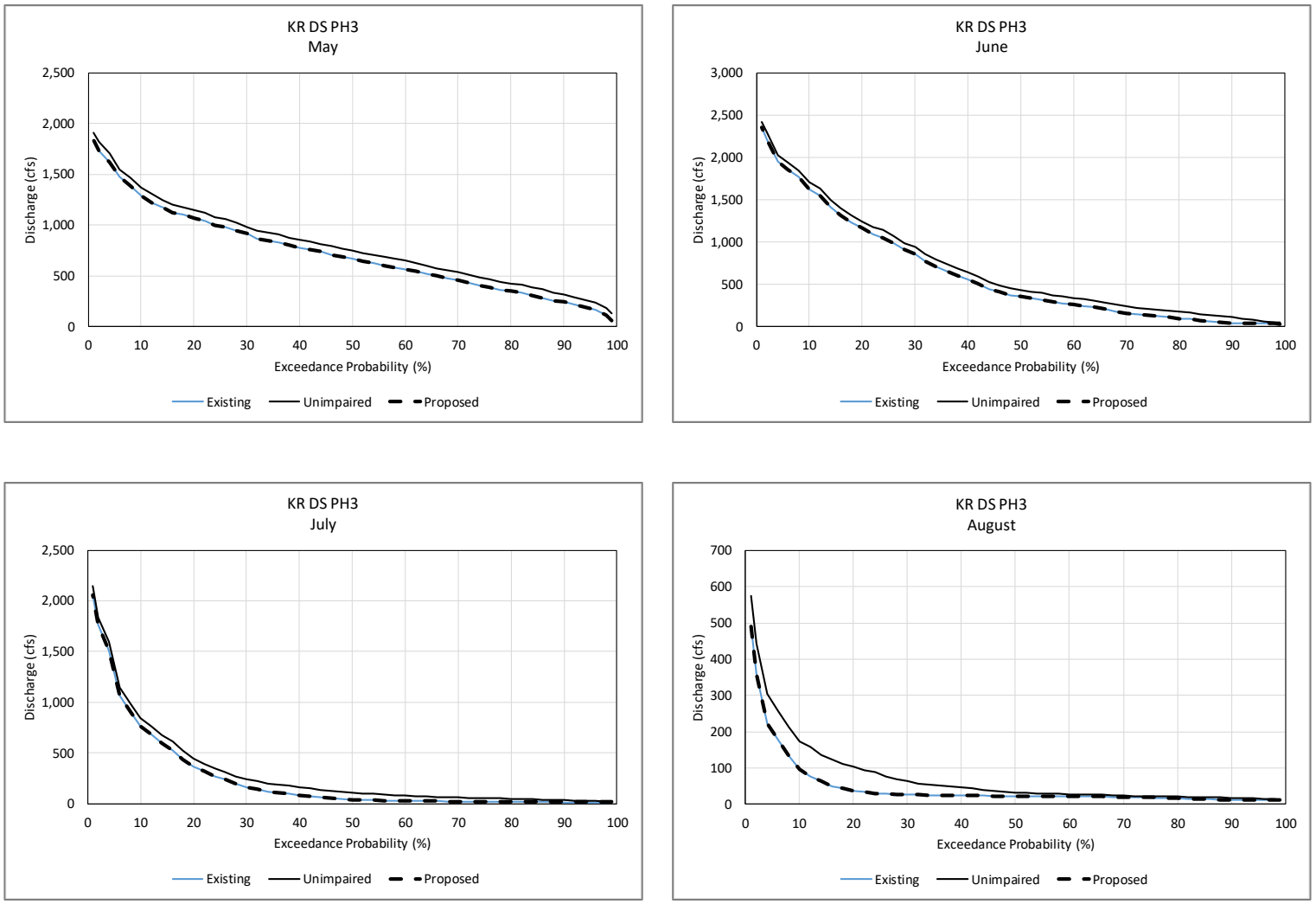


**Figure 8.4-2. (continued) Kaweah River Downstream of Kaweah No. 3 Powerhouse and Upstream of the East Fork Kaweah River Confluence Flow Exceedance Plots (1994-2018) Comparing Existing, Unimpaired, and Proposed Flows**

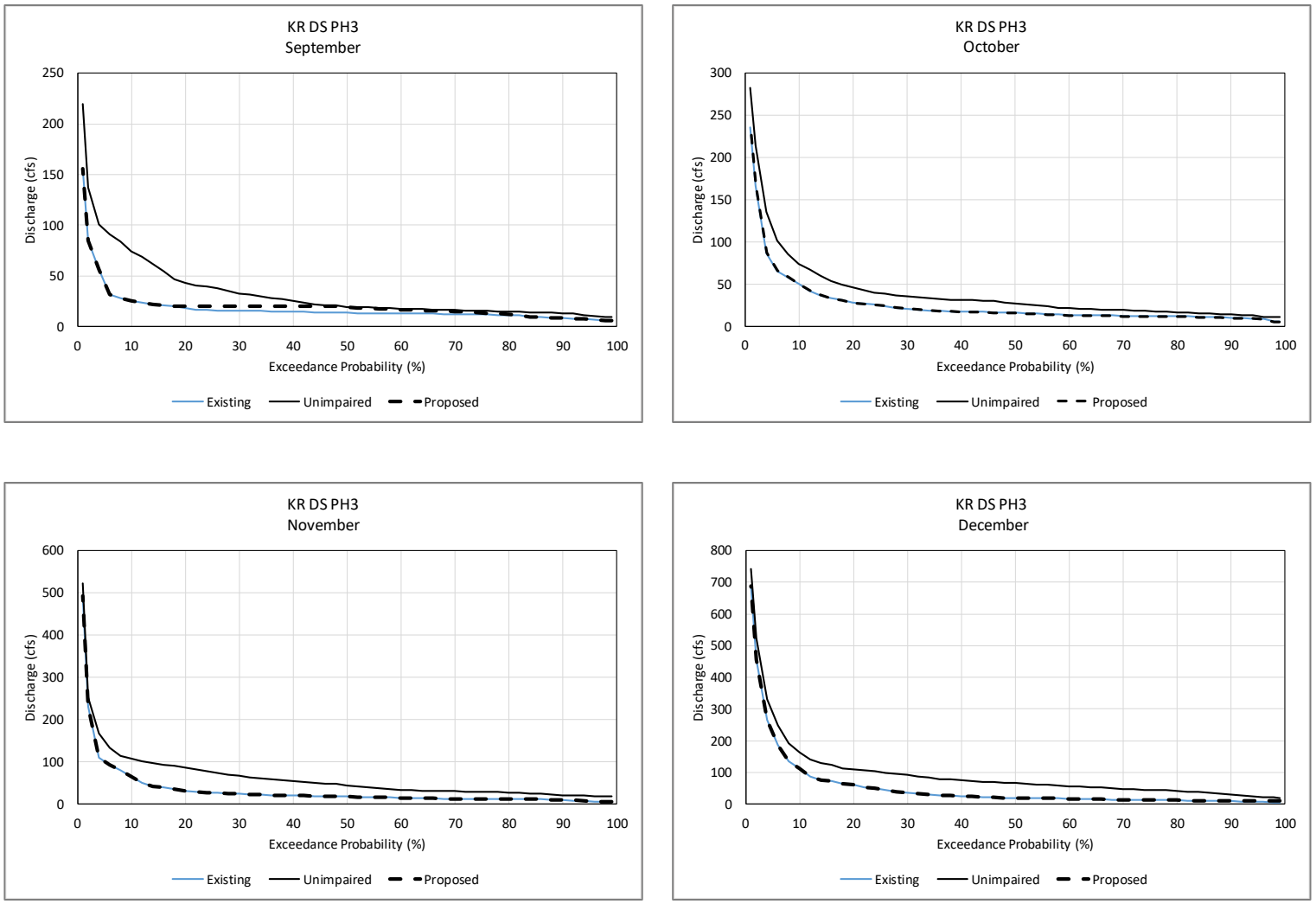


**Figure 8.4-2. (continued) Kaweah River Downstream of Kaweah No. 3 Powerhouse and Upstream of the East Fork Kaweah River Confluence Flow Exceedance Plots (1994-2018) Comparing Existing, Unimpaired, and Proposed Flows**

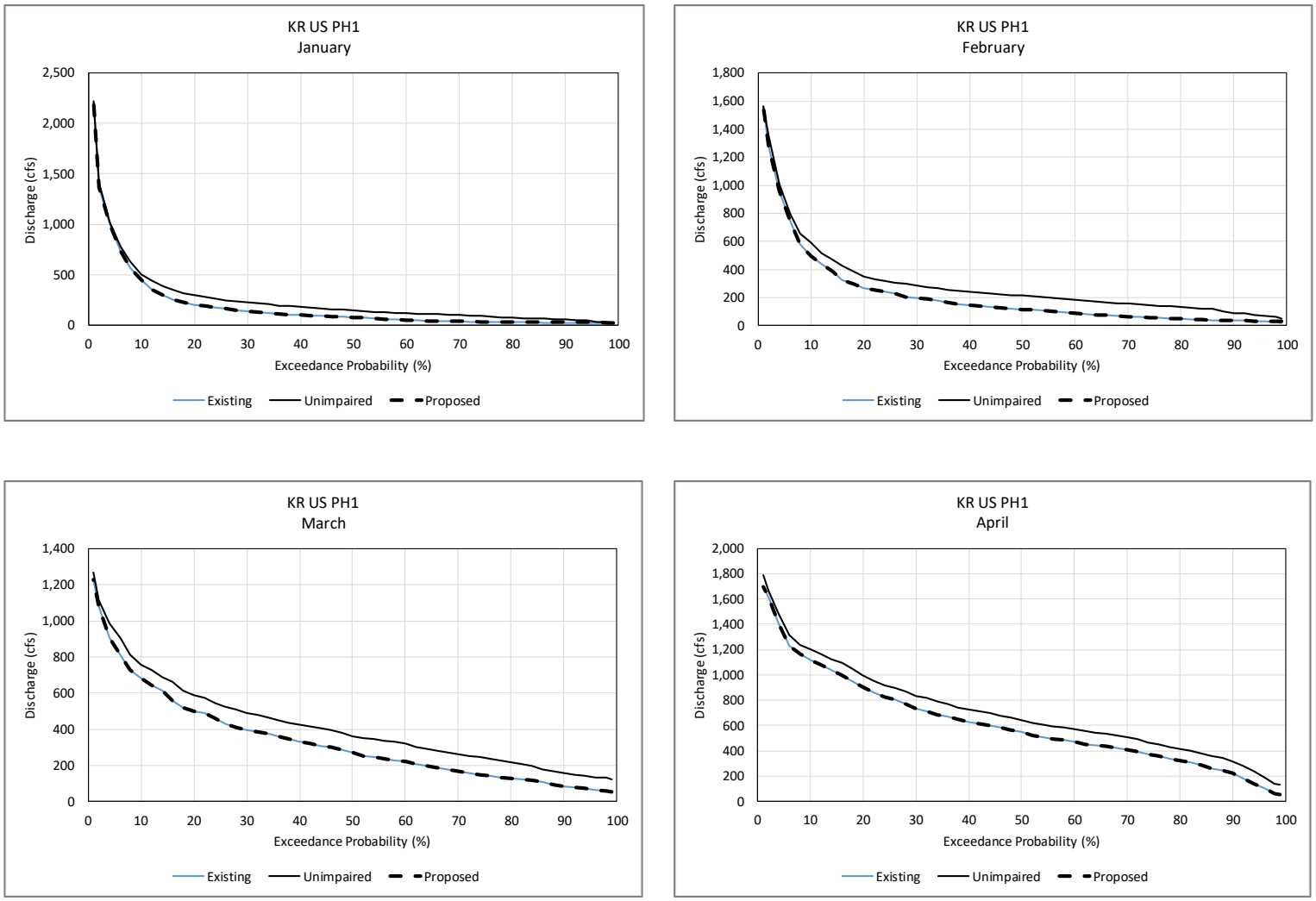


**Figure 8.4-3. Kaweah River Downstream of the East Fork Kaweah River Confluence and Upstream of Kaweah No.1 Powerhouse Flow Exceedance Plots (1994-2018) Comparing Existing, Unimpaired, and Proposed Flows**

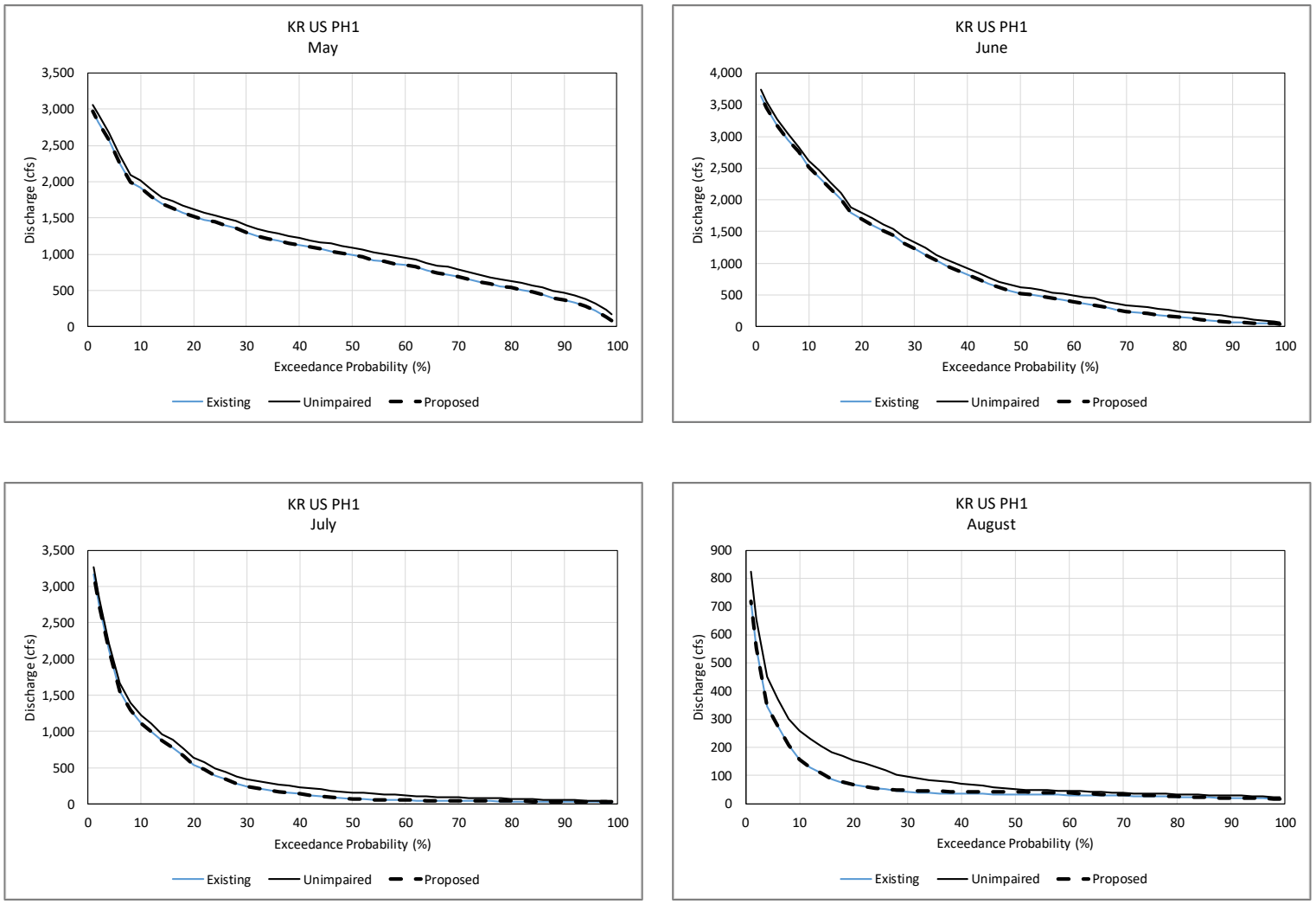


**Figure 8.4-3. (continued) Kaweah River Downstream of the East Fork Kaweah River Confluence and Upstream of Kaweah No.1 Powerhouse Flow Exceedance Plots (1994-2018) Comparing Existing, Unimpaired, and Proposed Flows**

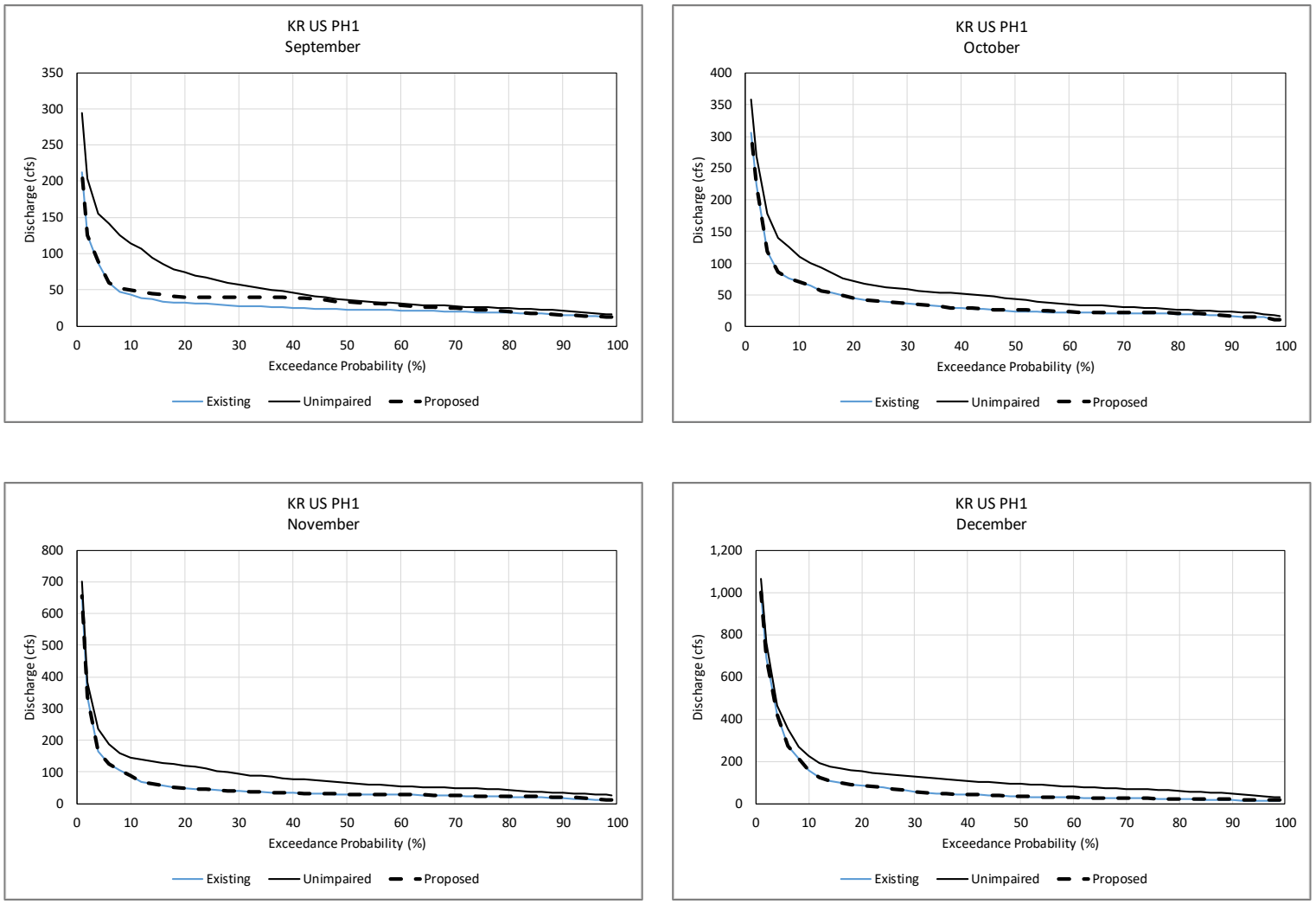


**Figure 8.4-3. (continued) Kaweah River Downstream of the East Fork Kaweah River Confluence and Upstream of Kaweah No.1 Powerhouse Flow Exceedance Plots (1994-2018) Comparing Existing, Unimpaired, and Proposed Flows**

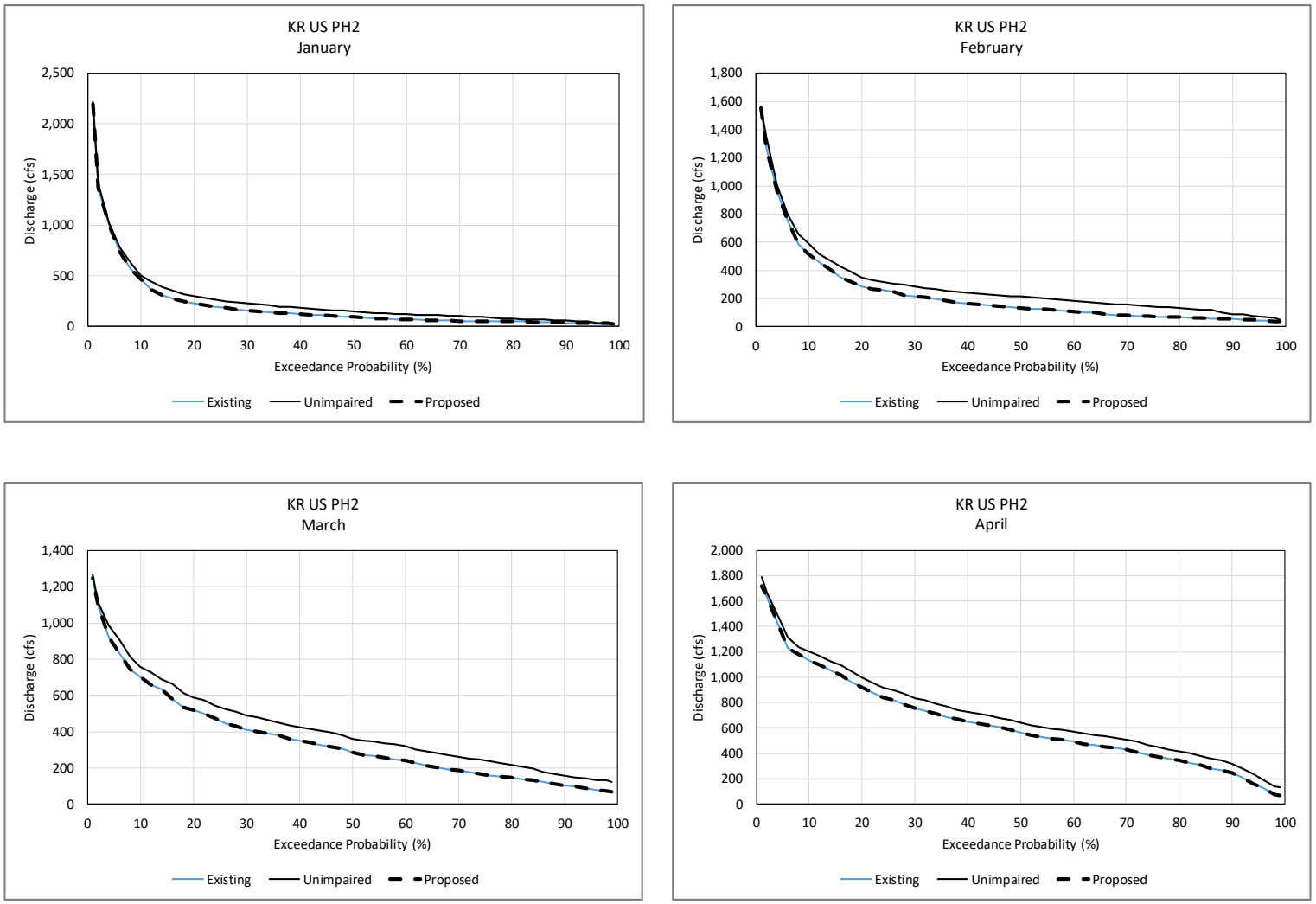


**Figure 8.4-4. Kaweah River Downstream of Kaweah No.1 Powerhouse and Upstream of Kaweah No.2 Powerhouse Flow Exceedance Plots (1994-2018) Comparing Existing, Unimpaired, and Proposed Flows**

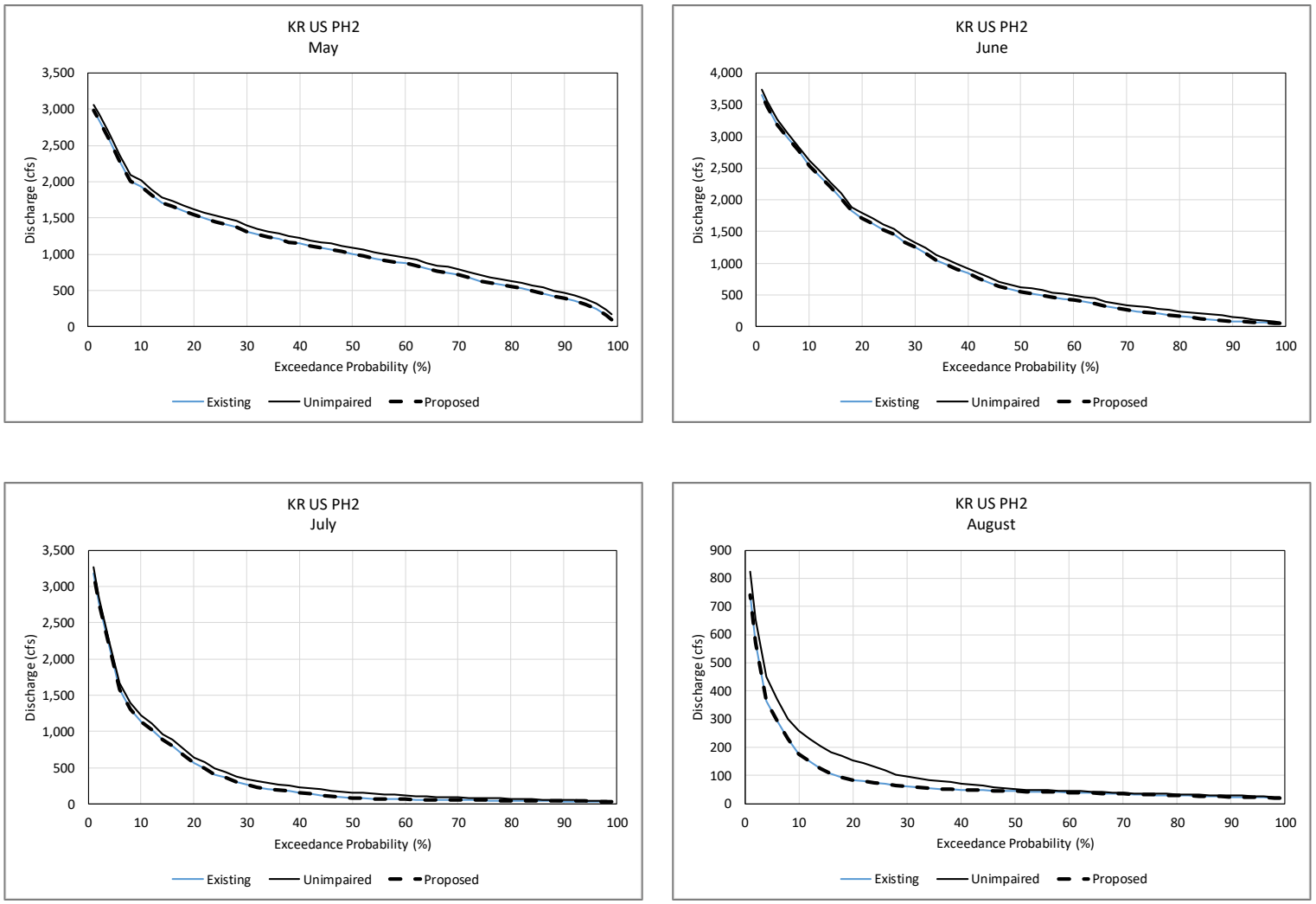


**Figure 8.4-4. (continued) Kaweah River Downstream of Kaweah No.1 Powerhouse and Upstream of Kaweah No.2 Powerhouse Flow Exceedance Plots (1994-2018) Comparing Existing, Unimpaired, and Proposed Flows**

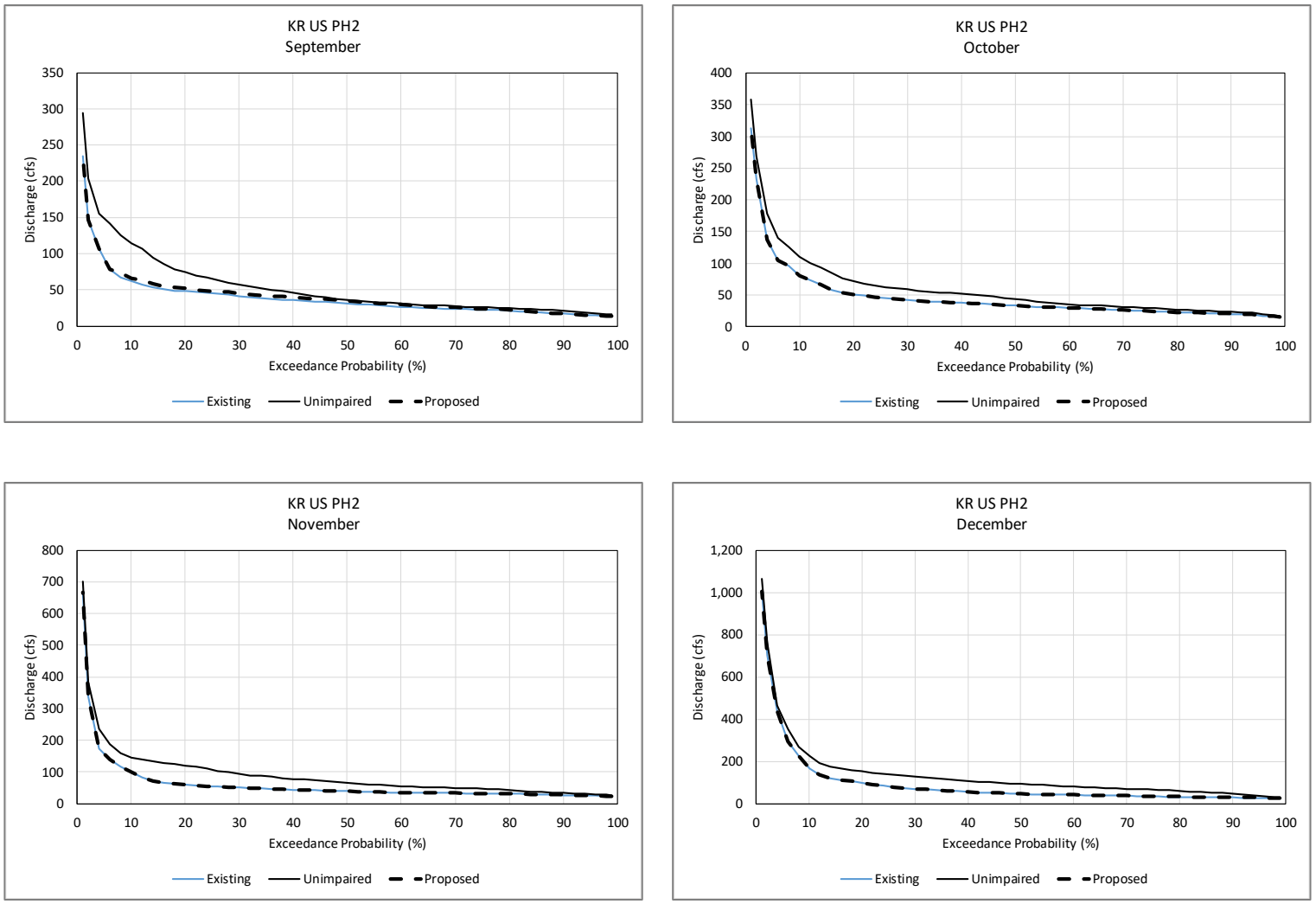


**Figure 8.4-4. (continued) Kaweah River Downstream of Kaweah No.1 Powerhouse and Upstream of Kaweah No.2 Powerhouse Flow Exceedance Plots (1994-2018) Comparing Existing, Unimpaired, and Proposed Flows**

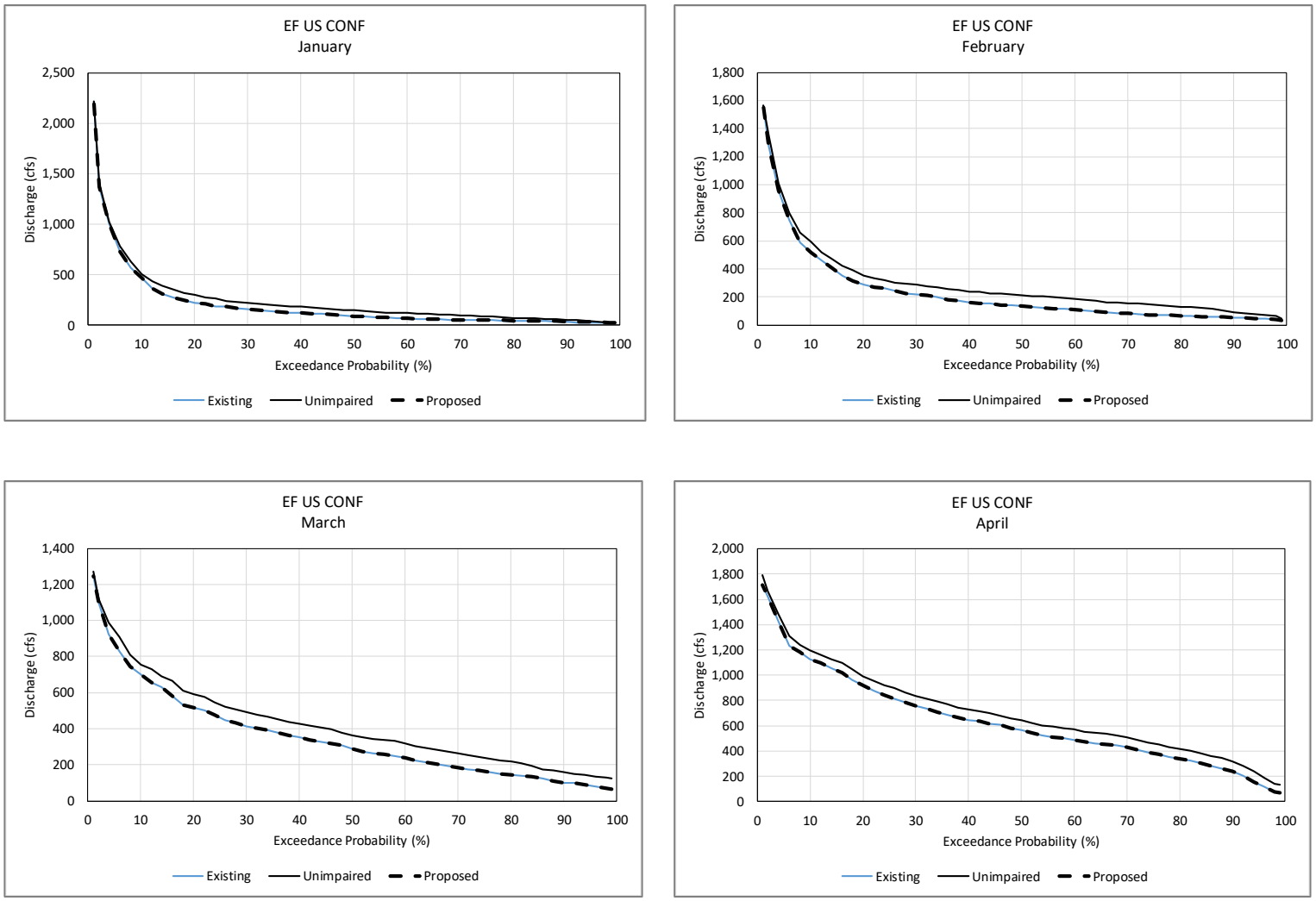


**Figure 8.4-5. East Fork Kaweah River Upstream of Kaweah River Confluence Flow Exceedance Plots (1994-2018) Comparing Existing, Unimpaired, and Proposed Flows**

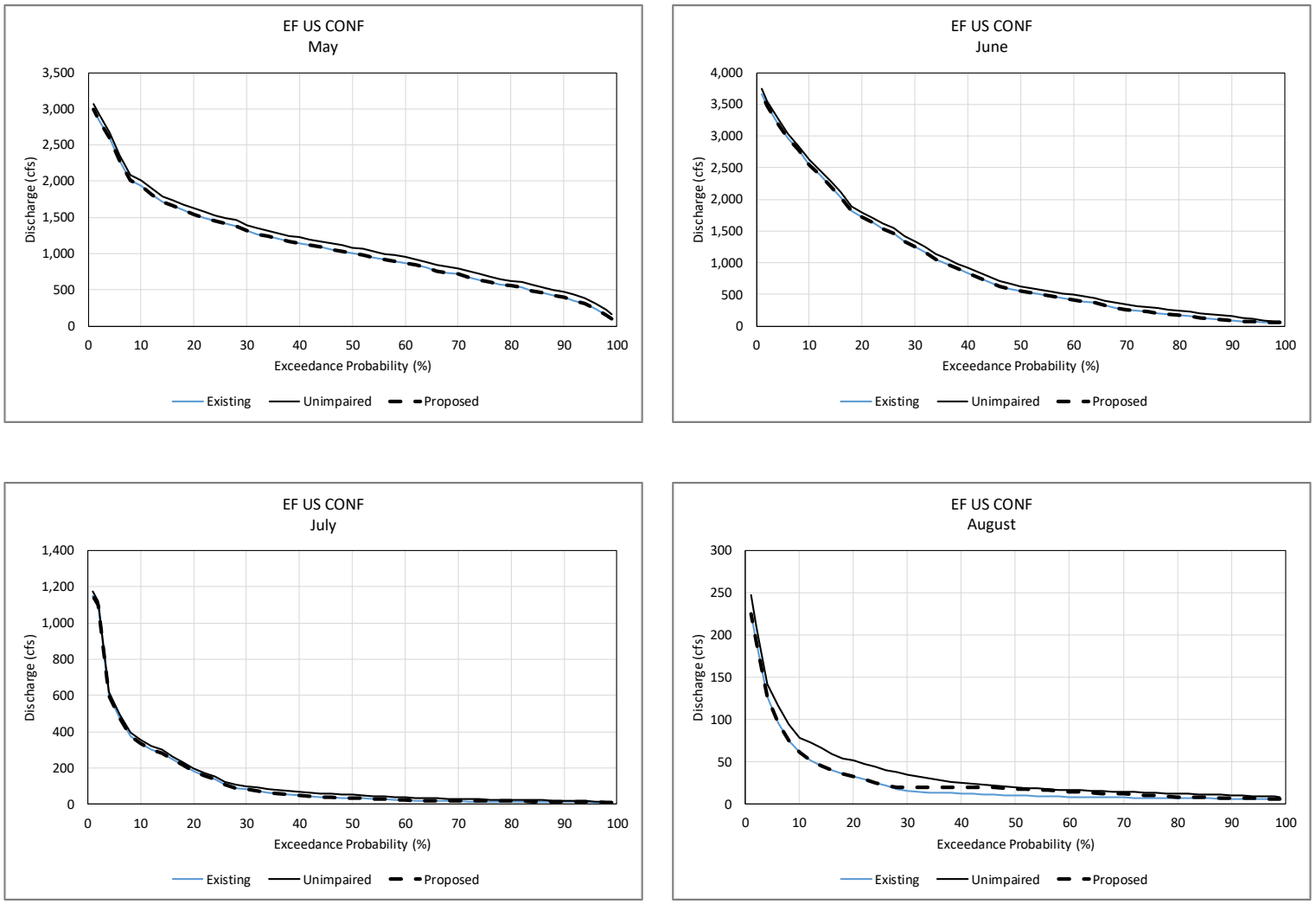


**Figure 8.4-5. (continued) East Fork Kaweah River Upstream of Kaweah River Confluence Flow Exceedance Plots (1994-2018) Comparing Existing, Unimpaired, and Proposed Flows**

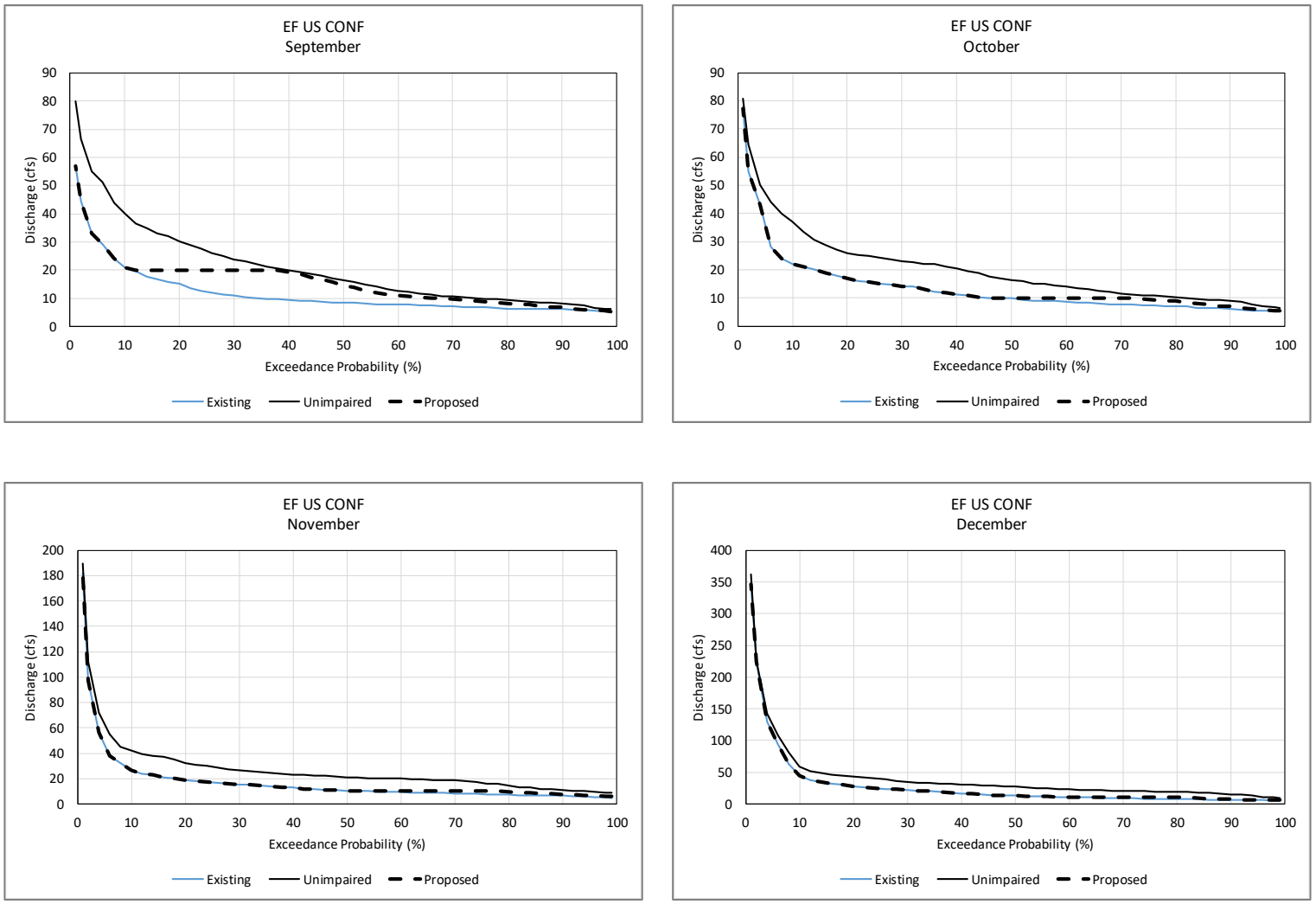


**Figure 8.4-5. (continued) East Fork Kaweah River Upstream of Kaweah River Confluence Flow Exceedance Plots (1994-2018) Comparing Existing, Unimpaired, and Proposed Flows**

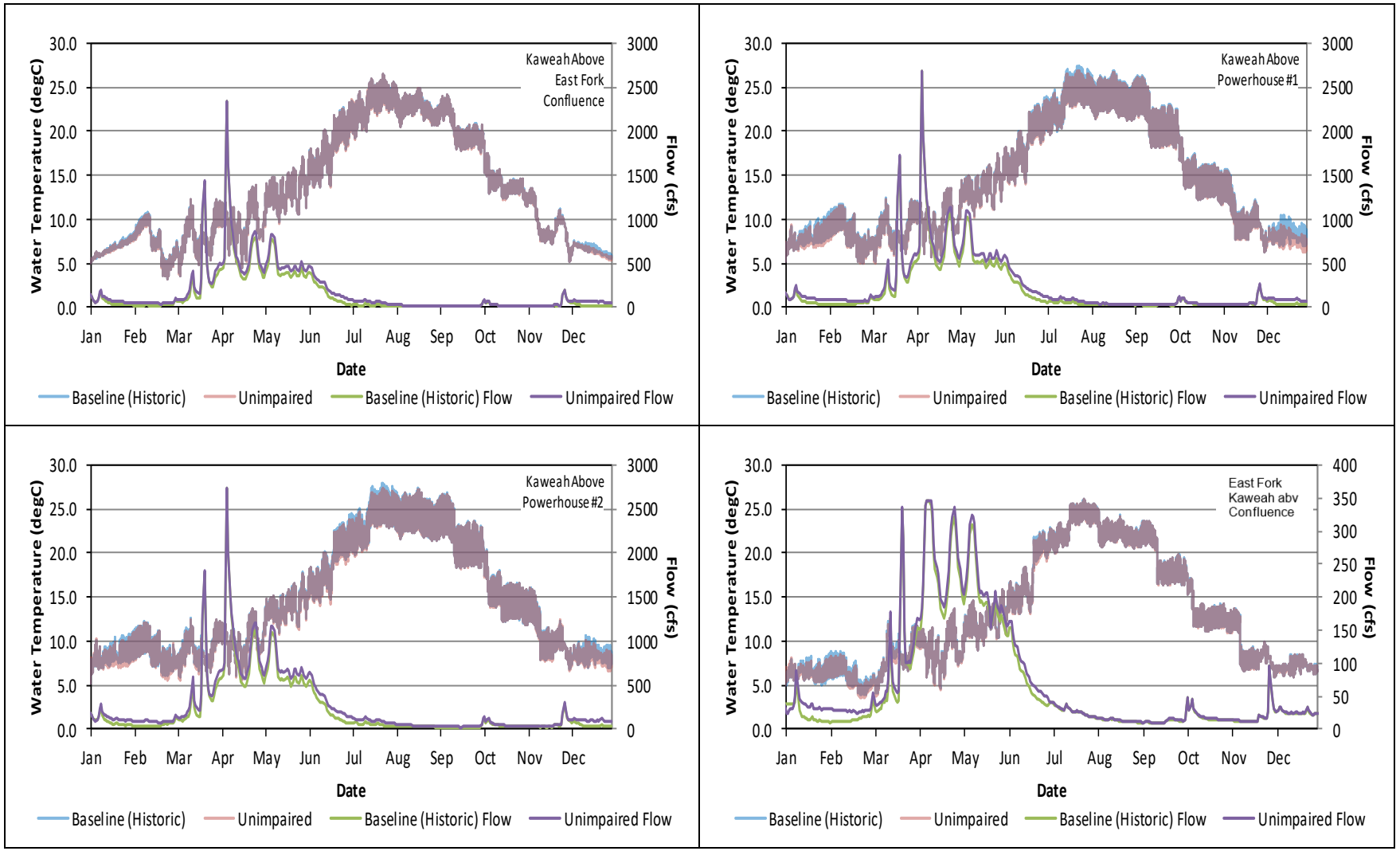


**Figure 8.4-6a. Hourly Water Temperature and Daily Average Flow Results for the Baseline (Historic) and Unimpaired Simulations for the Kaweah River and East Fork of the Kaweah River, January 1 – December 31, 2018 (reaches are indicated in the figures)**

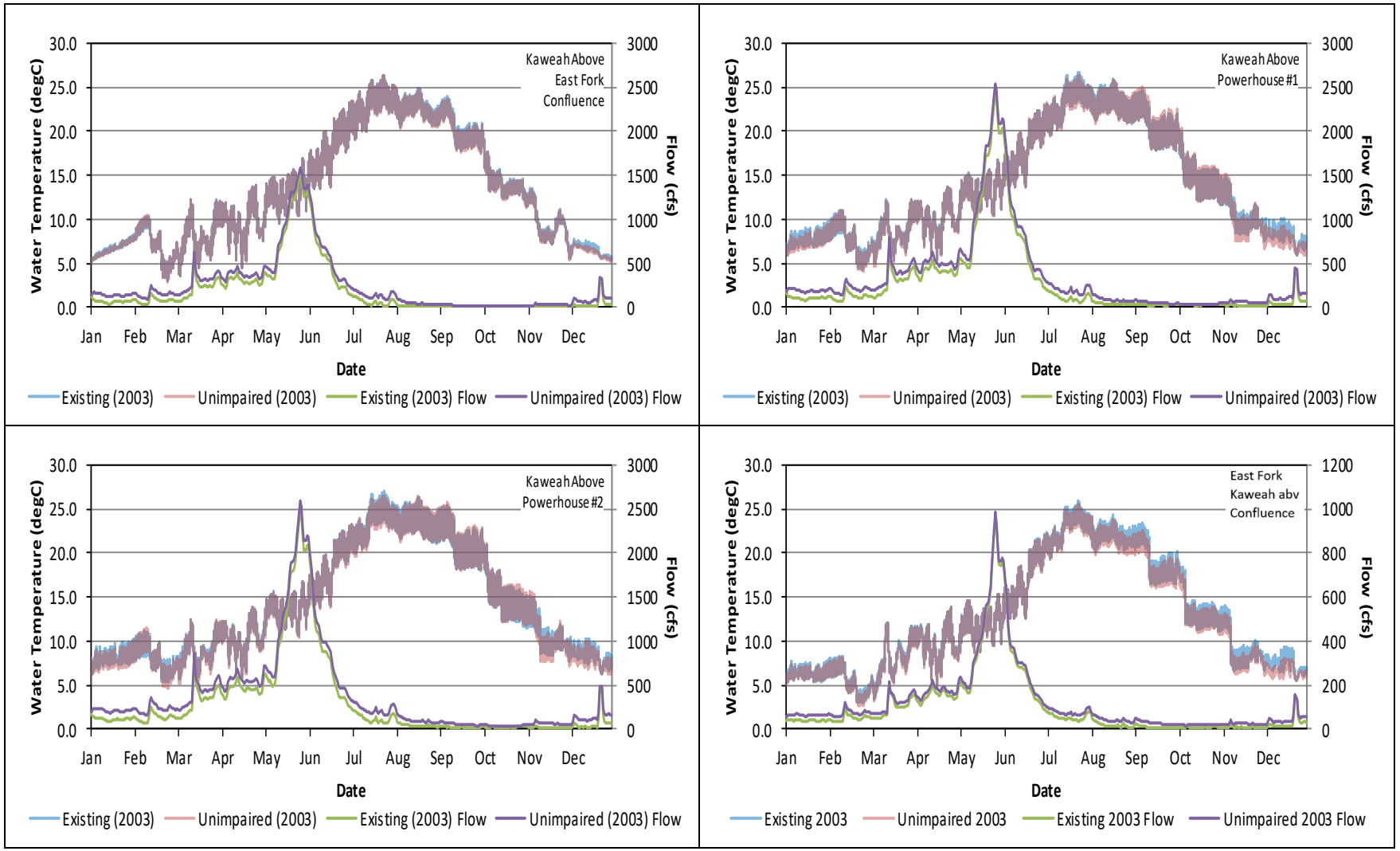


**Figure 8.4-6b. Hourly Water Temperature and Daily Average Flow Results for the Existing (Historic) and Unimpaired Simulations for the Kaweah River and East Fork of the Kaweah River, January 1 – December 31, 2003 (reaches are indicated in the figures)**

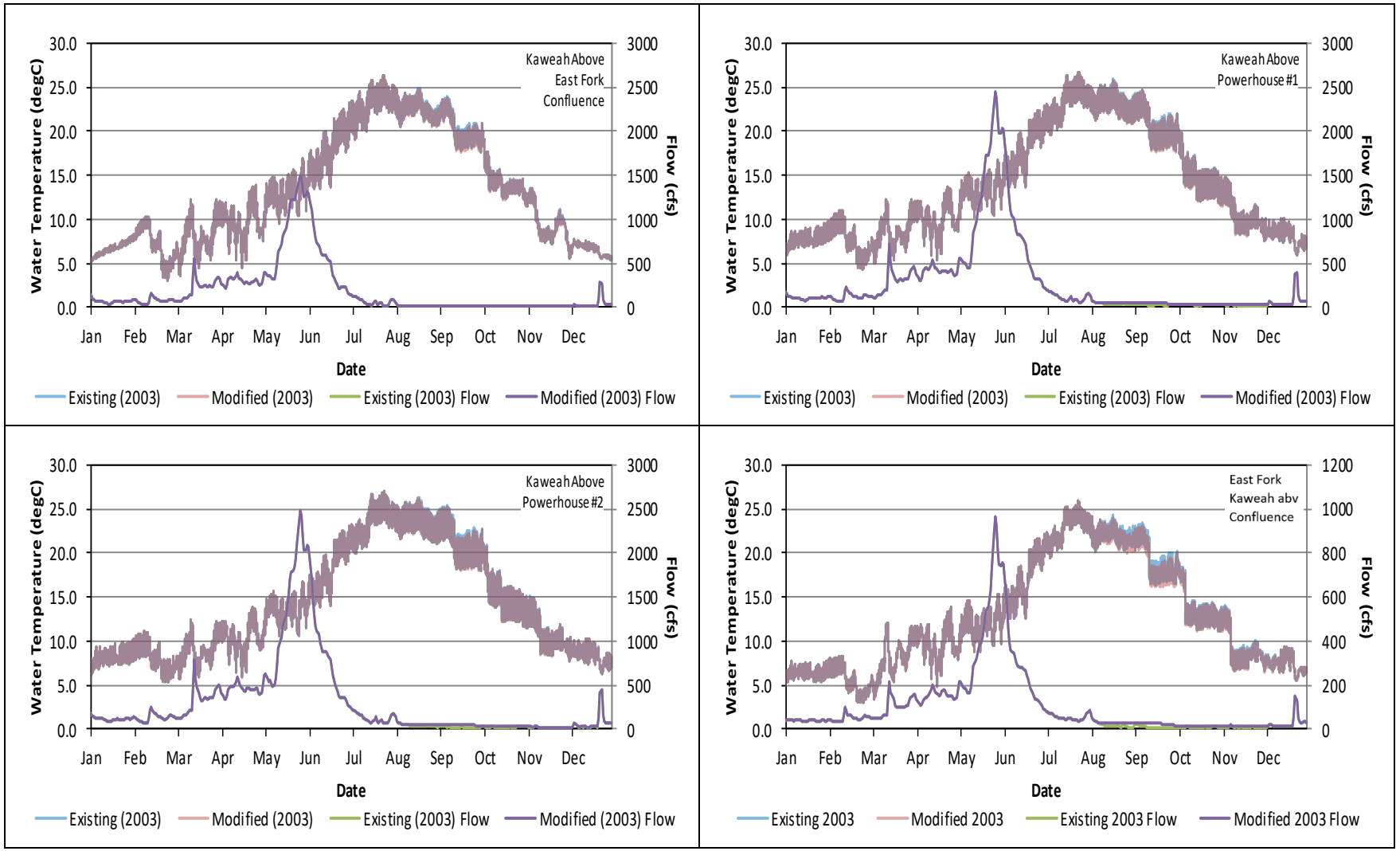


**Figure 8.4-6c. Hourly Water Temperature and Daily Average Flow Results for the Existing (Historic) and Modified Simulations for the Kaweah River and East Fork of the Kaweah River, January 1 – December 31, 2003 (reaches are indicated in the figures)**

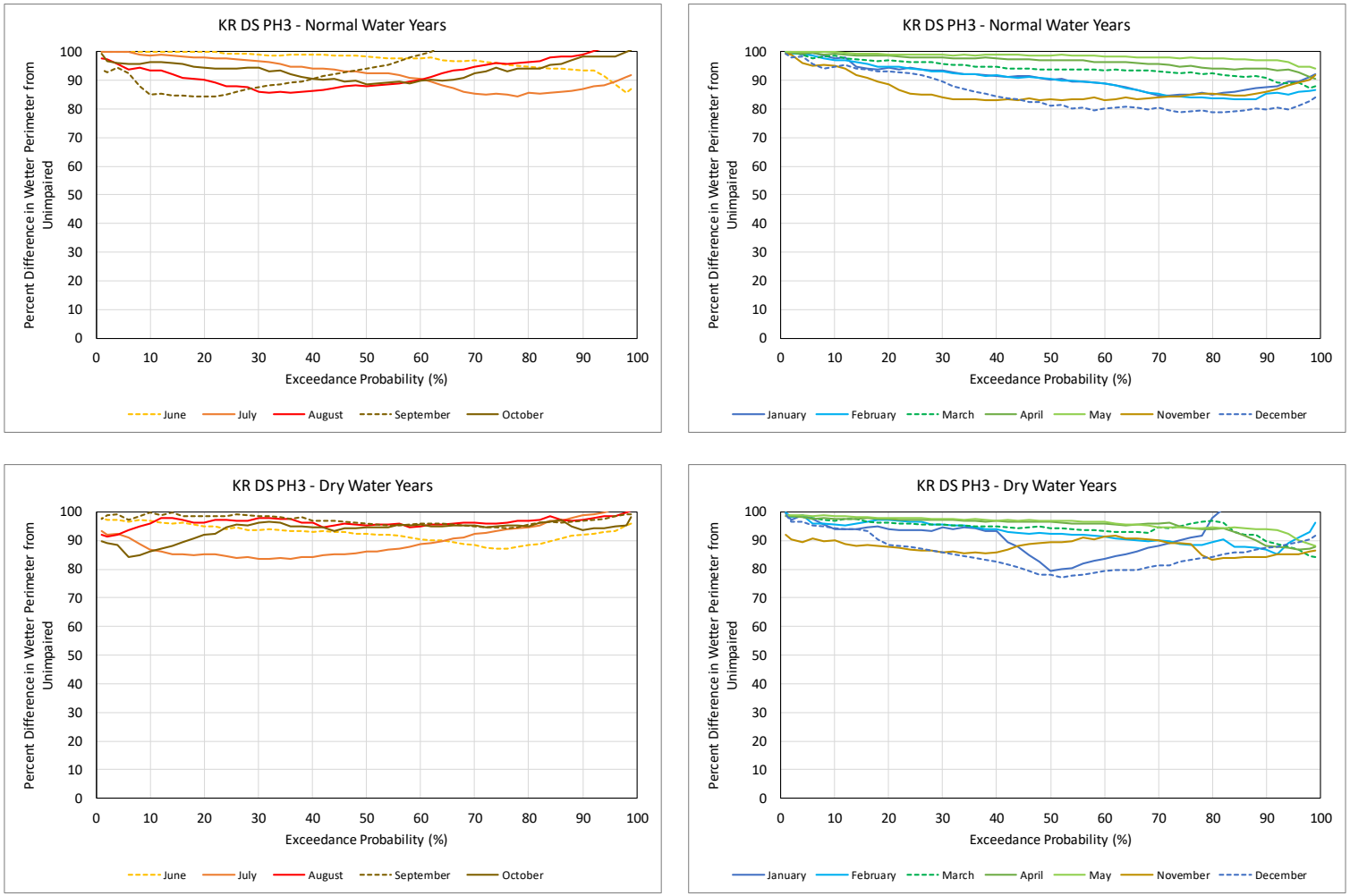


**Figure 8.4-7. Kaweah River Downstream of Kaweah No. 3 Powerhouse and Upstream of the East Fork Kaweah River Confluence Wetted Perimeter Percent of Unimpaired Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**

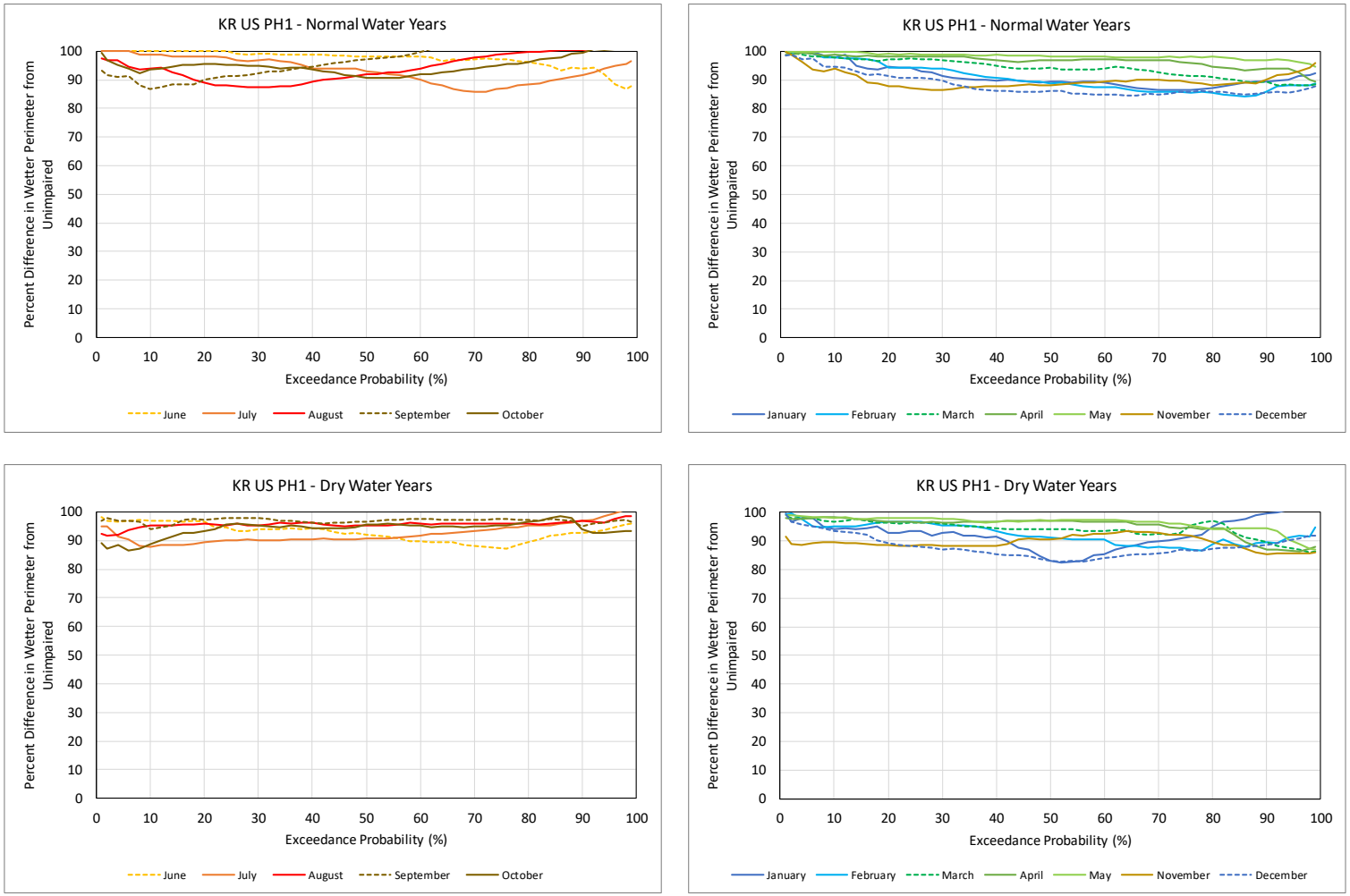


**Figure 8.4-8. Kaweah River Downstream of East Fork Kaweah Confluence and Upstream of Kaweah No. 1 Powerhouse Wetted Perimeter Percent of Unimpaired Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**

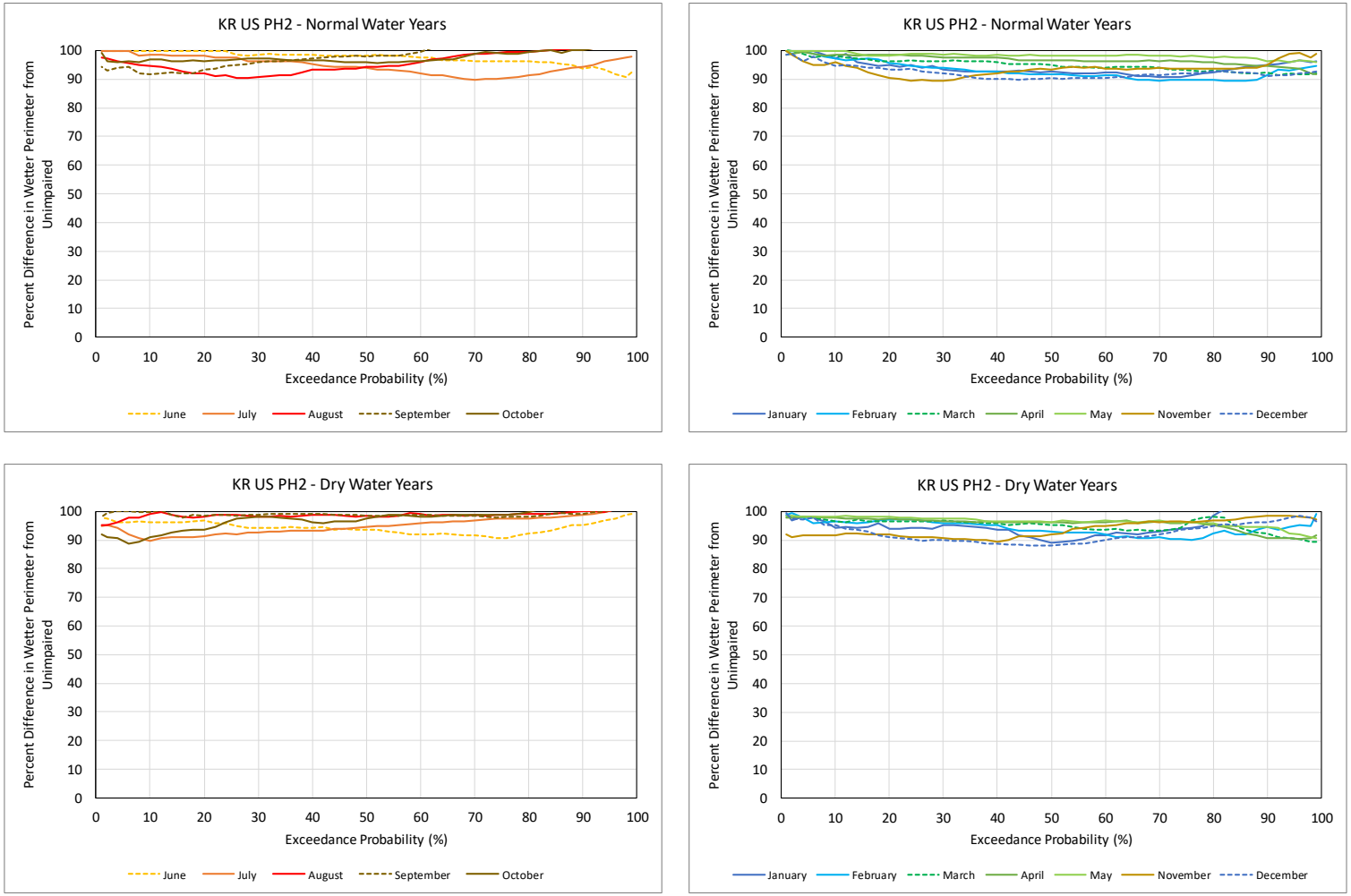


**Figure 8.4-9. Kaweah River Downstream of Kaweah No. 1 Powerhouse and Upstream of Kaweah No. 2 Powerhouse Wetted Perimeter Habitat Percent of Unimpaired Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**

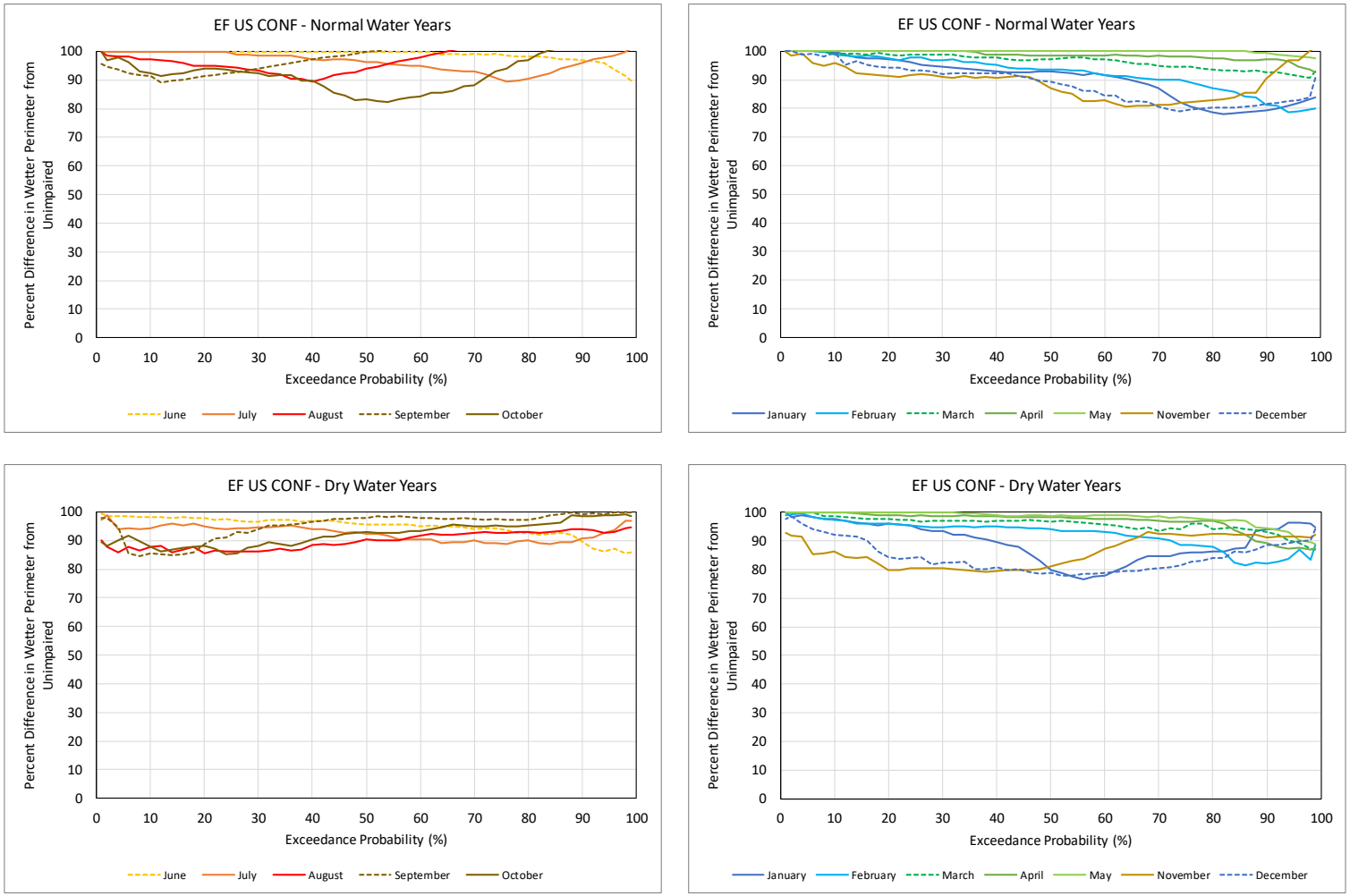


**Figure 8.4-10. East Fork Kaweah River Upstream of the Confluence with Kaweah River Wetted Perimeter Percent of Unimpaired Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**

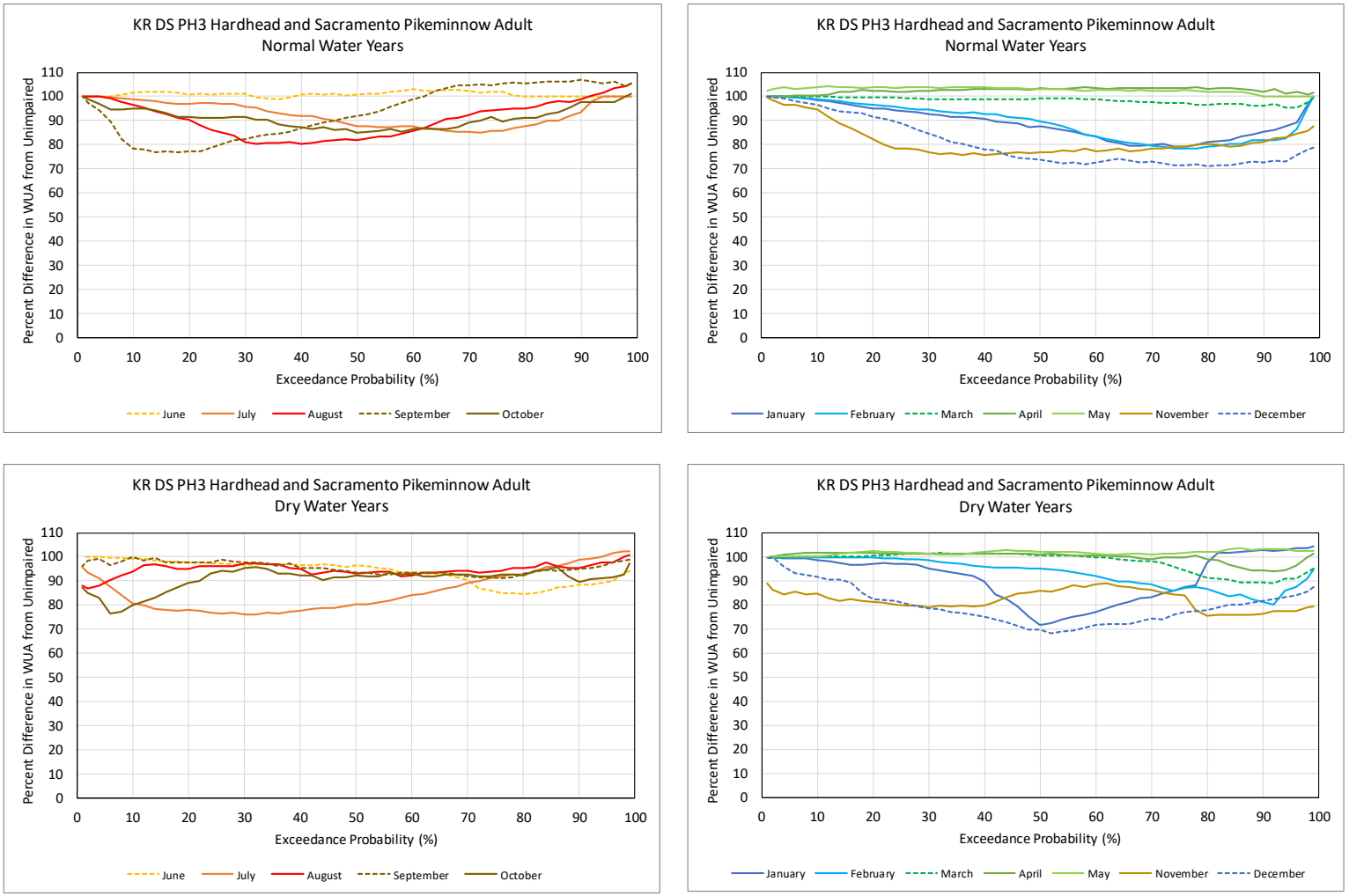


**Figure 8.4-11. Kaweah River Downstream of Kaweah No. 3 Powerhouse and Upstream of the East Fork Kaweah River Confluence Hardhead and Sacramento Pikeminnow Adult Habitat Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**

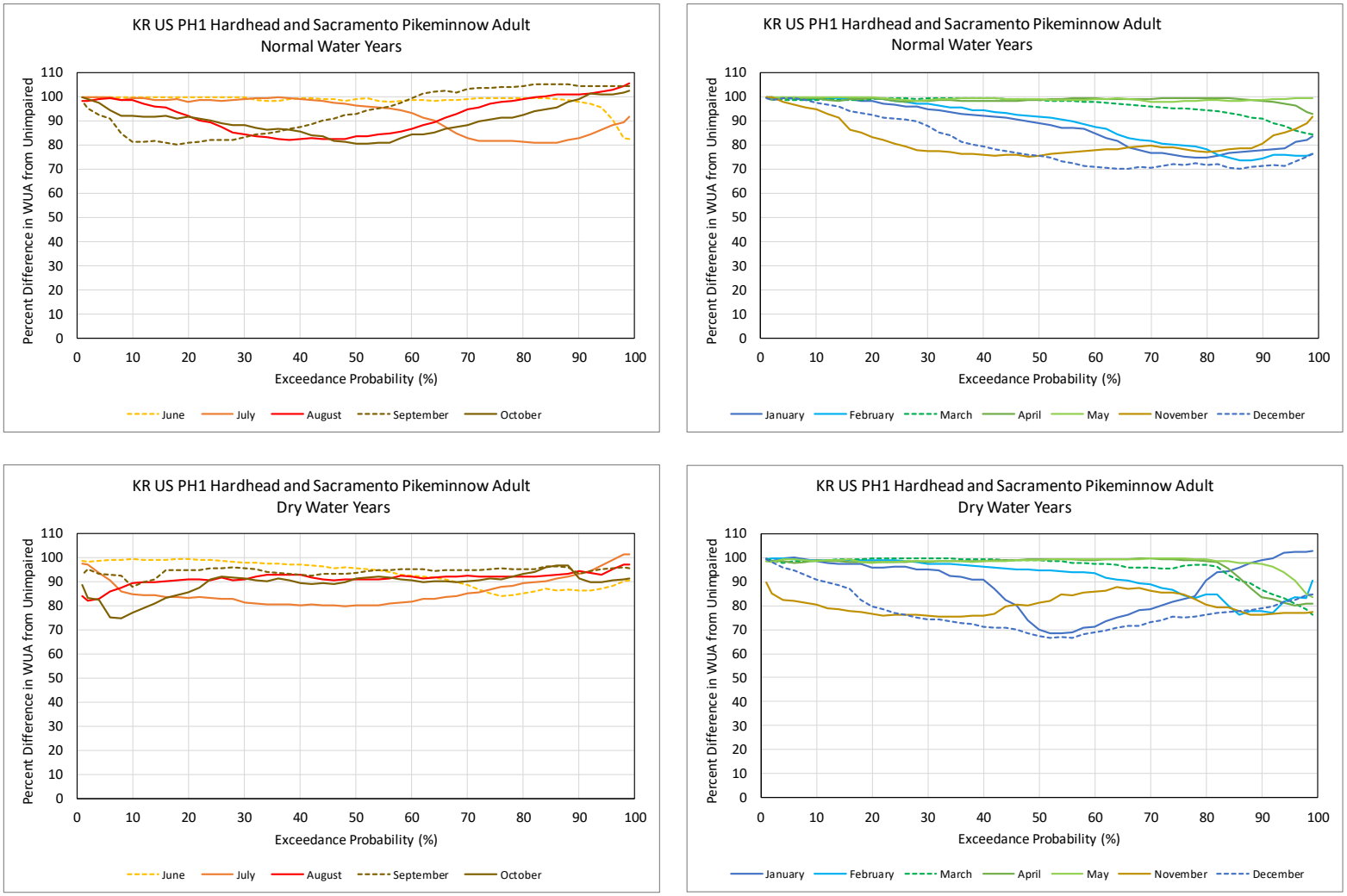


**Figure 8.4-12. Kaweah River Downstream of East Fork Kaweah Confluence and Upstream of Kaweah No. 1 Powerhouse Hardhead and Sacramento Pikeminnow Adult Habitat Percent of Unimpaired Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**


**Figure 8.4-13. Kaweah River Downstream of Kaweah No. 1 Powerhouse and Upstream of Kaweah No. 2 Powerhouse Hardhead and Sacramento Pikeminnow Adult Habitat Percent of Unimpaired Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**

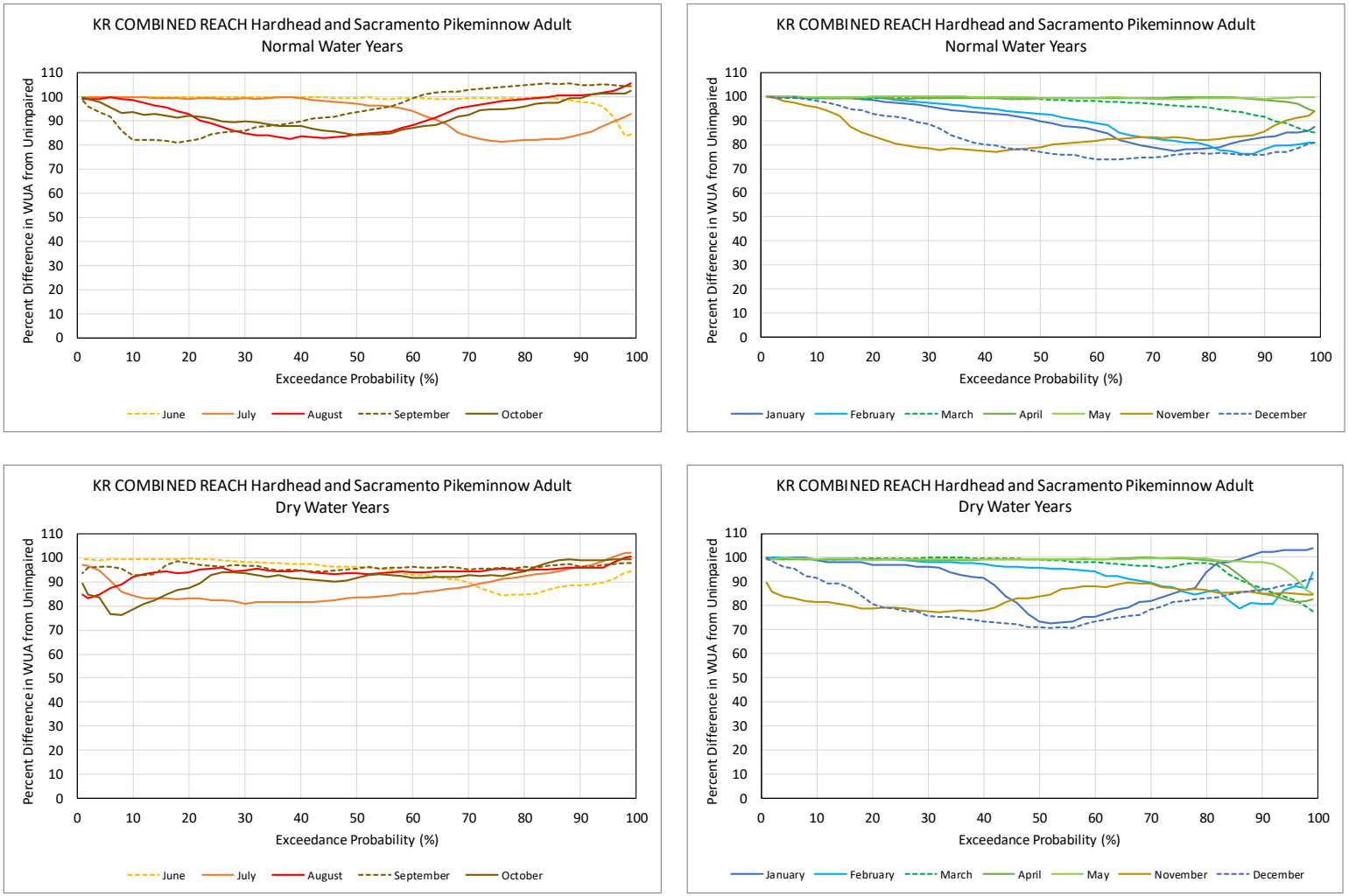


**Figure 8.4-14. Kaweah River Combined Reaches Hardhead and Sacramento Pikeminnow Adult Habitat Percent of Unimpaired Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**

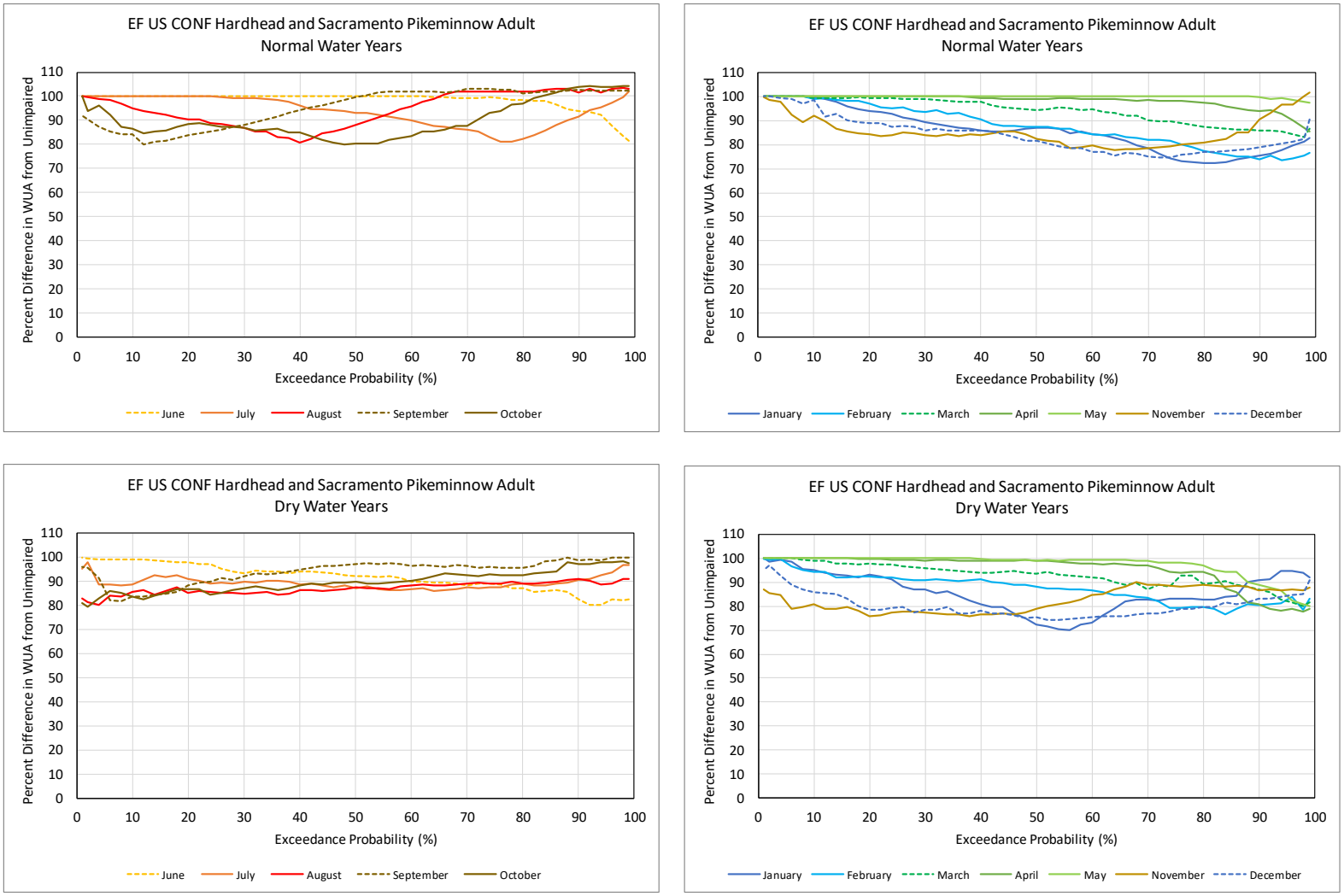


**Figure 8.4-15. East Fork Kaweah River Upstream of the Confluence with Kaweah River Hardhead and Sacramento Pikeminnow Adult Habitat Percent of Unimpaired Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**

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# APPENDIX A

## Wetted Perimeter Monthly Exceedance Plots

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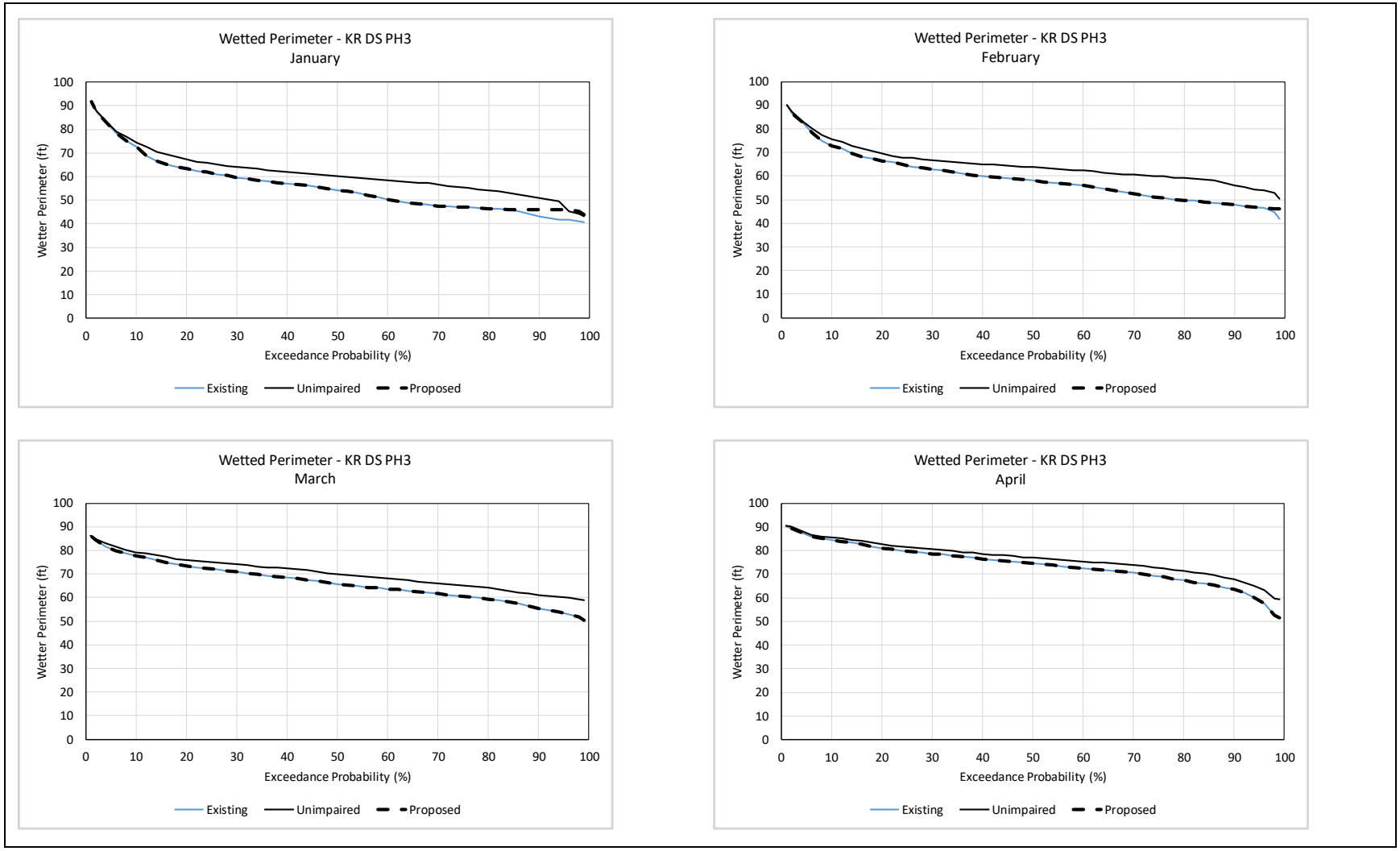
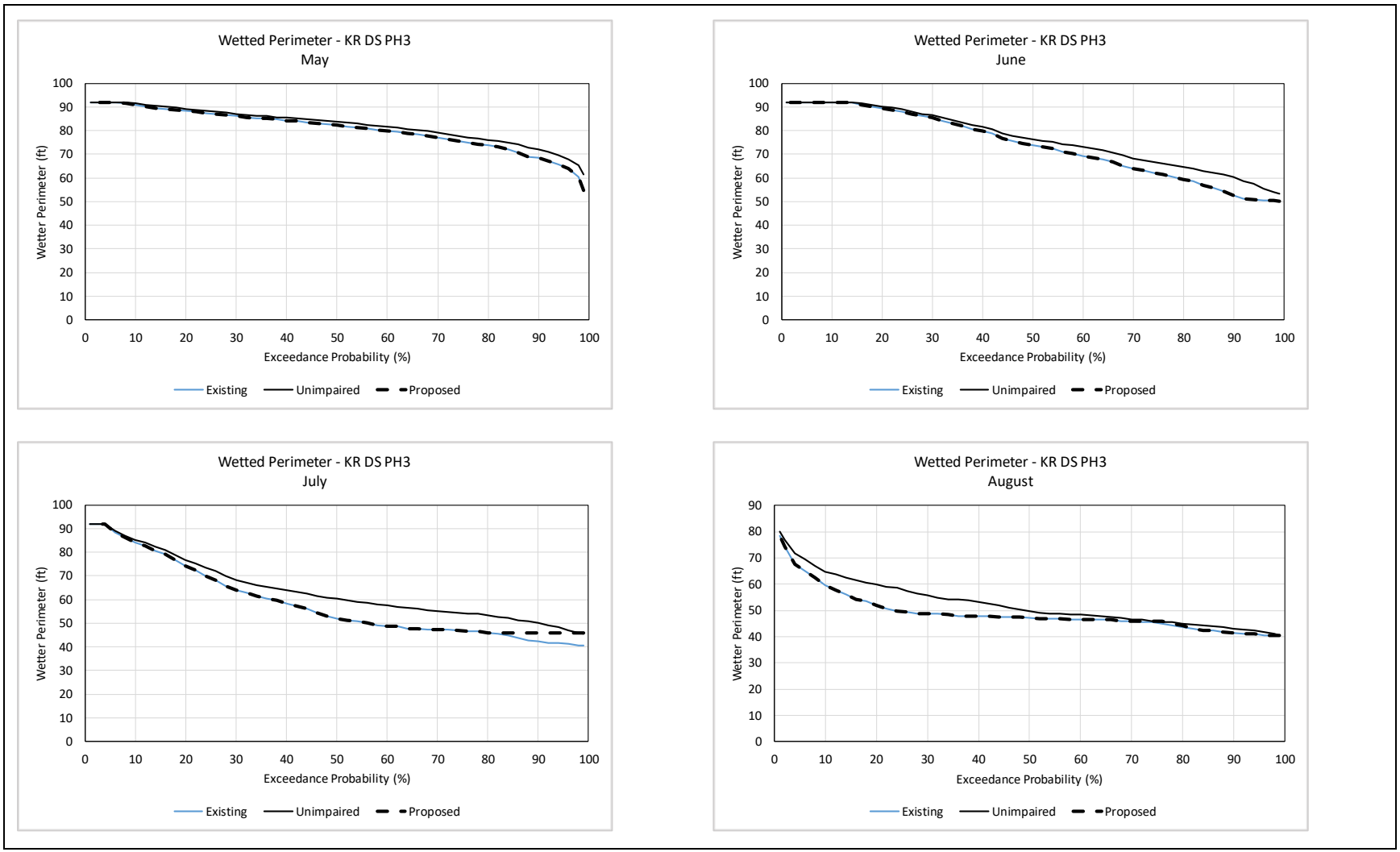
**Figure A8.4-1. Kaweah River Downstream of Kaweah No. 3 Powerhouse and Upstream of the East Fork Kaweah River Confluence Wetted Perimeter Exceedance Plots (1994-2018) Comparing Existing, Unimpaired, and Proposed Action Wetted Perimeters**




Wetted Perimeter - KR DS PH3
May
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed
Wetted Perimeter - KR DS PH3
June
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed
Wetted Perimeter - KR DS PH3
July
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed
Wetted Perimeter - KR DS PH3
August
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed

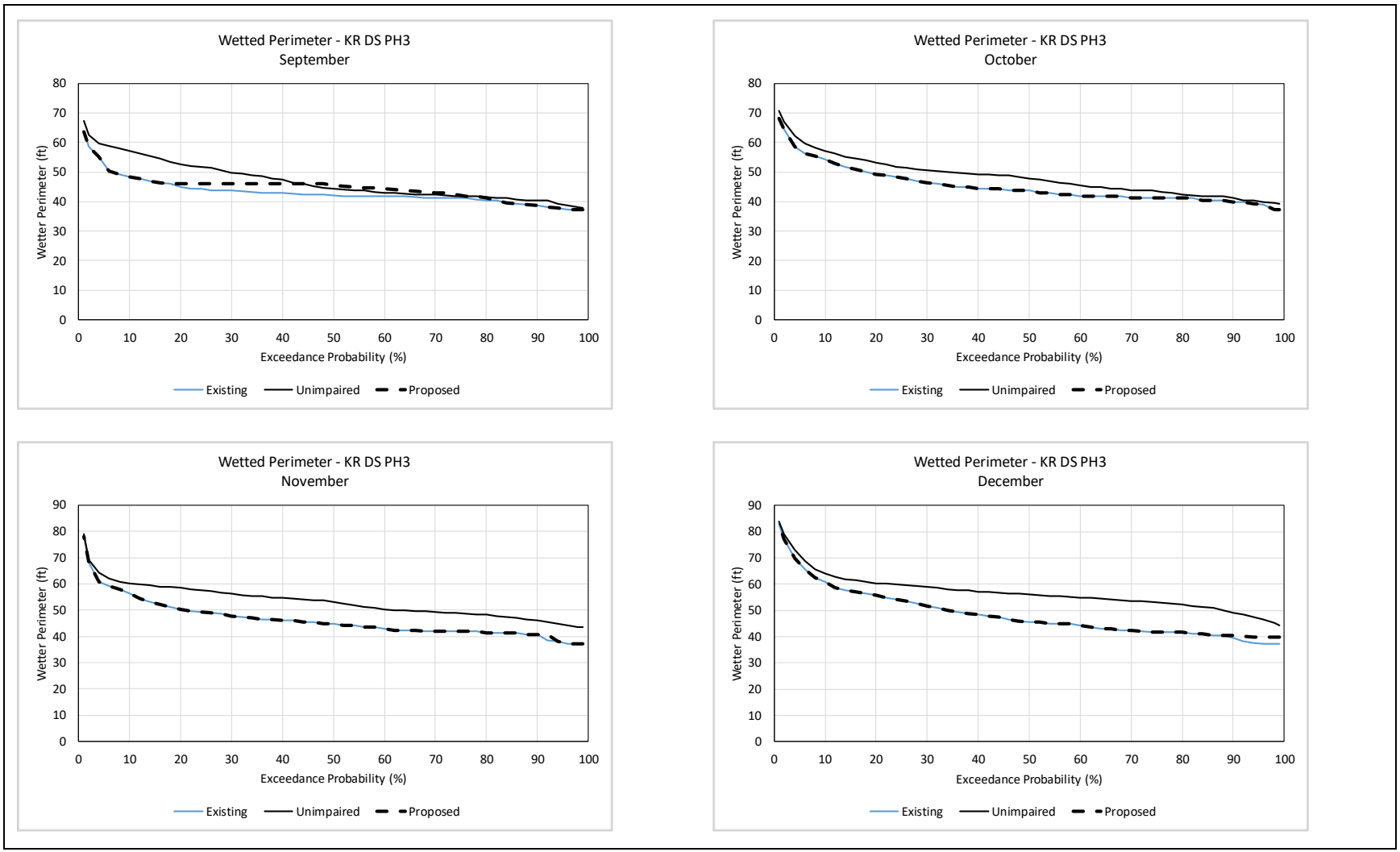
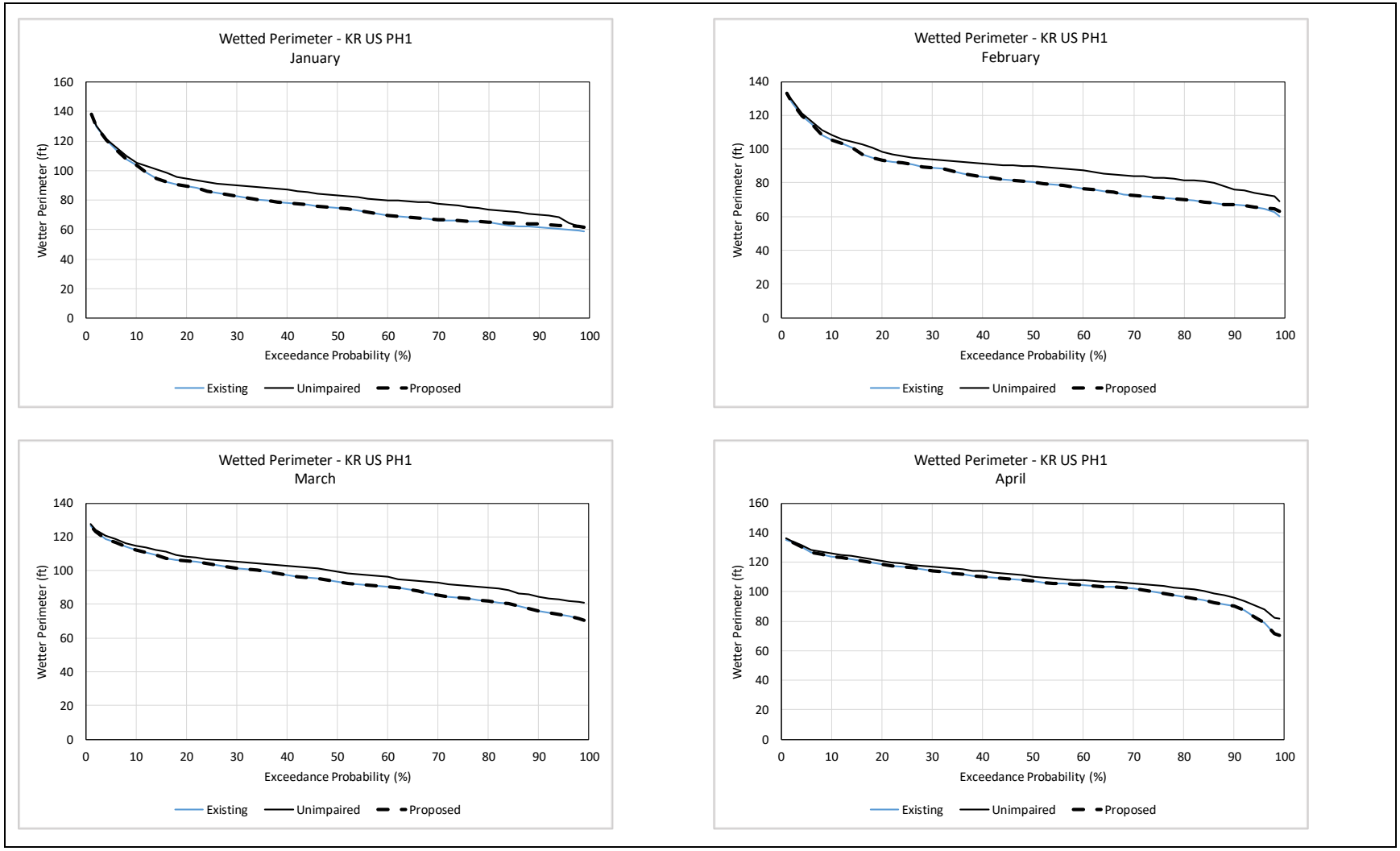
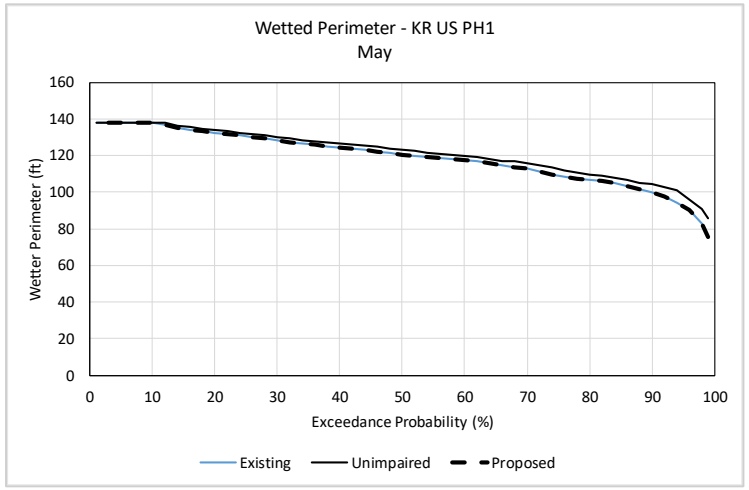
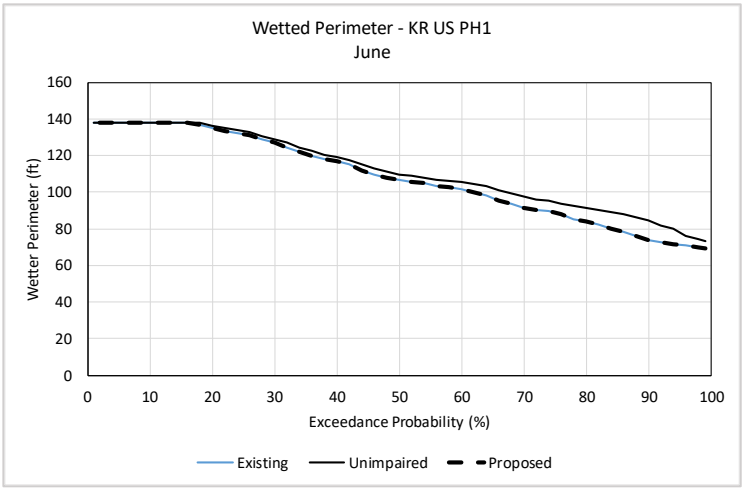
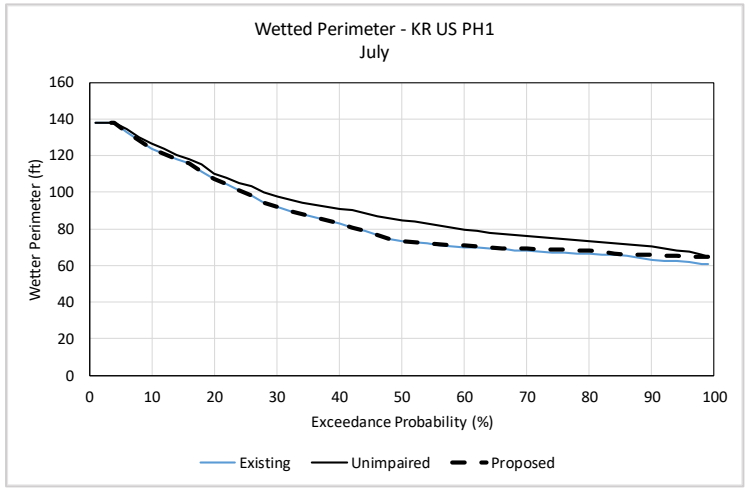

Wetted Perimeter - KR DS PH3
September
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed
Wetted Perimeter - KR DS PH3
October
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed
Wetted Perimeter - KR DS PH3
November
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed
Wetted Perimeter - KR DS PH3
December
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed

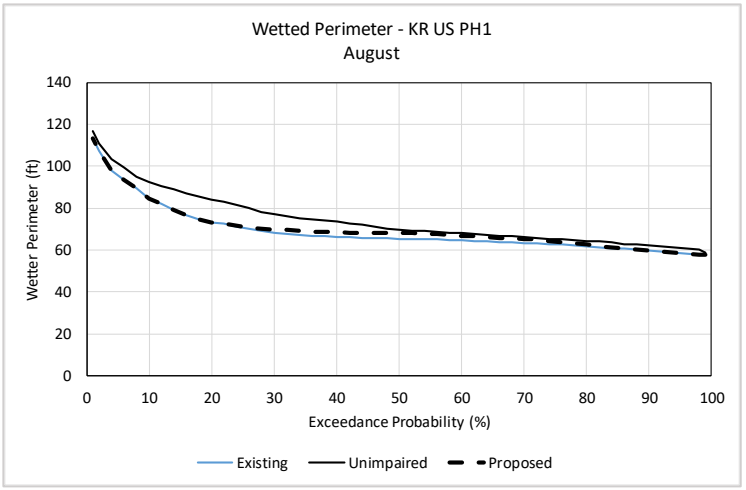
**Figure A8.4-2. Kaweah River Downstream of the East Fork Kaweah River Confluence and Upstream of Kaweah No.1 Powerhouse Wetted Perimeter Exceedance Plots (1994-2018) Comparing Existing, Unimpaired, and Proposed Action Wetted Perimeters**

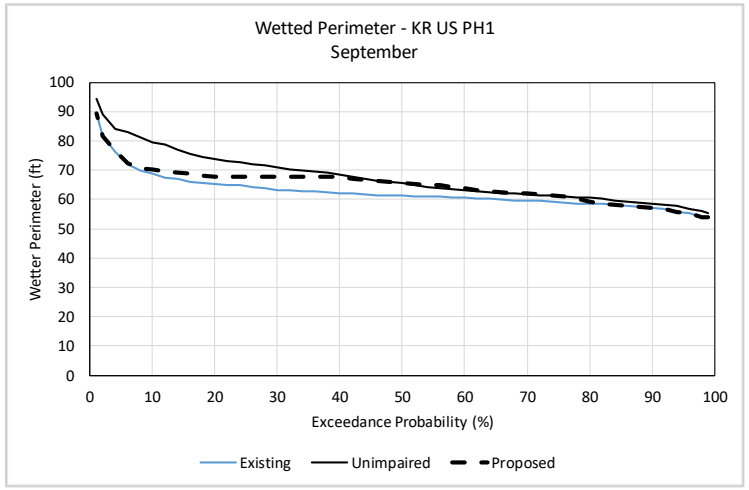


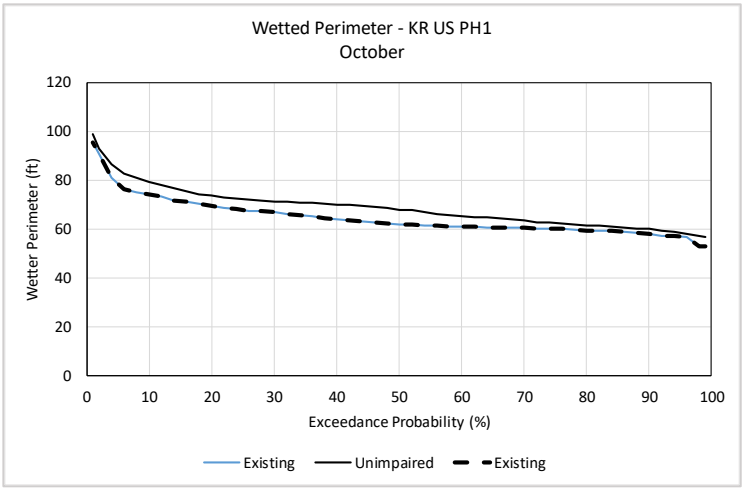

Wetted Perimeter - KR US PH1
May
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed

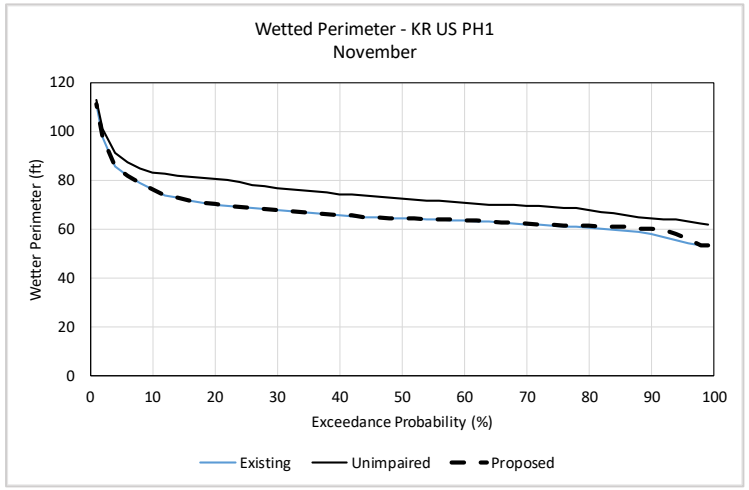

Wetted Perimeter - KR US PH1
June
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed


Wetted Perimeter - KR US PH1
July
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed


Wetted Perimeter - KR US PH1
August
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed


Wetted Perimeter - KR US PH1
September
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed


Wetted Perimeter - KR US PH1
October
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Existing


Wetted Perimeter - KR US PH1
November
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed

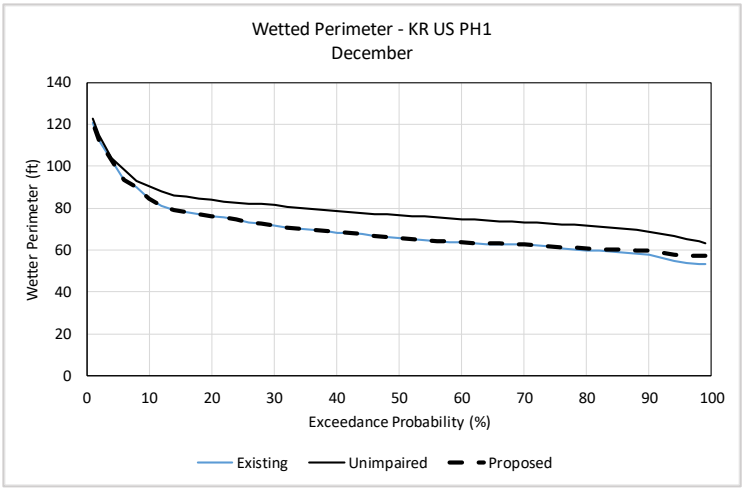
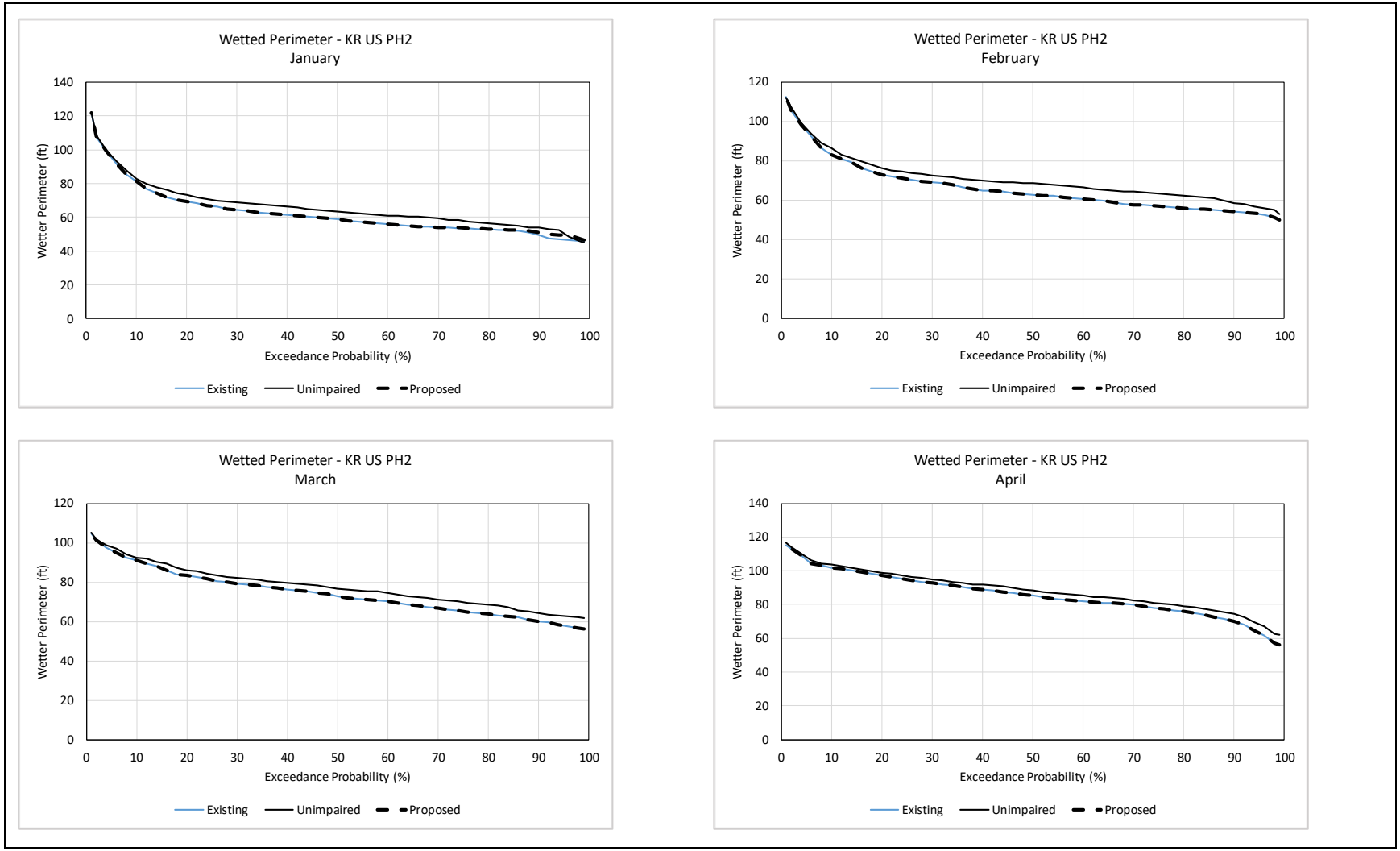
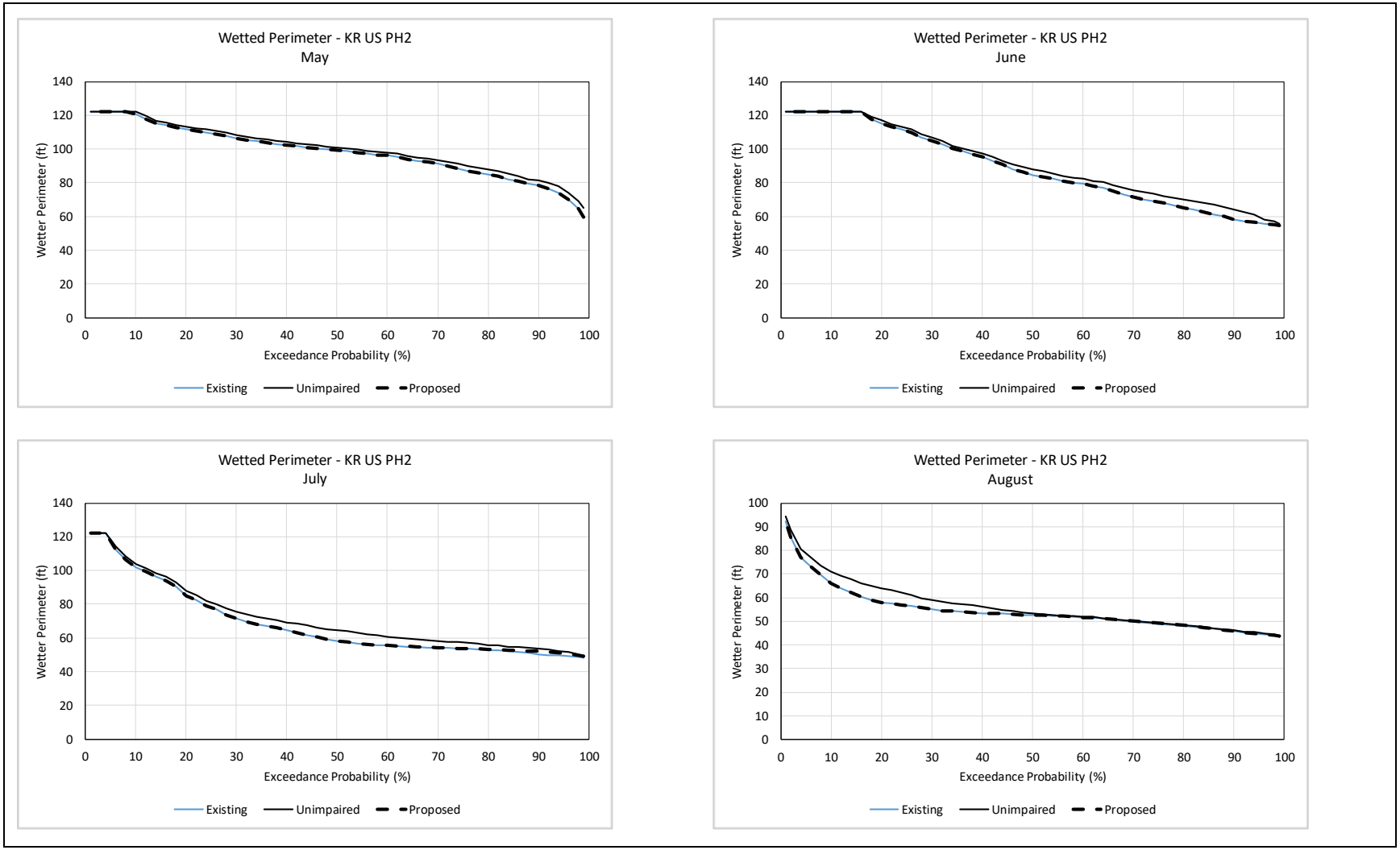
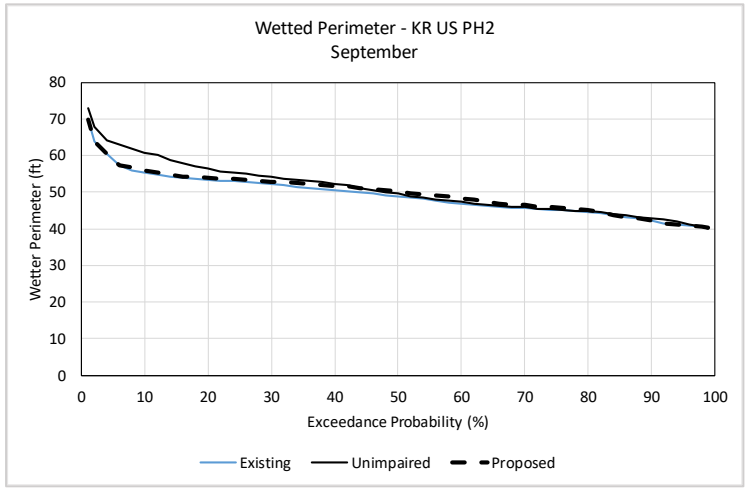
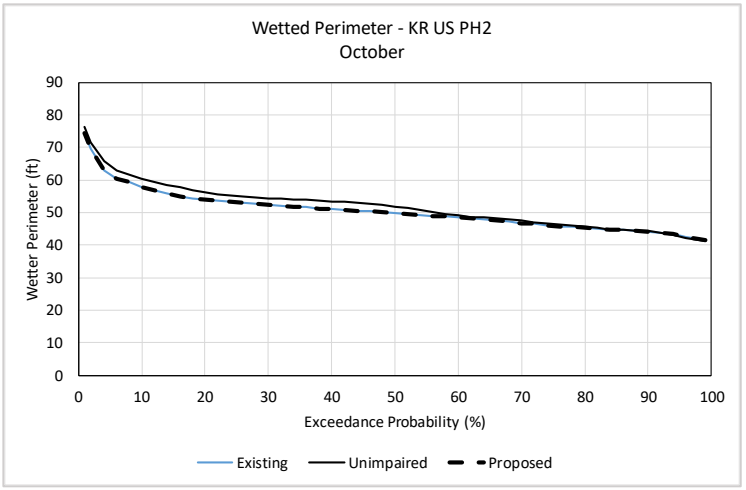

Wetted Perimeter - KR US PH1
December
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed

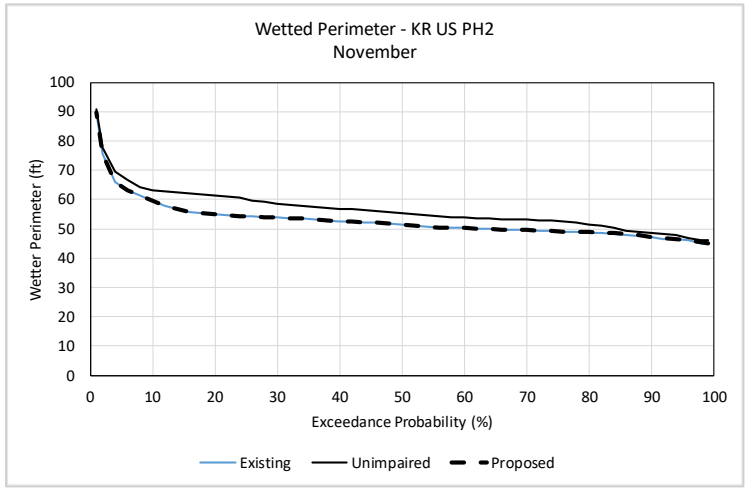
**Figure A8.4-3. Kaweah River Downstream of Kaweah No.1 Powerhouse and Upstream of Kaweah No.2 Powerhouse Wetted Perimeter Exceedance Plots (1994-2018) Comparing Existing, Unimpaired, and Proposed Action Wetted Perimeters**




Wetted Perimeter - KR US PH2
May
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed
Wetted Perimeter - KR US PH2
June
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed
Wetted Perimeter - KR US PH2
July
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed
Wetted Perimeter - KR US PH2
August
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed


Wetted Perimeter - KR US PH2
September
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed


Wetted Perimeter - KR US PH2
October
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed


Wetted Perimeter - KR US PH2
November
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed

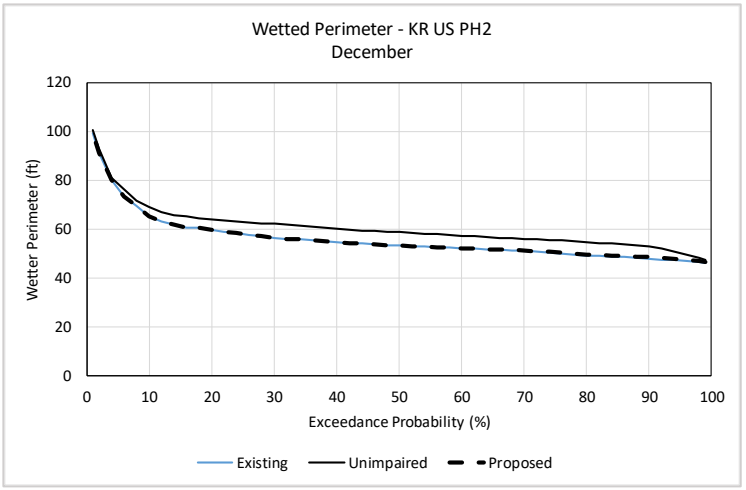
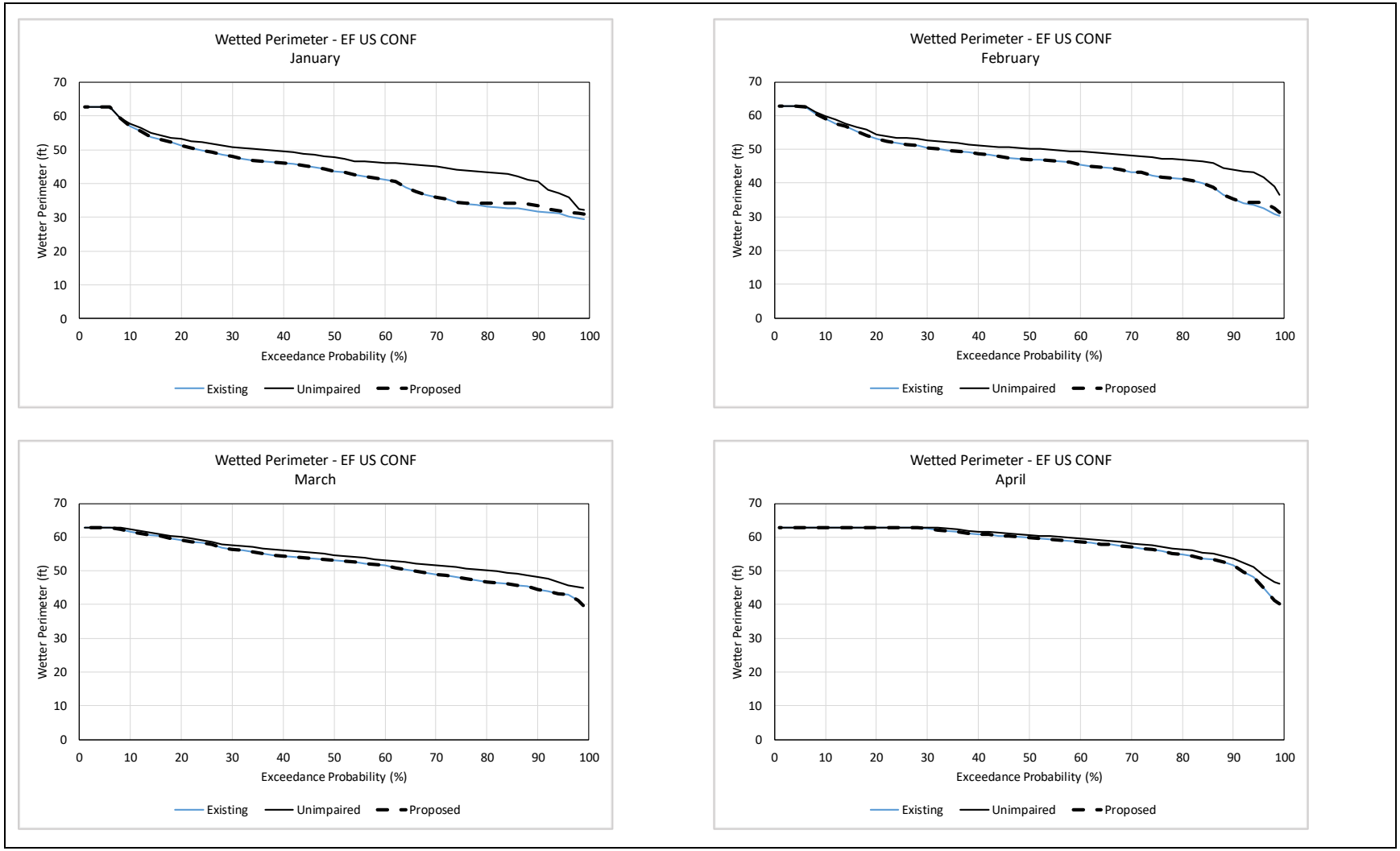
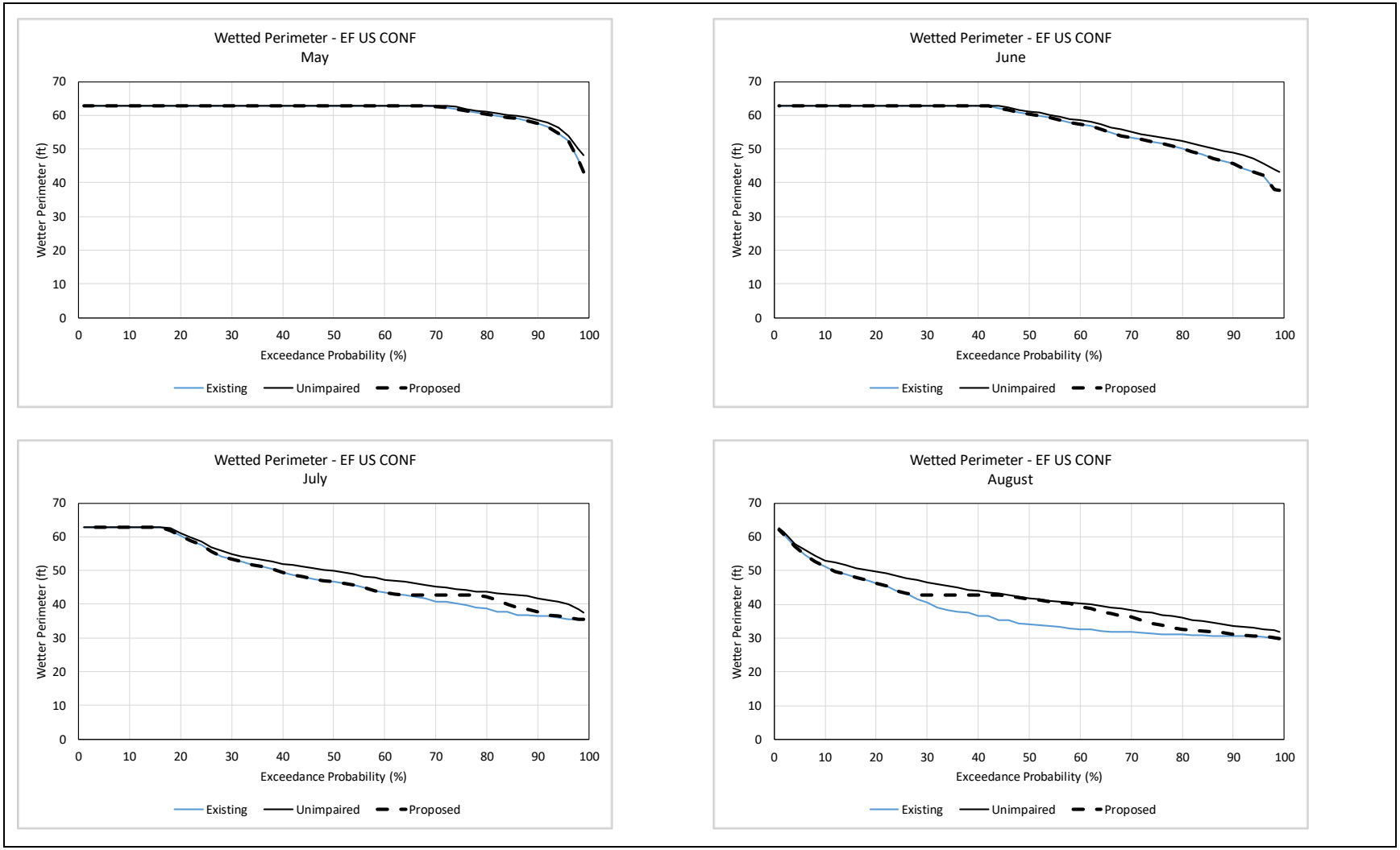
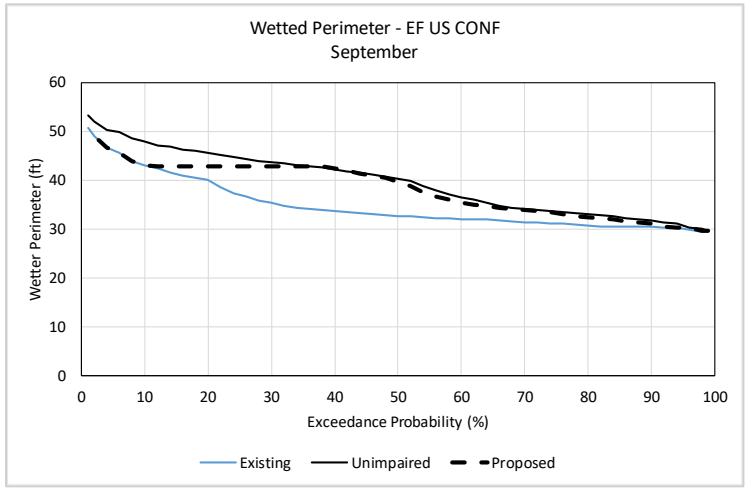
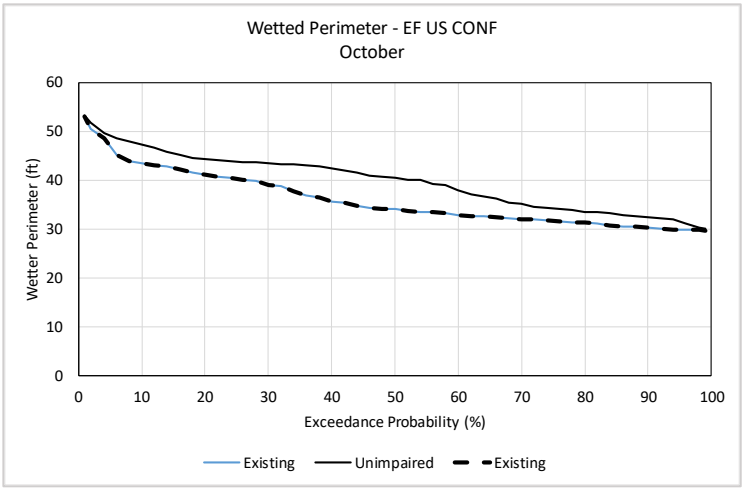

Wetted Perimeter - KR US PH2
December
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed

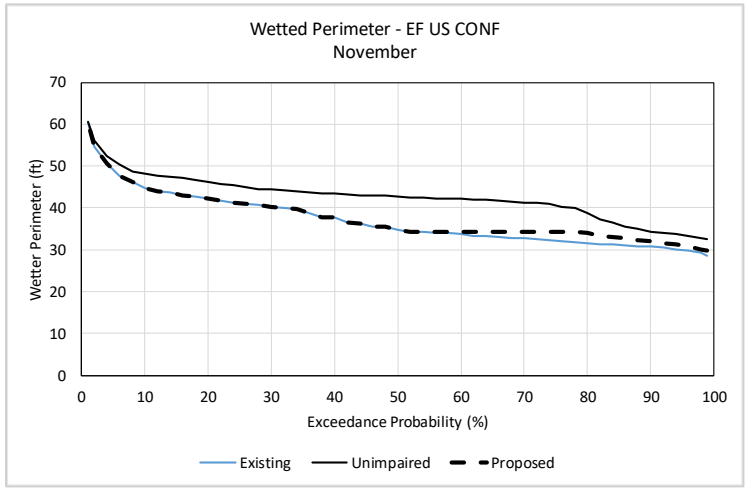
**Figure A8.4-4. East Fork Kaweah River Upstream of Kaweah River Confluence Wetted Perimeter Exceedance Plots (1994-2018) Comparing Existing, Unimpaired, and Proposed Action Wetted Perimeters**

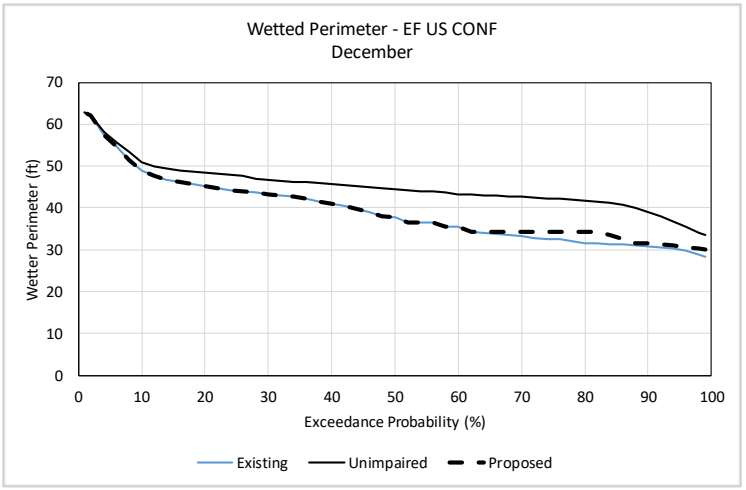



Wetted Perimeter - EF US CONF
May
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed
Wetted Perimeter - EF US CONF
June
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed
Wetted Perimeter - EF US CONF
July
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed
Wetted Perimeter - EF US CONF
August
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed


Wetted Perimeter - EF US CONF
September
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed


Wetted Perimeter - EF US CONF
October
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Existing


Wetted Perimeter - EF US CONF
November
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed


Wetted Perimeter - EF US CONF
December
Wetter Perimeter (ft)
Exceedance Probability (%)
Existing
Unimpaired
Proposed

# APPENDIX B

## Weighted Usable Area Percent of Unimpaired Habitat Exceedance Plots

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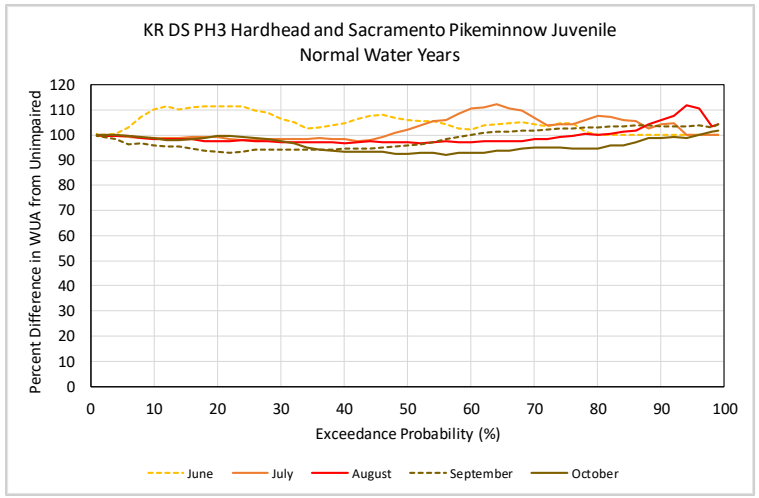
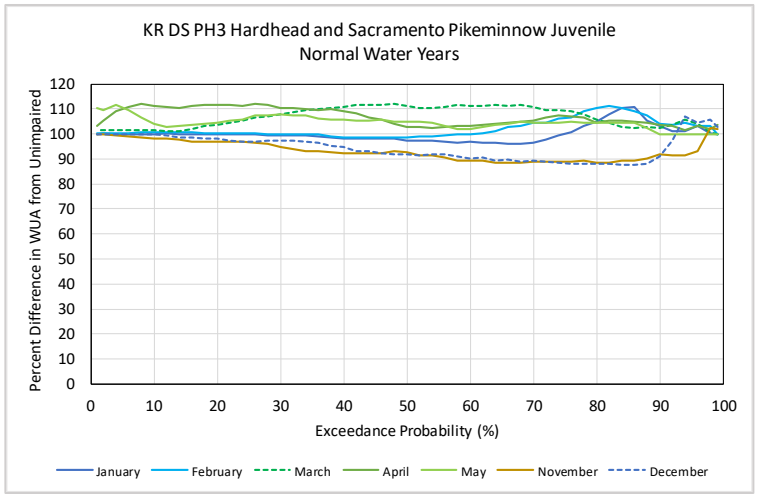
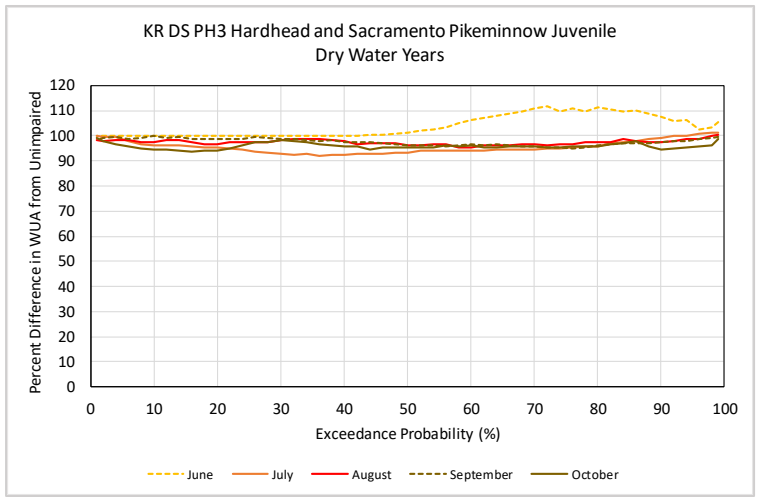
**Figure B8.4-1.** **Kaweah River Downstream of Kaweah No. 3 Powerhouse and Upstream of the East Fork Kaweah River Confluence Hardhead and Sacramento Pikeminnow Juvenile Habitat Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**



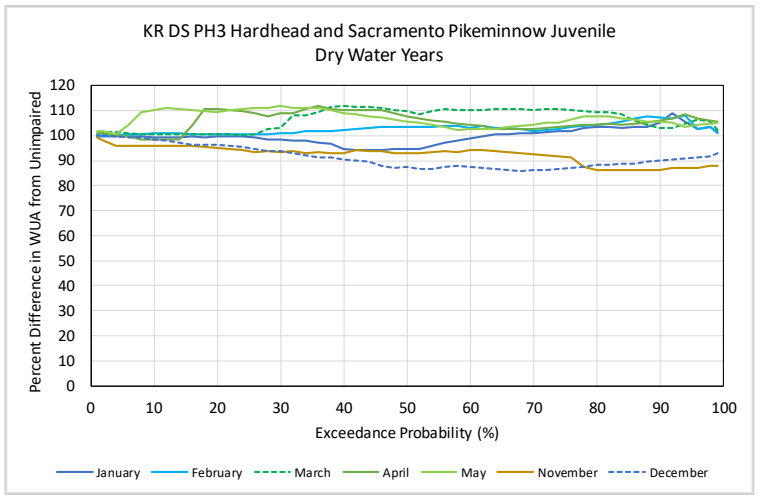
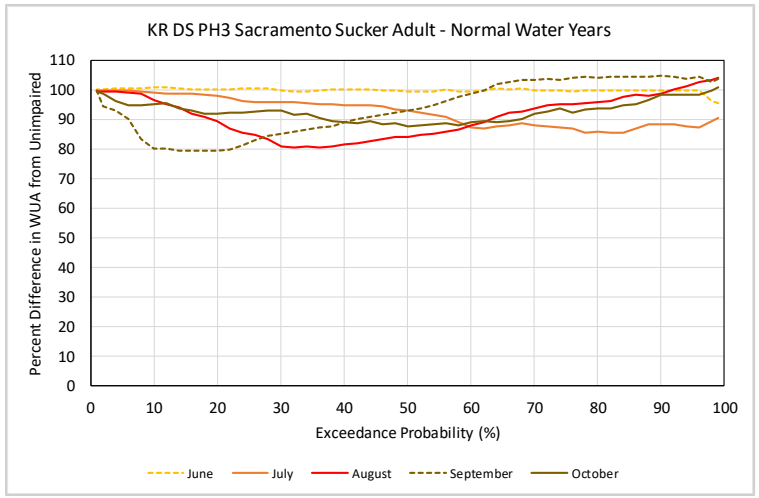
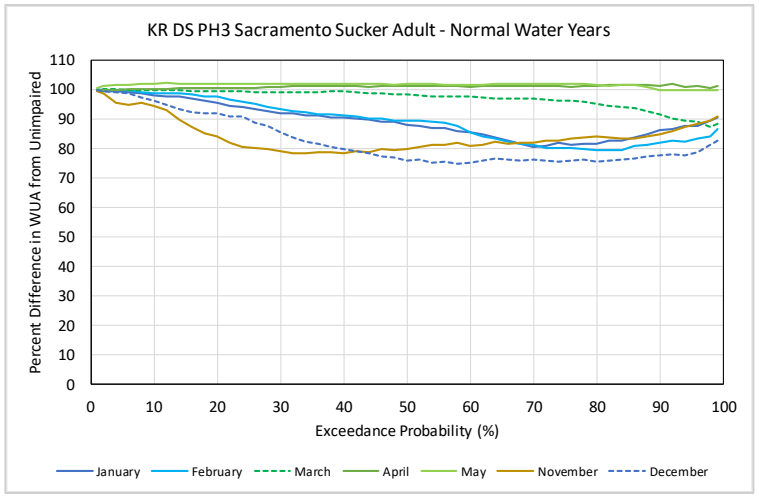
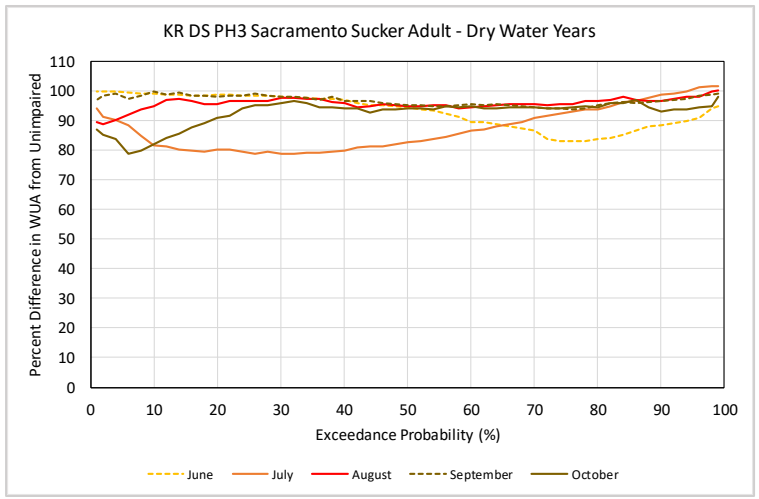



**Figure B8.4-2.** **Kaweah River Downstream of Kaweah No. 3 Powerhouse and Upstream of the East Fork Kaweah River Confluence Sacramento Sucker Adult Habitat Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**



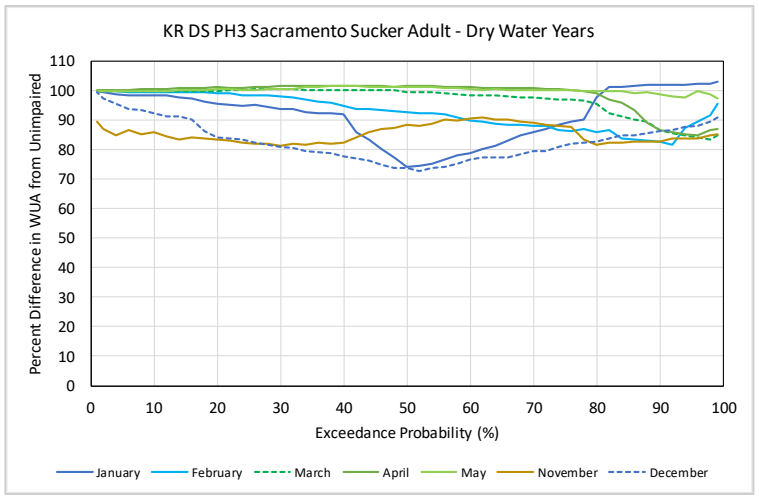
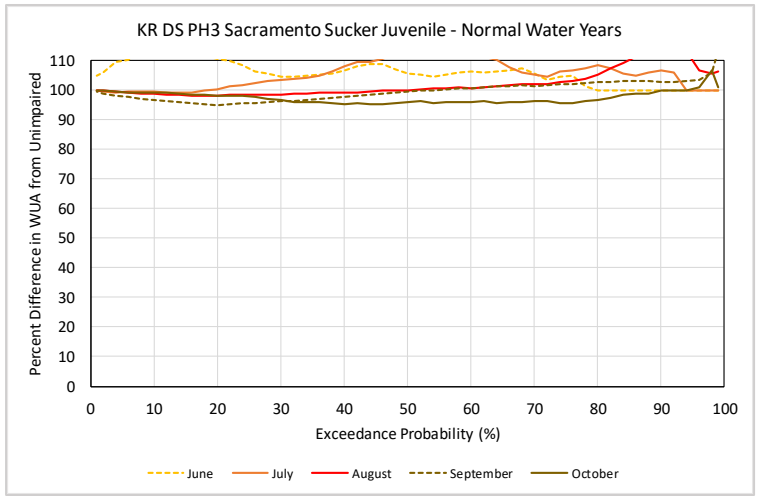
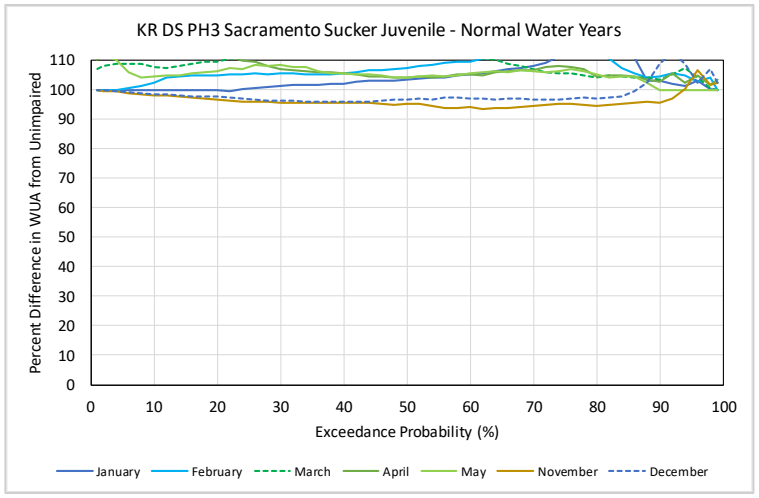
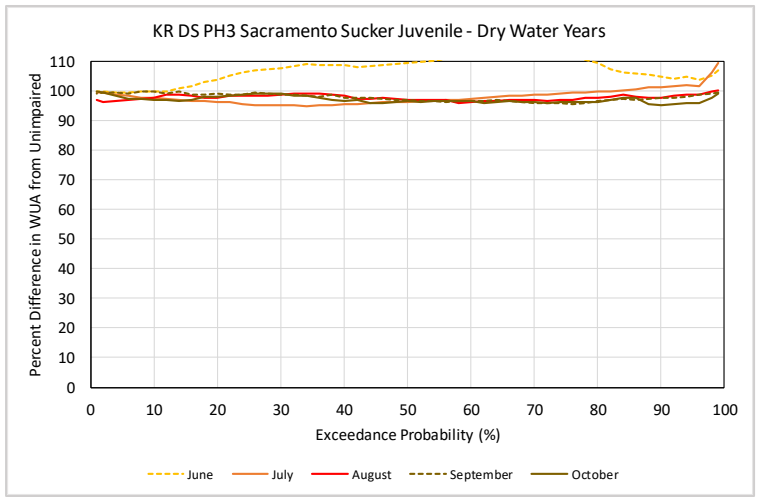



**Figure B8.4-3. Kaweah River Downstream of Kaweah No. 3 Powerhouse and Upstream of the East Fork Kaweah River Confluence Sacramento Sucker Juvenile Habitat Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**



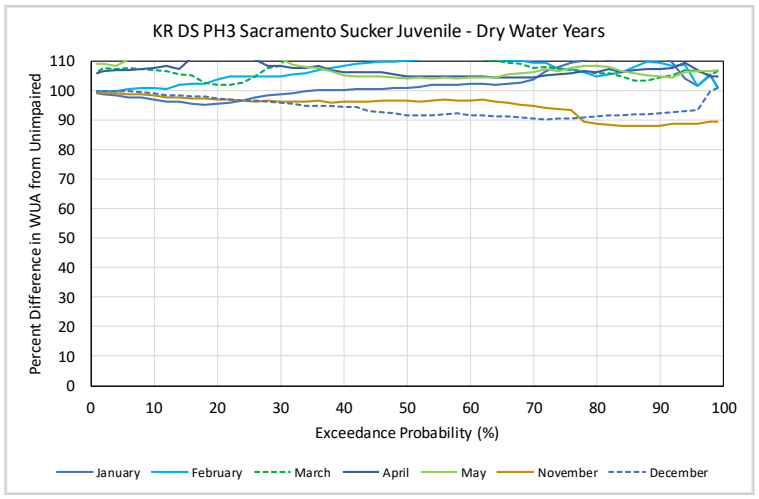
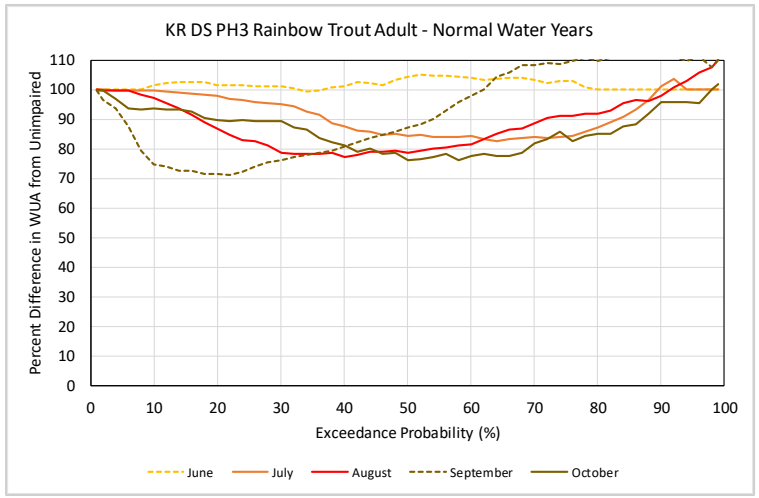
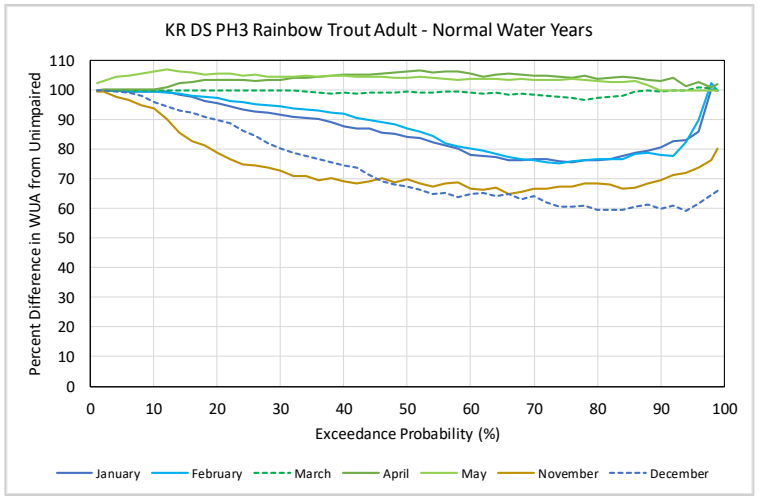
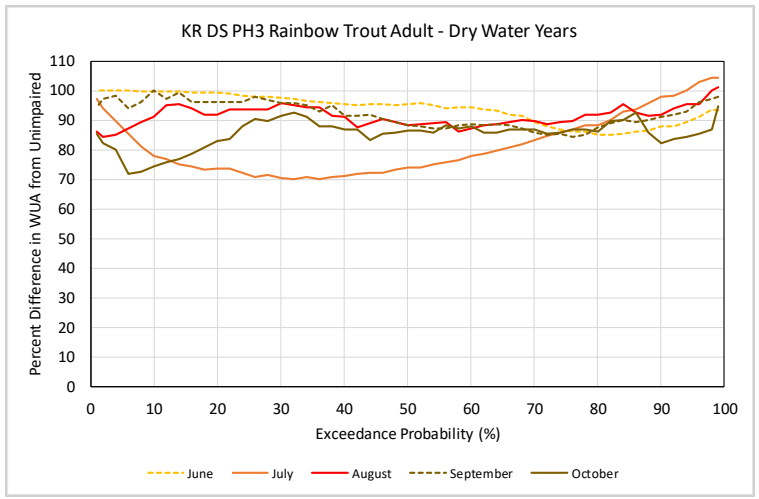



**Figure B8.4-4.** **Kaweah River Downstream of Kaweah No. 3 Powerhouse and Upstream of the East Fork Kaweah River Confluence Rainbow Adult Habitat Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**



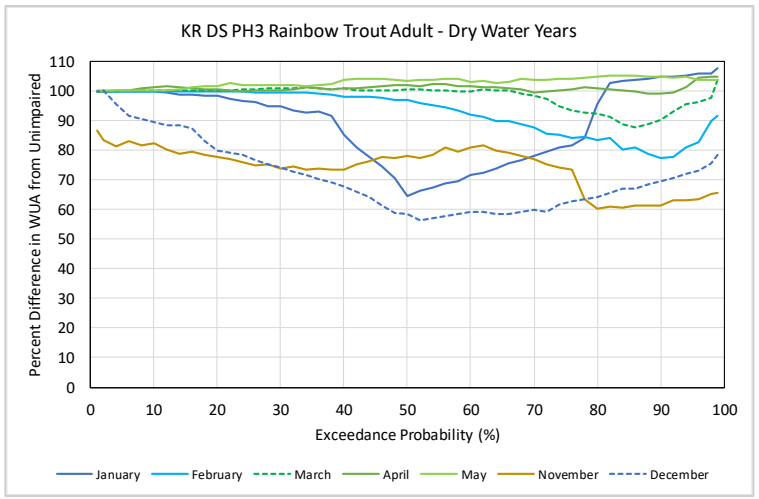
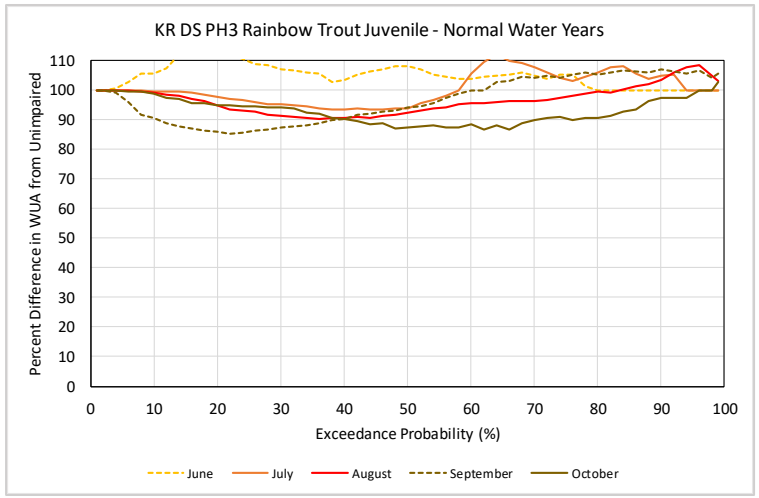
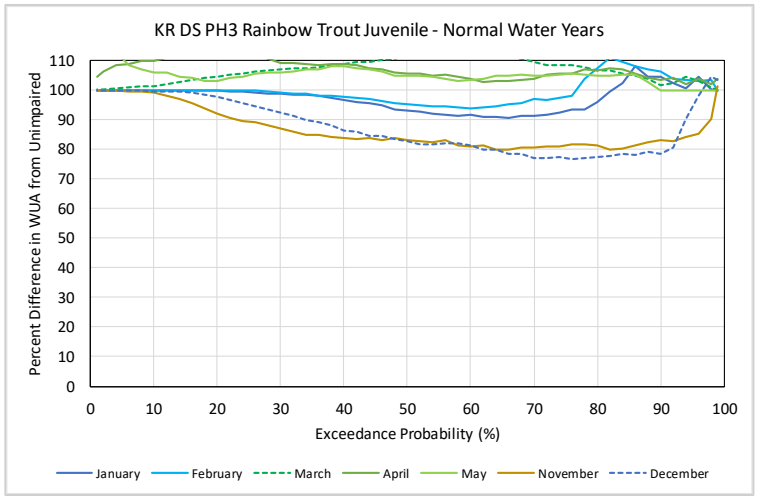
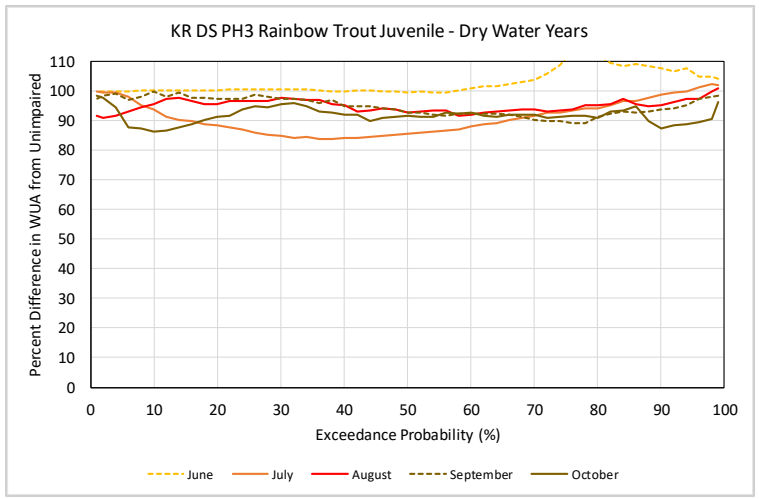



**Figure B8.4-5.** **Kaweah River Downstream of Kaweah No. 3 Powerhouse and Upstream of the East Fork Kaweah River Confluence Rainbow Adult Juvenile Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**



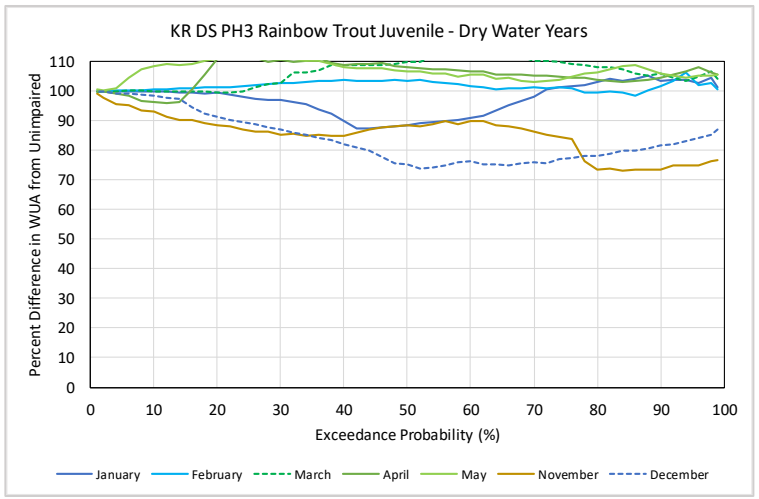
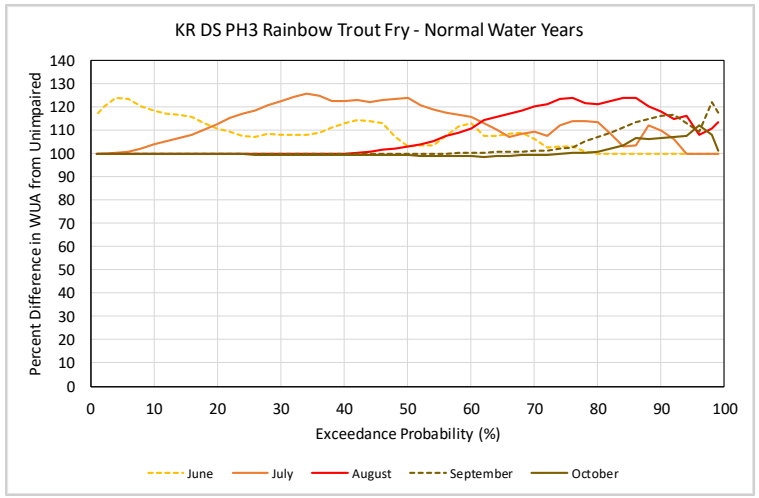
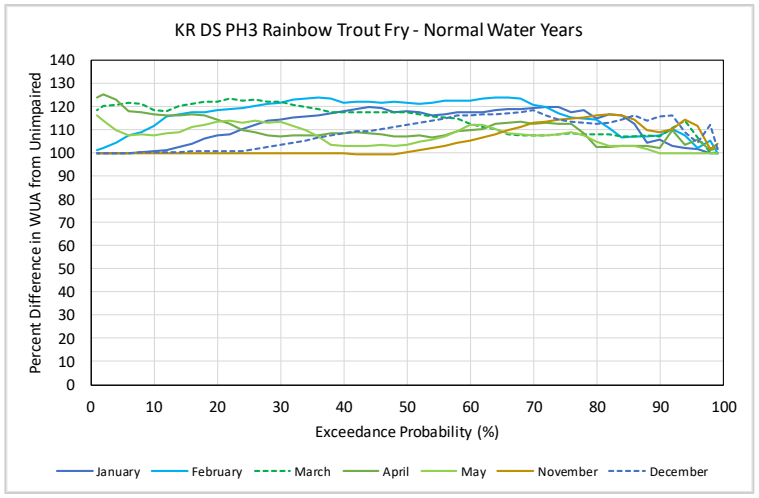
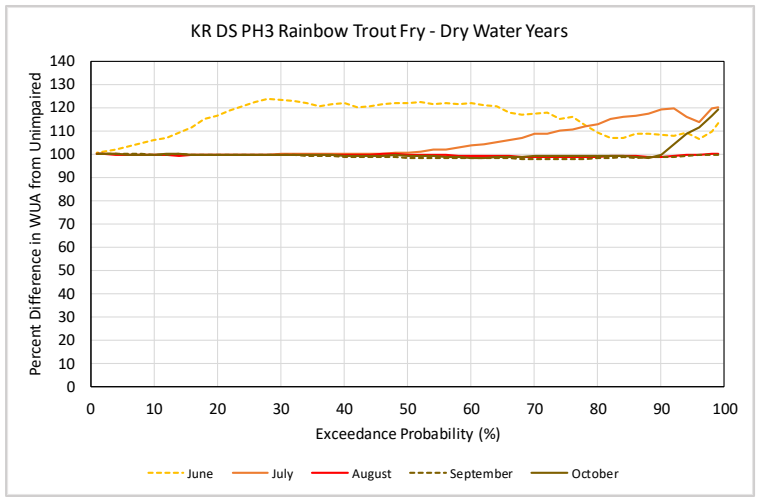



**Figure B8.4-6.** **Kaweah River Downstream of Kaweah No. 3 Powerhouse and Upstream of the East Fork Kaweah River Confluence Rainbow Adult Fry Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**



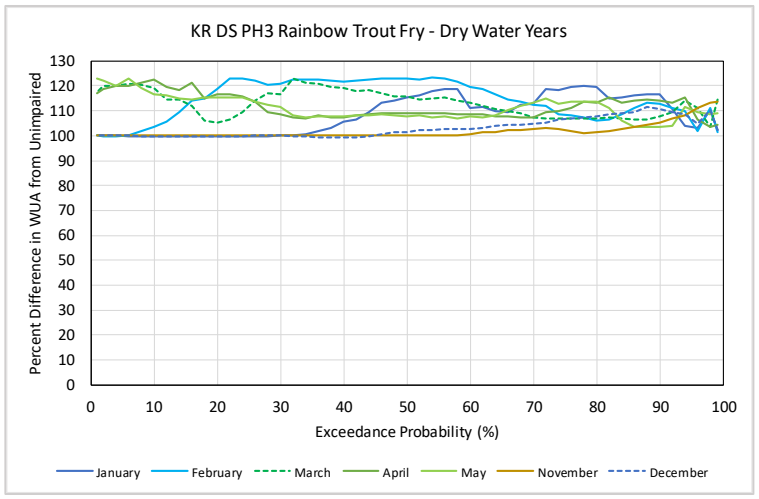
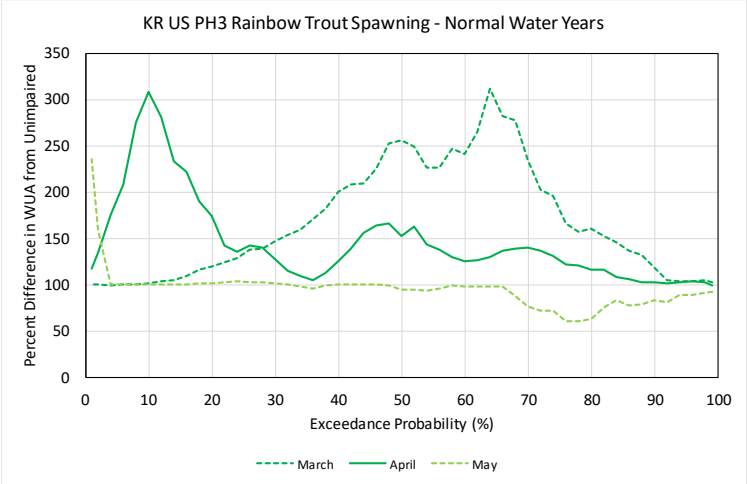



**Figure B8.4-7. Kaweah River Downstream of Kaweah No. 3 Powerhouse and Upstream of the East Fork Kaweah River Confluence Rainbow Adult Spawning Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) using Proposed Action Minimum Instream Flows**



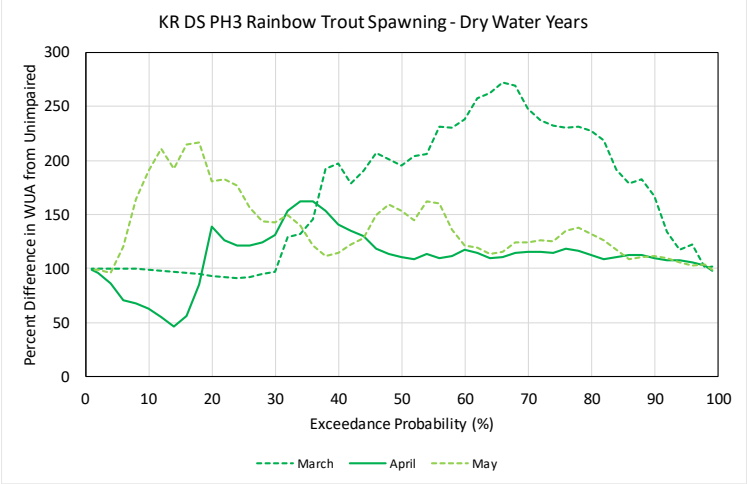
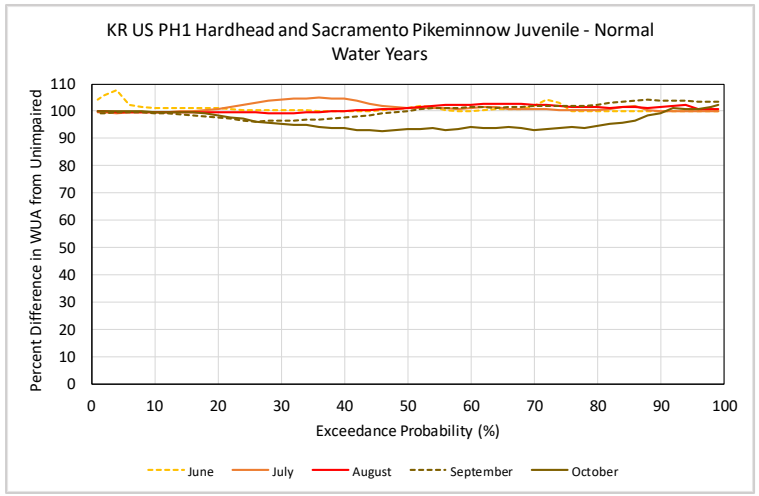
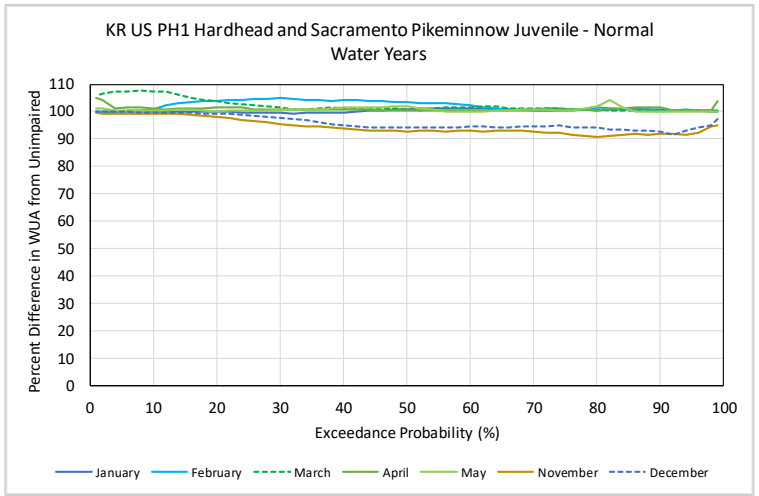
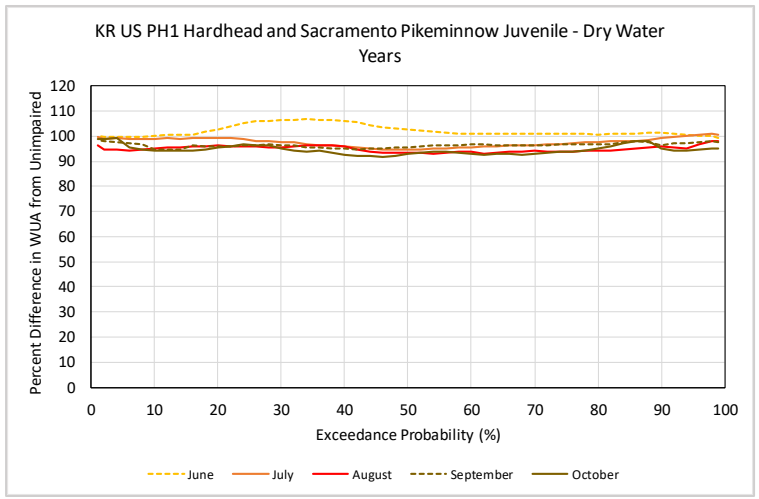



**Figure B8.4-8. Kaweah River Downstream of East Fork Kaweah Confluence and Upstream of Kaweah No. 1 Powerhouse Hardhead and Sacramento Pikeminnow Juvenile Habitat Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**



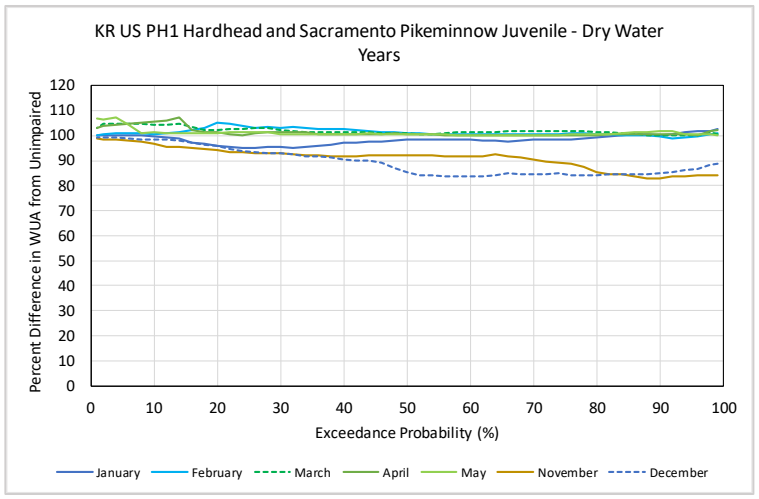
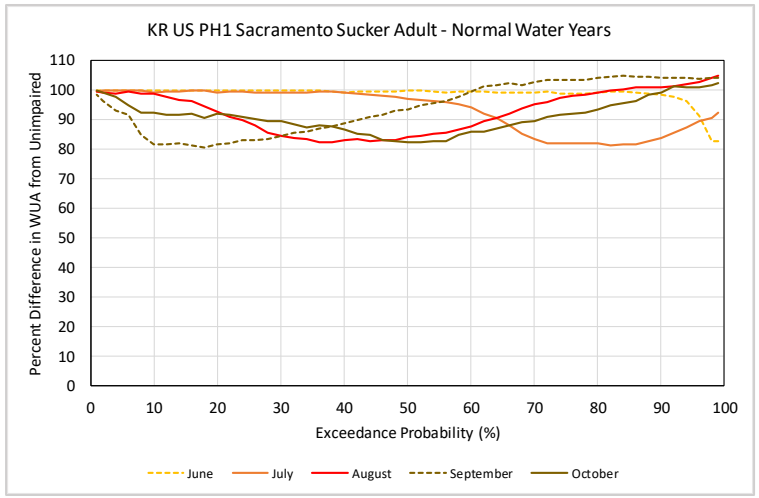
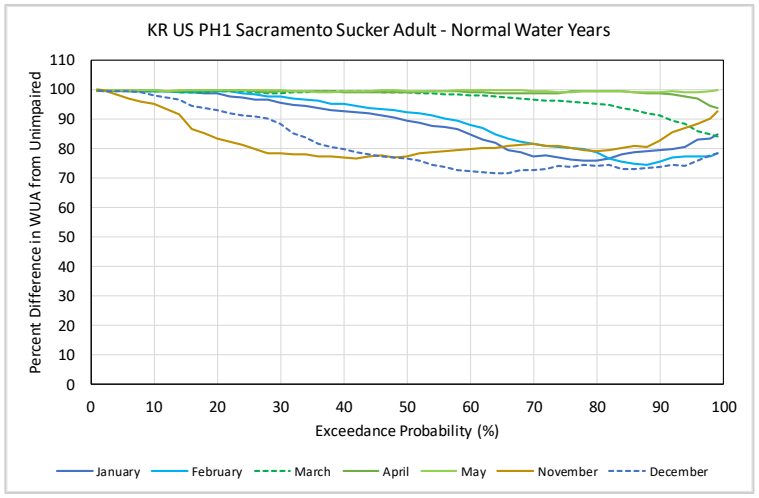
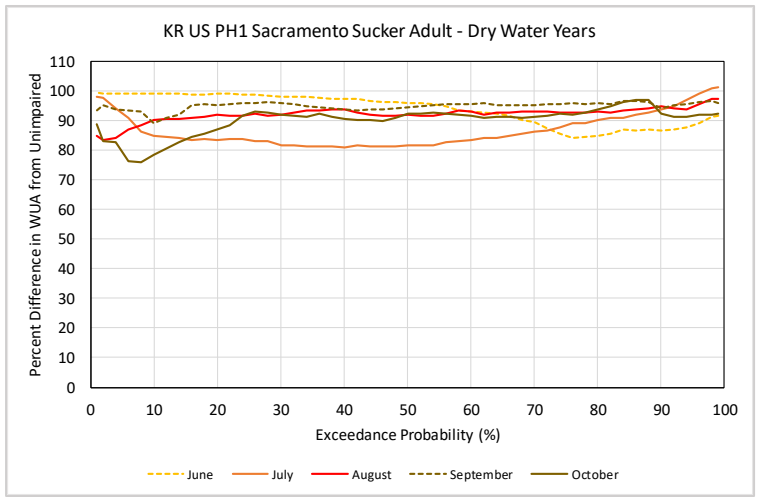



**Figure B8.4-9.** **Kaweah River Downstream of East Fork Kaweah Confluence and Upstream of Kaweah No. 1 Powerhouse Sacramento Sucker Adult Habitat Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**



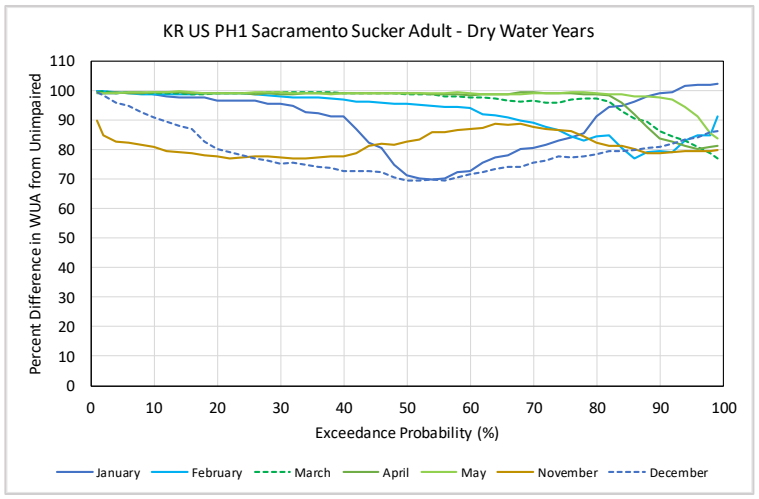
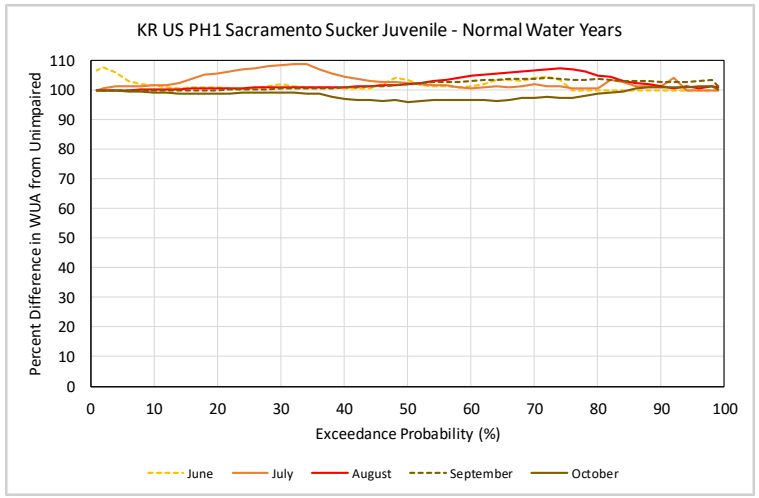
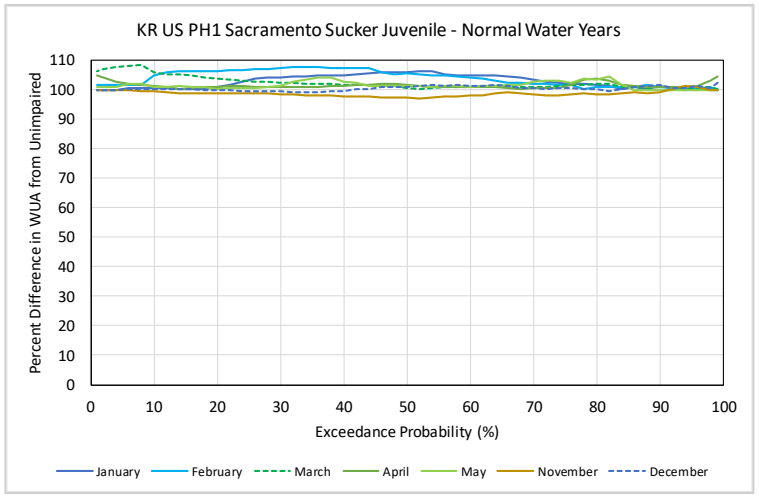
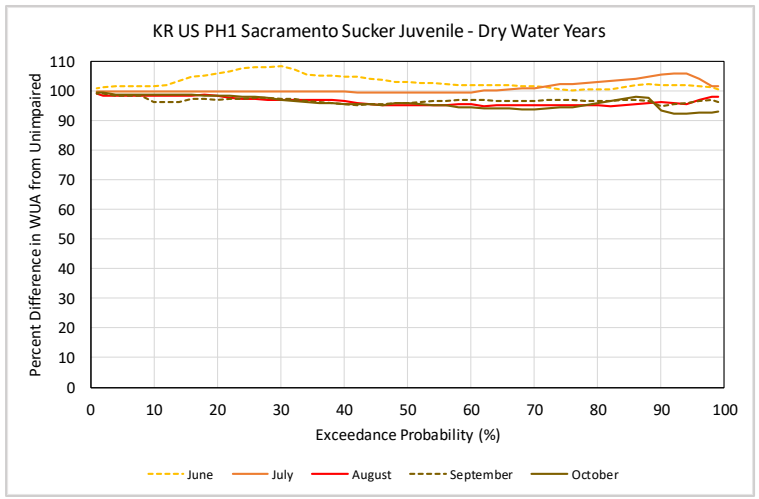



**Figure B8.4-10. Kaweah River Downstream of East Fork Kaweah Confluence and Upstream of Kaweah No. 1 Powerhouse Sacramento Sucker Juvenile Habitat Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**



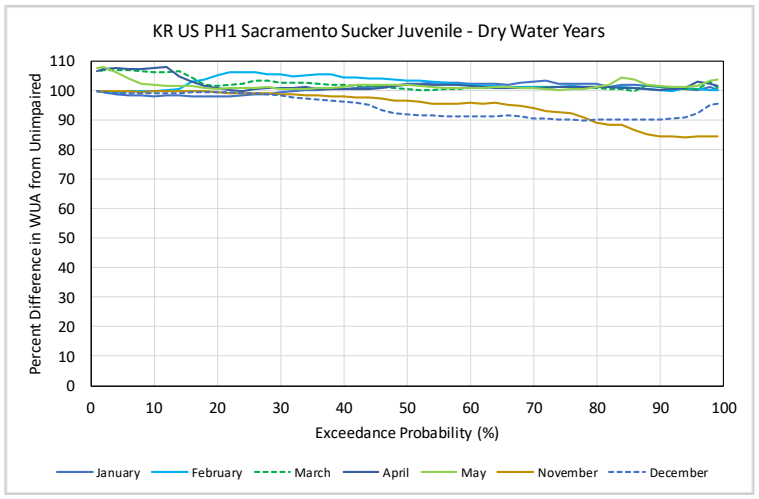
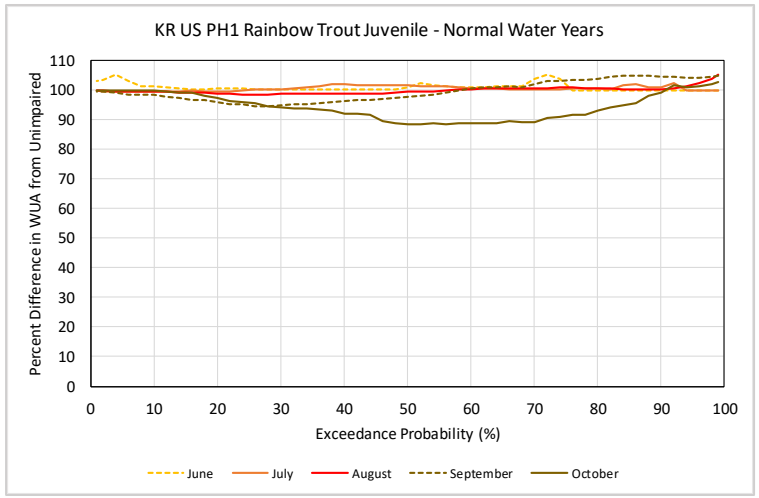
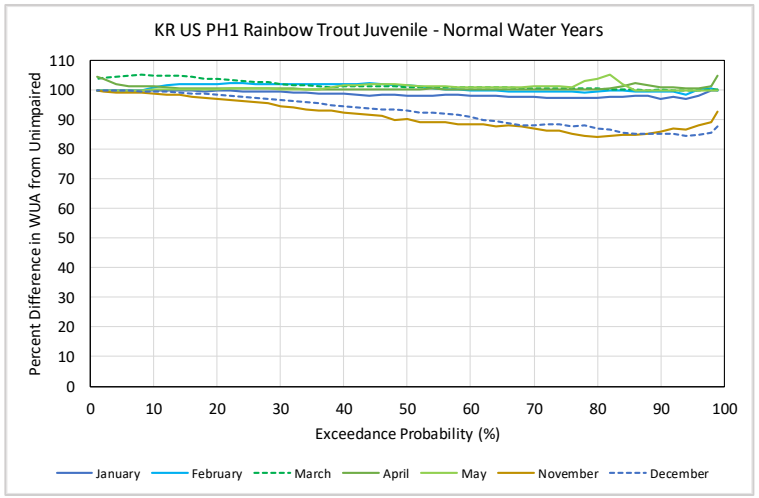
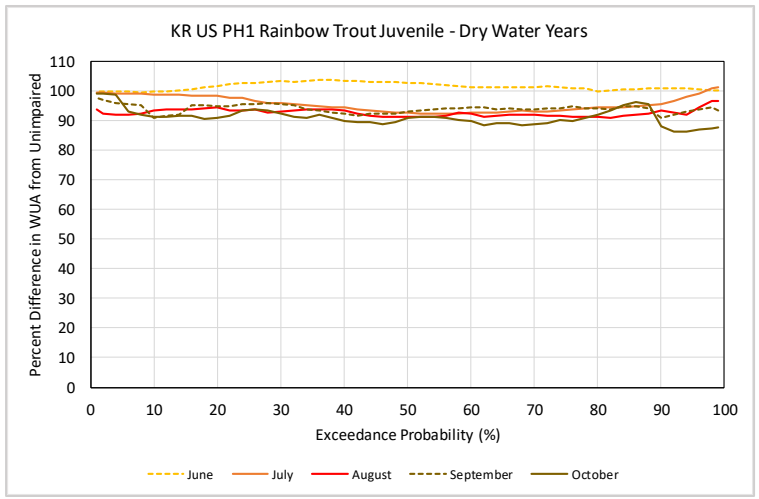



**Figure B8.4-11. Kaweah River Downstream of East Fork Kaweah Confluence and Upstream of Kaweah No. 1 Powerhouse Rainbow Adult Habitat Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**

**Figure B8.4-12. Kaweah River Downstream of East Fork Kaweah Confluence and Upstream of Kaweah No. 1 Powerhouse Rainbow Adult Juvenile Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**



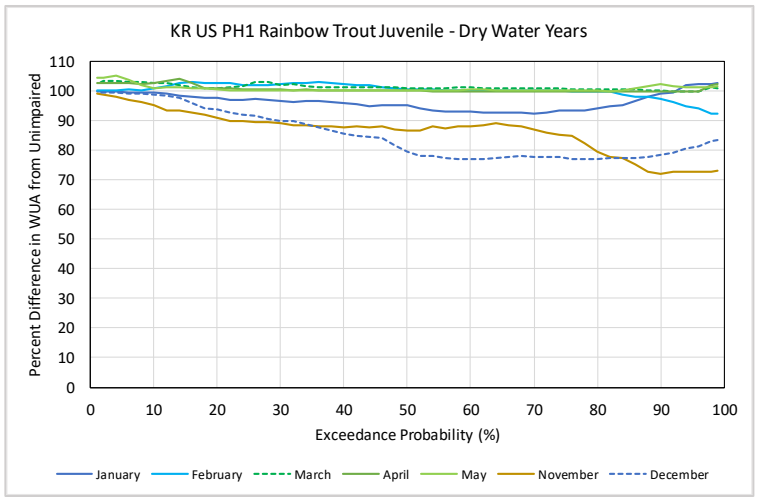
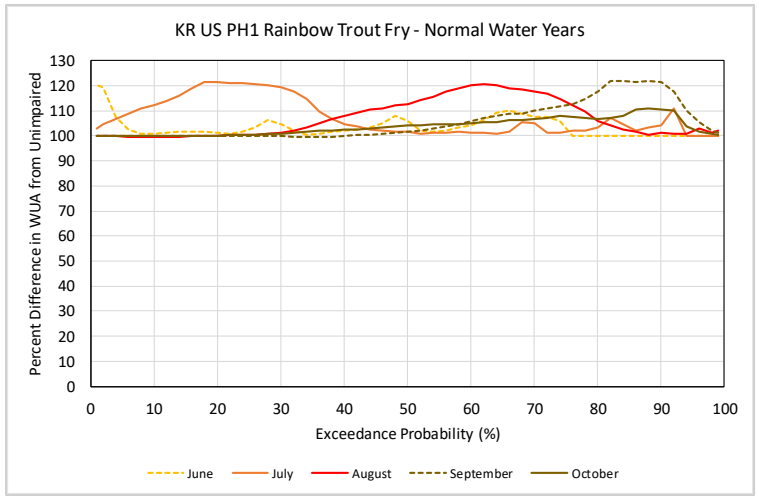
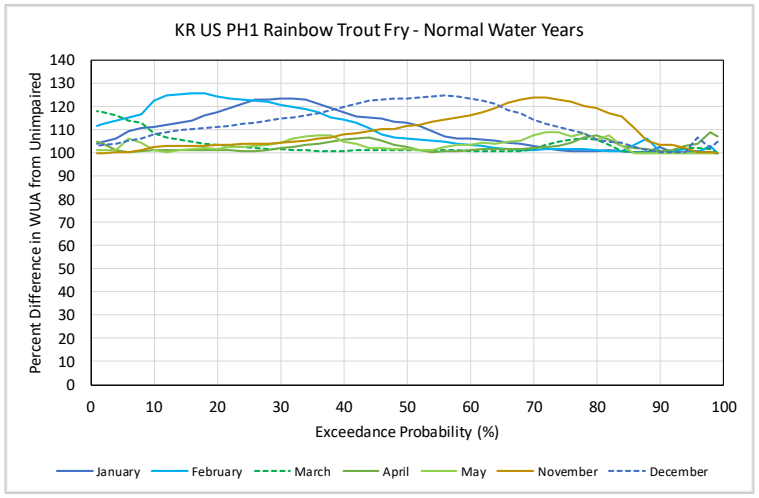
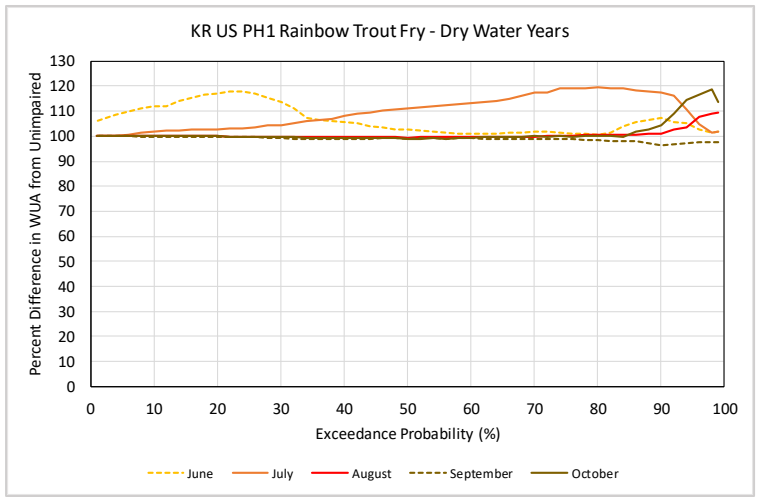



**Figure B8.4-13. Kaweah River Downstream of East Fork Kaweah Confluence and Upstream of Kaweah No. 1 Powerhouse Rainbow Adult Fry Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**



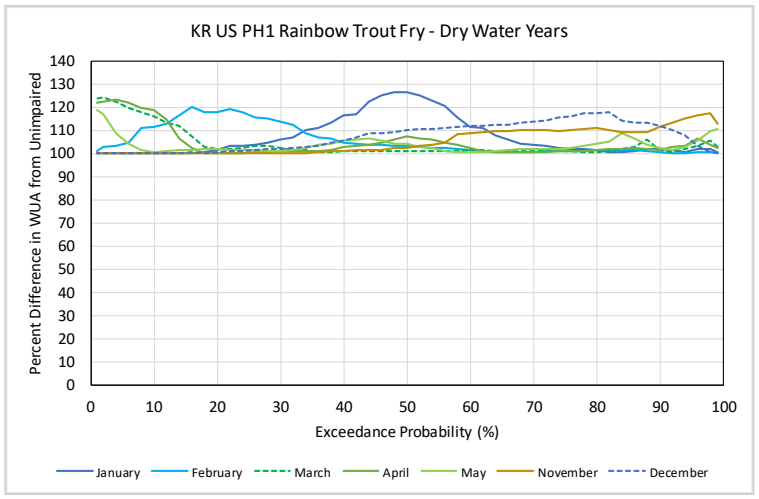
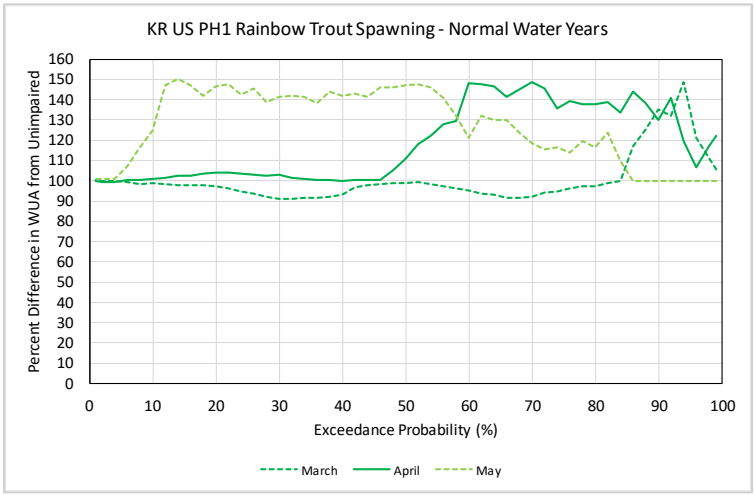



**Figure B8.4-14. Kaweah River Downstream of East Fork Kaweah Confluence and Upstream of Kaweah No. 1 Powerhouse Rainbow Adult Spawning Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) using Proposed Action Minimum Instream Flows**



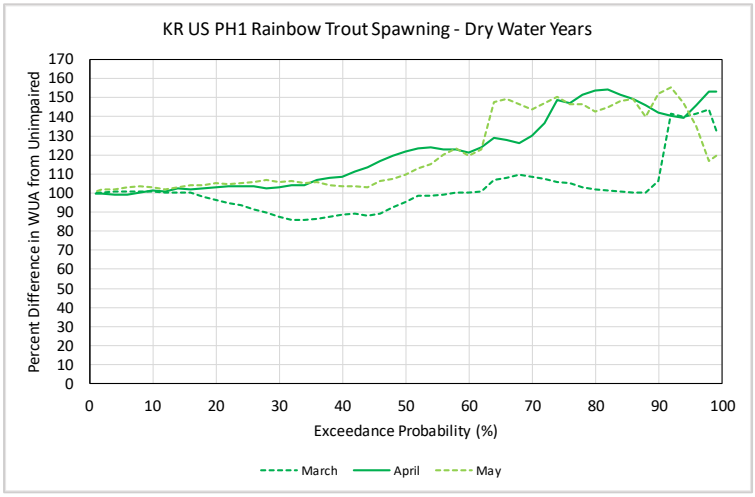
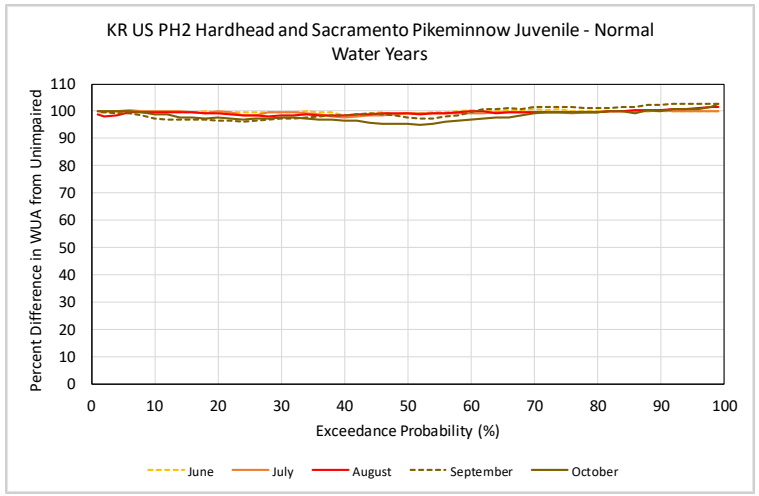
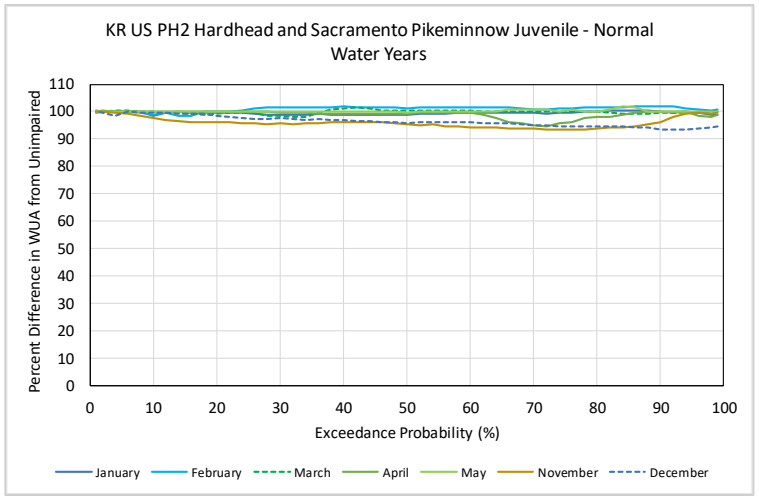
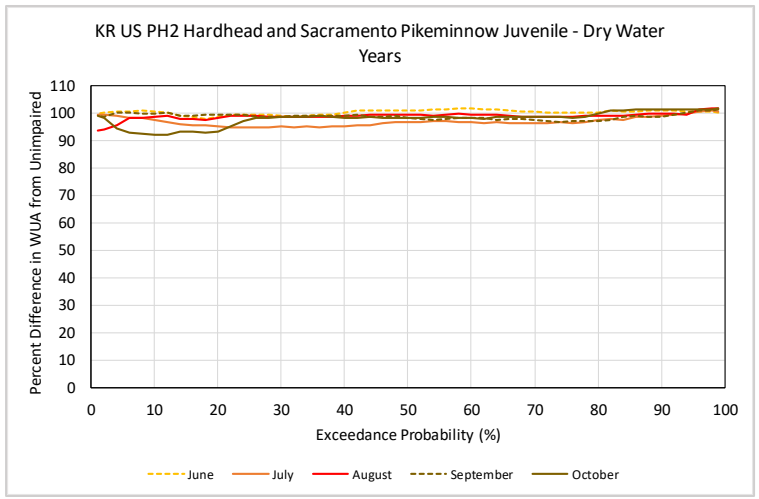



**Figure B8.4-15. Kaweah River Downstream of Kaweah No. 1 Powerhouse and Upstream of Kaweah No. 2 Powerhouse Hardhead and Sacramento Pikeminnow Juvenile Habitat Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**



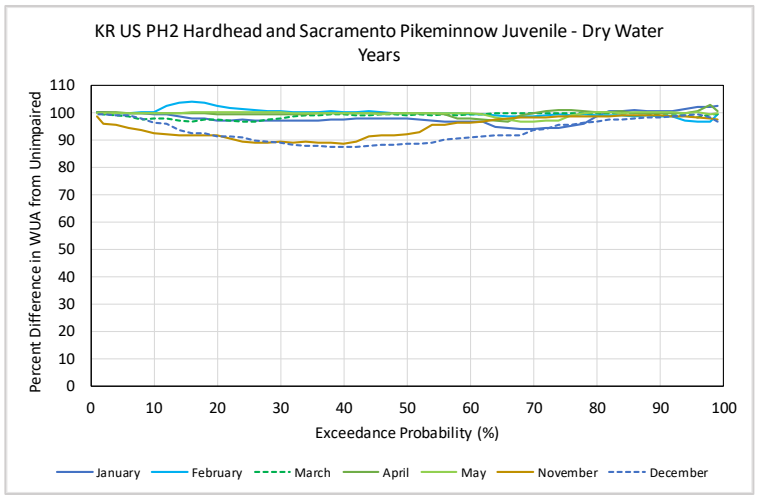
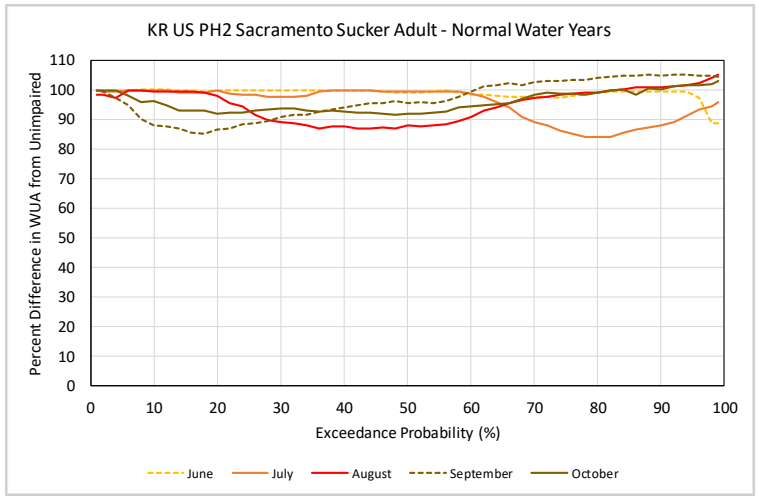
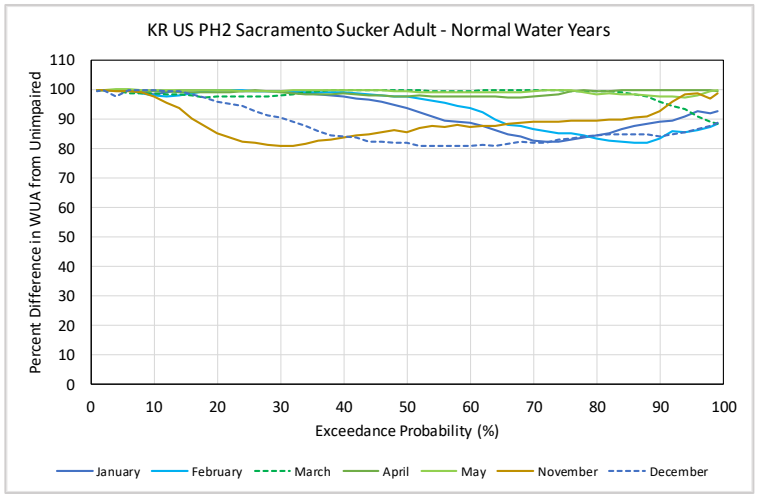
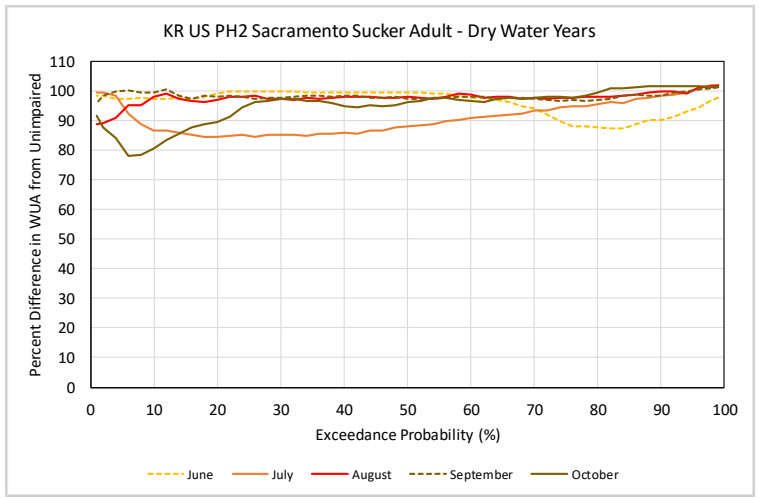



**Figure B8.4-16. Kaweah River Downstream of Kaweah No. 1 Powerhouse and Upstream of Kaweah No. 2 Powerhouse Sacramento Sucker Adult Habitat Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**



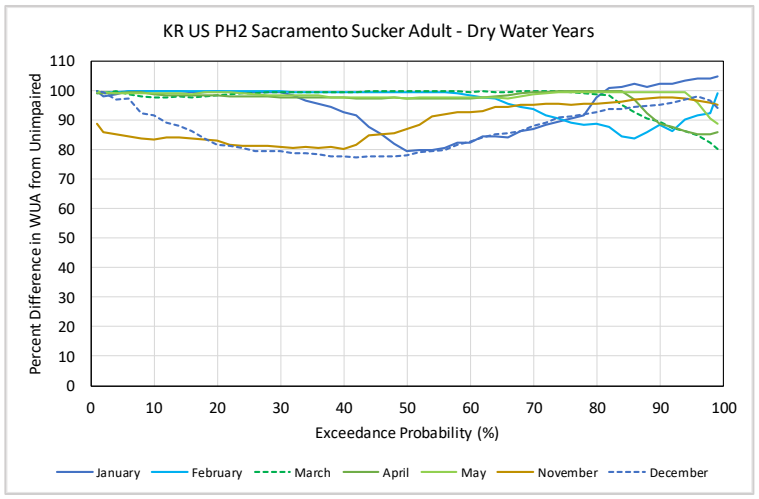



**Figure B8.4-17. Kaweah River Downstream of Kaweah No. 1 Powerhouse and Upstream of Kaweah No. 2 Powerhouse Sacramento Sucker Juvenile Habitat Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**

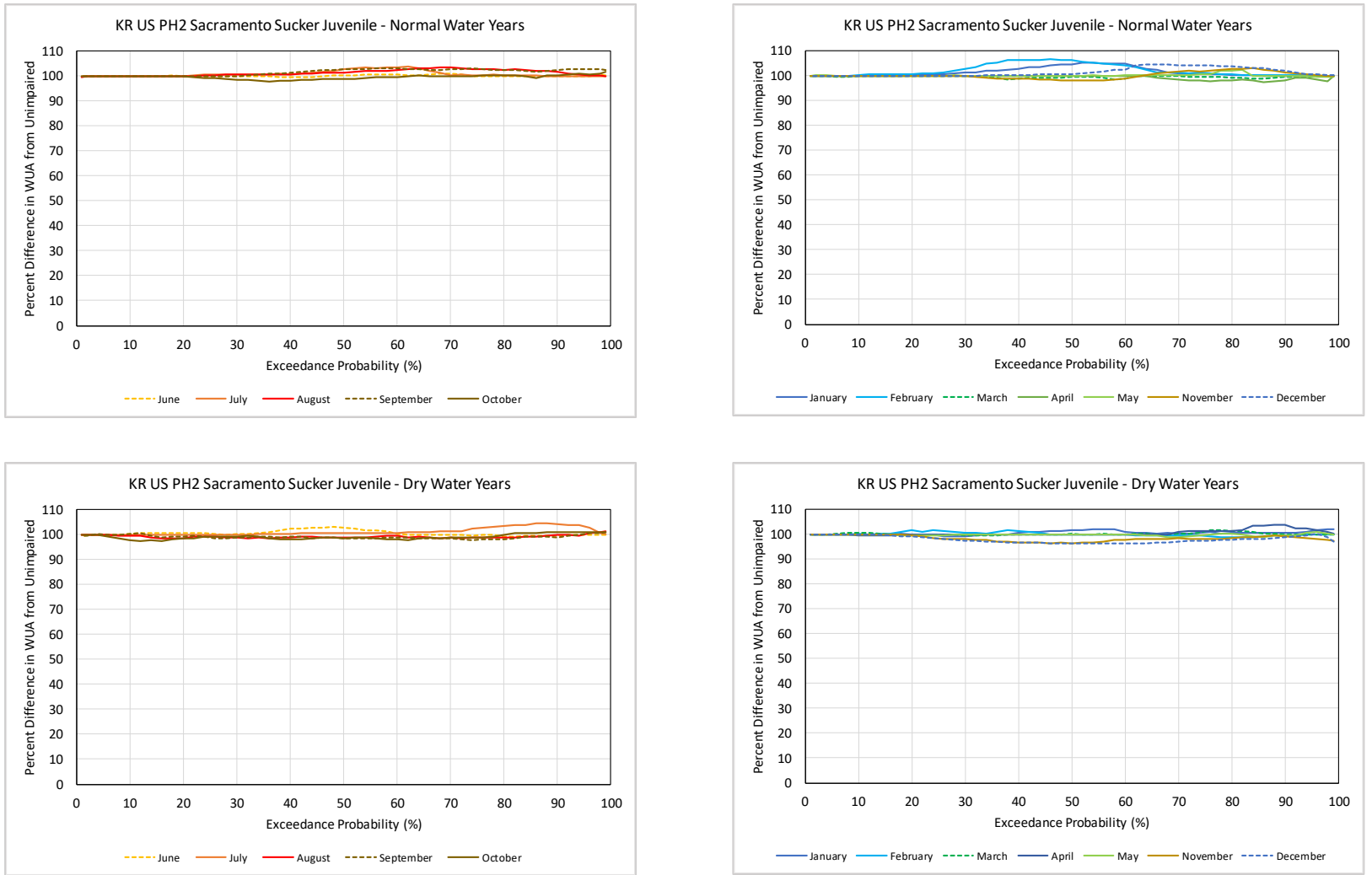
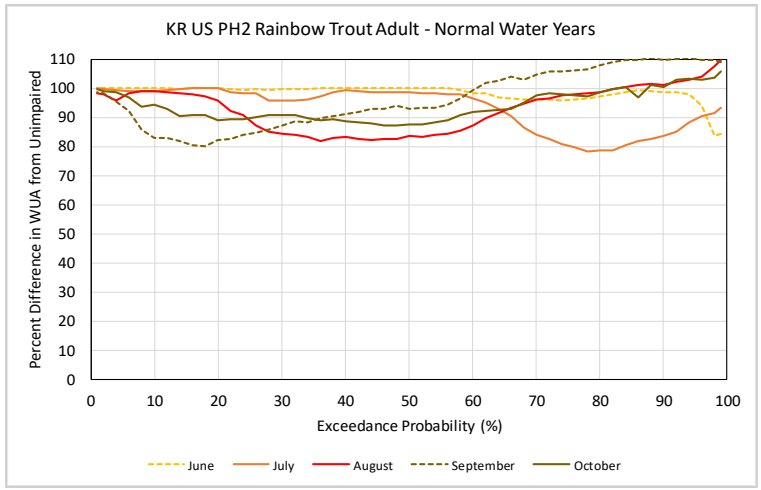
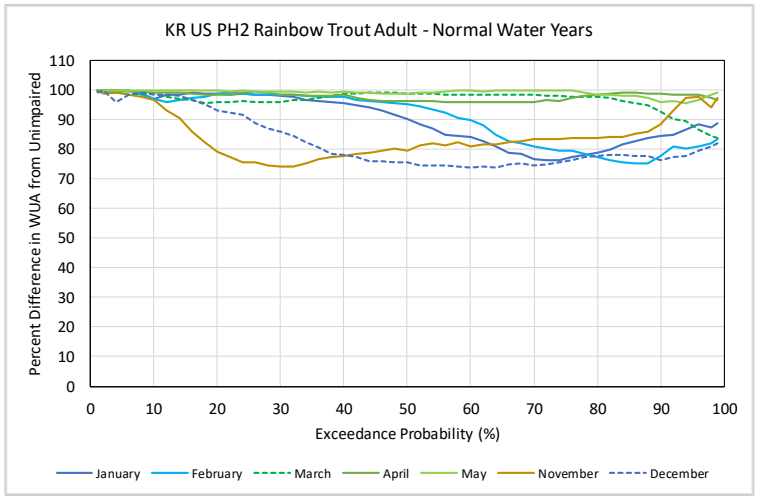
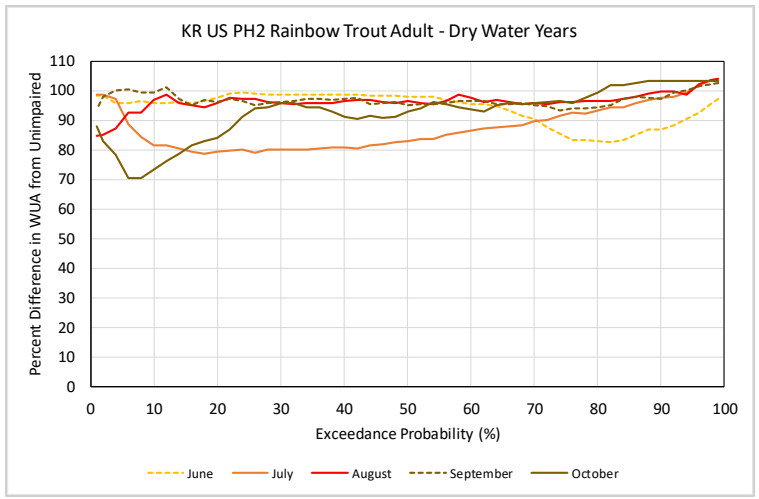


**Figure B8.4-18. Kaweah River Downstream of Kaweah No. 1 Powerhouse and Upstream of Kaweah No. 2 Powerhouse Rainbow Adult Habitat Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**



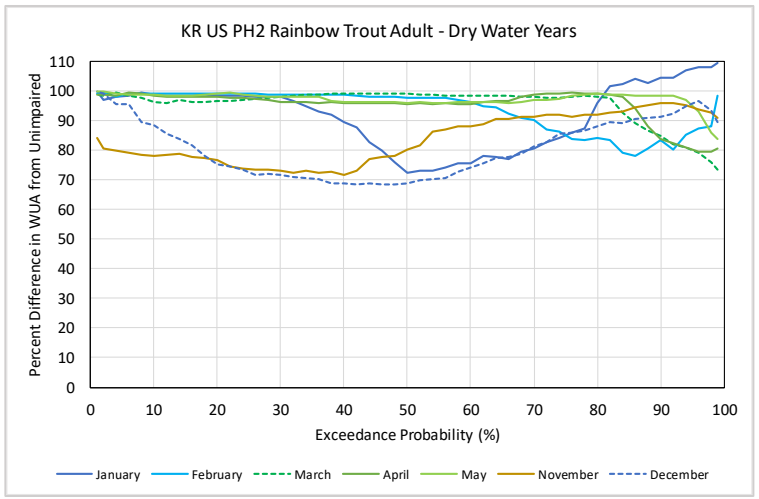
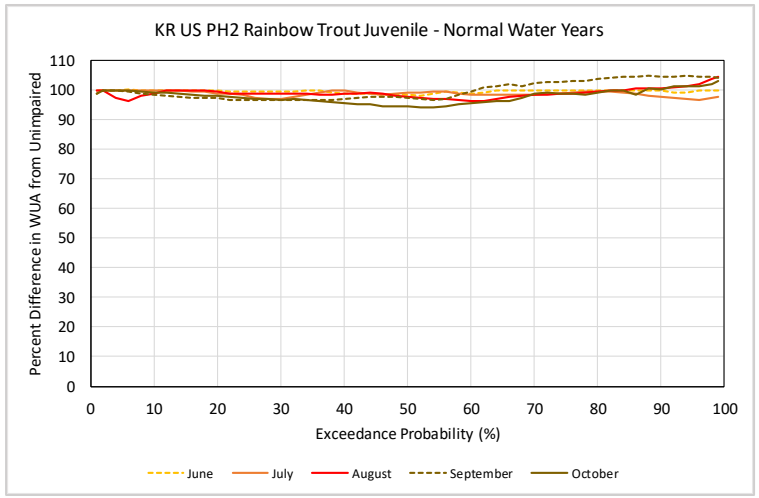
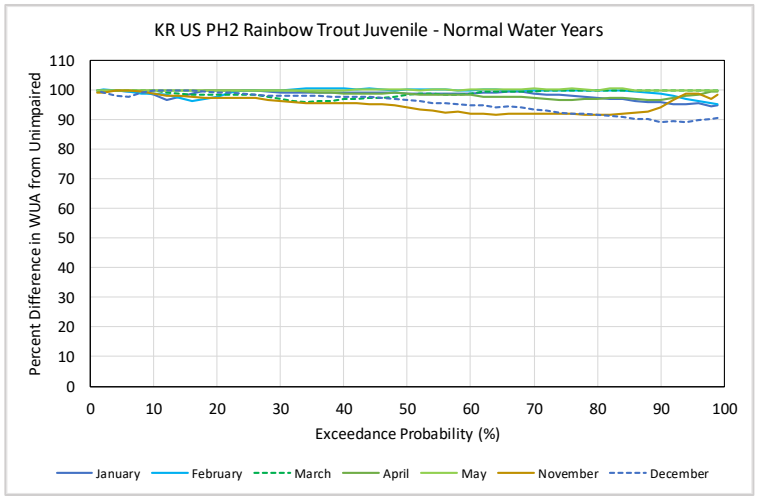
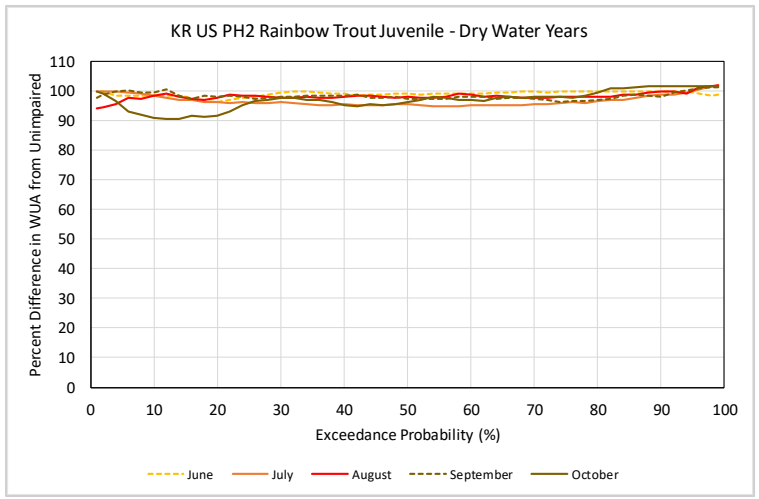



**Figure B8.4-19. Kaweah River Downstream of Kaweah No. 1 Powerhouse and Upstream of Kaweah No. 2 Powerhouse Rainbow Adult Juvenile Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**



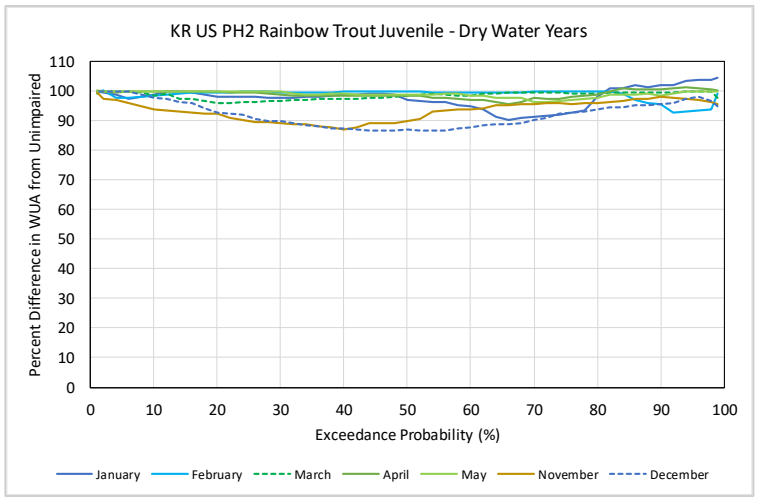
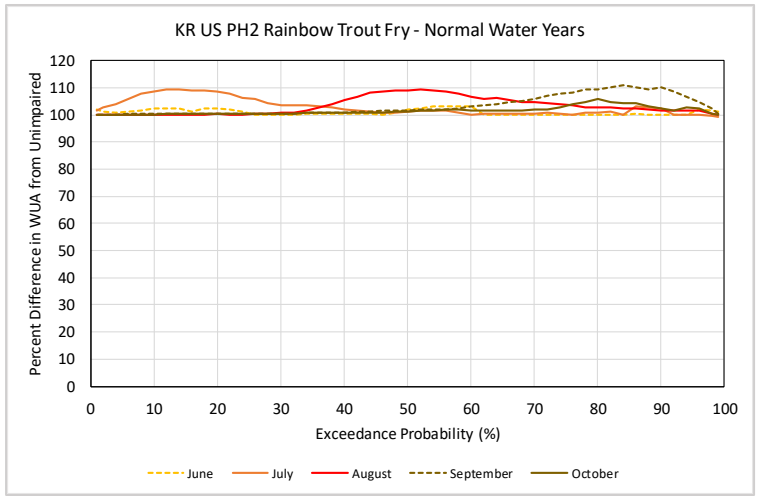
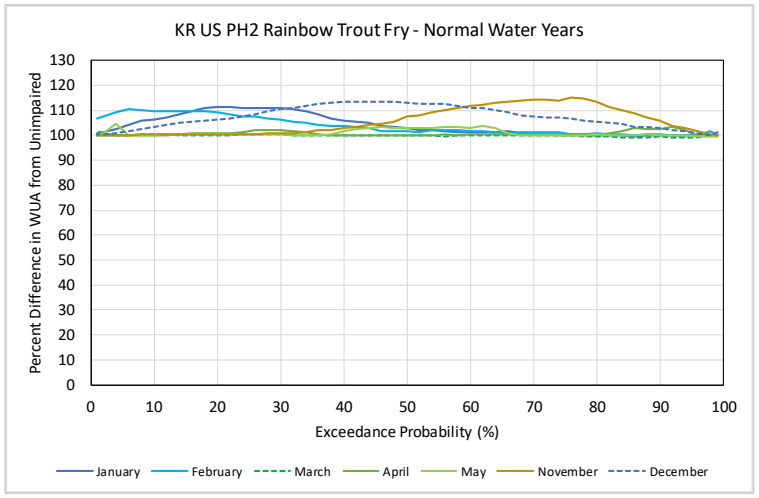
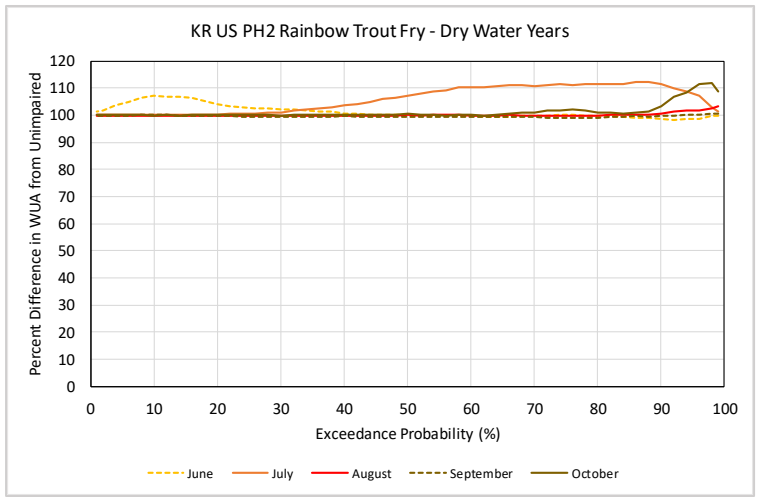



**Figure B8.4-20. Kaweah River Downstream of Kaweah No. 1 Powerhouse and Upstream of Kaweah No. 2 Powerhouse Rainbow Adult Fry Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**



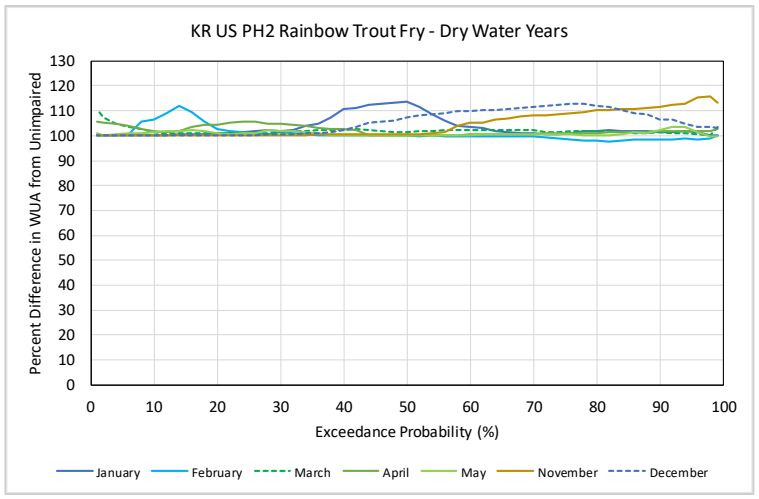
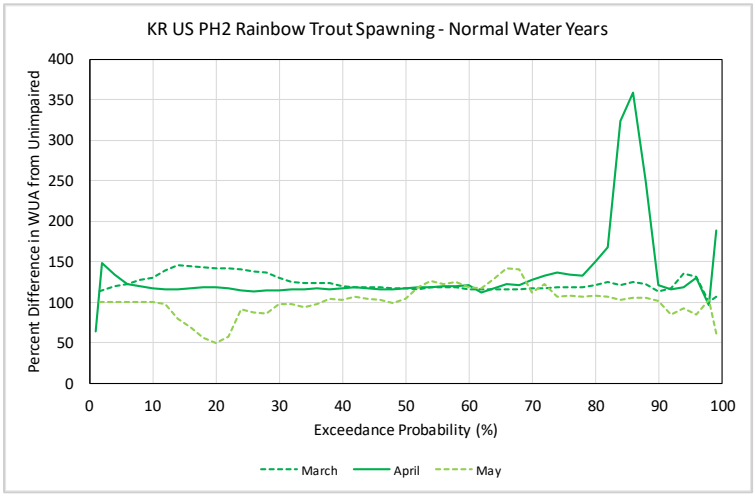



**Figure B8.4-21. Kaweah River Downstream of Kaweah No. 1 Powerhouse and Upstream of Kaweah No. 2 Powerhouse Rainbow Adult Spawning Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) using Proposed Action Minimum Instream Flows**



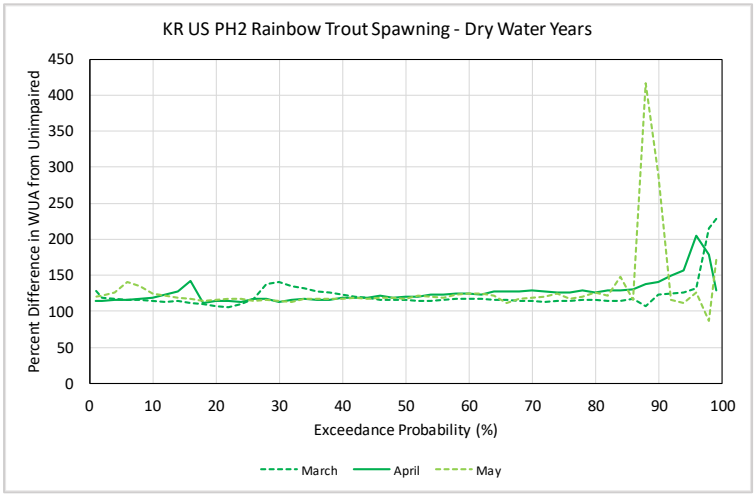
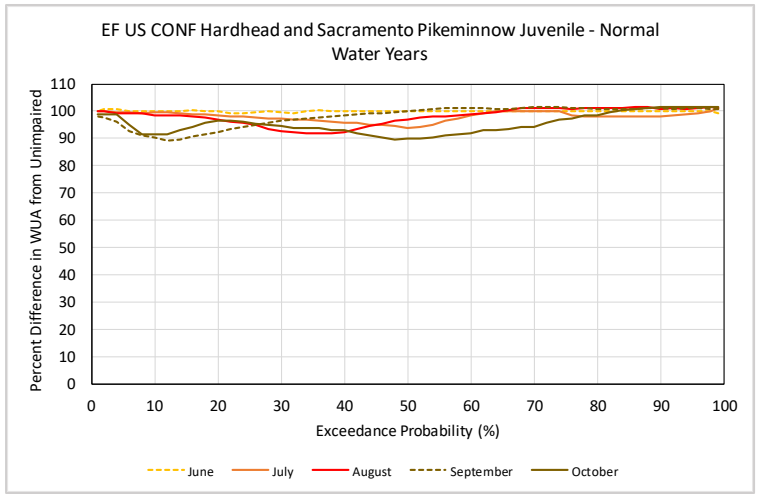
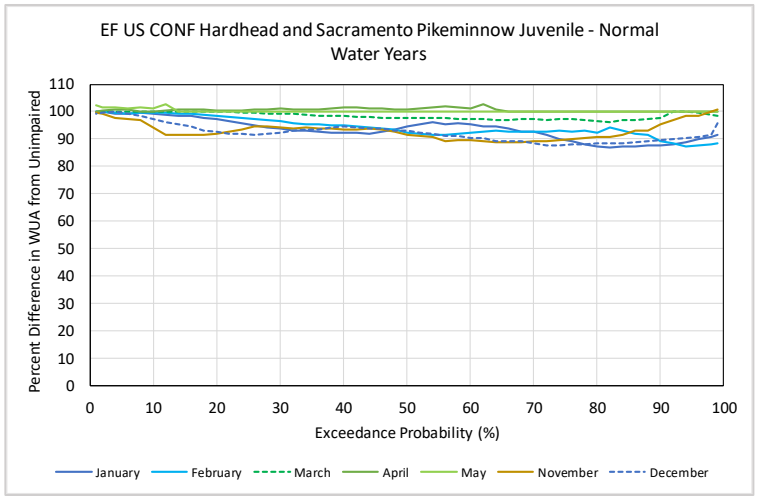
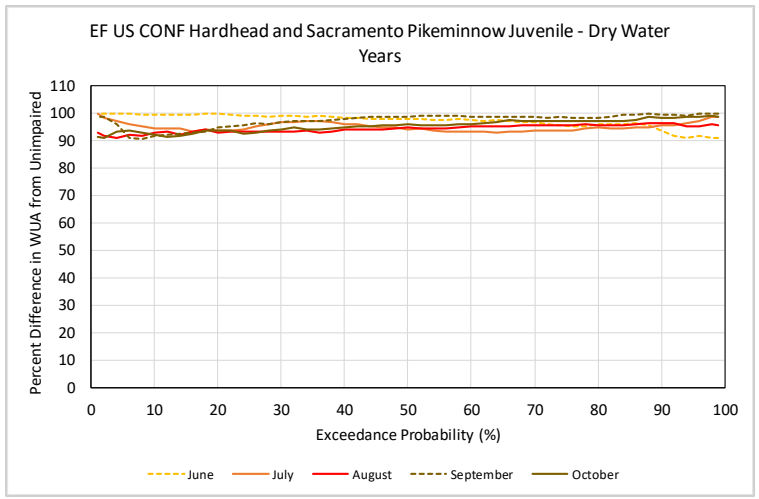



**Figure B8.4-22. East Fork Kaweah River Upstream of the Confluence with Kaweah River Hardhead and Sacramento Pikeminnow Juvenile Habitat Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**



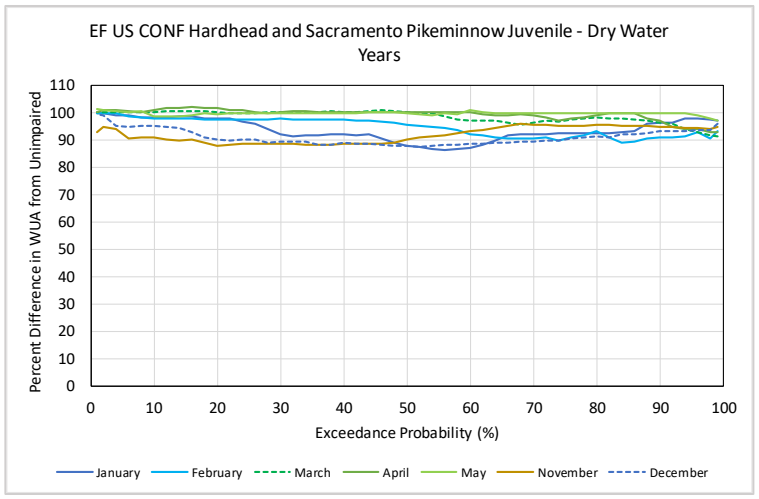
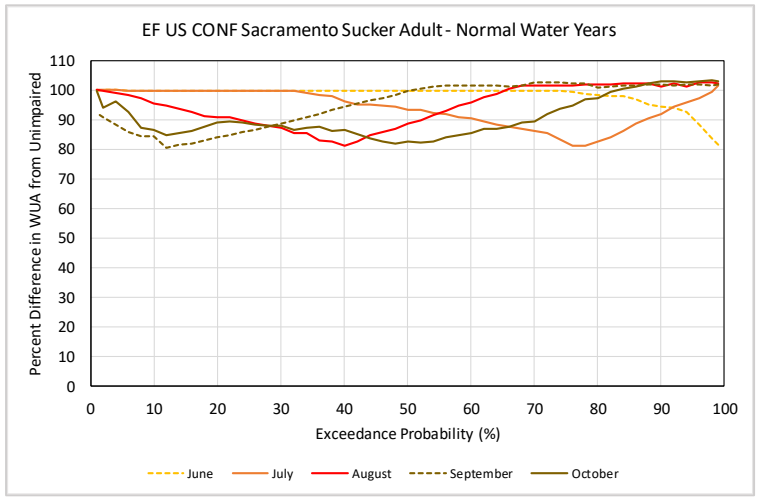
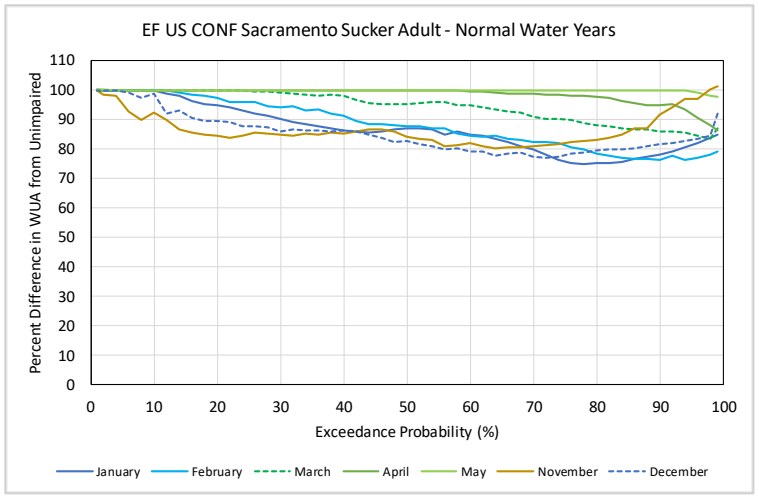
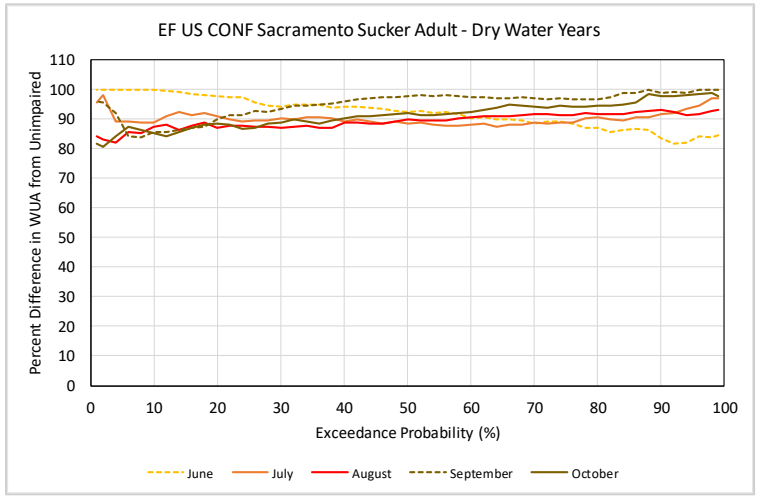



**Figure B8.4-23. East Fork Kaweah River Upstream of the Confluence with Kaweah River Sacramento Sucker Adult Habitat Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**



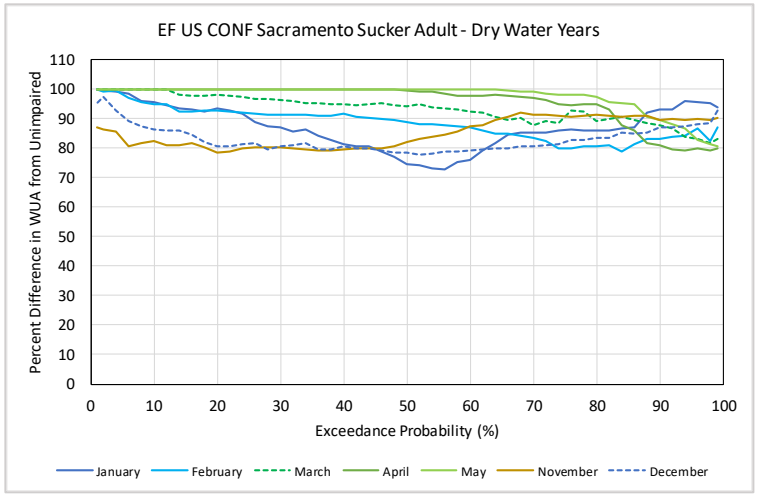
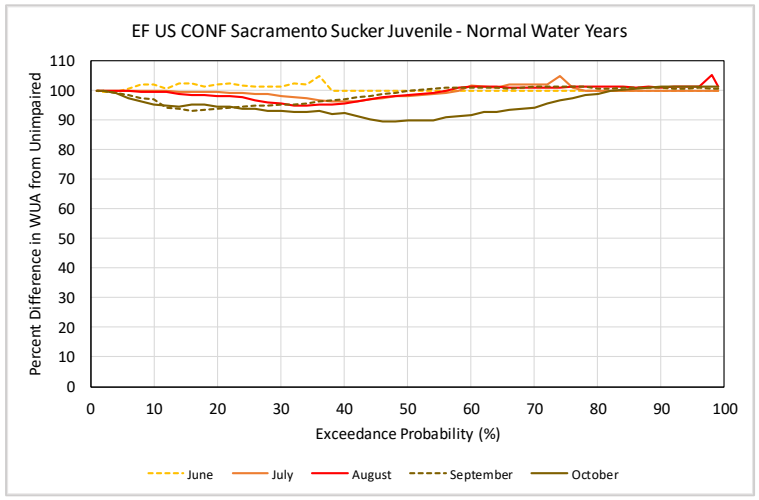
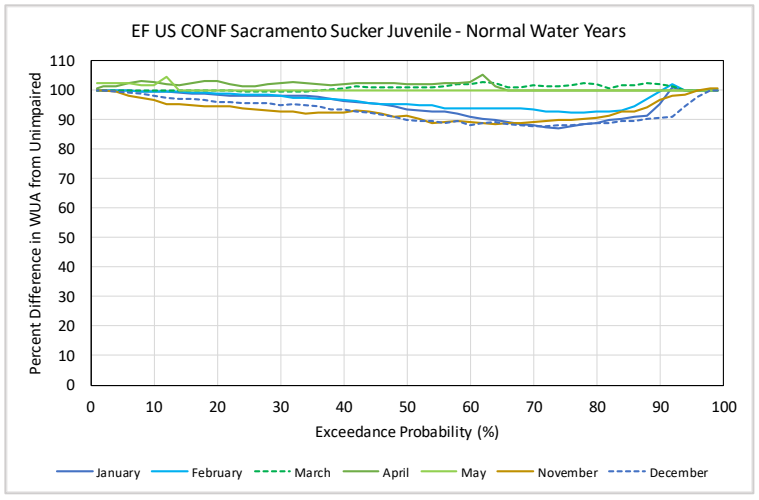
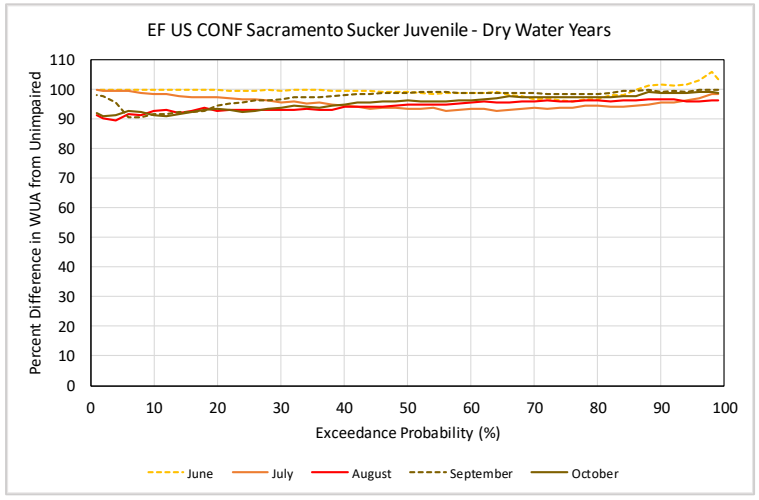



**Figure B8.4-24. East Fork Kaweah River Upstream of the Confluence with Kaweah River Sacramento Sucker Juvenile Habitat Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**



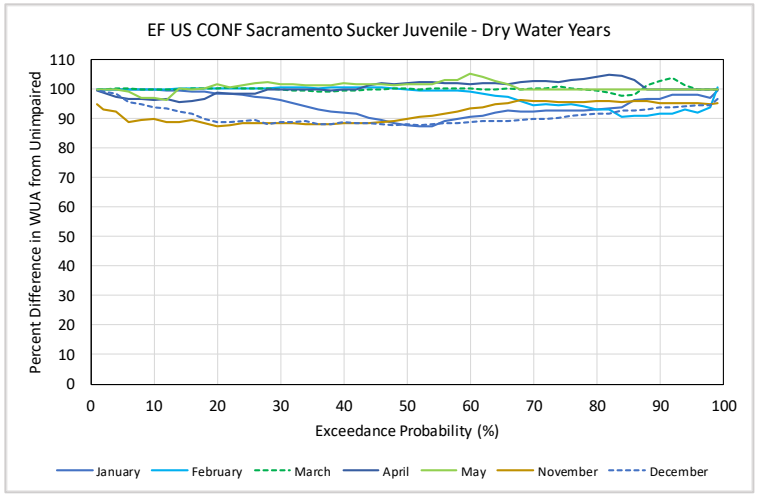
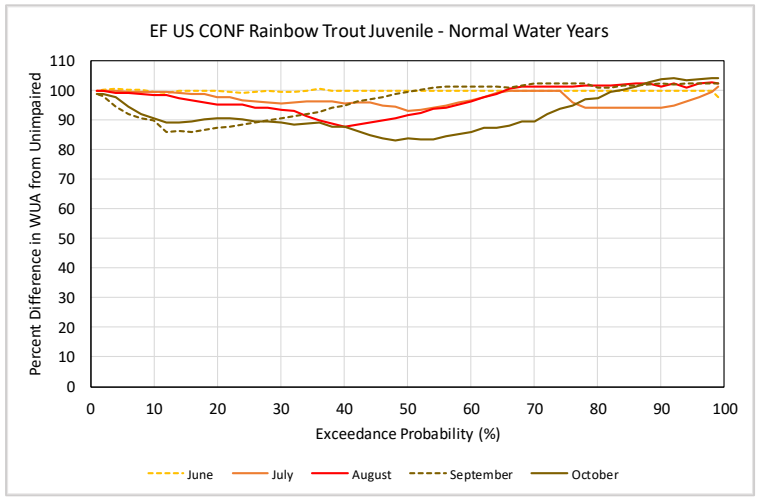
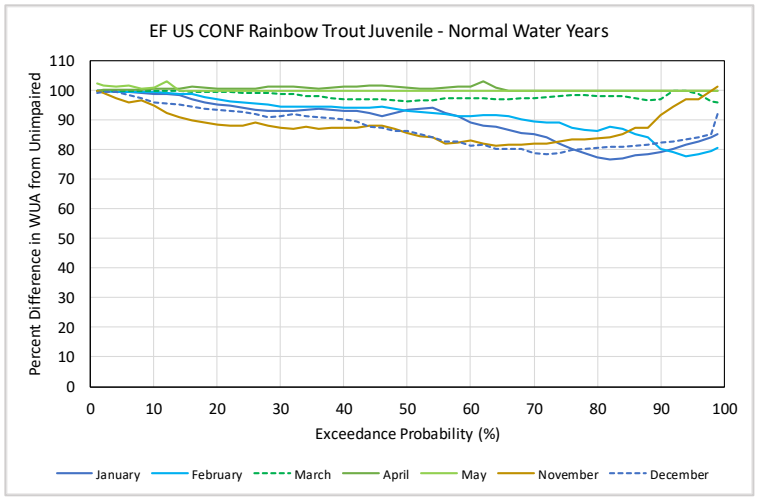
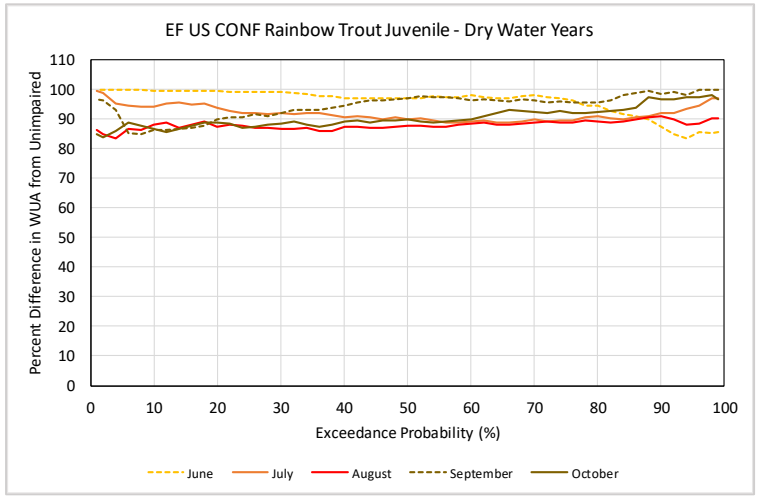



**Figure B8.4-25. East Fork Kaweah River Upstream of the Confluence with Kaweah River Rainbow Adult Habitat Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**

**Figure B8.4-26. East Fork Kaweah River Upstream of the Confluence with Kaweah River Rainbow Adult Juvenile Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**



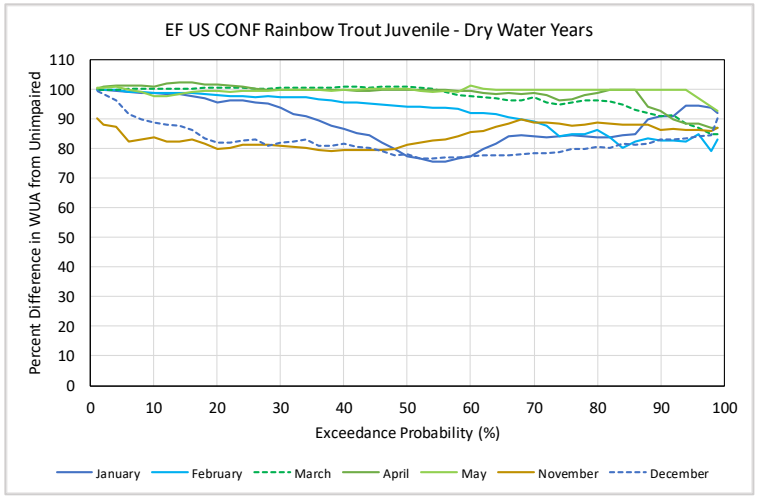
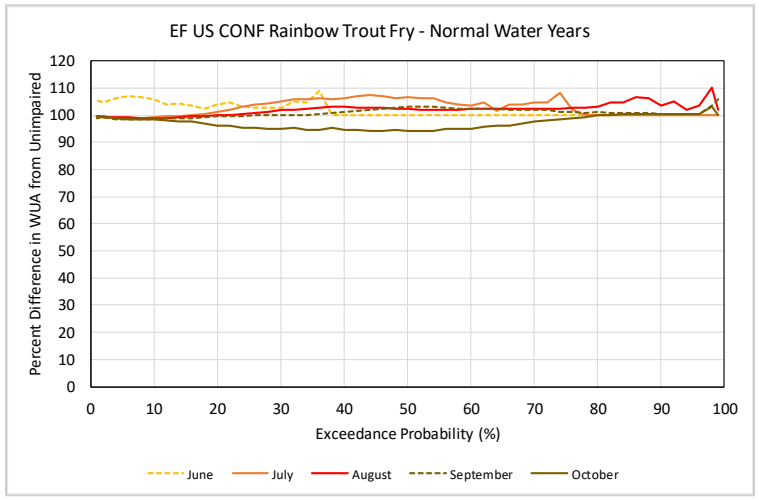
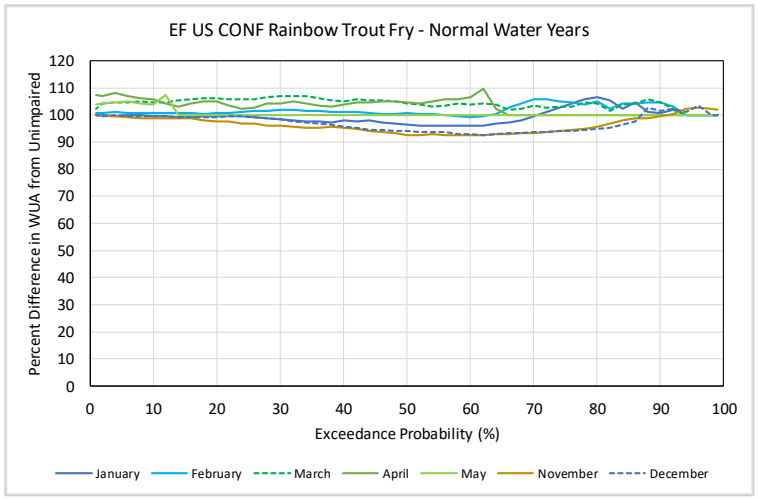
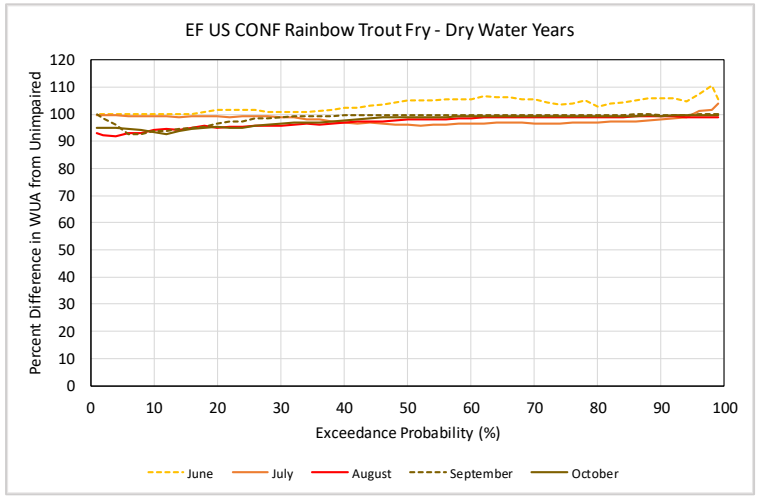



**Figure B8.4-27. East Fork Kaweah River Upstream of the Confluence with Kaweah River Rainbow Adult Fry Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) (warm water temperature months, left, cool water temperature months, right) using Proposed Action Minimum Instream Flows**



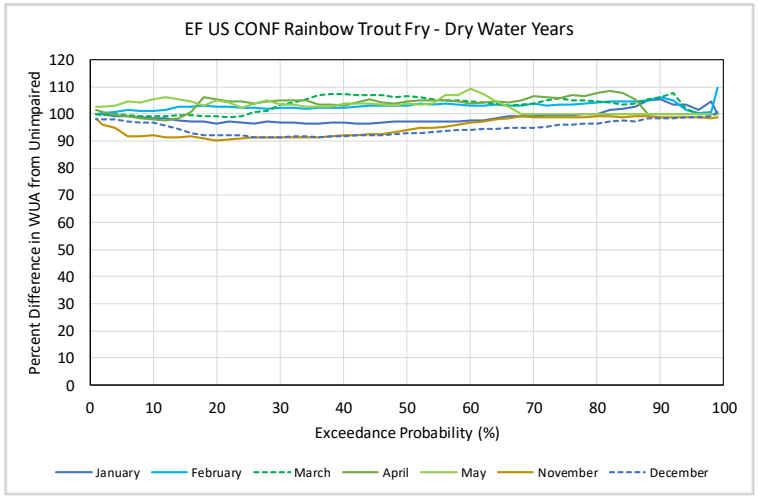
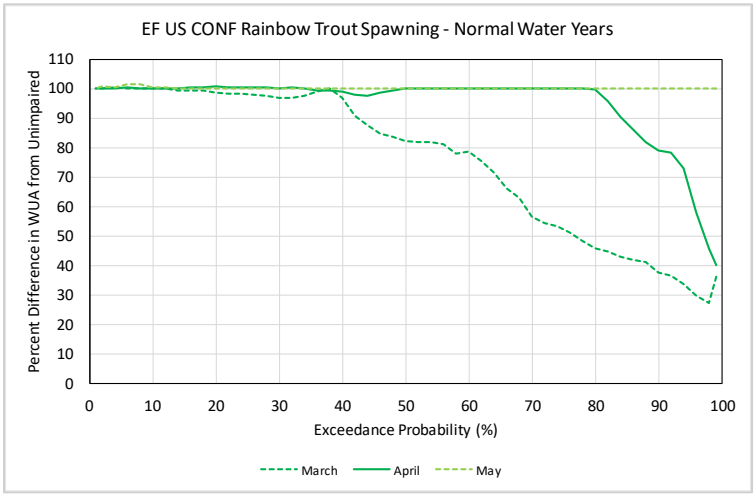
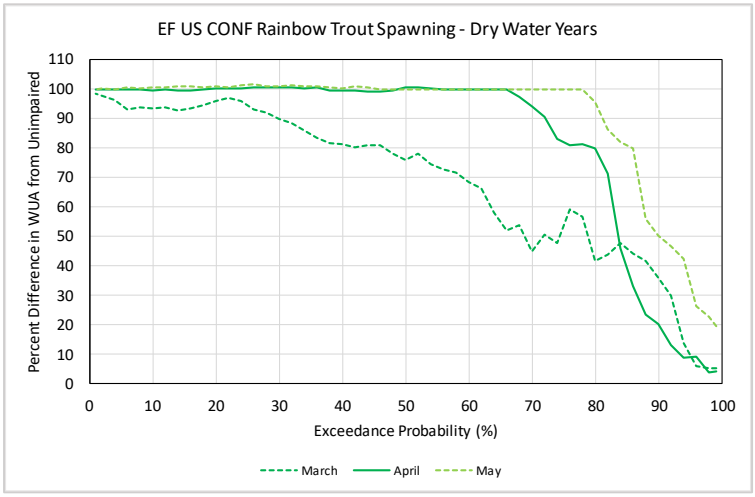



**Figure B8.4-28. East Fork Kaweah River Upstream of the Confluence with Kaweah River Rainbow Adult Spawning Percent of Unimpaired Habitat Exceedance Plots (1994-2018) for Normal (top) and Dry Water Year Types (bottom) using Proposed Action Minimum Instream Flows**



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## LIST OF ACRONYMS

| | |
|---|---|
| AMMP | Avian Mortality and Monitoring Plan |
| APLIC | Avian Power Line Interaction Committee |
| BCC | Bird of Conservation Concern |
| BLM | Bureau of Land Management |
| BLMS | Bureau of Land Management Sensitive |
| CDFW | California Department of Fish and Wildlife |
| CESA | California Endangered Species Act |
| CFP | California Fully Protected |
| CRPR | California Rare Plant Rank |
| ESA | Federal Endangered Species Act |
| ETP | Environmental Training Program |
| FERC or Commission | Federal Energy Regulatory Commission |
| FPT | Federal Proposed Threatened |
| ft/hr | foot/feet per hour |
| MIF | minimum instream flow |
| NNIP | Non-Native Invasive Plant |
| PCA | Pest Control Advisor |
| Project | Kaweah Project |
| PUP | Pesticide Use Permit |
| SCE | Southern California Edison Company |
| SMECP | Sediment Management and Erosion Control Plan |
| SPPMP | Special-Status Plant Protection and Management Plan |
| SSC | State Species of Concern |
| ST | State Threatened |
| TSR | Technical Study Report |
| USFWS | U.S. Fish and Wildlife Service |
| VIPMP | Vegetation and Integrated Pest Management Plan |
| WL | Watch List |
| WMMP | Wildlife Mortality Monitoring Plan |

## 8.5 BOTANICAL AND WILDLIFE RESOURCES ENVIRONMENTAL EFFECTS

This section describes the potential effects to botanical and wildlife resources (including rare, threatened, and endangered terrestrial species) under the Proposed Action for Southern California Edison Company's (SCE) Kaweah Project (Project). Section 3.0 – No-Action Alternative provides a description of current routine operation and maintenance activities and Section 4.0 – Proposed Action identifies changes from the No-Action Alternative.

Potential effects to botanical and wildlife resources have been identified based on continued operation and maintenance of the Project, including modified ramping rates and increased minimum instream flows (MIF). Specifically, effects on botanical and wildlife resources include potential loss or degradation of habitat, loss of individuals, and/or disturbance during critical periods.

Effects on botanical and wildlife resources are evaluated in this analysis based on the resources present in the study area and activities to be implemented under the Proposed Action. Section 8.5.1 provides an analysis of potential effects of the Proposed Action to special-status plant species. Section 8.5.2 provides an analysis of potential effects of the Proposed Action to special-status wildlife species and game species, grouped taxonomically. Measures incorporated into the Proposed Action would protect, maintain, and/or enhance special-status botanical and wildlife resources as well as common wildlife species.

Effects to botanical and wildlife resources are evaluated as follows:

### Potential Effects to Special-Status Plant Species

- Potential loss of upland special-status plants or degradation of habitat from:
    - Flowline maintenance.
    - Vegetation management.
    - Road and trail maintenance.
    - Vegetation clearance associated with transmission, power, and communication line maintenance.
- Potential effects to riparian special-status plants or their habitat resulting from:
    - Changes in Project operations (MIF releases and ramping rates).
    - Vegetation management.
    - Vegetation clearance associated with transmission, power, and communication line maintenance.

## Potential Effects to Special-Status Wildlife Species

- Potential effects to special-status raptors and other birds:
  - Effects to aquatic-foraging habitat for osprey resulting from:
    - Changes in Project operations (MIF releases and ramping rates).
    - Sediment management.
    - Vegetation management (herbicide use).
  - Effects to golden eagles or other raptors in upland foraging habitats.
  - Effects to riparian songbirds or their habitat resulting from:
    - Changes in Project operations (MIF releases and ramping rates).
    - Vegetation management.
    - Transmission, power, and communication line maintenance.
  - Electrocution of raptors or other birds on Project transmission lines or power lines.
  - Secondary poisoning of scavengers resulting from pesticide use.
- Potential effects to special-status bats:
  - Potential disturbance of bat roosts from maintenance activities within Project facilities.
  - Effects to aquatic-foraging habitat resulting from:
    - Changes in Project operations (MIF releases and ramping rates).
    - Sediment management.
    - Vegetation management (herbicide use).
- Potential effects to special-status mammals and game mammals:
  - Secondary poisoning of scavengers resulting from ongoing pesticide use.
  - Drowning of mammals in Project flowlines.

Potential effects to special-status aquatic species are discussed in Section 8.4 – Fish and Aquatic Resources. Potential effects to riparian resources are identified in Section 8.8 – Riparian Resources.

A discussion of the potential effects to botanical and wildlife resources that could occur as a result of implementation of the Proposed Action, considering new environmental measures; management and monitoring plans; and programs is provided below. Unavoidable adverse effects are also discussed at the end of this section.

### 8.5.1 Effects to Special-Status Plant Species

The following sections describe potential Project effects on upland and riparian special-status plant species. The study area for special-status plants is defined as the Federal Energy Regulatory Commission (FERC or Commission) Project boundary where operations and/or maintenance activities are conducted, plus a protective buffer. Refer to Table 7.6-2 for a list of plant species known to occur or potentially occurring in the study area, and their status and habitat requirements.

No plants or mosses listed under the federal Endangered Species Act (ESA) or California Statue ESA (CESA) have been identified in the study area.

#### 8.5.1.1 Effects to Upland Plant Species Resulting from Project Maintenance

One upland plant species considered sensitive by the Bureau of Land Management (BLM), Munz's iris (*Iris munzii* [BLMS, California Rare Plant Rank (CRPR) 1B.3]), was documented during TERR 1 special-status plant surveys (TERR 1 – Botanical Resources Technical Study Report [TSR] [TERR 1 – TSR]) (SCE 2019a). Provided below is a description of potential effects on Munz's iris, as well as other upland species, from implementation of Project maintenance activities under the Proposed Action.

**Munz's Iris**

Populations of Munz's iris were documented at the following locations:

- Twenty-eight populations along the Kaweah No. 1 Flowline;
- One population near the Kaweah No. 1 Flowline Access Road – Upper Pine; and
- One population along the Kaweah No. 1 Flowline Access Road – Slick Rock.

Under the Proposed Action, SCE would continue to implement several Project maintenance activities that may potentially affect Munz's iris individuals:

- Flowline maintenance – repair of wooden support structures, if required along the Kaweah No. 1 Flowline on land known to support the species, could affect individual Munz' iris as a result of ground disturbance.
- Vegetation management – trimming of vegetation by hand or with equipment along the Kaweah No. 1 Flowline, the Kaweah No. 1 Flow Line Access Road – Upper Pine, or the Kaweah No. 1 Flow Line Access Road – Slick Rock, as well as limited application of herbicides, could result in direct loss of Munz's iris individuals or degradation of habitat.

- Road maintenance – maintenance or repair of the Kaweah No. 1 Flow Line Access Road – Upper Pine or the Kaweah No. 1 Flow Line Access Road – Slick Rock could result in loss of Munz's iris individuals along the shoulder of the roads.

Under the Proposed Action, SCE would implement the following new measure described in Appendix 4-A, Section 4.5.3 – Special-Status Plant Protection and Monitoring Plan (SPPMP) to minimize the potential for effects to known populations:

- SCE will observe a minimum 5-foot protective buffer around known populations of Munz's iris.

Munz's iris is a perennial plant with rhizomes, or modified underground stems, which grow horizontally and retain the ability to allow new shoots to grow upwards. New rhizomes are developed immediately before and after flowering which occurs in April; therefore, the sensitive period for this plant is March through May. If vegetation management or other maintenance activities within 5 feet of these populations is necessary for public health and safety, the work will be implemented June through February, outside the plant's sensitive period.

The following measures described in Appendix 4-A, Section 4.5.2 – Vegetation and Integrated Pest Management Plan (VIPMP) would further minimize the potential for effects to these populations:

- On BLM-owned lands, herbicides will be applied in accordance with a BLM-approved Pesticide Use Permit (PUP). On SCE-owned lands, herbicides will be applied in accordance with a Tulare County-approved PUP.
    - Each PUP will define the pesticide that can be used, species to be treated, treatment methods, treatment sites, and rates of application.

Finally, use of vehicles and foot traffic associated with maintenance activities could degrade habitat for Munz' iris through the introduction or spread of non-native invasive plants (NNIP). Under the Proposed Action, the Licensee would implement the following new measure from the VIPMP to reduce the spread or introduction of NNIPs:

- Licensee will wash heavy equipment previously used on non-paved surfaces, outside of the watershed, with power or high-pressure washers to remove soil, seeds, vegetation, or other seed-bearing material before using on Project operation and maintenance activities.

Finally, the SPPMP requires implementation of protocol-level botanical surveys in Year 2 following license issuance and every 10 years thereafter. The results of the surveys, including the location and size of known populations of Munz's iris, and any proposed avoidance and protection measures to protect the populations, would be provided to U.S. Fish and Wildlife Service (USFWS), BLM and California Department of Fish and Wildlife (CDFW) for review. Upon agency approval, these measures would be implemented as part of ongoing Project maintenance.

With implementation of measures described in the VIPMP and SPPMP, effects to Munz's iris under the Proposed Action would be negligible.

### Other Upland Special-Status Plants

Under the Proposed Action, SCE would continue to implement flowline maintenance, vegetation management; and road and trail maintenance as described under the No-Action Alternative. In addition, as memorialized in Appendix 4-A, Section 4.5.6 – Transmission, Power, and Communication Lines Maintenance Measures, under the Proposed Action SCE would continue to implement vegetation clearance within 15 feet on either side of transmission, power, and communication lines. Implementation of these Project maintenance activities could potentially affect newly identified upland special-status plant individuals or populations identified over the term of the new license.

As described above, the SPPMP would be implemented as part of the Proposed Action. This plan requires the following measures to minimize the potential for effects to new upland special-status plant populations identified over the term of the license:

- Protocol-level botanical surveys would be required in Year 2 following license issuance and every 10 years thereafter.

- A minimum 5-foot protective buffer will be established around any special-status plant populations identified during these surveys. No Project maintenance activities that may potentially affect the plants will be implemented within the protective buffer (e.g., vegetation management, road and trail maintenance, and vegetation clearance associated with transmission, power, and communication line maintenance).

- If Project maintenance activities are necessary within the buffer to protect public health and safety, alternate measures will be developed in consultation with the appropriate resource agencies, considering the species, location, and nature of work to be implemented.

In addition, under the Proposed Action, the VIPMP would minimize the potential for degradation of habitat for special-status plants through implementation of a new measure to reduce the spread or introduction of NNIPs:

- Licensee will wash heavy equipment previously used on non-paved surfaces, outside of the watershed, with power or high-pressure washers to remove soil, seeds, vegetation, or other seed-bearing material before using on Project operation and maintenance activities.

With implementation of new measures described in the VIPMP and SPPMP, effects to other upland special-status plants identified during the term of the license would be negligible.

#### 8.5.1.2 Effects to Special-Status Riparian Plant or Moss Species Resulting from Project Operations and Maintenance

No special-status riparian plants or mosses were identified in the study area during botanical studies conducted for the TERR 1 – TSR, or in riparian sampling areas along bypass reaches (refer to Section 8.8 – Riparian Resources). Three special-status riparian plant species may potentially occur in the bypass reaches—watershield (*Brasenia schreberi* [CRPR 2B.3]), American manna grass (*Glyceria glandis* [CRPR 2B.3]), and Holzinger's orthotrichum moss (*Orthotrichum holzingeri* [CRPR 1B.3]). Additionally, special-status riparian plants or mosses may be identified during special-status plant inventory surveys that would be conducted over the term of the new license. Potential effects to special-status plants and mosses resulting from changes in Project operations or from implementation of Project maintenance activities are described below.

**Project Operations**

The Proposed Action includes modifications to ramping rates and to MIF releases that could potentially affect riparian resources (refer to Section 8.8 – Riparian Resources), including special-status riparian plants and mosses.

Under the No-Action Alternative, the Licensee operates flows below the Kaweah No. 1 and No. 2 diversion dams and Kaweah No. 1 and No. 2 powerhouses such that they are not altered at a rate greater than 30% of the existing streamflow per hour. In the bypass reaches, this results in average stage changes as shown in Section 7.4, Figures 7.4-2, 7.4-3, 7.4-4, and 7.4-5.

As indicated, under the current FERC license the up ramping rates are on the order of <0.1 to <0.3 foot/hour. The down ramping rates are approximately <0.1 to 0.3 foot/hour in the range of flows that the Project can operate (24 cfs at Kaweah No. 1 Diversion and 87 cfs at Kaweah No. 2 Diversion).

Under the Proposed Action, ramping rates will be modified as described in Appendix 4-A, Section 4.1.1 – Instream Flow Measures. Down ramping will be implemented consistent with current operations, but up ramping will be modified to provide for flexibility in operation of Project powerhouses. Under the Proposed Action, the modified up-ramping rate in the Kaweah River will range from 0.2 to 1.0 foot/hour and from approximately 0.1 to 1.0 foot/hour on the East Fork Kaweah River, depending on flow.

Under the Proposed Action, MIF releases would be increased in select months and water years as compared to the No-Action Alternative, which would enhance habitat for aquatic species and better simulate a more natural hydrograph.

Modified up-ramping rates under the Proposed Action would maintain riparian resources; and increased MIFs would maintain/enhance riparian resources. In addition, the Proposed Action would maintain channel conditions and riparian communities along and within the channel by maintaining the frequency of high magnitude events. The Proposed Action would also maintain conditions suitable for riparian recruitment by maintaining the same magnitude, frequency, timing, and recession rates of spring recruitment flows as

under the No-Action Alternative (SCE 2019a and 2019b). Overall, operations under the Proposed Action would maintain/enhance riparian resources. Therefore, proposed changes in Project operations would indirectly benefit special-status riparian plants and mosses identified over the term of the new license by maintaining/enhancing riparian habitat.

**Project Maintenance**

Under the Proposed Action, SCE would continue to implement vegetation management as memorialized in the VIPMP. In addition, SCE would continue to conduct vegetation clearing within 15 feet on either side of transmission, power, and communication lines. Vegetation management/vegetation clearance would be conducted at locations along linear Project facilities (i.e., roads, trails, and transmission, power, and communication lines) that intersect the Kaweah River or other drainages and ponds at several locations. Removal of vegetation as part of the VIPMP and the Transmission, Power, and Communication Line Maintenance Measure could therefore potentially affect any new special-status riparian plants or mosses that may be identified over the term of the new license.

As described above, the SPPMP would be implemented as part of the Proposed Action. This plan requires the following measures that would minimize the potential for effects to any new special-status riparian plant or moss populations identified over the term of the license:

- Protocol-level botanical surveys would be required in Year 2 following license issuance and every 10 years thereafter.

- A minimum 5-foot protective buffer will be established around any special-status plant or moss populations identified during these surveys. No Project maintenance activities that may potentially affect the plants will be implemented within the protective buffer (e.g., vegetation management, road and trail maintenance, and vegetation clearance associated with transmission, power, and communication line maintenance).

- If Project maintenance activities are necessary within the buffer to protect public health and safety, alternate measures will be developed in consultation with the appropriate resource agencies, considering the species, location, and nature of work to be implemented.

Measures included in the VIPMP would provide additional protection to riparian special-status plant and moss populations:

- Riparian vegetation would not be removed. If removal of riparian vegetation is required to protect worker/public safety and Project facilities, SCE will consult with appropriate resource agencies and obtain approvals prior to removal.

- On BLM-owned lands, herbicides will be applied in accordance with a BLM-approved PUP. On SCE-owned lands, herbicides will be applied in accordance with a Tulare County-approved PUP.
    - Each PUP will define the herbicide that can be used, species to be treated, treatment methods, treatments sites, and rates of application.
- To minimize the risk of herbicides inadvertently entering waters, no herbicides will be applied within 50 feet of streams or drainages.
- Herbicide applications shall not occur when weather parameters exceed label requirements, during precipitation, or when there is a forecast of greater than a 50% chance of precipitation in the next 48 hours.
- Herbicide use will be limited to days when measured wind conditions are less than 5 mph and shall be applied in a downwind direction from adjacent trees or shrubs.

Finally, under the Proposed Action, the VIPMP would minimize the potential for degradation of habitat for riparian special-status plants through implementation of a new measure to reduce the spread or introduction of to reduce the spread or introduction of NNIPs:

- Licensee will wash heavy equipment previously used on non-paved surfaces, outside of the watershed, with power or high-pressure washers to remove soil, seeds, vegetation, or other seed-bearing material before using on Project operation and maintenance activities

With implementation of new measures described in the VIPMP and SPPMP, effects to riparian special-status plants identified during the term of the license would be negligible.

#### 8.5.1.3 Additional Measures for the Protection of Special-Status Plants

Under the No-Action Alternative, SCE implements the Environmental Training Program (ETP) to educate Project personnel regarding special-status species potentially present in the study area, as well as measures required to avoid or minimize effects to these species and their habitats. As memorialized in Appendix 4-A, Section 4.6.1, SCE would continue to implement the ETP as part of the Proposed Action. The Licensee would review and update the ETP annually, prior March 1 each year, to account for any changes in resources status. Continued implementation of the ETP would benefit special-status plants by ensuring awareness, and thus improving the effectiveness, of measures to avoid or minimize effects to species as described in the VIPMP (Appendix 4-A, Section 4.5.2); and the SPPMP (Appendix 4-A, Section 4.5.3).

#### 8.5.1.4 Conclusion – Special-Status Plants

As described above, the Proposed Action would have a negligible effect on special-status plants with implementation of measures, management plans and ETPs described in Appendix 4-A. A summary of measures and programs that would protect special-status plants is provided below.

- Changes in Project operations (ramping rates and increased MIFs).
- Measures included in the SPPMP, including:
  - Conducting protocol-level botanical surveys in Year 2 following license issuance and every 10 years thereafter.
  - Implementation of protective buffers around known populations, or new populations identified over the term of the new license.
- Measures included in the VIPMP, including:
  - Restrictions on the timing, location, and method of herbicide applications.
  - Measures to reduce the introduction and spread of NNIPs.
- Continued training of Project personnel through implementation of the ETP.

### 8.5.2 Effects to Terrestrial Wildlife Species

The following section provides an analysis of potential effects of the Proposed Action on special-status wildlife and game species, grouped to include taxonomically similar species: birds/raptors, bats, and mammals (including game mammals). The study area for special-status wildlife (excluding bats) includes the FERC Project boundary where operations and/or maintenance activities are conducted, plus a protective buffer. Refer to Table 7.5-2 for the survey area by facility type. The study area for special-status bats includes facilities listed on Table 7.5-6.

Refer to Table 7.5-7 and 7.5-8 for a list of wildlife species known to occur or potentially occurring in the study area, their status, and habitat requirements.

A description of the potential effects of the Proposed Action on special-status wildlife and game mammals resulting from Project operations and maintenance, as well as measures proposed to minimize the potential effects and/or benefit species, is provided below.

#### 8.5.2.1 Effects to Special-Status Raptors and Other Birds

No raptors or other birds listed under the ESA or CESA are known to occur in the study area.

As described in Section 7.5.3.2, two special-status raptors, osprey (*Pandion haliaetus* [Watch List (WL)]) and golden eagle (*Aquila chrysaetos* [BLMS, Bird of Conservation Concern (BCC), California Fully Protected (CFP), WL]) were observed in the study area. The study area does not provide suitable nesting habitat for these species. However, osprey may forage along riverine and lacustrine habitats; and golden eagles may forage in grasslands in the study area.

In addition, one non-raptorial special-status bird, yellow warbler (*Dendroica petechia* [BCC, State Species of Concern (SSC)]), was observed in the study area during surveys conducted for the TERR 2 – Wildlife Resources TSR (TERR 2 – TSR) (SCE 2019b). Suitable breeding habitat for this species occurs along the East Fork Kaweah River and Kaweah River in riparian habitats.

Because osprey, golden eagle, and yellow warbler are known to occur in the study area, the analysis is focused on these species. However, the measures described would also provide protection for other special-status bird species that may potentially be present in the study area over the term of the new license.

Potential effects to special-status birds resulting from implementation of the Proposed Action include:

- Degradation of aquatic-foraging habitat resulting from changes in Project operations, sediment management, or herbicide use;
- Alteration of grassland or other upland foraging habitats resulting from vegetation management or vegetation clearance associated with Project transmission, power, or communication line maintenance;
- Modification of riparian habitat resulting from changes in Project operations, vegetation management, and vegetation clearing associated with Project transmission, power, or communication line maintenance;
- Electrocution of raptors on Project transmission or power lines; and
- Secondary poisoning of raptors resulting from pesticide use.

Each of these potential effects are discussed below.

## Effects to Aquatic-Foraging Raptors or Other Birds

Osprey or other aquatic-foraging bird species such as bald eagle (*Haliaeetus leucocephalus* [Delisted under the ESA and CESA; BCC, CFP]) and black swift (*Cypseloides niger* [BCC, SSC]) could potentially forage in bypass reaches. Operations and maintenance activities implemented under the Proposed Action that could potentially degrade aquatic-foraging habitats by affecting water quantity or quality, with subsequent effects to aquatic prey species. Each of these potential effects are discussed below.

*PROJECT OPERATIONS*

The Proposed Action includes modifications to ramping rates and to MIF releases. These changes in hydrology could potentially affect the distribution and abundance of aquatic prey species, indirectly affecting osprey or other aquatic-foraging birds.

As described previously, under the Proposed Action, the Licensee would implement down-ramping consistent with current operations, and would modify up-ramping rates to provide for improved flexibility in operation of Project powerhouses. Under the Proposed Action, MIF releases would be increased in select months and water years as compared to the No-Action Alternative, which would enhance habitat for aquatic species and better simulate a more natural hydrograph.

Modified up-ramping rates under the Proposed Action would maintain the distribution or abundance of fish or other aquatic species; and increased MIFs would maintain/enhance aquatic resources (refer to Section 8.4). Maintenance/enhancement of aquatic macroinvertebrate and fish populations in bypass reaches would, in turn maintain/enhance habitat for aquatic-foraging birds and their prey base.

Therefore, changes in operations would enhance aquatic-foraging habitat for osprey and other aquatic-foraging birds.

*PROJECT MAINTENANCE*

Under the Proposed Action, the Licensee would continue to remove sediment deposited in Project flowlines and forebays. These activities are memorialized in Appendix 4-A, Section 4.1.3 – Sediment Management and Erosion Control Plan (SMECP). The SMECP establishes methods for removal of sediments that protects water quality and downstream aquatic resources. These measures include, but are not limited to, routine opening of low-level outlets to minimize accumulations of sand and fine sediments; removal of rock debris to prevent build-up of sediment and facility damage; and release of sediments during high-flow events. The SMECP also includes protocols to reduce the potential for an failure of the Kaweah No. 1 and No. 2 flowlines, and measures to be implemented in the event of a failure. With implementation of the SMECP, any impacts to water quality associated with sediment management would be negligible.

Under the Proposed Action, SCE would continue to use herbicides as part of vegetation management and vegetation clearance. The following measures included in the VIPMP would minimize the potential for contamination of aquatic habitats resulting from use of herbicides:

- On BLM-owned lands, herbicides will be applied in accordance with a BLM-approved PUP. On SCE-owned lands, herbicides will be applied in accordance with a Tulare County-approved PUP.
    - Each PUP will define the herbicide that can be used, species to be treated, treatment methods, treatments sites, and rates of application.
- To minimize the risk of herbicides inadvertently entering waters, no herbicides will be applied within 50 feet of streams or drainages.
- Herbicide applications shall not occur when weather parameters exceed label requirements, during precipitation, or when there is a forecast of greater than a 50% chance of precipitation in the next 48 hours.
- Herbicide use will be limited to days when measured wind conditions are less than 5 mph and shall be applied in a downwind direction from adjacent trees or shrubs.

With implementation of measures described in the SMECP and the VIPMP, effects to aquatic-foraging habitat resulting from implementation of Project maintenance activities would be negligible.

### Effects to Raptors in Upland Foraging Habitats

Under the Proposed Action, SCE would continue to implement vegetation management as described under the No-Action Alternative. In addition, vegetation would continue to be cleared within 15 feet on either side of Project transmission, power, and communication line. Golden eagles or other special-status raptors including, but not limited to, California condor (*Gymnogyps californianus* [FE, SE, CFP]), northern harrier (*Circus cyaneus* [SSC)], white-tailed kite (*Elanus leucurus* [BLMS, CFP)], and short-eared owl (*Asio flammeus* [SSC]) could potentially forage in grasslands in the study area, and could potentially be affected by these activities. However, as described in Table 3.7 (Section 3.4.4, No-Action Alternative) vegetation is removed only within a specified work buffer immediately adjacent to developed Project facilities. These buffers represent the area required to protect and maintain Project facilities, and provide for human health and safety.

Considering that vegetation management and clearing is conducted only within small areas immediately adjacent to developed facilities and would not result in a change in habitat condition or quality, any effects to golden eagles or other upland foraging raptors would be negligible.

## Effects to Riparian-Nesting Birds

Yellow warblers and other riparian-nesting bird species such as willow flycatcher (*Empidonax traillii* [BCC]) and southwest willow flycatcher (*Empidonax traillii extimus* [FE, SE]) may be present in riparian habitats along the Kaweah River, East Fork Kaweah, or other drainages or water features in the study area. Operations and maintenance activities implemented under the Proposed Action could potentially result in the loss or degradation of riparian habitat for these species. Each of these potential effects are described below.

*PROJECT OPERATIONS*

As described above, the Proposed Action includes modifications to ramping rates and to MIF releases. Modified up-ramping rates under the Proposed Action would maintain riparian resources; and increased MIFs would maintain/enhance riparian resources. In addition, the Proposed Action would maintain channel conditions and riparian communities along and within the channel. . The Proposed Action would also maintain conditions suitable for riparian recruitment by maintaining the same magnitude, frequency, timing, and recession rates of spring recruitment flows as under the No-Action Alternative (SCE 2019a and 2019b). Overall, operations under the Proposed Action would enhance riparian resources. Therefore, implementation of changes in operations under the Proposed Action would benefit riparian-nesting songbirds by enhancing riparian resources.

*PROJECT MAINTENANCE*

Under the Proposed Action, SCE would continue to implement vegetation management activities described under the No-Action Alternative and memorialized in the VIPMP. In addition, as described in the Transmission, Power, and Communication Line Maintenance Measure, SCE would continue to conduct vegetation clearing within 15 feet on either side of transmission, power, and communication lines. Removal of vegetation as part of the VIPMP and the Transmission, Power, and Communication Line Maintenance Measure could potentially result in removal of riparian habitat for yellow warbler and riparian-nesting species. Specifically, vegetation management/vegetation clearance would be conducted along linear Project facilities (i.e., roads, trails, and transmission, power, and communication lines) that intersect the Kaweah River and other drainages and ponds at several locations. Implementation of vegetation management/clearance at these locations could potentially result in removal of riparian vegetation over the term of the license.

However, as described above, measures included in the VIPMP would protect riparian habitat; thereby protecting and maintaining nesting habitat for riparian-nesting birds:

- Riparian vegetation will not be removed. If removal of riparian vegetation is required to protect worker/public safety and Project facilities, SCE will consult with appropriate resource agencies and obtain approvals prior to removal.

- On BLM-owned lands, herbicides will be applied in accordance with a BLM-approved PUP. On SCE-owned lands, herbicides will be applied in accordance with a Tulare County-approved PUP.
    - Each PUP will define the herbicide that can be used, species to be treated, treatment methods, treatments sites, and rates of application.
- To minimize the risk of herbicides inadvertently entering waters, no herbicides will be applied within 50 feet of streams or drainages.
- Herbicide applications shall not occur when weather parameters exceed label requirements, during precipitation, or when there is a forecast of greater than a 50% chance of precipitation in the next 48 hours.
- Herbicide use will be limited to days when measured wind conditions are less than 5 mph and shall be applied in a downwind direction from adjacent trees or shrubs.

Finally, under the Proposed Action, the VIPMP would minimize the potential for degradation of habitat for riparian habitat through implementation of a new measure to reduce the spread or introduction of to reduce the spread or introduction of NNIPs:

- Licensee will wash heavy equipment previously used on non-paved surfaces, outside of the watershed, with power or high-pressure washers to remove soil, seeds, vegetation, or other seed-bearing material before using on Project operation and maintenance activities

With implementation of new measures described in the VIPMP, effects to riparian nesting birds would be negligible.

Overall, the Proposed Action would benefit riparian nesting birds by increasing MIFs; thus enhancing riparian habitats.

### Electrocution of Birds on Project Transmission or Power Lines

Under existing conditions (No-Action Alternative), several Project transmission line and power line poles have design elements that may pose a potential risk for raptor electrocution. Refer to the Transmission Line Evaluation in the TERR 2 – TSR (SCE 2019b).

Though some lines and poles may pose a potential risk, based on a review of Avian Mortality Reports submitted to FERC as required by License Article 412, there have been no documented avian mortalities on Project transmission and power lines during monitoring since 1993 (TERR 2 – TSR) (SCE 2019b). However, there is still some potential for raptors or other birds to be electrocuted on Project transmission and power lines or poles that do not have raptor-safe configurations.

Under the Proposed Action, SCE would continue to monitor avian mortalities along Project transmission and power lines. As memorialized in Appendix 4-A, Section 4.5.4 – Avian Mortality Monitoring Plan (AMMP), the following measures would be implemented to monitoring avian mortality:

- The Licensee will monitor for avian mortality on Project transmission lines, transmission tap lines, and power lines in conjunction with routine operation and maintenance of the Project.
    - If an avian mortality is identified, the following data will be obtained and provided to SCE's Avian Protection Specialist:
        - Location and date
        - Avian species affected
        - Photographs of the pole and adjacent poles, and associated structure numbers
    - SCE's Avian Protection Specialist will provide notification within 5 days of the mortality discovery to the following agencies:
        - CDFW
        - USFWS, if the species is federally listed
        - BLM, if the species is a BLM sensitive species and is found on BLM lands

Results of monitoring will be submitted to USFWS, BLM, and CDFW annually for review and comment.

Under the No-Action Alternative, existing power poles and powerlines are replaced as necessary (i.e., when they are damaged or have exceeded their usable lifespan) using traditional design configurations (TERR 2 – TSR) (SCE 2019). Under the Proposed Action, SCE would implement measures described in the Transmission, Power and Communication Line Maintenance Measure (Appendix 4-A, Section 4.5.6). These measures include:

- Evaluation of any transmission line, transmission tap line, or power line involved in the electrocution of a protected raptor to determine the most feasible approach to eliminate the specified mortality risk through retrofitting the structure with raptor-safe equipment or replacing the structure with a raptor-safe pole configuration. The evaluation will be completed in consultation with the appropriate resource agencies (e.g., CDFW, USFWS, and BLM) and agreed upon measures will be implemented by the Licensee.

- Use of raptor-safe powerline design configurations described in *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (Avian Powerline Interaction Committee [APLIC] 2006) when replacing existing towers, poles, phase conductors, and associated equipment. Table TPCLMP-1 in Appendix 4-A provides a list of Project transmission lines, transmission tap lines, and power lines with one or more design elements that pose a risk for avian electrocution.

Considering that there are no documented avian mortalities, and with implementation of measures included in the AMMP and the Transmission, Power and Communication Line Maintenance Measure, effects to special-status raptors or other birds resulting from electrocution on Project transmission or power lines would be negligible.

**Secondary Poisoning of Raptors**

Under the Proposed Action, SCE would continue to administer rodenticides to control pests as described under No-Action Alternative. Raptors could potentially be poisoned through consumption of rats or other prey contaminated by rodenticides.

As memorialized in the VIPMP (Appendix 4-A, Section 4.5.2), use of rodenticides would be limited to the interior of or within the perimeter fencing of powerhouses, switchyards, and at the Kaweah No. 1 Powerhouse Campus facilities. Interiors of facilities are inaccessible to raptors; and switchyards and areas within the perimeter fences around these facilities provide limited, if any, foraging habitat. The VIPMP also requires rodenticide applications to be implemented by a licensed pest control advisor (PCA). This ensures proper placement and dosage of rodenticides to minimize the potential for secondary poisoning.

Within implementation of pesticides as described in the VIPMP, any potential for effects to special-status raptors from secondary poisoning would be negligible.

### 8.5.2.2 Effects to Special-Status Bats

No bat species listed under the ESA or CESA are known to occur in the study area.

Several other special-status bat species were observed in the study area, including pallid bat (*Antrozous pallidus* [BLMS, SSC]), Townsend's big-eared bat (*Corynorhinus townsendii* [BLMS, SSC]), spotted bat (*Euderma maculatum* [BLMS, SSC]), western red bat (*Lasiurus blossevillii* [SSC]), western small-footed myotis (*Myotis ciliolabrum* [BLMS]), long-eared myotis (*Myotis evotis* [BLMS]), fringed myotis (*Myotis thysanodes* [BLMS]), Yuma myotis (*Myotis yumanensis* [BLMS]), and western mastiff bat (*Eumops perotis californicus* [BLMS, SSC]). Of these, Yuma myotis were observed day-roosting inside the Kaweah No. 2 Powerhouse, and a night roost was observed on a maintenance building near the Kaweah No. 3 Powerhouse. Western small-footed myotis are suspected to day roost inside the Kaweah No. 2 Powerhouse and a day roost was observed inside a maintenance building on the Kaweah No. 1 Powerhouse campus. Refer to Table 7.5-8 for more detailed locations of each special-status bat species in relation to Project facilities.

Special-status bats could potentially be disturbed by ongoing maintenance within the Kaweah No. 2 Powerhouse, and the Kaweah No. 1 Powerhouse campus maintenance buildings where roosts are present. Changes in Project operations, sediment management, and herbicide use could also affect aquatic-foraging habitat. Each of these potential effects is described below.

### Disturbance of Special-Status Bat Roosts

Under the Proposed Action, SCE would continue to inspect powerhouses and appurtenances on a regular basis. Minor maintenance and repairs to powerhouses or powerhouse campus structures are made on an as-need basis. Maintenance repairs that affect structures near walls and ceilings (i.e., painting or power washing) could potentially disturb western small-footed myotis and Yuma myotis day or night roosts. To protect special-status bat roosts, SCE would implement new measures described in Appendix 4-A, Section 4.5.1, Special-Status Bat Protection Measures. These include:

- In locations with day roosts, maintenance activities at the roost site will be conducted after dusk.

- In locations with night roosts, maintenance activities at the roost site will be conducted in the daylight hours.

- If it is necessary to implement the maintenance during restricted time periods (identified above), the Licensee will inspect the site prior to conducting the work. If no bats are present and the roost areas are unoccupied, the maintenance activities will proceed as planned. If bats are present, a qualified biologist will temporarily exclude the bats (using passive exclusion methods) until the maintenance work has been completed. The Licensee will consult with BLM and CDFW and obtain approval of the proposed exclusion method.

Implementation of these measures would protect western small-footed myotis, Yuma myotis, and any other special-status bat roosts identified during the term of the license.

### Effects to Aquatic-Foraging Habitat for Special-Status Bats

*PROJECT OPERATIONS*

As described above, the Proposed Action includes modifications to ramping rates and to MIF releases. These changes could potentially affect the foraging habitat for special-status bats and the distribution and abundance of prey species.

Modified up-ramping rates under the Proposed Action would maintain/enhance the distribution or abundance of macroinvertebrate prey species; and increased MIFs would enhance aquatic resources (refer to Section 8.4). Maintenance/enhancement of aquatic macroinvertebrate populations in the bypass reaches would, in turn maintain/enhance habitat for aquatic-foraging bats and their prey base.

Therefore, changes in operations would benefit aquatic-foraging habitat for special-status bats.

*PROJECT MAINTENANCE*

Under the Proposed Action, the Licensee would continue to remove sediment deposited in Project flowlines and forebays. These activities are memorialized in Appendix 4-A, Section 4.1.3 – SMECP.

The SMECP establishes methods for removal of sediments that protects water quality and downstream aquatic resources. These measures include, but are not limited to, routine opening of low-level outlets to minimize accumulations of sand and fine sediments; removal of rock debris to prevent build-up of sediment and facility damage; and release of sediments during high-flow events. The SMECP also includes protocols to reduce the potential for an failure in the Kaweah No. 1 and No. 2 flowlines, and measures to be implemented in the event of a failure. With implementation of the SMECP, any impacts to water quality associated with sediment management would be negligible.

Under the Proposed Action, SCE would continue to use herbicides as part of vegetation management and vegetation clearance. The following measures included in the VIPMP would minimize the potential for contamination of aquatic habitats resulting from use of herbicides:

- On BLM-owned lands, herbicides will be applied in accordance with a BLM-approved PUP. On SCE-owned lands, herbicides will be applied in accordance with a Tulare County-approved PUP.
    - Each PUP will define the herbicide that can be used, species to be treated, treatment methods, treatments sites, and rates of application.
- To minimize the risk of herbicides inadvertently entering waters, no herbicides will be applied within 50 feet of streams or drainages.
- Herbicide applications shall not occur when weather parameters exceed label requirements, during precipitation, or when there is a forecast of greater than a 50% chance of precipitation in the next 48 hours.
- Herbicide use will be limited to days when measured wind conditions are less than 5 mph and shall be applied in a downwind direction from adjacent trees or shrubs.

With implementation of measures described in the SMECP and the VIPMP, effects to aquatic-foraging for special-status bats resulting from implementation of Project maintenance activities would be negligible.

#### 8.5.2.2 Effects to Special-Status Mammals and Game Mammals

The presence of one special-status mammal, ringtail (*Bassariscus astutus* [CFP]), was detected in 2018 during studies conducted in support of Project relicensing. Fisher *Pekania pennanti* [FPT, BLMS, State Threatened [ST], SSC]) and (American badger (*Taxidea taxus* [SSC]) may also potentially occur in the study area.

Game mammals known or potentially occurring the Kaweah study area include mule deer, desert cottontail (*Sylvilagus audubonii*), western gray squirrel (*Sciurus griseus*), gray fox (*Urocyon cinereoargenteus*), black bear (*Ursus americanus*), American mink (*Mustela vison*), , raccoon (*Procyon lotor*), bobcat (*Lynx rufus*), mule deer (*Odocoileus hemionus*), and wild pig (*Sus scrofa*).

Potential Project effects to special-status mammals and game mammals including secondary poisoning of scavengers from rodenticide application; and drowning in Project flowlines. Each of these potential effects is described below.

**Secondary Poisoning**

Under the Proposed Action, SCE would continue to administer rodenticides to control pests as described under No-Action Alternative. Special-status mammals such as ringtail or fisher, as well as other scavengers such as gray fox or raccoon, could potentially be poisoned through consumption of rodents that may have ingested rodenticides.

As memorialized in the VIPMP (Appendix 4-A, Section 4.5.2), use of rodenticides would be limited to the interior of or within the perimeter fencing of powerhouses, switchyards, and at the Kaweah No. 1 Powerhouse Campus facilities. Interiors of facilities are generally inaccessible to mammals; and switchyards and areas within the perimeter fences around these facilities provide limited, if any, foraging habitat. The VIPMP also rodenticide applications to be implemented by a licensed PCA. This ensures proper placement and dosage of rodenticides to minimize the potential for secondary poisoning.

Within implementation of pesticides as described in the VIPMP, any potential for effects to mammalian scavengers from secondary poisoning would be negligible.

**Drowning in Project Flowlines**

As described in Section 7.5.3.3, one of the two mule deer herds present in the study area, the Kaweah Herd, is migratory. This herd spends the majority of the year in higher-elevation areas in the Sequoia National Park and moves down to lower-elevation areas (including portions of the study area) during the winter. Project flowlines historically represented a potential barrier to movement for migratory mule deer and other wildlife. Drowning of mule deer and other wildlife in Project flowlines was identified by agencies as a resource issue during the previous relicensing (SCE 1989, FERC 1991). A total of 142 mule deer drowned in the Kaweah No. 2 and Kaweah No. 3 flowlines in the period from 1964 to 1989 (an average of 6 per year). Under the No-Action Alternative, SCE has complied with License Articles 408 and 409 of the current FERC license to minimize wildlife drowning in the Kaweah No. 2 and Kaweah No. 3 flowlines. The articles required

modification, relocation, and/or rebuilding of existing foot and wildlife bridges, constructing new wildlife bridges, and installation of hazers and flashers at existing escape ramps. These improvements were implemented between 1994 and 1996.

In compliance with License Article 410, SCE has monitored wildlife drownings since 1993. Since implementation of the measures in Articles 408 and 409, there has been a significant decline in wildlife mortality, particularly in the last 10 years of monitoring (between 1 and 6 mortalities in a given year). Refer to Figure 7.5-1 for the number of wildlife mortalities in Project flowlines since 1991.

Monitoring of wildlife bridges along the Kaweah No.2 and Kaweah No. 3 was conducted in the spring and fall of 2018 to evaluate whether mule deer and other species were successfully using the wildlife bridges. Refer to Table 7.5-10 for a list of all species and the number observed during flowline monitoring. Eight species were observed crossing wildlife bridges, including mule deer, bobcat, coyote, gray fox, black bear, striped skunk, western spotted skunk, and raccoon. No special-status wildlife species were observed during monitoring.

Under the Proposed Action, SCE would continue to implement measures to enhance movement of wildlife and to prevent and monitor wildlife drownings as described under the No-Action Alternative (Section 3.4). These measures, which are memorialized in Appendix 4-A, Section 4.5.5 – Wildlife Mortality Monitoring Plan (WMMP), include:

- Recording wildlife mortality during regular inspections of the Kaweah No. 2 and No. 3 flowlines and their associated forebays; and

- Documenting the condition of wildlife bridges, escape ramps, and escape fencing, hazers/flashers during routine operation and maintenance activities and implementing required maintenance activities, as needed.

Results of monitoring, inspection, and repair of facilities would be provided to USFWS and CDFW annually for review and comment.

Implementation of the WMMP would continue to facilitate the movement of mule deer and other game mammals while minimizing the potential for wildlife drownings, and would have a beneficial effect on special-status mammals and game mammals, including mule deer, over the term of the new license.

#### 8.5.2.3 Additional Measures for the Protection of Special-Status Wildlife

Under the No-Action Alternative, SCE implements the ETP to educate Project personnel regarding special-status species potentially present in the study area, as well as measures required to avoid or minimize effects to these species and their habitats. As memorialized in Appendix 4-A, Section 4.6.1, SCE would continue to implement the ETP as part of the Proposed Action. The Licensee will review and update the ETP annually, prior March 1 each year, to account for any changes in resources status. Continued implementation of the ETP would benefit special-status wildlife by ensuring awareness, and thus improving the effectiveness, of measures to avoid or minimize effects to species

described in the Special-Status Bat Protection Measures (Appendix 4-A, Section 4.5.1); the VIPMP (Appendix 4-A, Section 4.5.2); the AMMP (Appendix 4-A, Section 4.5.4); the WMMP (Appendix 4-A, Section 4.5.5); and the Transmission, Power, and Communication Line Measures (Appendix 4-A, Section 4.5.6).

#### 8.5.2.4 Conclusions – Special-Status Wildlife

This section provides an overall effect conclusion by species or group of species associated with implementation of the Proposed Action.

*SPECIAL-STATUS BIRDS*

The Proposed Action would have a negligible effect on special-status raptors and other special-status birds with implementation of measures, management plans and ETPs described in Appendix 4-A. A summary of measures and programs that would protect special-status birds is provided below.

- Changes in Project operations (ramping rates and increased MIFs).
- Measures included in the SMECP, including restrictions on the timing and method of sediment management.
- Measures included in the VIPMP, including restrictions on the timing, location, and methods for herbicide and pesticide applications.
- Measures included in the AMMP, including:
  - Requirements for ongoing monitoring and reporting of Project-related avian mortalities;
  - Identification of transmission or power poles involved in an avian mortality.
- Implementation of the Transmission, Power, and Communication Line Maintenance Measure, including evaluation and replacement of transmission or power poles involved in an avian mortality using raptor-safe design configurations.
- Continued training of Project personnel through implementation of the ETP.

*SPECIAL-STATUS BATS*

The Proposed Action would have a negligible effect on special-status bat with implementation of measures, management plans and ETPs described in Appendix 4-A. A summary of measures and programs that would protect special-status bats is provided below.

- Changes in Project operations (ramping rates and increased MIFs).
- Measures included in the SMECP, including restrictions on the timing and method of sediment management.
- Measures included in the Special-Status Bat Protection Measure, including:
    - Restrictions on the timing of maintenance of activities potentially affecting day and night roosts;

      Site inspections prior to conducting maintenance activities and determining if roosts are occupied. If roosts are occupied, SCE will consult with BLM and CDFW to obtain approval to temporarily exclude the bats until the maintenance work has been completed.
- Measures included in the VIPMP, including restrictions on the timing, location, and methods for herbicide applications.
- Continued training of Project personnel through implementation of the ETP.

*SPECIAL-STATUS MAMMALS*

The Proposed Action would have a negligible effect on special-status mammals and game mammals with implementation of measures, management plans and ETPs described in Appendix 4-A. A summary of measures and programs that would protect special-status mammals and game mammals is provided below.

- Measures included in the VIPMP, including restrictions on the timing, location, and methods for pesticide applications.
- Measures included in the WMMP, including continued monitoring of wildlife mortalities and inspection and maintenance of wildlife bridges, escape ramps, escape fencing, and hazers/flashers along Project flowlines.
- Continued training of Project personnel through implementation of the ETP.

### 8.5.3 Threatened and Endangered Species

This section provides information on species listed as endangered or threatened under the ESA, as well as species proposed for listing as endangered or threatened, or candidates for proposal (referred to in this section as "federally listed" species).

Table 7.5-7 provides a list of the 16 federally listed species under the jurisdiction of USFWS. Of these species, 13 were eliminated from analysis because the study area is outside the known geographic range of the species and/or does not contain suitable habitat for the species. The remaining three species (two birds and one mammal), are not known to occur in the study area but may potentially occur based on historical occurrences and presence of suitable habitat. A brief discussion of each species is provided below.

#### 8.5.3.1 California Condor

The California condor is listed as endangered under the ESA. There is one record for this species outside the study area, which documents a roosting area located approximately 4.5 miles to the southwest of the Kaweah No. 2 Powerhouse. This species is not known to breed, but may potentially forage, in the study area. Refer to Table 7.5-7 for details.

This species is found mostly below 9,000 feet in open rangelands in the mountain ranges surrounding the southern San Joaquin Valley. As shown in Table 7.5.1, there are approximately 985 acres of annual grasslands and 172 acres of barren lands within 1 mile of the study area that represent suitable foraging habitat for California condor.

There is no Critical Habitat for California condor in the study area; therefore, the Proposed Action would have no effect on Critical Habitat. The closest Critical Habitat is located west of the study area near Kaweah Lake.

Recovery for the species is described in *The Recovery Plan for the California Condor* (USFWS 1996). There are no current recovery actions applicable to the Proposed Action or the study area.

Refer to Section 8.5.2.1 and 8.5.2.3 for a discussion of potential direct and indirect effects to raptors resulting from implementation of the Proposed Action, as well as proposed measures to minimize the potential for effects. There are no interrelated actions or interdependent actions associated with the Proposed Action that would affect California condor. With incorporation of measures described in Section 8.5.2.1 and 8.5.2.3, any effects to California condor would be negligible.

### 8.5.3.2 Southwestern Willow Flycatcher

The southwestern willow flycatcher is listed as endangered under the ESA. The study area is located outside the breeding range for this species, but individuals may be present during the non-breeding season. Refer to Table 7.5-7 for details.

This species is found in wet meadow and montane riparian habitats at elevations ranging from 2,000 to 8,500 feet in elevation. It most often occurs in broad, open river valleys or large mountain meadows with lush growth of shrubby willows. As shown in Table 7.5.1, there are approximately 363 acres of montane riparian habitat and 103 acres of valley foothill riparian habitat within 1 mile of the study area. In the vicinity of the Kaweah Project, the distribution and abundance of riparian vegetation is limited by the narrow valley bottoms with limited floodplain development and alluvial deposits, steep side slopes, and prevalence of bedrock and coarse substrate along long sections of the river.

There is no Critical Habitat for southwestern willow flycatcher in the study area; therefore, the Proposed Action would have no effect on Critical Habitat. The closest Critical Habitat is located in Kern County.

Recovery for the species is described in *The Final Recovery Plan for the Southwest Willow Flycatcher* (USFWS 2002). The study area is not located within designated recovery units for the species, and there are no current recovery actions applicable to the Proposed Action or the study area.

Refer to Section 8.5.2.1 and 8.5.2.3 for a discussion of potential direct and indirect effects to riparian birds resulting from implementation of the Proposed Action, as well as proposed measures to minimize the potential for effects. There are no interrelated actions or interdependent actions associated with the Proposed Action that would affect southwestern willow flycatcher. With incorporation of measures described in Section 8.5.2.1 and 8.5.2.3, any effects to southwestern willow flycatcher would be negligible.

### 8.5.3.3 Fisher

As described above, one mammal, the fisher, that is proposed for listing as threatened under the ESA (West Coast Distinct Population Segment [DPS]) may potentially occur in suitable habitat in the study area. There are several records for this species within 5 miles of the study area. Refer to Table 7.5-7 for details.

This species is typically found in large areas of mature, dense conifer forest (e.g., red fir, lodgepole pine, ponderosa pine, mixed conifer, and Jeffery pine forests) with snags and greater than 50% canopy closure, from sea level to 8,000 feet above mean sea level (msl). Mature conifer forest habitat is very limited in the study area. As shown in Table 7.5.1, only 2 acres of conifer habitat (i.e., Sierran mixed conifer) habitat have been mapped within 1 mile of the FERC boundary. Given that the fisher is a shy and secretive animal, and considering the limited amount of habitat in the study area and proximity to human activity, this species is unlikely to den, but may forage in the study area.

Because this species is still currently only proposed for listing, there is no designated Critical Habitat for the species, and no recovery plan has been developed.

Refer to Section 8.5.2.2 and 8.5.2.3 for a discussion of potential direct and indirect effects to mammals resulting from implementation of the Proposed Action, as well as proposed measures to minimize the potential for effects. There are no interrelated actions or interdependent actions associated with the Proposed Action that would affect fisher. With incorporation of measures described in Section 8.5.2.2 and 8.5.2.3, any effects to fisher would be negligible.

### 8.5.4 Unavoidable Adverse Effects

There are no unavoidable adverse effects to botanical and wildlife resources under the Proposed Action.

### 8.5.5 Literature Cited

APLIC (Avian Power Line Interaction Committee). 2006. Suggested Practices for Avian Protection on Powerlines: The State of the Art in 2006. Edison Electric Institute, APLIC, and the California Energy Commission. Washington, D.C., and Sacramento, California.

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## LIST OF ACRONYMS

| | |
|---|---|
| BLM | Bureau of Land Management |
| CFR | Code of Federal Regulations |
| FERC or Commission | Federal Energy Regulatory Commission |
| Project | Kaweah Project |
| MW | Megawatt |
| SCE | Southern California Edison Company |

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## 8.6 GEOLOGY AND SOILS ENVIRONMENTAL EFFECTS

This section describes potential effects to geology and soils under the Proposed Action for Southern California Edison Company's (SCE) Kaweah Project (Project). Section 3.0 – No-Action Alternative provides a description of current routine operation and maintenance activities and Section 4.0 – Proposed Action identifies changes from the No-Action Alternative. Potential effects to geology and soils were identified based on continued operation and maintenance of the Project under the Proposed Action.

The following potential effects to geology and soils were evaluated:

- Potential effects from ongoing operation and maintenance activities that could result in erosion in natural drainage channels and hillslope instability, including:
  - Forebay spills[1];
  - Utilizing low-level outlets to drain forebays during Project outages and to conduct sediment management.
- Potential effects on channel topography as a result of sediment management activities at the Kaweah No. 1 and No. 2 intakes.
- Potential effects from erosion as a result of flowline failure.
- Potential effects to soil stability due to disturbance and erosion associated with road and trail maintenance.
- Potential soil contamination from implementation of vegetation and pest management activities (herbicide and pesticide use).

A description of potential effects on flows in the bypass reaches[2] under the Proposed Action is presented in Section 8.2 – Water Use and Hydrology. Potential effects on channel morphology and sediment processes are discussed in Section 8.7 – Geomorphology.

A discussion of the potential effects to geology and soils that could occur as a result of implementation of the Proposed Action, considering new environmental measures; management and monitoring plans; and programs is provided below. Unavoidable adverse effects are also discussed at the end of this section.

[1] Project forebays include the Kaweah No. 1 Forebay Tank, Kaweah No. 2 Forebay, and Kaweah No. 3 Forebay.

[2] A bypass reach is a segment of a river downstream of a diversion facility where Project operations result in the diversion of a portion of the water from that reach.

#### 8.6.1.1 Effects on Natural Channel and Hillslope Stability from Ongoing Project Operation and Maintenance Activities

Under the Proposed Action, SCE would continue to implement Project operation and maintenance activities as described under the No-Action Alternative. Ongoing operation and maintenance activities that have the potential to affect natural channel and hillslope stability include: (1) spills from Project forebays; and (2) utilizing low-level outlets to drain forebays during Project outages and sediment management. These activities could cause erosion to occur in natural drainage channels associated with these facilities and affect hillslope stability, as described below.

Under the Proposed Action, forebay spills and draining of flowlines and forebays during Project outages and sediment management would continue to be implemented, as described under the No-Action Alternative. Specifically, in the event of an unplanned powerhouse outage (i.e., unit trips), water in the flowlines continues to flow (drain) into the forebays until the diversion is turned out (closed). Water entering the forebays can either be: (1) passed through the generating units at the powerhouse (if operational); (2) released through the powerhouse bypass valve (if present); or (3) released from each forebay via Project spillways/spillway chutes that direct the overflow into natural drainage channels for conveyance to the Kaweah River (refer to Section 7.6 – Geology and Soils).

Under the Proposed Action, draining of the flowlines and forebays during planned Project outages and sediment management, which includes opening low-level outlets to release water and flush sand and fine sediment from the facilities and into natural drainage channels would continue to be implemented, as described under the No-Action Alternative.

Inherent channel and hillslope stability in the vicinity of the Kaweah Project is controlled by the geologic setting and process history. The Project facilities are situated on highly-resistant granitic rock. Unconsolidated sediments in the watershed are generally limited to surface soils, and recent alluvium deposited in the stream and river courses and associated terraces. Forebay spills associated with powerhouse outages, forebay and flowline maintenance, and/or other operational or maintenance practices occur into adjacent bedrock-bounded natural channels. Use of these drainages has occurred for decades and initial scour to bedrock and associated hillslope adjustment has long since stabilized and is not likely to change due to periodic spills or use of low-level outlets to drain forebays for operation and maintenance activities.

Under the Proposed Action, forebay spills and sediment management activities would continue to be implemented as described in the Sediment Management and Erosion Control Plan (SMECP) (Appendix 4-A, Section 4.1.3). This plan memorializes existing sediment management activities, including methods to minimize erosion within the natural drainage channels that could affect channel and hillslope stability. In particular, due to the size of the Kaweah No. 3 Forebay, water drained from the forebay would be slowly metered to minimize sediment disturbance in the forebay pool and the volume of water discharged to the natural drainage channel and the Kaweah River. Therefore, continued use of natural drainage channels for Project operation and maintenance activities that

would be implemented under the Proposed Action would have a negligible effect on natural channel and hillslope stability.

### 8.6.2 Effects on Natural Channel Topography as a Result of Sediment Management Activities at the Kaweah No. 1 and No. 2 Intakes

Under the Proposed Action, sediment management activities would continue to be implemented at Project facilities to prevent deposits of sediment from building up or blocking Project flowlines and intakes as described under the No-Action Alternative. Sediment management activities include sediment removal/flushing at the Kaweah No. 1 Intake Sandbox and sediment removal at the Kaweah No. 2 Intake. These activities could affect natural channel topography by altering sediment transport and deposition processes in the bypass reaches.

As described in the SMECP, at the Kaweah No. 1 Intake Sandbox, the low-level outlet at the sandbox would be routinely opened during high flows to minimize accumulation of sand/fine sediment and transport it back into the active stream channel. If larger substrate becomes trapped in the sandbox, it would be removed by hand and placed along the margin of the active channel during the fall maintenance outage where it can be entrained into the channel during high-flow events. At the Kaweah No. 2 Intake, during high-flow events, large boulders and rocks accumulate on the intake grate obstructing flow into the intake and, at times, allowing sediment to build up near the intake. When necessary, this rock debris would be removed and placed downstream of the diversion structure to improve flow into the intake and prevent facility damage.

Sediment management at intakes would occur during high flows when natural sediment transporting processes are typically occurring. Removed sediment would be placed adjacent to the natural channel to allow for entrainment and routing during high flows. Generally the volume of sediment removed is relatively small, is composed of native material, and any effects on natural topography would be temporary.

Therefore, continued sediment management activities that would be implemented under the Proposed Action would have a negligible effect on natural channel topography in the bypass reaches.

### 8.6.3 Effects from Erosion as a Result of Flowline Failure

The Project utilizes flowlines to transport water from diversion intakes to powerhouses. Accidental flowline breaks have the potential to erode hillslopes adjacent to the break. Under the Proposed Action, SCE would implement the Sediment Management and Erosion Control Plan (SMECP) (Appendix 4-A, Section 4.1.3). This plan memorializes sediment management activities, and inspection protocols and measures to be implemented in the event of a flowline failure on the Kaweah No. 1 or No. 2 flowlines. These protocols define routine inspections, identify potential maintenance issues, and define an approach to address the flowline failure or canal break considering engineering design and environmental resource protection.

Inspection protocols and measures included in the SMECP would continue to provide clear steps for timely repair of the flowline and to address any erosion in consultation with resource agencies. Therefore, effects are considered negligible.

### 8.6.4 Effect on Soil Stability Due to Road and Trail Maintenance

Under the Proposed Action, Project roads and trails would continue to be regularly inspected and maintained during normal Project operations to maintain access to Project facilities, protect worker/public health and safety, and minimize erosion and sedimentation. Road and trail maintenance activities could have an effect on soil stability depending on work implemented and the location.

As described in the Road and Trail Management Plan (RTMP) (Appendix 4-A, Section 4.3.1), implementation of major road and trail maintenance would be implemented in accordance with either Tulare County or BLM standards depending on land jurisdiction and in consultation with the respective agency, as applicable. This consultation would include review of measures to protect environmental and cultural resources, and best management practices (BMP). BMPs would include measures to protect against potential soil instability, erosion, and sedimentation as a result of the activity. In addition, as applicable, resource agency permits and approvals would be obtained prior to implementation of the maintenance activity.

Therefore, continued road and trail maintenance activities that would be implemented under the Proposed Action would have a negligible effect on soil stability.

#### 8.6.4.1 Effects on Soil Contamination Due to Vegetation and Pest Management

Under the Proposed Action, vegetation management, including the use of herbicides, would continue to be implemented at Project facilities consistent with the No-Action Alternative. Soils could potentially be contaminated as a result of application of herbicides.

As described in the Vegetation and Pest Management Plan (VIPMP) (Appendix 4-A, Section 4.5.2), herbicide application on BLM lands would be conducted in accordance with a BLM-approved Pesticide Use Permit (PUP), and herbicide application on private lands would be implemented in accordance with a Tulare County-approved PUP. Each PUP defines the herbicides that can be used, species to be treated, treatment methods, treatments sites, and rates of application.

Therefore, continued vegetation management activities, including the use of herbicides, that would be implemented under the Proposed Action would have a negligible effect on soils.

### 8.6.5 Unavoidable Adverse Effects

There are no unavoidable adverse effects to geology and soils under the Proposed Action.

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## LIST OF ACRONYMS

| | |
|---|---|
| BLM | Bureau of Land Management |
| CFR | Code of Federal Regulations |
| FERC or Commission | Federal Energy Regulatory Commission |
| Project | Kaweah Project |
| MW | Megawatt |
| SCE | Southern California Edison Company |

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## 8.7 GEOMORPHOLOGY ENVIRONMENTAL EFFECTS

This section describes potential effects to channel geomorphology (sediment supply, channel morphology, and sediment conditions) under the Proposed Action for Southern California Edison Company's (SCE) Kaweah Project (Project). Section 3.0 – No-Action Alternative provides a description of current routine operation and maintenance activities and Section 4.0 – Proposed Action identifies changes from the No-Action Alternative. Potential effects to channel geomorphology were identified based on continued operation and maintenance of the Project under the Proposed Action.

The following potential effects to channel geomorphology were evaluated:

- Potential effects on channel geomorphology in the bypass reaches[1] associated with changes in Project operations, including:
  - Minimum instream flow releases; and
  - Ramping rates.
- Potential effects from ongoing operation and maintenance activities that could result in erosion and sediment transport from natural drainage channels into the Kaweah River, including:
  - Forebay spills[2]; and
  - Utilizing low-level outlets to drain forebays during Project outages and to conduct sediment management.
- Potential effects on channel geomorphology as a result of sediment management activities at the Kaweah No. 1 and No. 2 intakes.

A description of potential effects on flows in the bypass reaches under the Proposed Action is presented in Section 8.2, and effects to geology and soils associated with operation and maintenance of the Project is presented in Section 8.6.

A discussion of the potential effects to channel geomorphology that could occur as a result of implementation of the Proposed Action, considering new environmental measures; management and monitoring plans; and programs is provided below. Unavoidable adverse effects are also discussed at the end of this section.

[1] A bypass reach is a segment of a river downstream of a diversion facility where Project operations result in the diversion of a portion of the water from that reach.

[2] Project forebays include the Kaweah No. 1 Forebay Tank, Kaweah No. 2 Forebay, and Kaweah No. 3 Forebay.

### 8.7.1 Effects on Channel Geomorphology Due to Changes in Project Operations

Under the Proposed Action, minimum instream flow releases would be increased during select months and water years to enhance habitat for aquatic species and to better simulate a more natural hydrograph. In addition, ramping rates would be modified under the Proposed Action to allow for greater flexibility in operating the Kaweah No. 1 and No. 2 powerhouses. Potential effects to channel geomorphology that could occur as a result of these modifications are discussed below. Detailed information about the minimum instream flows and ramping rates that would occur under the Proposed Action are available in Appendix 4-A, Section 4.1.1 – Instream Flow Measures.

#### 8.7.1.1 Minimum Instream Flow Releases

Under the Proposed Action, changes in minimum instream flows has the potential to affect channel geomorphology in the bypass reaches by altering the timing of initiation or cessation of sediment transport. Changes to minimum instream flows would modestly increase baseline flows, but would remain well below the threshold for incipient motion for all sediment size classes and would have no effect on geomorphology. Therefore, the modified minimum instream flow releases that would be implemented under the Proposed Action would have a negligible effect on channel geomorphology on the bypass reaches.

#### 8.7.1.2 Ramping Rates

Under the Proposed Action, changes in up-ramping rates has the potential to effect channel geomorphology in the bypass reaches by altering the timing of initiation or cessation of sediment transport. Under the Proposed Action down-ramping rates at both the Kaweah No. 1 and Kaweah No. 2 diversions would be no more than 30% of the existing streamflow per hour. At the Kaweah No. 1 Diversion, up-ramping rates would not increase greater than 24 cubic feet per second (cfs) per hour. At the Kaweah No. 2 Diversion, up-ramping rates would not increase greater than 25 cfs per hour when the existing streamflow is ≤40 cfs. When flows are ≥40 cfs there is no up-ramping requirement.

During periods when sediment transport is occurring, the rate changes in discharge attributable of down ramping at the Kaweah No. 1 and No. 2 diversions relative to discharge in the bypass reaches would have a negligible effect on sediment transport processes. Similarly, during periods of sediment transport, up-ramping rates at both the Kaweah No. 1 and No. 2 diversions are small relative to discharge in the bypass reaches and would have a negligible effect on sediment transport processes. Therefore, the modified ramping rates that would be implemented under the Proposed Action would have a negligible effect on channel geomorphology on the bypass reaches.

### 8.7.2 Effects on Channel Geomorphology from Ongoing Project Operation and Maintenance Activities

Under the Proposed Action, SCE would continue to implement Project operation and maintenance activities as described under the No-Action Alternative. Ongoing operation and maintenance activities that have the potential to affect channel geomorphology in the Kaweah River include: (1) spills from the Kaweah No 1, No. 2, and No. 3 forebays; and (2) utilizing low-level outlets to drain the Kaweah No. 1, No. 2, and No. 3 flowlines and forebays during planned Project outages and sediment management. These activities could cause erosion to occur in natural drainage channels associated with these facilities and transport of sediment from these channels into the Kaweah River, as described below.

Under the Proposed Action, forebay spills and draining of flowlines and forebays during planned Project outages and sediment management would continue to be implemented, as described under the No-Action Alternative. In the event of an unplanned powerhouse outage (i.e., unit trips), water in the flowlines continues to flow (drain) into the forebays until the diversion is turned out (closed). Water entering the forebays can either be: (1) passed through the generating units at the powerhouse (if operational); (2) released through the powerhouse bypass valve (if present); or (3) released from each forebay via Project spillways/spillway chutes that direct the overflow into natural drainage channels for conveyance to the Kaweah River (refer to Section 7.6 – Geology and Soils).

Under the Proposed Action, draining of the flowlines and forebays during Project outages and sediment management, which includes opening low-level outlets to release water and flush sand and fine sediment from the facilities and into natural drainage channels would continue to be implemented, as described under the No-Action Alternative.

Use of these natural drainage channels during spills and opening low-level outlets to drain flowlines and forebays has occurred for decades. Initial scour to bedrock in these channels has long since stabilized and is not likely to change. In addition, the total volume of sediment mobilized during spills and operations activities is small relative to background sediment volume of the Kaweah River. Furthermore, the volume of sediment to reach the river channel is smaller than the total mobilized, if any. The relative volume of water discharged compared to the river is small and the sediment transport capacity would not be affected.

Under the Proposed Action, forebay spills and sediment management activities would continue to be implemented as described in the Sediment Management and Erosion Control Plan (SMECP) (Appendix 4-A, Section 4.1.3). This plan memorializes existing sediment management activities, including methods to minimize erosion within the natural drainage channels. In particular, due to the size of the Kaweah No. 3 Forebay, water drained from the forebay would be slowly metered to minimize sediment disturbance in the forebay pool and the volume of water discharged to the natural drainage channel and the Kaweah River. Therefore, continued use of natural drainage channels for Project operation and maintenance activities that would be implemented under the Proposed Action would have a negligible effect on channel geomorphology in the Kaweah River.

### 8.7.3 Effects on Channel Geomorphology from Sediment Management Activities at the Kaweah No. 1 and No. 2 Intakes

Under the Proposed Action, sediment management activities would continue to be implemented at Project facilities to prevent deposits of sediment from building up or blocking Project flowlines and intakes as described under the No-Action Alternative. Sediment management activities include sediment removal/flushing at the Kaweah No. 1 Intake Sandbox and sediment removal at the Kaweah No. 2 Intake. These activities could alter sediment transport and deposition processes in the bypass reaches.

As described in the SMECP, at the Kaweah No. 1 Intake Sandbox, the low-level outlet at the sandbox would be routinely opened during high flows to minimize accumulation of sand/fine sediment and transport it back into the active stream channel. If larger substrate becomes trapped in the sandbox, it would be removed by hand and placed along the margin of the active channel during the fall maintenance outage where it can be entrained into the channel during high-flow events. At the Kaweah No. 2 Intake, during high-flow events, large boulders and rocks accumulate on the intake grate obstructing flow into the intake and, at times, allowing sediment to build up near the intake. When necessary, this rock debris would be removed and placed downstream of the diversion structure to improve flow into the intake and prevent facility damage.

Sediment management at intake structures would occur during high flows when natural sediment transporting processes are typically occurring. Removed sediment would be placed adjacent to the natural channel to allow for entrainment and routing during high flows. The relatively small amount of coarse material cleared would be re-incorporated into the background bedload volume, maintaining sediment transport and deposition processes in the bypass reaches.

Therefore, continued sediment management activities that would be implemented under the Proposed Action would have a negligible effect on channel geomorphology in the bypass reaches.

### 8.7.4 Unavoidable Adverse Effects

There are no unavoidable adverse effects to geomorphology under the Proposed Action.

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Table 8.8-1. Comparison of Existing Minimum Flow Requirements and Modified Minimum Flow Requirements

## LIST OF ACRONYMS

| | |
|---|---|
| BLM | Bureau of Land Management |
| BMP | Best Management Practices |
| cfs | cubic feet per second |
| FERC or Commission | Federal Energy Regulatory Commission |
| Project | Kaweah Project |
| PUP | Pesticide Use Proposal |
| RTMP | Road and Trail Management Plan |
| SCE | Southern California Edison Company |
| TPCLMM | Transmission, Power, Communication Line Maintenance Measure |
| VIPMP | Vegetation and Integrated Pest Management Plan |

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## 8.8 RIPARIAN RESOURCES ENVIRONMENTAL EFFECTS

This section describes the potential effects to riparian resources, including wetland habitat, under the Proposed Action for Southern California Edison Company's (SCE) Kaweah Project (Project). Impacts on riparian resources and wetland habitat are evaluated in this analysis based on the resources present in the study area, and activities to be implemented under the Proposed Action. The study area is defined as the bypass reaches[1] and lands within the Federal Energy Regulatory Commission (FERC or Commission) Project boundary where operations and/or maintenance activities are conducted, plus a protective buffer. Section 3.0 – No-Action Alternative provides a description of current routine operation and maintenance activities and Section 4.0 – Proposed Action identifies changes from the No-Action Alternative.

The following potential effects to riparian resources and wetland habitat were evaluated:

- Potential effects on the abundance and distribution of riparian vegetation in the bypass reaches from changes in Project operations, including:
    - Down-ramping rates; and
    - Minimum instream flow releases.
- Direct loss of riparian vegetation and wetland habitat from Project maintenance activities, including:
    - Vegetation management;
    - Road and trail maintenance; and
    - Transmission, power, and communication line maintenance.

Potential effects of the Proposed Action on flows in the bypass reaches are discussed in Section 8.2 – Water Use and Hydrology. Potential effects on channel morphology and sediment processes are discussed in Section 8.5 – Geomorphology. Potential effects on aquatic species are discussed in Section 8.4 – Fish and Aquatic Resources. Potential effects on special-status plants and mosses that have the potential to occur in riparian and wetland habitats are identified in Section 8.5 – Botanical and Wildlife Resources.

A description of potential effects to riparian resources and wetland habitat from implementation of the Proposed Action, considering new environmental measures; management and monitoring plans; and programs is provided below. Unavoidable adverse effects are also discussed at the end of this section.

[1] A bypass reach is a segment of a river downstream of a diversion facility where Project operations result in the diversion of a portion of the water from that reach.

### 8.8.1 Effects on the Abundance and Distribution of Riparian Vegetation in Bypass Reaches from Changes in Project Operations

Riparian vegetation patterns (i.e., distribution, abundance, community composition, and age class structure) in the vicinity of the Kaweah Project are largely controlled by the geomorphic characteristics of the watershed and the hydrologic regime. In the Kaweah Project study area, the distribution and abundance of riparian vegetation are limited by the narrow valley bottoms with limited floodplain development and alluvial deposits, steep side slopes, and prevalence of bedrock and coarse substrate along long sections of the river (reference). In reaches where the valley bottom broadens, riparian vegetation establishes on the floodplain and channel bars.

Riparian vegetation patterns also reflect the recent hydrologic regime, which influences recruitment and establishment of vegetation. Flows can affect the formation of geomorphic landforms (e.g., floodplains and bars), the quantity and quality of substrate available for supporting riparian vegetation (e.g., recruitment sites), transport of seeds and stems, and viability of riparian vegetation once established. Flow attributes that are important for maintaining the distribution and structural and compositional complexity of riparian species include: (1) the frequency of high magnitude scouring or "re-setting" flows; (2) the frequency, magnitude, and timing of seed setting flows (recruitment flows); (3) hydrograph shape/recession rates of spring flows; and (4) inter-annual variability. Flow attributes during ecologically-sensitive time periods for riparian species (i.e., seed release, initial establishment, growing season) are particularly important for maintaining riparian resources. Riparian vegetation often establishes in elevation zones where water is available during the drier months and the plants are not too close the channel and susceptible to damage by high flows.

The Proposed Action includes modifications to ramping rates and to minimum instream flow releases in the bypass reaches (Appendix 4-A, Section 4.1.1 – Instream Flow Measures). Provided below is an analysis of potential effects of these actions on riparian and wetland resources. The Proposed Action would maintain the frequency of high magnitude flow events that maintain riparian vegetation consistent with the No-Action Alternative.

#### 8.8.1.1 Ramping Rates

The existing FERC license (No-Action Alternative) requires SCE to operate the Kaweah No. 1 and No. 2 diversion dams and the Kaweah No. 1 and No. 2 powerhouses such that they do not alter stream flows downstream of the facilities at a rate greater than 30% of the existing streamflow per hour. This condition applies to down ramp and up ramp rates. Under the No-Action Alternative, natural high flow events occurred during spring snowmelt downstream of the Project diversions (bypass reaches). Typically recession rates were less than 1 inch per day during the recruitment period (seed establishment and growing season) and always less than the maximum rate identified in the literature (e.g., 3.9 inches per day) (Braatne et al. 1996; Amlin and Rood 2002; Shaforth et al. 2017; SCE 2019a) necessary to provide riparian seedling recruitment (Section 7.8.2.1 and AQ 1

– TSR [SCE 2019a, SD A]). The Project operations (No-Action Alternative), including the ramping rates, maintained riparian recruitment process.

Under the Proposed Action, down ramping rates in the IFM environmental measure, downstream of the Kaweah No. 1 and No. 2 diversion dams, will remain the same as those in the No-Action Alternative (30% of the existing streamflow per hour). The diversions are also the locations that control down ramping below the powerhouses. Under the Proposed Action, therefore, high flow events will continue to occur during spring snowmelt in all of the bypass reaches and recession rates will continue to be typically less than 1 inch per day during the recruitment period (seed establishment and growing season) and always less than the maximum rate identified in the literature (e.g., 3.9 inches per day), necessary to provide riparian seedling recruitment

Therefore, the Proposed Action would maintain riparian resources in the bypass reaches by maintaining conditions suitable for riparian recruitment, including the magnitude, frequency, timing, and down-ramp rates of spring flows, consistent with the No-Action Alternative (SCE 2019a and 2019b).

#### 8.8.1.2 Minimum Instream Flow Releases

Under the No-Action Alternative, minimum instream flows are required in the bypass reaches. These requirements are provided in Table 3-8 in Section 3.0 – No-Action Alternative. The minimum instream flows under the No-Action Alternative in the Kaweah River bypass reach are based on a dry/normal year type designation. In the East Fork Kaweah River bypass reach, the minimum instream flows are the same for both dry and normal years. Instream flow requirements on the Kaweah River and East Fork Kaweah River are higher in spring and early summer, and lower in the fall and winter.

Under the Proposed Action, minimum instream flow releases would be increased during select months and water years to enhance instream habitat and to better simulate a more natural hydrograph, as summarized in Table 8.8-1. Monthly minimum instream flow requirements in dry and normal years are the same or greater than those under the No-Action Alternative. Greater minimum instream flows at the end of the dry summer would maintain/enhance riparian resources along the bypass reaches by increasing the potential for water availability during the driest months of the year that can limit riparian vegetation health and survival. In the Kaweah River, July instream flow requirements are 10 cubic feet per second (cfs) greater under the Proposed Action Alternative in dry years and 9 cfs greater in normal years compared to the No-Action Alternative. In the East Fork Kaweah River, minimum instream flow requirements are 10 cfs greater in July, 15 cfs greater in August and September, and 5 cfs greater in October under the Proposed Action than the No-Action Alternative. Therefore, the minimum instream flows under the Proposed Action would maintain/enhance riparian resources in the bypass reaches.

### 8.8.2 Direct Loss of Riparian Vegetation and Wetland Habitat during Project Maintenance

Under the Proposed Action, vegetation management and clearance, and road and trail maintenance could result in loss of riparian vegetation and wetland habitat.

Under the Proposed Action, SCE would continue to implement vegetation management as memorialized in the Vegetation and Integrated Pest Management Plan (VIPMP)**,** included in Appendix 4-A, Section 4.5.2. In addition, SCE would continue to conduct vegetation clearance within 15 feet on either side of transmission, power, and communication as described in the Transmission, Power, and Communication Line Maintenance Measure (TPCLMM), included in Appendix 4-A, Section 4.5.6. Vegetation management/vegetation clearance would be conducted at locations along linear Project facilities (i.e., roads, trails, and transmission, power, and communication lines) that intersect the Kaweah River or other drainages and ponds at several locations. Removal of vegetation as part of the VIPMP and the TPCLMM could potentially remove riparian vegetation and wetland habitat.

Under the Proposed Action, SCE would continue to implement road and trail maintenance as memorialized in the Project Road and Trail Management Plan (RTMP) included in Appendix 4-A, Section 4.3.1. Road maintenance including repair, installation, or replacement of culverts and other drainage features could result in effects on riparian vegetation or wetland habitat.

Under the Proposed Action, SCE would continue to implement measures to protect riparian vegetation and wetland habitat during maintenance activities as described in the VIPMP, TPCLMM, and RTMP, including:

Measures to reduce potential effects to riparian vegetation and wetland habitat during vegetation maintenance, including:

- Vegetation removal will be limited to the identified buffer areas determined to be necessary to protect human health and safety.

- Riparian vegetation will not be removed. If removal of riparian vegetation is required to protect worker/public safety and Project facilities, SCE will consult with appropriate resource agencies and obtain approvals prior to removal.

- The Licensee to consult annually with U.S. Bureau of Land Management (BLM) and/or Tulare County prior to vegetation maintenance to discuss the method, location, and timing of activities and Best Management Practices (BMP) and measures, as appropriate, for the protection of environmental resources, including riparian vegetation and wetland habitat.

Measures to reduce potential effects from use of herbicides, including:

- On BLM-owned lands, herbicides will be applied in accordance with a BLM-approved Pesticide Use Proposal (PUP). On SCE-owned lands, herbicides will be applied in accordance with a Tulare County-approved PUP.
    - Each PUP will define the herbicide that can be used, species to be treated, treatment methods, treatments sites, and rates of application.
- To minimize the risk of herbicides inadvertently entering waters, no herbicides will be applied within 50 feet of streams or drainages.
- Herbicide applications shall not occur when weather parameters exceed label requirements, during precipitation, or when there is a forecast of greater than a 50% chance of precipitation in the next 48 hours.
- Herbicide use will be limited to days when measured wind conditions are less than 5 miles per hour and shall be applied in a downwind direction from adjacent trees or shrubs.

Measures to reduce potential effects to riparian vegetation and wetland habitat during road and trail maintenance, including:

- All necessary permits and approvals will be obtained prior to implementation of major road maintenance (e.g., U.S. Army Corps of Engineers 404 Permit, State Water Board 401 Water Quality Certification, and California Department of Fish and Wildlife Streambed Alteration Agreement). If required, all measures and conditions established by resource agencies in these permits and agreements will be implemented as part of major road maintenance.

Finally, under the Proposed Action, the VIPMP would minimize the potential for degradation of riparian and wetland habitat through implementation of a new measure to reduce the spread or introduction of non-native invasive plants:

- Licensee will wash heavy equipment previously used on non-paved surfaces, outside of the watershed, with power or high-pressure washers to remove soil, seeds, vegetation, or other seed bearing material before using on Project operation and maintenance activities.

Overall, the Proposed Action would enhance riparian resources by increasing minimum instream flows (base flows); thus benefiting riparian vegetation and wetland habitats along 8.8 miles of bypass reaches. Therefore, with implementation of the VIPMP, TPCLMM, and RTMP effects from maintenance activities under the Proposed Action would be considered negligible.

### 8.8.3 Conclusion – Riparian Resources

Overall, the Proposed Action would enhance riparian vegetation along approximately 4.1 miles of the Kaweah River and 4.7 miles of the East Fork Kaweah River. The minimum instream flows under the Proposed Action would maintain/enhance riparian resources in the bypass reaches. Continued implementation of the measures in the VIPMP, TPCLMM, and RTMP, and the environmental training program under the Proposed Action protects riparian vegetation and wetland habitat during maintenance activities. In addition implementation of new measures to prevent the spread or introduction of noxious weed would benefit riparian and wetland habitat. Overall, the Proposed Action would enhance riparian resources and wetland habitats.

### 8.8.4 Unavoidable Adverse Effects

There are no unavoidable adverse effects to riparian resources under the Proposed Action.

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# TABLES

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## Table 8.8-1. Comparison of Existing Minimum Flow Requirements and Modified Minimum Flow Requirements

| Month | No-Action Alternative | | Proposed Action | |
|---|---|---|---|---|
| | Normal Year (cfs) | Dry Year (cfs) | Normal Year (cfs) | Dry Year (cfs) |
| **Kaweah River** | | | | |
| January | 20 | 10 | 20 | 20 |
| February | 20 | 10 | 20 | 20 |
| March | 30 | 20 | 30 | 20 |
| April | 30 | 30 | 30 | 30 |
| May | 30 | 30 | 30 | 30 |
| June | 30 | 30 | 30 | 30 |
| July | 20 | 10 | 20 | 20 |
| August | 20 | 10 | 20 | 10 |
| September | 11 | 5 | 20 | 5 |
| October | 11 | 5 | 11 | 5 |
| November | 11 | 5 | 11 | 5 |
| December | 11 | 5 | 11 | 10 |
| **East Fork Kaweah River** | | | | |
| January | 5 | 5 | 10 | 5 |
| February | 5 | 5 | 10 | 5 |
| March | 10 | 10 | 20 | 10 |
| April | 10 | 10 | 20 | 10 |
| May | 10 | 10 | 20 | 10 |
| June | 10 | 10 | 20 | 10 |
| July | 10 | 10 | 20 | 10 |
| August | 5 | 5 | 20 | 5 |
| September | 5 | 5 | 20 | 5 |
| October | 5 | 5 | 10 | 5 |
| November | 5 | 5 | 10 | 5 |
| December | 5 | 5 | 10 | 5 |

Note: The minimum instream flows are as shown above *or* Natural Flow - 3 cfs, whichever is lower. A total of 3 cfs is required to meet SCE's pre-1914 consumptive water right delivery obligation.

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## LIST OF ACRONYMS

| | |
|---|---|
| BLM | Bureau of Land Management |
| ERMA | Extensive Recreation Management Area |
| FERC or Commission | Federal Energy Regulatory Commission |
| Project | Kaweah Project |
| RMP | Resource Management Plan |
| SCE | Southern California Edison Company |

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## 8.9 LAND USE ENVIRONMENTAL EFFECTS

This section describes the potential effects related to land use and management under the Proposed Action for Southern California Edison Company's (SCE) Kaweah Project (Project). Section 3.0 – No-Action Alternative provides a description of current routine operation and maintenance activities and Section 4.0 – Proposed Action identifies changes from the No-Action Alternative. Potential effects related to land use and management were identified based on continued operation and maintenance of the Project under the Proposed Action.

The following potential effects related to land use and management were evaluated:

- Potential effects that could occur as a result of FERC boundary modifications, including those related to:
    - Land management and jurisdiction;
    - Private property rights;
    - Conflicts with land management plans and policies;
    - Land use designations; and
    - Specially designated areas.

A discussion of the potential effects related to land use and management that could occur as a result of implementation of the Proposed Action, considering new environmental measures; management and monitoring plans; and programs is provided below. Unavoidable adverse effects are discussed at the end of this section.

### 8.9.1 FERC Project Boundary Modifications

Under the Proposed Action, the Federal Energy Regulatory Commission (FERC) Project boundary would be modified to: (1) include all lands necessary for operation and maintenance of the Project; (2) remove lands no longer necessary for operation and maintenance of the Project; and (3) correct known errors in the current Exhibit G for the Project. Specific FERC Project boundary modifications that would occur under the Proposed Action are described in detail in Section 4.0 – Proposed Action and graphically depicted on Maps 4-1a through 4-1h. Detailed maps and specific parcel and acreage information will be provided in Exhibits A and G of the Final License Application. Potential effects related to land use and management that could occur as a result of the proposed FERC boundary modifications are discussed below.

#### 8.9.1.1 Land Management and Jurisdiction

The FERC Project boundary is an administrative marker that delineates the lands that are necessary for operation and maintenance of the Project and for other project purposes, such as protection of environmental resources, as designated in the Project license

(FERC 2012). Under both the No-Action and Proposed Action alternatives, the land that is encompassed by the FERC Project boundary would be under FERC jurisdiction and therefore would be subject to all of the terms and conditions of the new license. Conversely, land that lies outside of the FERC Project boundary would not be under FERC jurisdiction, but would be managed according to existing Tulare County and Bureau of Land Management (BLM) plans and policies. Adjustments to the Project boundary would provide an overall benefit by ensuring that only those lands necessary for the safe and efficient operation and maintenance of the Project are included within the FERC Project boundary.

#### 8.9.1.2 Private Property Rights

The current FERC Project boundary encompasses private land that is owned by SCE, private land owned by other private parties, and public land managed by the BLM. Under the Proposed Action, the proportion of private and public lands that are encompassed by the FERC Project boundary would change slightly, but land ownership (and jurisdiction) would not change.

The presence of a FERC Project boundary has no effect on private property rights (FERC 2012). Whatever rights private property owners currently have (e.g., rights acquired in fee title, easements and rights-of-way) would continue whether their land is located within or outside the FERC Project boundary. Therefore, the FERC Project boundary modifications that would be implemented under the Proposed Action would have no effect on private property rights.

#### 8.9.1.3 Potential Conflicts with Land Management Plans and Policies

Private land located within or outside of the FERC Project boundary is subject to the provisions contained in the Tulare County General Plan (Tulare County 2012). Private land within the Three Rivers Urban Development Boundary is also subject to the Three Rivers Community Plan 2018 Update (Tulare County 2018). Public lands under BLM management, whether inside or outside of the FERC Project boundary, are subject to the goals, objectives, and management actions contained in the Bakersfield Field Office Resource Management Plan (Bakersfield RMP) (BLM 2014). An overview of these plans and how they relate to the Project is provided in the Land 1 – Land Use Technical Study Report (SCE 2019), which is included in Supporting Document A.

Operation and maintenance of the Project is consistent with the goals, objectives, policies and management measures outlined in the above reference plans. Furthermore operation and maintenance of the Project does not conflict with any existing or planned land uses outlined in these plans. Under the Proposed Action, operation and maintenance of the Project would continue to conform to the goals, objectives, policies and measures outlined in the BLMs Bakersfield RMP, the Tulare County General Plan and the Three Rivers Community Plan 2018 Update. Therefore, the Proposed Action would have no effect related to established land management plans and policies.

#### 8.9.1.4 Land Use Designations

Land use designations would not change as a result of adding or removing land to the FERC Project boundary. All lands that would be added to, or removed from, the FERC Project boundary would continue to maintain the same land use designations identified in the Tulare County General Plan (Tulare County 2012) and the Three Rivers Community Plan 2018 Update (Tulare County 2018), depending upon location. Similarly, land uses identified in the BLM's Bakersfield RMP (BLM 2014) would not change. Land uses that are allowed under the No-Action Alternative would continue to be allowed under the Proposed Action. Therefore, the Proposed Action would have no effect on land use designations.

#### 8.9.1.5 Specially Designated Areas

Some Project roads and trails are located within the BLM's Case Mountain Extensive Recreation Management Area (ERMA), which is managed in accordance with the BLM's Bakersfield RMP (BLM 2014). Otherwise, no other Project facilities are located within a Specially Designated Area such as a Wilderness Area. In addition, none of the bypass reaches have been found suitable, eligible or designated as Wild and Scenic under either the California or National Wild and Scenic River acts. Project roads and trails that are located within the Case Mountain ERMA would continue to be operated and maintained in a manner that is consistent with the goals and objectives established for the Case Mountain ERMA, regardless of the FERC Project boundary modifications. Therefore, the Proposed Action would have no effect on Specially Designated Areas.

### 8.9.2 Other Land Use Issues

The BLM allows livestock grazing on BLM-administered lands in the Kaweah River Watershed, including certain lands in the vicinity of the Project. Map 7.9-2 shows the grazing allotments present within the Watershed based on GIS data published by the BLM (BLM 2016). An allotment is a designated area of land available for livestock grazing.

The BLM and/or private parties have erected fencing in various locations to contain livestock to designated allotments. SCE is not responsible for installing or maintaining fencing associated with BLM livestock grazing allotments. SCE does not maintain exclusionary fencing along the Project flowlines. The only exclusionary fencing that SCE maintains is at the Kaweah No. 3 Forebay, where SCE recently erected fencing to prevent cattle from causing erosion along the banks of the forebay (i.e. to protect SCE infrastructure).

At the request of the BLM, and consistent with the LAND 3 – Land Use TSP, SCE mapped the location and documented the condition of livestock fencing in the vicinity of the Kaweah No. 2 and Kaweah No. 3 flowlines (including the associated forebays). The results of this effort are depicted on Maps LAND 3-1a-j in the LAND 3 – TSR (SD A). As indicated on these maps, the existing livestock fencing that was mapped as part of the study effort is fragmented, discontinuous and generally in fair to poor condition.

As stated in SCE's previous filings, SCE does not believe that the Project flowlines effect cattle grazing opportunities or other uses on BLM land. As shown on Map 7.9-2, only small portions of the Project flowlines intersect or cross BLM grazing allotments. The Kaweah No. 1 Flowline borders the northeast corner of a cattle allotment. However, the entire Kaweah No. 1 flowline is elevated and is therefore not considered a hazard to cattle or impediment to grazing. The Kaweah No. 2 Flowline intersects one boundary corner of a cattle allotment, and the flowline is elevated in that location. A small portion of the Kaweah No. 3 Flowline bisects the far west corner of a grazing allotment, but this portion of the flowline traverses a steep slope that is not conducive to cattle grazing.

As previously stated, SCE does not believe it should be responsible for erecting or maintaining exclusionary fencing along the Project flowlines. It is unreasonable for the BLM to expect SCE to control land uses on BLM land and/or private property, or to maintain exclusionary fencing to reduce operational costs for a private parties leasing grazing rights from the BLM.

### 8.9.3 Unavoidable Adverse Effects

There are no unavoidable adverse effects related to land use or management associated with implementation of the Proposed Action.

### 8.9.4 Literature Cited

BLM (U.S. Bureau of Land Management). 2014. Bakersfield Field Office Resource Management Plan. Approved December 22, 2014. Available at: http://www.blm.gov/style/medialib/blm/ca/pdf/bakersfield/planning/Bakersfield_ARMP_ROD.Par.35153.File.dat/Bakersfield_ROD-ARMP.pdf.

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| | |
|---|---|
| ADA | American's with Disabilities Act |
| BLM | Bureau of Land Management |
| CDEC | California Data Exchange Center |
| cfs | cubic feet per second [cfs |
| ERMA | Extensive Recreation Management Area |
| FERC or Commission | Federal Energy Regulatory Commission |
| Project | Kaweah Project |
| SCE | Southern California Edison Company |
| TSP | Technical Study Plan |
| USGS | U.S. Geological Survey |
| WBFG | Whitewater Boating Focus Group |

## 8.10 RECREATION RESOURCES ENVIRONMENTAL EFFECTS

This section describes the potential effects to recreation resources under the Proposed Action for Southern California Edison Company's (SCE) Kaweah Project (Project). Section 3.0 – No-Action Alternative provides a description of current routine operation and maintenance activities and Section 4.0 – Proposed Action identifies changes from the No-Action Alternative. Potential effects to recreation resources were identified based on continued operation and maintenance of the Project under the Proposed Action.

The following potential effects to recreation resources were evaluated:

- Potential effects to stream-based recreation opportunities, including whitewater boating, that could occur as a result of the following modifications to Project operations:
  - Minimum instream flow releases; and
  - Ramping rates.
- Potential effects to recreation visitors that could occur as a result of ongoing Project maintenance activities, including:
  - Maintenance of the Kaweah No. 2 Flowline; and
  - Maintenance of the Kaweah No. 1 Forebay Road.
- Benefits that would occur as a result of recreation enhancements included in the Proposed Action, including:
  - The addition of a trash receptacle and Porta-Potty at Kaweah No. 2 Powerhouse River Access Parking Area; and
  - Dissemination of real-time flow information.

A discussion of the potential effects to recreation resources that could occur as a result of implementation of the Proposed Action, considering new environmental measures; management and monitoring plans; and programs is provided below. Unavoidable adverse effects are discussed at the end of this section.

### 8.10.1 Effects to Stream-Based Recreation Opportunities from Modifications to Project Operations

Under the Proposed Action, minimum instream flow releases will be increased during select months and water years to enhance habitat for aquatic species and to better simulate a more natural hydrograph. In addition, ramping rates will be modified under the Proposed Action to allow greater flexibility in powerhouse operations. Potential effects to stream-based recreation opportunities that could occur as a result of these modifications are discussed below. Detailed information about the minimum instream flows and

ramping rates that would occur under the Proposed Action is available in Appendix 4-A, Section 4.1.1 – Instream Flow Measures.

#### 8.10.1.1 Minimum Instream Flow Releases

The current Project license requires SCE to release minimum instream flows below the Kaweah No. 1 and Kaweah No. 2 diversion dams according to a schedule that varies by month and water year type. Under the Proposed Action, minimum instream flow releases will be increased compared to the No-Action Alternative during select months and water years as summarized on Table 8.10-1. Potential effects related to recreation that could occur as a result of the modifications to minimum instream flows are discussed in the following.

**Stream-Based Recreation**

The modified minimum instream flow releases that will occur under the Proposed Action are specifically designed to enhance habitat for aquatic species and to better simulate a more natural hydrograph. In general, enhancing habitat for aquatic species enhances recreation opportunities by improving angling success. Similarly, a hydrograph that more closely mimics natural conditions generally enhances aesthetic conditions, which improves recreation experience for all user groups, including anglers, swimmers/waders, and whitewater boaters. Therefore, the modified instream flows that will occur under the Proposed Action will have an overall beneficial effect to recreation resources.

**Whitewater Boating Opportunities**

Whitewater boating occurs on the Kaweah River and the East Fork Kaweah River. As documented in Section 7.10, three runs are located in the bypass reaches (i.e., below the Project diversions), as follows:

- **Park Boundary Run.** This run is located on the Kaweah River and extends 0.6 mile from just below the Kaweah No. 2 Diversion Dam to the East Fork confluence.

- **Gateway Bridge Run.** This run is located on the Kaweah River and extends 3.1 miles from the East Fork Kaweah River Confluence to Dinely Bridge.

- **Lower East Fork Run.** This run is located on the East Fork Kaweah River and extends 4.3 miles from the Oak Grove Bridge to its confluence with the Kaweah River.

Boatable flow ranges for the Gateway Bridge Run and the Lower East Fork Run were identified using information contained in existing whitewater guide books, augmented by information developed in consultation with a Whitewater Boating Focus Group (WBFG) that was convened on April 3, 2018, in Three Rivers, California in association with the REC 2 – Whitewater Boating Technical Study Plan (TSP) (SCE 2017). A boatable flow range was not established for the Park Boundary Run because, although it can be boated as a “stand-alone” run, it is typically boated in combination with the upstream Ash

Mountain run or the downstream Gateway Bridge Run. The boatable flow range for the Park Boundary Run is assumed to be consistent with the downstream Gateway Bridge Run (SCE 2019). The boatable flow ranges for the Gateway Bridge Run and Lower East Fork Run are as follows:

- Gateway Bridge Run
  - Boatable flow range for Rafts = 500 to 3,000 cfs
  - Boatable flow range for Kayaks = 300 to 3,000 cfs
- Lower East Fork Run
  - Boatable flow range for kayaks = 80 to 400 cfs
  - This run is not typically boated in rafts due to the difficulty of the run and required portages. As such, a boatable flow range for rafts was not established.

The boatable flow ranges identified above were used in conjunction with hydrologic information developed in association with the REC 2 – TSP (SCE 2017) to estimate the number of boating opportunity days for different watercraft for the Gateway Bridge Run and the Lower East Fork Run under the following conditions:

- Unimpaired – represents conditions without the Project;
- Existing (No-Action Alternative) – represents existing conditions with current minimum instream flows; and
- Proposed (Proposed Action Alternative) – represents flow conditions with modified minimum instream flows.

The following analysis was conducted using a period of record extending from May 10, 1994, through May 9, 2017 (24 water years), and the results were organized by dry and normal water year types. The analytical results are summarized in the following tables:

- Table 8.10-2 summarizes the average, minimum, and maximum number of boating opportunity days under unimpaired, existing, and proposed conditions for the Gateway Bridge Run for rafting and kayaking.
- Table 8.10-3 summarizes the average, minimum, and maximum number of boating opportunity days under unimpaired, existing, and proposed conditions for the Lower East Fork Run for kayaking.
- Table 8.10-4 summarizes the number of boating opportunity days by year for the Gateway Bridge Run (rafts).

- Table 8.10-5 summarizes the number of boating opportunity days by year for the Gateway Bridge Run (kayaks).

- Table 8.10-6 summarizes the number of boating opportunity days by year for the Lower East Fork Run (kayaks).

As shown on Table 8.10-2, for both rafts and kayaks, the average, minimum, and maximum number of boating opportunity days available on the Gateway Bridge Run under unimpaired conditions (i.e., No-Project) are higher than the number of boating days available under both the No-Action and Proposed Action alternatives during both normal and dry water year types. Similarly, as shown on Table 8.10-3, the average, minimum, and maximum number of boating opportunity days available for kayaking on the Lower East Fork Run under unimpaired conditions (i.e., No-Project) are higher than the number of boating days available under both the No-Action and Proposed Action alternatives during both normal and dry water year types. This occurs because, under both the No-Action and Proposed Action alternatives, water is diverted into the flowlines, which sometimes reduces instream flow to levels that fall below the whitewater boating flow thresholds. However, as shown on Tables 8.10-4, 8.10-5, and 8.10-6, numerous whitewater boating opportunity days are available on both the Gateway Bridge and Lower East Fork Runs during both dry and normal water types under both the No-Action and Proposed Action alternatives.

As shown on the above referenced tables, there is no difference between the number of available boating opportunity days when comparing the No-Action and Proposed Action alternatives. The number of boating opportunity days is the same under both scenarios. This occurs because the changes to minimum instream flow occur at flows that are well below the whitewater boating range. Therefore, the differences between minimum flows under the No-Action Alternative and the Proposed Action do not factor into a whitewater boating day. The modified minimum instream flow releases that will be implemented under the Proposed Action will have no effect on whitewater boating opportunities.

### 8.10.1.2 Modified Ramping Rates

The existing FERC license for the Project requires SCE to operate flows below the Kaweah No. 1 and No. 2 diversion dams and the Kaweah No. 1 and No. 2 powerhouses such that they are not altered at a rate greater than 30% of the existing streamflow per hour. In the bypass reaches, this results in average stage changes as shown in Figures 7.4-2, 7.4-3, 7.4-4, and 7.4-5. As indicated, under the current FERC license the up ramping rates are on the order of <0.1 to <0.3 foot/hour. The down ramping rates are approximately <0.1 to 0.3 foot/hour in the range of flows that the Project can operate (24 cfs at Kaweah No. 1 Diversion and 87 cfs at Kaweah No. 2 Diversion).

Under the Proposed Action, ramping rates will be modified as described in Appendix 4-A, Section 4.1.1 – Instream Flow Measures. Down ramping will be implemented consistent with current operations, but up ramping will be modified to provide for flexibility in operation of Project powerhouses. Under the Proposed Action, the modified up-ramping

rate in the Kaweah River will range from 0.2 to 1.0 foot/hour and from approximately 0.1 to 1.0 foot/hour on the East Fork Kaweah River, depending on flow (Figure 8.10-1).

The up-ramping rates on both the Kaweah River and the East Fork Kaweah River were established with consideration to stream-based recreation. Specifically, the up-ramping rate was established to provide for a stage change of ≤1.0 foot/hour. This up-ramping rate preserves instream recreation opportunities and is considered acceptable for instream recreation users (e.g., swimmer, waders, and boaters). Furthermore, it is consistent with up-ramping rates that have been established in other relicensing proceedings.

Because the modified up-ramp rate under the Proposed Action is within the range acceptable for recreation, and is consistent with other rates established for similar hydroelectric projects, implementation of the modified up-ramp rate would have a negligible effect on recreation resources.

### 8.10.2 Effects to Recreation Visitors from Project Maintenance Activities

Under the Proposed Action, SCE will continue to maintain Project flowlines and Project roads and trails as described in Section 3.0 – No-Action Alternative. Potential effects related to recreation that could occur as a result of Project maintenance activities are discussed in the following.

#### 8.10.2.1 Kaweah No. 2 Flowline Maintenance

The Project does not include any recreation trails. However, access trails are located on both sides of the concrete sections of the Kaweah No. 2 Flowline. These trails are not formally developed for recreation purposes but SCE does not prohibit the general public from using these trails. SCE has observed the general public using the access trails that parallel both sides of the Kaweah No. 2 Flowline for walking, hiking, and occasionally mountain biking. Photographs captured by six game cameras located along the flowline confirmed that the trails along the Kaweah No. 2 Flowline are used for recreation purposes (SCE 2019b). As discussed in the REC 1 – TSR (SCE 2019b), the photographs captured by the game cameras indicate that the access trails are primarily used by local residents who were observed repeatedly using the trails to exercise and walk their dogs. These residents can access the flowline trails from private property that is present along nearly the entire length of the flowline.

Under the Proposed Action, the Project flowlines will continue to be maintained following routine inspections. Maintenance of the Kaweah No. 2 Flowline may temporarily disrupt people using the trails that parallel the flowline for recreation purposes. However, no new maintenance activities along the flowline or adjacent trails are included under the Proposed Action. Recreation visitors who use the Kaweah No. 2 Flowline access trails will experience the same level of maintenance that currently occurs under the No-Action Alternative. Therefore, implementation of the Proposed Action will have no effect on recreation visitors using the access trails along the Kaweah No. 2 Flowline for recreation purposes.

### 8.10.2.2 Flowline Failure Prevention

Under the Proposed Action, SCE will implement a Sediment Management and Erosion Control Plan (SMECP) as described in Appendix 4-A, Section 4.1.3. This plan memorializes sediment management activities, inspection protocols, and measures that SCE will implement to reduce the possibility of a flowline failure. In addition, the SMECP identified an approach to address flowline failure or canal breaks considering engineering design and environmental resource protection.

A flowline failure would temporally disrupt recreation along the Kaweah No. 2 Flowline access trails while the flowline is repaired. Implementation of the SMECP will continue to reduce the potential for flowline failures thereby reducing the possibility of disrupting recreation visitors who use the flowline access trails for recreation purposes. The SMECP provides inspection protocols and measures that would continue to provide a process for timely repair of the flowline, limiting disruptions to recreation users, should they occur. Therefore, implementation of the Proposed Action, including the SMECP, would have a negligible effect on recreation resources.

### 8.10.2.3 Kaweah No. 1 Forebay Road Maintenance

Recreation visitors have been observed using the Kaweah No. 1 Forebay Road for recreation purposes, including walking, hiking, mountain biking, and horseback riding. Photographs captured by a game camera located along the Kaweah No. 1 Forebay Road confirmed that the road is used for recreation purposes (SCE 2019b). The Kaweah No. 1 Forebay Road is located within the Bureau of Land Management's (BLM) Case Mountain Extensive Recreation Management Area (ERMA). The road is not formally developed for recreation purposes. However, SCE does not prohibit the general public from using the road for non-motorized recreation activities. The road is gated to prevent vehicular access by the general public.

Under the Proposed Action, SCE will continue to regularly inspect and maintain the Project roads during normal Project operations. Minor repairs will be conducted on an as-needed basis and major repairs will be implemented annually during late summer/fall. In addition, under the Proposed Action, SCE will implement a Road and Trail Management Plan (RTMP) as described in Appendix 4-A, Section 4.3.1. This plan memorializes road and trail maintenance activities and includes new consultation and reporting requirements associated with major road and trail maintenance activities. Specifically, SCE will consult with the BLM and/or Tulare County (depending upon jurisdiction) prior to implementing major road maintenance to ensure it is implemented in accordance with applicable agency standards with consideration to the type and level of use that occurs along the road. Because the Kaweah No. 1 Forebay Road crosses land under BLM jurisdiction, SCE will consult with the BLM prior to implementing major maintenance activities on this road to ensure compatibility with BLM management objectives, including those pertaining to non-motorized recreation use.

Maintenance of the Kaweah No. 1 Forebay Road may temporarily disrupt people using the road for recreation purposes. However, no new maintenance activities along the road are included under the Proposed Action. Accordingly, recreation visitors who use the Kaweah No. 1 Forebay Road for recreation purposes will experience the same level of maintenance that currently occurs under the No-Action Alternative. In addition, implementation of the RTMP will ensure that the road is maintained at a level that is consistent with the BLM's goals and objectives for the Case Mountain ERMA. Therefore, implementation of the Proposed Action will have no effect on recreation visitors using the Kaweah No. 1 Forebay Road for recreation purposes.

### 8.10.3 Benefits of Recreation Enhancements

The Proposed Action includes two measures that are designed to enhance recreation conditions and opportunities over the term of the new license:

- Kaweah No. 2 Powerhouse River Access Parking Area Measure
- Dissemination of Real-time Flow Information Measure

These measures are described in Appendix 4-A, Section 4.4.1. The recreation benefits associated with these measures are discussed below.

Per requests by the National Park Service and American Whitewater, SCE explored options to facilitate public access to the Kaweah River from land owned by SCE in the vicinity of the Kaweah No. 1, Kaweah No. 2 and Kaweah No. 3 powerhouses (SCE 2019a). However, SCE determined that providing river access at the Kaweah No. 1 and Kaweah No. 3 powerhouses is not viable and providing additional access at the Kaweah No. 2 Powerhouse is not warranted for the reasons identified in SCE's response to comment No. 4b on Table SD A-2 – Stakeholder Comments on the Draft Technical Study Reports and Associated SCE Responses.

#### 8.10.3.1 Addition of a Trash Receptacle and Porta-Potty at Kaweah No. 2 Powerhouse River Access Parking Area

The Project does not include any developed recreation facilities. However, SCE maintains a small parking area adjacent to the Kaweah No. 2 Powerhouse and allows the public to use this parking area on a limited basis. The Kaweah No. 2 Powerhouse River Access Parking Area is paved with six striped parking stalls, one of which is identified as disabled accessible. Other than signage, the parking area does not currently include any amenities. This parking area is typically used by recreation visitors who park in the lot then walk to a small beach known locally as "Edison Beach", located approximately 400 feet southeast of the parking lot, on the northeast bank of the Kaweah River. Edison Beach is not a formally developed recreation facility.

The Proposed Action includes implementation of the Kaweah No. 2 Powerhouse River Access Parking Area Enhancement Measure. This measure requires SCE to continue to maintain the Kaweah No. 2 Powerhouse River Access Parking Area and allow the general public to use the parking area on a limited basis. Current use restrictions will remain in

effect out of respect for nearby private property owners, and to help minimize the potential for conflicts between recreation visitors and private property owners. In addition, to enhance recreation experience and to protect environmental resources, this measure requires SCE to install an American's with Disabilities Act (ADA) compliant portable restroom (also known as a Porta-Potty) and an animal resistant trash receptacle at the Kaweah No. 2 Powerhouse River Access Parking Area within one year of license issuance. To ensure that these features are clean and in good working order, SCE will inspect and maintain the portable bathroom and the garbage receptacle once weekly, or more frequently if use levels warrant. Installing a portable restroom and garbage receptacle will address local concerns regarding sanitation while enhancing the experience of recreation visitors. Accordingly, implementation of the Proposed Action, including the Kaweah No. 2 Powerhouse River Access Parking Area Enhancement Measure, will have a beneficial effect to recreation resources.

### 8.10.3.2 Dissemination of Real-Time Flow Information

According to WBFG participants, flow information that is currently available to the public on Dreamflows[1] is not sufficient to determine whether boating flows are available in the bypass reaches. The WBFG participants indicated that providing additional real-time flow information on the bypass reaches would enhance their ability to take advantage of the existing whitewater boating opportunities within the bypass reaches, as well as other river reaches within the Kaweah River Watershed.

The Proposed Action includes implementation of the Dissemination of Real-time Flow Information Measure. This measure requires SCE to provide real-time flow information to the public, using data collected at the following two U.S. Geological Survey (USGS) stream gages located on the East Fork Kaweah River and Kaweah River, respectively, downstream of the Project diversions:

- East Fork Kaweah River near Three Rivers CA (USGS Gage No. 11208730) (SCE Gage No. 201)

- Kaweah River below Conduit No. 2 near Hammond CA (USGS Gage No. 11208600) (SCE Gage No. 203)

The data collected at these two gages will be provided to the public on a new website to be developed and maintained by SCE. The data provided on the Licensee's website will show the most recent 7 days of flow information in 1-hour increments.

Implementation of the Dissemination of Real-time Flow Information Measure will enhance stream-based recreation opportunities on the Kaweah River and on the East Fork Kaweah River. Stream-based recreation users will be able to utilize the real-time flow data for trip planning and scheduling purposes. Whitewater boaters in particular will be able to utilize the real-time flow data to determine when boating flows are available so

[1] A website commonly used by whitewater boaters to obtain flow information on whitewater boating runs (www.dreamflows.com/graphs/day.103.php).

they can take advantage of the whitewater boating opportunities on the bypass reaches. Accordingly, implementation of the Proposed Action, including the Dissemination of Real-time Flow Information Measure, will have a beneficial effect to recreation resources.

### 8.10.4 Conclusions – Recreation Resources

Implementation of the Proposed Action would maintain/enhance recreation resources compared to the No-Action Alternative. Specifically:

- Changes in minimum instream flows under the Proposed Action would enhance recreation opportunities and experience for all user groups, including anglers, swimmers/waders, and whitewater boaters.

- Modifying the up-ramp rate would have a negligible effect on recreation resources because the modified up-ramp rate under the Proposed Action is within the range that is acceptable for recreation, and is consistent with other ramping rates established for similar hydroelectric projects.

- Implementation of the SMECP would maintain trail opportunities along the Kaweah No. 2 Flowline by minimizing the potential for flowline failures, thereby reducing the possibility of disrupting recreation visitors who use the flowline access trails for recreation purposes.

- Continued maintenance of the Kaweah No. 1 Forebay Road would maintain non-motorized trail opportunities for the general public.

- Recreation enhancements that would occur under the Proposed Action would enhance recreation experience and opportunities on the Kaweah River, while addressing local concerns regarding sanitation.

- The provision of real-time flow information that would occur under the Proposed Action will enhance recreation opportunities by providing information that can be used by whitewater boaters and other stream-based recreation users for trip planning and scheduling purposes.

### 8.10.5 Unavoidable Adverse Effects

There are no unavoidable adverse effects to recreation resources associated with implementation of the Proposed Action.

### 8.10.6 Literature Cited

SCE (Southern California Edison Company). 2017. Kaweah Project, Revised Study Plan. February.

SCE. 2019a. REC 2 – Whitewater Boating Technical Study Report, available in Supporting Document A (SD A).

SCE. 2019b. REC 1 – Recreation Resources Technical Study Report, available in SD A.

# TABLES

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## Table 8.10-1. Existing Minimum Flow Requirements versus Modified Minimum Flow Requirements

| Month | Existing (No-Action Alternative) | | Modified (Proposed Action Alternative) | |
|---|---|---|---|---|
| | Normal Year (cfs) | Dry Year (cfs) | Normal Year (cfs) | Dry Year (cfs) |
| **Kaweah River** | | | | |
| January | 20 | 10 | 20 | 20 |
| February | 20 | 10 | 20 | 20 |
| March | 30 | 20 | 30 | 20 |
| April | 30 | 30 | 30 | 30 |
| May | 30 | 30 | 30 | 30 |
| June | 30 | 30 | 30 | 30 |
| July | 20 | 10 | 20 | 20 |
| August | 20 | 10 | 20 | 10 |
| September | 11 | 5 | 20 | 5 |
| October | 11 | 5 | 11 | 5 |
| November | 11 | 5 | 11 | 5 |
| December | 11 | 5 | 11 | 10 |
| **East Fork Kaweah River** | | | | |
| January | 5 | 5 | 10 | 5 |
| February | 5 | 5 | 10 | 5 |
| March | 10 | 10 | 20 | 10 |
| April | 10 | 10 | 20 | 10 |
| May | 10 | 10 | 20 | 10 |
| June | 10 | 10 | 20 | 10 |
| July | 10 | 10 | 20 | 10 |
| August | 5 | 5 | 20 | 5 |
| September | 5 | 5 | 20 | 5 |
| October | 5 | 5 | 10 | 5 |
| November | 5 | 5 | 10 | 5 |
| December | 5 | 5 | 10 | 5 |

Note that minimum instream flows are as shown above *or* Natural Flow - 3 cfs, whichever is lower. A total of 3 cfs is required to meet SCE's pre-1914 consumptive water right delivery obligation.

## Table 8.10-2. Number of Boating Days Under Unimpaired, Existing, and Proposed Conditions – Gateway Bridge Run

| Water-year Type | Number of Boating Days | | | Difference between Unimpaired and Existing / Proposed |
|---|---|---|---|---|
| | No Project (Unimpaired) | No-Action Alternative (Existing) | Proposed Action (Proposed) | |
| **Rafting (500 to 3,000 cfs)** | | | | |
| **Normal Year** | | | | |
| Average | 103 | 90 | 90 | -13 |
| Minimum | 32 | 28 | 28 | -4 |
| Maximum | 181 | 157 | 157 | -24 |
| **Dry Year** | | | | |
| Average | 54 | 41 | 41 | -13 |
| Minimum | 11 | 6 | 6 | -5 |
| Maximum | 101 | 86 | 86 | -15 |
| **Kayaking (300 to 3,000 cfs)** | | | | |
| **Normal Year** | | | | |
| Average | 139 | 122 | 122 | -18 |
| Minimum | 76 | 52 | 52 | -24 |
| Maximum | 226 | 212 | 212 | -14 |
| **Dry Year** | | | | |
| Average | 94 | 73 | 73 | -21 |
| Minimum | 28 | 19 | 19 | -9 |
| Maximum | 134 | 108 | 108 | -26 |

## Table 8.10-3. Number of Boating Days Under Unimpaired, Existing, and Proposed Conditions – Lower East Fork Run

| Water-year Type | Number of Boating Days | | | Difference between Unimpaired and Existing / Proposed |
|---|---|---|---|---|
| | No Project (Unimpaired) | No-Action Alternative (Existing) | Proposed Action (Proposed) | |
| **Kayaking (80 to 400 cfs)** | | | | |
| **Normal Year** | | | | |
| Average | 115 | 104 | 104 | -11 |
| Minimum | 39 | 37 | 37 | -2 |
| Maximum | 186 | 183 | 183 | -3 |
| **Dry Year** | | | | |
| Average | 89 | 76 | 76 | -13 |
| Minimum | 27 | 24 | 24 | -3 |
| Maximum | 124 | 103 | 103 | -21 |

## Table 8.10-4. Boating Opportunity Days by Year – Gateway Bridge Run (Rafts)

| Year | Water Type Year | Boating Opportunity Days per Year[1] | | |
|---|---|---|---|---|
| | | No Project (Unimpaired) | No-Action Alternative (Existing) | Proposed Action (Proposed) |
| 1994 | Dry | 101 | 86 | 86 |
| 1995 | Normal | 163 | 149 | 149 |
| 1996 | Normal | 181 | 148 | 148 |
| 1997 | Normal | 113 | 107 | 107 |
| 1998 | Normal | 85 | 75 | 75 |
| 1999 | Dry | 84 | 60 | 60 |
| 2000 | Normal | 78 | 62 | 62 |
| 2001 | Normal | 70 | 57 | 57 |
| 2002 | Normal | 84 | 52 | 52 |
| 2003 | Normal | 95 | 78 | 78 |
| 2004 | Dry | 77 | 54 | 54 |
| 2005 | Normal | 127 | 116 | 116 |
| 2006 | Normal | 87 | 72 | 72 |
| 2007 | Dry | 51 | 43 | 43 |
| 2008 | Normal | 79 | 69 | 69 |
| 2009 | Normal | 85 | 56 | 56 |
| 2010 | Normal | 140 | 133 | 133 |
| 2011 | Normal | 102 | 100 | 100 |
| 2012 | Normal | 32 | 28 | 28 |
| 2013 | Dry | 16 | 11 | 11 |
| 2014 | Dry | 11 | 6 | 6 |
| 2015 | Dry | 39 | 29 | 29 |
| 2016 | Normal | 163 | 157 | 157 |
| 2017 | Normal | 67 | 71 | 71 |

[1] Flow range used for computation is 500 cfs to 3,000 cfs, the boating flow range for rafting the Gateway Bridge Run.

## Table 8.10-5. Boating Opportunity Days by Year – Gateway Bridge Run (Kayaks)

| Year | Water Type Year | Boating Opportunity Days per Year[1] | | |
|---|---|---|---|---|
| | | No Project (Unimpaired) | No-Action Alternative (Existing) | Proposed Action (Proposed) |
| 1994 | Dry | 134 | 108 | 108 |
| 1995 | Normal | 195 | 191 | 191 |
| 1996 | Normal | 226 | 212 | 212 |
| 1997 | Normal | 166 | 140 | 140 |
| 1998 | Normal | 113 | 103 | 103 |
| 1999 | Dry | 120 | 103 | 103 |
| 2000 | Normal | 100 | 85 | 85 |
| 2001 | Normal | 95 | 79 | 79 |
| 2002 | Normal | 113 | 105 | 105 |
| 2003 | Normal | 123 | 115 | 115 |
| 2004 | Dry | 118 | 92 | 92 |
| 2005 | Normal | 163 | 139 | 139 |
| 2006 | Normal | 138 | 106 | 106 |
| 2007 | Dry | 108 | 71 | 71 |
| 2008 | Normal | 126 | 103 | 103 |
| 2009 | Normal | 133 | 116 | 116 |
| 2010 | Normal | 205 | 159 | 159 |
| 2011 | Normal | 141 | 118 | 118 |
| 2012 | Normal | 76 | 52 | 52 |
| 2013 | Dry | 58 | 43 | 43 |
| 2014 | Dry | 28 | 19 | 19 |
| 2015 | Dry | 93 | 74 | 74 |
| 2016 | Normal | 175 | 170 | 170 |
| 2017 | Normal | 82 | 79 | 79 |

[1] Flow range used for computation is 300 cfs to 3,000 cfs, the boating flow range for kayaking the Gateway Bridge Run.

## Table 8.10-6. Boating Opportunity Days by Year – Lower East Fork Run (Kayaks)

| Year | Water Type Year | Boating Opportunity Days per Year[1] | | |
|---|---|---|---|---|
| | | No Project (Unimpaired) | No-Action Alternative (Existing) | Proposed Action (Proposed) |
| 1994 | Dry | 124 | 99 | 99 |
| 1995 | Normal | 133 | 131 | 131 |
| 1996 | Normal | 186 | 183 | 183 |
| 1997 | Normal | 149 | 128 | 128 |
| 1998 | Normal | 86 | 75 | 75 |
| 1999 | Dry | 111 | 103 | 103 |
| 2000 | Normal | 91 | 78 | 78 |
| 2001 | Normal | 93 | 80 | 80 |
| 2002 | Normal | 118 | 112 | 112 |
| 2003 | Normal | 107 | 97 | 97 |
| 2004 | Dry | 115 | 98 | 98 |
| 2005 | Normal | 114 | 107 | 107 |
| 2006 | Normal | 94 | 75 | 75 |
| 2007 | Dry | 105 | 88 | 88 |
| 2008 | Normal | 112 | 99 | 99 |
| 2009 | Normal | 118 | 116 | 116 |
| 2010 | Normal | 185 | 145 | 145 |
| 2011 | Normal | 101 | 92 | 92 |
| 2012 | Normal | 78 | 58 | 58 |
| 2013 | Dry | 59 | 46 | 46 |
| 2014 | Dry | 27 | 24 | 24 |
| 2015 | Dry | 83 | 73 | 73 |
| 2016 | Normal | 147 | 147 | 147 |
| 2017 | Normal | 39 | 37 | 37 |

[1] Flow range used for computation is 80 to 400 cfs, the boating flow range for kayaking the Lower East Fork Run.

# FIGURES

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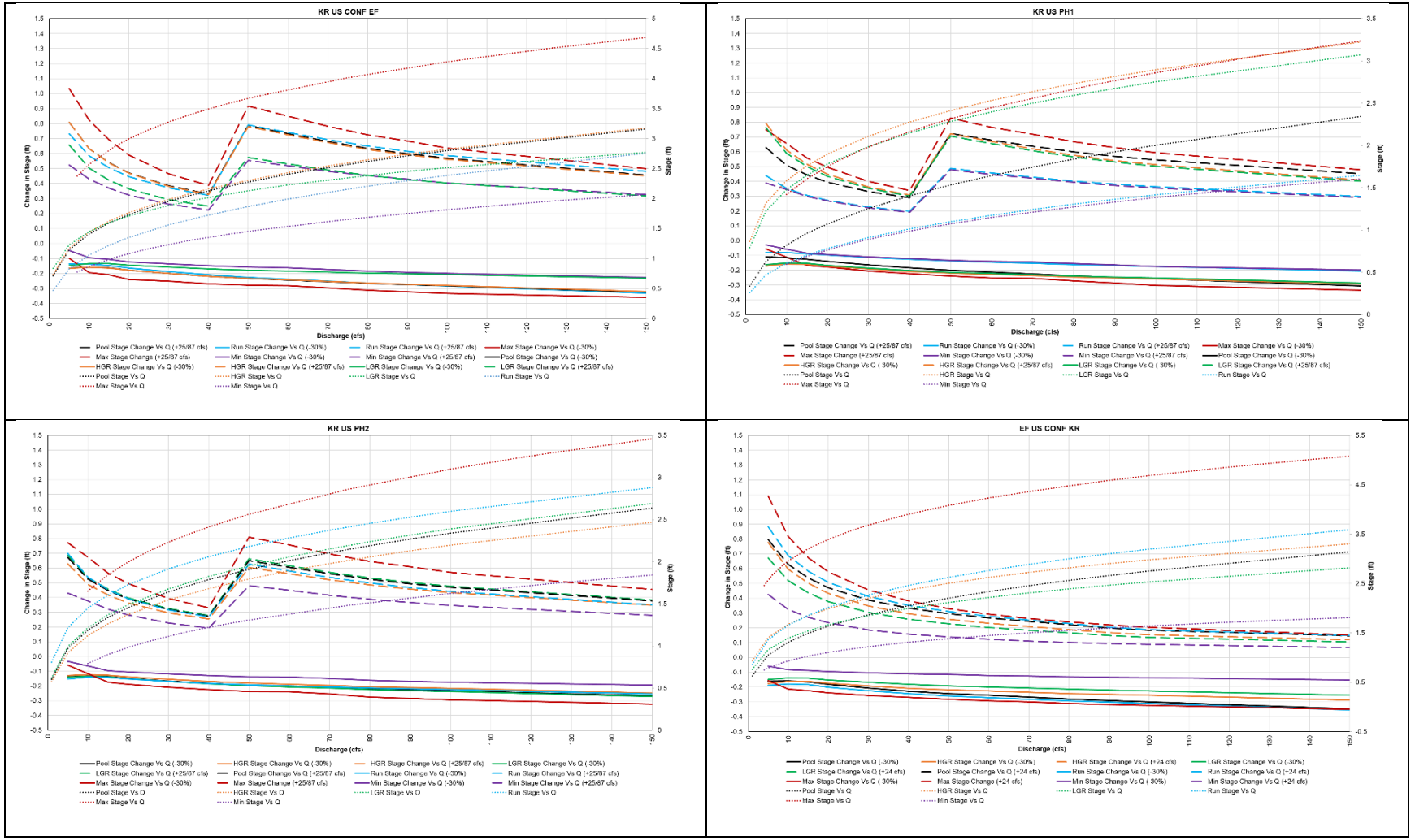


**Figure 8.10-1. Stage changes in the Kaweah River Reaches Downstream of Kaweah No. 2 Diversion (KR US CONF EF, KR US PH1, KR US PH2) and in the East Fork Kaweah River (EF US CONF KR) Based on the Proposed Action Modified Up Ramp Rate of 25 cfs/hr when Flows are <40 cfs and the Down Ramp Rate of 30% of Existing Streamflow per Hour.**

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## LIST OF ACRONYMS

| | |
|---|---|
| ADA | American's with Disabilities Act |
| cfs | cubic feet per second |
| dB | decibels |
| FERC or Commission | Federal Energy Regulatory Commission |
| $L_{90}$ | A-weighted sound level equaled or exceeded 90% |
| $L_{eq}$ | equivalent continuous sound level |
| Project | Kaweah Project |
| SCE | Southern California Edison Company |
| SD A | Supporting Document A |
| SNP | Sequoia National Park |
| TSR | Technical Study Report |

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## 8.11 AESTHETIC RESOURCES ENVIRONMENTAL EFFECTS

This section describes the potential effects related to aesthetic resources under the Proposed Action for Southern California Edison Company's (SCE) Kaweah Project (Project). Section 3.0 – No-Action Alternative provides a description of current routine operation and maintenance activities and Section 4.0 – Proposed Action identifies changes from the No-Action Alternative. Potential effects to aesthetic resources were identified based on continued operation and maintenance of the Project under the Proposed Action.

The following potential effects to aesthetic resources were evaluated:

- Effects to aesthetic resources that could occur as a result of Project operations, including:
  - Modifications to minimum instream flow releases; and
  - Spills from the Kaweah No. 3 Forebay.
- Effects to aesthetic resources that could occur as a result of recreation enhancements, including the addition of a trash receptacle and Porta-Potty at the Kaweah No. 2 Powerhouse River Access Parking Area.

A discussion of the potential effects to aesthetic resources that could occur as a result of implementation of the Proposed Action, considering new environmental measures; management and monitoring plans; and programs is provided below. Unavoidable adverse effects are discussed at the end of this section.

### 8.11.1 Effects to Aesthetic Resources from Project Operations

This section discusses potential effects to aesthetic resources that could occur as a result of modifications to Project operations.

#### 8.11.1.1 Modified Minimum Instream Flow Releases

The current Project license requires SCE to release minimum instream flows below the Kaweah No. 1 and Kaweah No. 2 diversion dams according to a schedule that varies by month and water year type. Under the Proposed Action, minimum instream flow releases would be increased compared to the No-Action Alternative during select months and water years as summarized on Table 8.4-2.

The modified minimum instream flow releases would result in higher water levels in the Kaweah River during September of normal water years and during January, February, July, and December of dry water years compared to the No-Action Alternative. On the East Fork Kaweah River, modified instream flow releases would result in higher flows during all months of normal water years compared to the No-Action Alternative. Higher instream flows would maintain and/or improve riparian vegetation in the Kaweah River and East Fork Kaweah River. Accordingly, increasing the minimum instream flows and

improving riparian vegetation would enhance overall visual quality along both the Kaweah River and East Fork Kaweah River. Therefore, the modified instream flows that would occur under the Proposed Action would have an overall beneficial effect to aesthetic resources.

#### 8.11.1.2 Spills from the Kaweah No. 3 Forebay

The short segment of the Kaweah No. 3 Flowline under FERC jurisdiction consists of a 2,975-foot long concrete box flume that terminates at the Kaweah No. 3 Forebay, which is an embankment forebay with a capacity of approximately 11 acre-feet. Under the No-Action Alternative, in the event of an unplanned powerhouse outage (i.e., unit trips), overflow from the Kaweah No. 3 Forebay is directed down slope through an approximately 75-foot long concrete-lined spillway chute that begins at the upstream end of the forebay and terminates at a natural drainage channel (Map 7.6-7). The channel drains to the Kaweah River (within the Sequoia National Park [SNP]).

Per the request of the National Park Service (NPS), SCE documented visual conditions at the natural drainage channel under "no-spill" and near-maximum spill (92 cfs) scenarios as viewed from the Foothill Visitor Center Picnic Area on May 31, 2018. In addition, SCE simultaneously documented noise conditions from the Indian Head River Trailhead Parking Area and the Foothill Visitor Center Picnic Area. Both of these facilities are located within the SNP. The study methods and results are documented in the LAND 2 – Technical Study Report (TSR), which is available in Supporting Document A (SD A).

As documented in the LAND 2 – TSR, the natural drainage channel (referred to as the East Spillway Channel in the LAND 2 – TSR) is not visually discernable from the Foothill Visitor Center Picnic Area under the no-spill condition, mainly due to the viewing angle, and the long viewing distance between the visitor center and the natural drainage channel. Conversely, the natural drainage channel is visible from the Foothill Visitor Center Picnic Area under the maximum spill scenario due to the contrast between the white color of the water relative to the adjacent vegetation and the linear nature of the natural drainage channel. However, overall the contrast rating is considered "weak" due to the long viewing distance between the natural drainage channel and the viewing area (Key Observation Point 4 for this study), and because the vegetation along the channel disrupts the linear nature of the channel, thereby reducing overall visual contrast. In general, with a flow of 92 cubic feet per second (cfs), the channel appears as a natural waterfall. Lower flows would be less discernable.

During the spill study, noise levels at the Foothill Visitor Center Picnic Area were generally dominated by noise associated with vehicle traffic on Highway 198 and the nearby parking area and occasional voices and aircraft. Residual background noise levels, as defined by the $L_{90}$ statistical descriptor were 4.8 decibels (dB) higher during the period the spill event was occurring. This change is generally perceivable by the human ear. However, noise associated with the spill event only increased overall noise levels (as defined by the $L_{eq}$) by approximately 2.5 dB during the period the spill event was occurring. Refer to the LAND 2 – TSR for definitions of the $L_{90}$ and $L_{eq}$ descriptors.

The spill/release was neither visible nor audible at the Indian Head River Trailhead Parking Area. Noise levels at the Indian Head River Trailhead Parking Area were generally dominated by noise associated with the flow of the Kaweah River. Other sources of noise observed during the measurement period including traffic noise associated with vehicles on Highway 198, as well as human voices and vehicle activities within the parking area and nearby trailhead.

The Proposed Action does not involve any changes to Project operations or to the capacity of the Kaweah No. 3 Flowline or the Kaweah No. 3 Forebay. Therefore, spill events from the Kaweah No. 3 Forebay would continue to occur at the same approximate frequency, duration, and magnitude as they do now. During spill events, visitors using the Foothill Visitor Center would continue to periodically observe and hear water cascading down the spillway channel, particularly during a maximum spill event. However, based on the LAND 2 study results, the change in noise levels during a maximum spill event would only be slightly discernable above background noise levels, if at all. Similarly, water cascading down the hillside would be noticeable but not visually obtrusive. Therefore, implementation of the Proposed Action would have no effect on existing aesthetic resources.

### 8.11.2 Effects to Aesthetic Resources from Recreation Enhancements

The Project does not include any developed recreation facilities. However, SCE maintains a small parking area adjacent to the Kaweah No. 2 Powerhouse and allows the public to use this parking area on a limited basis. The parking area, referred to as the Kaweah No. 2 Powerhouse River Access Parking Area, is paved and striped but does not include amenities such as a bathroom or garbage receptacles. This parking area is typically used by recreation visitors who park in the lot then walk to a small beach known locally as “Edison Beach”, located approximately 400 feet southeast of the parking lot, on the northeast bank of the Kaweah River. Edison Beach is not a formally developed recreation facility.

The Proposed Action includes implementation of the Kaweah No. 2 Powerhouse River Access Parking Area Enhancement Measure (Appendix 4-A, Section 4.4.1). This measure requires SCE to continue to maintain the Kaweah No. 2 Powerhouse River Access Parking Area and allow the general public to use the parking area on a limited basis. In addition, to enhance recreation experience and to protect environmental resources, this measure requires SCE to install an American’s with Disabilities Act (ADA) compliant portable restroom (also known as a Porta-Potty) and an animal resistant trash receptacle at the Kaweah No. 2 Powerhouse River Access Parking Area within one year of license issuance.

To reduce visual contrast, both the restroom and the trash receptacle would be painted brown, tan, or green to blend with the surrounding environment. Providing a bathroom and garbage receptacle would improve aesthetic conditions at the Kaweah No. 2 River Access Parking and near Edison Beach by containing garbage and human waste. Accordingly, implementation of the Proposed Action, including the Kaweah No. 2

Powerhouse River Access Parking Area Enhancement Measure, would have a beneficial effect on aesthetic resources.

### 8.11.3 Conclusions – Aesthetic Resources

Implementation of the Proposed Action would enhance and/or maintain visual resources compared to the No-Action Alternative. Specifically:

- Changes to minimum instream flows under the Proposed Action would result in more water in the river and healthier riparian vegetation which would enhance scenic quality.

- Recreation enhancements that would occur under the Proposed Action would enhance scenic quality by containing garbage and human waste.

- Under the Proposed Action, the Kaweah No. 3 Forebay would continue to periodically spill. However, adverse effects to aesthetic resources from spills are considered negligible because the change in noise levels during a maximum spill event is only slightly discernable above background noise levels, and because water cascading down the hillside is not visually obtrusive.

### 8.11.4 Unavoidable Adverse Effects

There are no unavoidable adverse effects related to aesthetic resources under the Proposed Action.

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## LIST OF ACRONYMS

| | |
|---|---|
| APE | Area of Potential Effects |
| BLM | Bureau of Land Management |
| CFR | Code of Federal Regulations |
| CRMP | Cultural Resource Management Plan |
| FERC or Commission | Federal Energy Regulatory Commission |
| HPMP | Historic Properties Management Plan |
| Project | Kaweah Project |
| MW | Megawatt |
| NPS | National Park Service |
| NRHP | National Register of Historic Places |
| O&M | Operations and Maintenance |
| Project | Kaweah Project |
| SCE | Southern California Edison Company |

| | |
|---|---|
| SNP | Sequoia National Park |
| SUP | Special Use Permit |
| TSR | Technical Study Report |

## 8.12 CULTURAL RESOURCES ENVIRONMENTAL EFFECTS

This section describes potential effects to cultural resources under the Proposed Action for Southern California Edison Company's (SCE) Kaweah Project (Project). Section 3.0 – No-Action Alternative provides a description of current routine operation and maintenance activities and Section 4.0 – Proposed Action identifies changes from the No-Action Alternative. Potential effects to cultural resources were identified based on continued operation and maintenance of the Project under the Proposed Action. A description of potential effects to tribal resources associated with operation and maintenance of the Project under the Proposed Action is presented in Section 8.13 – Tribal Resources.

For the purposes of this section, cultural resources are identified as human-made objects, features, sites, buildings, structures, and/or districts in the Project Area of Potential Effects (APE). The Project APE for cultural resources is defined as the FERC boundary and any associated facilities outside the FERC boundary and a defined buffer area, depending upon facility type. For further details on the Project APE, refer to Section 7.12 – Cultural Resources and the CUL 1 – Archaeology and Built Environment Technical Study Reports (TSR), included in Supporting Document A (SD A) (SCE 2019a and SCE 2019b).

For the purposes of this section and as defined by Section 106 of the National Historic Preservation Act (NHPA) (Section 106), historic properties are defined as cultural resources that are listed in, or eligible for listing, in the National Register of Historic Places (NRHP). For a description of cultural resources and historic properties in the Project APE, refer to Section 7.12 and the CUL 1 – Archaeology and Built Environment TSRs (SCE 2019a and SCE 2019b), included in SD A.

The analysis of environmental effects under the Proposed Action is limited to cultural resources within the Project APE under FERC jurisdiction. The analysis does not include those SCE facilities (non-FERC) that are located outside of the Project boundary on lands located within the Sequoia National Park (SNP) and operated and managed under a Special Use Permit (SUP) issued by the National Park Service (NPS) (refer to Appendix 3-A).

The following potential effects to cultural resources in the Project APE were evaluated:

- Potential effects from FERC Project boundary modifications.
- Potential effects from erosion associated with Project operation and maintenance activities, including:
    - Spills at the Kaweah No. 1 Forebay Tank and Kaweah No. 2 and No. 3 forebays;
    - Draining of flowlines and forebays/forebay tank during maintenance outages; and

  - Sediment removal/flushing at the Kaweah No. 1 Forebay Tank, Kaweah No. 2 Forebay, and Kaweah No. 3 Forebay.

- Potential inadvertent damage or destruction during Project maintenance activities, including:
  - Repair/maintenance activities at the Kaweah No. 3 Powerhouse[1];
  - Repair/maintenance of flumes, canals, and support structures;
  - Vegetation management;
  - Road and trail maintenance; and
  - Transmission, power, and communication line maintenance.
- Potential damage or destruction from continued public use of the Kaweah No. 2 Powerhouse River Access Parking Area.

A discussion of the potential effects to cultural resources that could occur as a result of implementation of the Proposed Action, considering new environmental measures; management and monitoring plans; and programs is provided below. Unavoidable adverse effects are also discussed at the end of this section.

As discussed in Section 8.1, effects are classified as no effect, negligible effect, adverse effect, or beneficial effect. For the purposes of this section, adverse effects are defined as those effects that will alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, workmanship, materials, feeling, setting, and association, as defined in 36 Code of Federal Regulations Part 800 (36 CFR Part 800).

### 8.12.1 Potential Effects from FERC Project Boundary Modifications

Under the Proposed Action, the FERC Project boundary would be modified to: (1) include all lands necessary for operation and maintenance of the Project; (2) remove lands no longer necessary for operation and maintenance of the Project; and (3) correct known errors in the current Exhibit G for the Project. Refer to Section 4.1 for a description of the FERC boundary modifications and Maps 4-1a through 4-1h.

Specifically, the FERC Project boundary would be increased to include existing Project facilities that are currently outside the boundary. These existing facilities are included in the Project APE and were previously surveyed and inventoried as part of the CUL 1 – Archaeology TSR.

[1] The Kaweah No. 3 Powerhouse is a component of the Kaweah No. 3 Hydroelectric System Historic District.

In addition, the FERC boundary would be decreased to remove communication line and road corridors that are remnants of the original Project which have been removed and/or replaced by newer technology and are no longer in existence. Two known sites are adjacent to a road corridor that is being removed from management, no ground disturbance or actual road removal is proposed – one resource is a historic-era isolate, and the other resource was a historic-era resource that has been destroyed by the property owner and no longer constitutes a site.

The Proposed Action includes development and implementation of a Historic Properties Management Plan (HPMP). The HPMP would guide the management, documentation, treatment and protection of unevaluated cultural resources and historic properties in the Project APE in accordance with Section 106. The HPMP would stipulate avoidance and protection measures to implement prior to any Project operation and maintenance activities that could affect historic properties and unevaluated cultural resources in the Project APE. The HPMP would also require that any unevaluated cultural resources that may be affected by Project operations be evaluated for the NRHP to determine historic property status. Lastly, the HPMP would stipulate consultation processes for the resolution of any adverse effects that are identified.

Under the Proposed Action, cultural resources and historic properties within the Project APE would be managed by the HPMP in compliance with Section 106. Therefore, FERC boundary modifications would have no effect on cultural resources or historic properties.

### 8.12.2 Potential Effects from Erosion Associated with Operation and Maintenance Activities

Under the Proposed Action, ongoing Project operation and maintenance activities that have the potential to cause erosion of cultural resources include: (1) spills from Project forebays/forebay tank; (2) draining of flowlines and forebays/forebay tank during planned Project maintenance outages; and (3) sediment management. These activities could result in erosion and/or inundation of cultural resources in natural drainage channels associated with these facilities, as described below.

Under the Proposed Action, forebay spills and draining of flowlines and forebays/forebay tank during Project outages would continue to occur. In the event of an unplanned powerhouse outage (i.e., unit trips), water in the flowlines continues to flow (drain) into the forebays/forebay tank until the diversion is turned out (closed). Water entering the forebays/forebay tank can either be: (1) passed through the generating units at the powerhouse (if operational); (2) released through the powerhouse bypass valve (if present); or (3) released from each forebay/forebay tank via Project spillways/spillway chutes that direct the overflow into natural drainage channels for conveyance to the Kaweah River (refer to Section 7.6 – Geology and Soils). The Proposed Action also includes draining of the flowlines and forebays/forebay tank during planned Project outages which includes opening the low-level outlet to release water into adjacent natural drainage channels.

Under the Proposed Action, sediment management activities would continue to be implemented at Project facilities to prevent deposits of sediment from building up or blocking Project flowlines and intakes. Sediment management activities include sediment removal/flushing at the Kaweah No. 1 Forebay Tank; sediment removal/flushing at the Kaweah No. 2 Forebay; and sediment removal at the Kaweah No. 3 Forebay. In order to conduct sediment management, Project forebays/forebay tank must be drained which includes opening low-level outlets to release water and flush sand and find sediment from the facilities and into natural drainage channels.

Cultural resources in the Project APE including archaeological sites P-54-004739/P-54-004756, P-54-004698, P-54-004695, K-ETE-002, K-ETE-003, K-ALK-001, P-54-004763, P-54-004764, P-54-005300, P-54-004765, and P-54-004761 are located adjacent and/or immediately downslope of Project forebays/forebay tank and their associated natural drainage channels. As such, spills and drainage events could affect known cultural resources through erosion or inundation. Additionally, while unlikely, Project spills and drainage events could erode soils and uncover previously unknown cultural resources.

As described above, the Proposed Action includes implementation of an HPMP that would guide the treatment and protection of historic properties and unevaluated cultural resources in the Project APE. Measures in the HPMP to protect cultural resources from potential erosion associated with Project operation and maintenance activities would include:

- NRHP evaluation of any unevaluated cultural resources that may be affected by operation and maintenance activities;
- Periodic site condition monitoring and monitoring of Project activities that have the potential to affect historic properties;
- Compliance procedures to be implemented in the event a previously unknown cultural resource is identified; and
- Requirements for consultation under Section 106 to address any adverse effects to identified historic properties.

Additionally, under the Proposed Action, an annual environmental training program would be administered to educate personnel and contractors about cultural resources in the vicinity of the Project and measures to protect these resources during routine operation and maintenance activities.

Under the Proposed Action, potential effects to cultural resources associated with erosion in natural drainage channels would be managed by the HPMP in compliance with Section 106. Additionally, implementation of the environmental training program would enhance management of and protect cultural resources in the Project APE. Therefore, implementation of the Proposed Action would have no effect on unevaluated cultural resources or historic properties.

### 8.12.3 Potential Inadvertent Damage or Destruction during Project Maintenance Activities

Under the Proposed Action, Project maintenance activities that have the potential to cause inadvertent damage or destruction of historic properties and/or unevaluated cultural resources include: (1) repair/maintenance activities at the Kaweah No. 3 Powerhouse (component of the Kaweah No. 3 Historic District); (2) repair of flumes, canals, and support structures (including components of the Kaweah No. 3 Historic District); (3) road and trail maintenance; and (4) transmission, power, and communication line maintenance. These activities could result inadvertent damage or destruction of historic properties and/or unevaluated cultural resources, as described below.

#### 8.12.3.1 Repair/Maintenance Activities at the Kaweah No. 3 Powerhouse

The NRHP eligible Kaweah No. 3 Hydroelectric System Historic District historic property includes Kaweah No. 3 Powerhouse[2], which could be affected by ongoing Project maintenance activities should such maintenance physically undermine any of the character defining features that convey the significance of the Powerhouse and the District, including the building's industrial Classical Revival mass, fenestration, ornamentation, and design (refer to the CUL 1 – Built Environment TSR in SD A for full listing of Kaweah No. 3 Hydroelectric System Historic District character defining features). Such maintenance and repair could include replacement and/or reconfiguration of fenestration, resurfacing of exterior walls, or addition of interior or exterior utility features.

#### 8.12.3.2 Repair of Flumes, Canals, and Support Structures

Under the Proposed Action, necessary repairs to Project flumes, canals, and support structures, including hand-patching of concrete, and repair of wood support structures, would continue to occur on an as-needed basis.

Cultural resources in the Project APE including archaeological sites P-54-004755, P-54-004616, P-54-004698, P-54-004696, P-54-004695, P-54-004693, P-54-4694, K-ALK-001, P-54-004762, P-54-004763, P-54-004764, and P-54-004765, P-54-004761 are located adjacent to or in close proximity to Project flowlines, canals, or support structures, and as such ongoing maintenance and repair of these flowlines has the potential to affect cultural resources through inadvertent damage or destruction to the sites.

Additionally, the NRHP eligible Kaweah No. 3 Hydroelectric System Historic District historic property includes Kaweah No. 3 Flowline and Kaweah No. 3 Forebay, which could be affected by Project maintenance should such maintenance undermine any of the character defining features that convey the significance of the facilities or of the district. Character defining features of the Kaweah No. 3 Flowline include its winding concrete ditch and flume infrastructure, stone wall foundational structure undergirding select portions, and board formed concrete slabs. Character defining features of the Kaweah No. 3 Forebay include its concrete lined forebay pool and its utilitarian control gates and

[2] The Kaweah No. 1 and No. 2 powerhouses are not part of the historic district and potential effects to resources adjacent to these sites are covered under routine maintenance activities.

spillway (refer to the CUL 1 – Built Environment TSR in SD A for full listing of Kaweah No. 3 Hydroelectric System Historic District character defining features).

#### 8.12.3.3 Vegetation Management

Under the Proposed Action, vegetation management would include ongoing vegetation trimming by hand, herbicide use, and hazard tree removal, and implementation of new measures to reduce the spread or introduction of noxious weeds (Appendix 4-A, Vegetation and Integrated Pest Management Plan).

These vegetation management activities have the potential to affect cultural resources through inadvertent damage or destruction to archaeological cultural resources that may be adjacent to clearance or management areas. Such affects could stem from site encroachment by management crews, damage from hazard tree felling, or ground disturbance associated with vegetation removal.

#### 8.12.3.4 Road and Trail Maintenance

Under the Proposed Action, Project access roads and trails would continue to be regularly inspected and repaired on an as-needed basis. Minor Project road maintenance generally includes, but is not limited to, the following types of activities: debris removal; basic repairs, including filing of potholes; maintenance of erosion control features such as culverts, drains, ditches, and water bars; repair, replacement, or installation of access control structures such as posts, cables, rails, gates, and barrier rock; and repair and replacement of signage. Major Project road maintenance generally includes, but is not limited to, the following types of activities: placement or replacement of culverts and other drainage features; bridge deck replacement; grading; sealing; resurfacing; and road replacement.

Cultural resources in the Project APE including archaeological sites P-54-000278, P-54-004693, P-54-004694, P-54-004754, CM-SSDV-2016-01, CM-SSDV-2016-02, and K-MMR-006 are located adjacent or in close proximity to Project roads, and as such ongoing maintenance and repair of these access facilities has the potential to affect cultural resources through inadvertent damage or destruction to archaeological sites. Such efforts could stem from site encroachment by management crews or ground disturbance associated with necessary repairs.

#### 8.12.3.5 Transmission, Power, and Communication Line Maintenance

The Proposed Action includes ongoing transmission, power, and communication line maintenance activities, including pole maintenance and replacement of damaged poles on an as-needed basis. New poles are placed in, or immediately adjacent to previously existing holes, using line trucks.

Cultural resources in the Project APE including NRHP-eligible archaeological historic property P-54-000232, NRHP-eligible archaeological historic property P-54-001480/H, and unevaluated archaeological site P-54-004342 are located in transmission line

corridors and in close proximity to utility poles and as such have the potential to be affected by pole replacement.

#### 8.12.3.6 Conclusion – Project Maintenance Activities

As described above, the Proposed Action includes implementation of an HPMP that would guide the treatment and protection of unevaluated cultural resources and historic properties in the Project APE. Management measures in the HPMP would include:

- NRHP evaluation of any unevaluated cultural resources that may be affected by adjacent maintenance activities;
- Avoidance measures, including establishment of buffers and protective barriers;
- Periodic site condition monitoring and monitoring of Project activities that have the potential to affect historic properties;
- Procedures to be implemented in the event a previously unknown cultural resource is identified;
- Stipulations that any maintenance work related to contributing elements of the Kaweah No. 3 Hydroelectric System Historic District would adhere to the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (36 CFR Part 68) (National Park Service 2017); and
- Requirements for consultation under Section 106 to address any adverse effects to identified historic properties.

Additionally, under the Proposed Action, an annual environmental training program would be administered to educate personnel and contractors about cultural resources in the vicinity of the Project and measures to protect these resources during routine operation and maintenance activities.

Under the Proposed Action, potential effects to cultural resources associated with Project maintenance activities would be managed by the HPMP in compliance with Section 106. Additionally, implementation of the environmental training program would enhance management of and protect cultural resources in the Project APE during maintenance activities. Therefore, implementation of the Proposed Action would have no effect on cultural resources.

### 8.12.4 Potential Damage or Destruction from use of the Kaweah No. 2 Powerhouse River Access Parking Area

The Project does not include any developed recreation facilities. However, SCE maintains a small parking area adjacent to the Kaweah No. 2 Powerhouse and allows the public to use this parking area on a limited basis. The Kaweah No. 2 Powerhouse River Access Parking Area is paved with six striped parking stalls, one of which is identified as disabled accessible. Other than signage, the parking area does not currently include any

amenities. This parking area is typically used by recreation visitors who park in the lot then walk to a small beach known locally as “Edison Beach”, located approximately 400 feet southeast of the parking lot, on the northeast bank of the Kaweah River. Edison Beach is not a formally developed recreation facility. Continued use of the parking area and beach has the potential to impact site P-54-004758.

The Proposed Action includes implementation of the Kaweah No. 2 Powerhouse River Access Parking Area Enhancement Measure (Appendix 4-A, Section 4.4.1). This measure requires SCE to continue to maintain the Kaweah No. 2 Powerhouse River Access Parking Area and allow the general public to use the parking area on a limited basis.

Under the Proposed Action, potential effects to site P-54-004758 associated with use of the Kaweah No. 2 Powerhouse River Access Parking Area and the adjacent Edison Beach area, would be managed by the HPMP in compliance with Section 106. Therefore, implementation of the Proposed Action would have no effect on this resource.

### 8.12.5 Unavoidable Adverse Effects

There are no unavoidable adverse effects to cultural resources or historic properties associated with implementation of the Proposed Action.

### 8.12.6 Literature Cited

National Park Service (NPS). 2017. Secretary of the Interior’s Standards for the Treatment of Historic Properties, with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings.

SCE (Southern California Edison Company). 1992. Cultural Resources Management Plan for SCE’s Kaweah Hydroelectric Project, Tulare County, California, FERC Project No. 298.

SCE. 2019a. CUL 1 – Cultural Resources Archaeology Technical Study Report, available in SD A.

SCE. 2019b. CUL 1 – Cultural Resources Built Environment Technical Study Report, available in SD A.

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## LIST OF ACRONYMS

| | |
|---|---|
| APE | Area of Potential Effects |
| CFR | Code of Federal Regulations |
| FERC or Commission | Federal Energy Regulatory Commission |
| HPMP | Historic Properties Management Plan |
| NHPA | National Historic Preservation Act |
| NRHP | National Register of Historic Places |
| Project | Kaweah Project |
| MW | Megawatt |
| SCE | Southern California Edison Company |
| SD | Supporting Document |
| TCP | Traditional Cultural Property |
| TSR | Technical Study Report |

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## 8.13 TRIBAL RESOURCES ENVIRONMENTAL EFFECTS

This section describes potential effects to tribal resources under the Proposed Action for Southern California Edison Company's (SCE) Kaweah Project (Project). Potential effects to tribal resources were identified based on continued operation and maintenance of the Project under the Proposed Action. A description of potential effects to cultural resources associated with operation and maintenance of the Project under the Proposed Action is presented in Section 8.12.

For the purposes of this section, tribal resources are identified as properties to which consulting Native American tribes ascribe traditional religious and cultural significance in the Project Area of Potential Effects (APE). Tribal resources that are listed in, or eligible for listing in, the National Register of Historic Places (NRHP) are identified as Traditional Cultural Properties (TCP). For the purposes of this section and as defined by Section 106 of the National Historic Preservation Act (NHPA), TCPs are historic properties. For a description of tribal resource identification efforts in the Project APE, refer to Section 7.13 and the CUL 1 – Ethnographic Technical Study Report (TSR) included in Supporting Document A (SD A) (SCE 2019).

Potential effects to tribal resources in the Project APE were evaluated as follows:

- Effects to Tribal Lands
- Effects to Tribal Agreements
- Effects to Tribal Resources and TCPs

As discussed in Section 8.1, effects are classified as no effect, negligible effect, adverse effect, or beneficial effect. For the purposes of this section, adverse effects are defined as those effects that will alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, workmanship, materials, feeling, setting, and association, as defined in 36 Code of Federal Regulations Part 800 (36 CFR Part 800).

A description of potential effects to tribal resources from implementation of the Proposed Action, considering new environmental measures; management and monitoring plans; and programs is provided below. Unavoidable adverse effects are also discussed at the end of this section.

### 8.13.1 Tribal Lands

No federally recognized tribal lands are located within or near the existing Federal Energy Regulatory Commission (FERC or Commission) Project boundary or within the Proposed FERC Project boundary. Therefore, implementation of the Proposed Action would have no effect on tribal lands.

### 8.13.2 Tribal Agreements

There are no known agreements between federally recognized tribes or other entities that have a connection to the operation and maintenance of the Project apart from the trust responsibilities accorded to tribes acknowledged by agencies of the United States. Therefore, implementation of the Proposed Action would have no effect on tribal agreements.

### 8.13.3 Tribal Resources and Traditional Cultural Properties

As discussed in Section 7.13 and detailed in CUL 1 – Ethnographic TSR included in SD A (SCE 2019), comprehensive outreach and consultation with federally-recognized and non-federally recognized tribes did not identify any tribal resources or TCPs in the Project APE.

While no tribal resources or TCPs have been identified in the Project APE, maintenance activities associated with continued operation and maintenance of the Project, including vegetation management; road and trail maintenance; and transmission, power, and communication line maintenance have the potential to affect tribal resources and/or TCPs if any such resources are identified in the future.

If tribal resources or TCPs are identified within the Project APE over the term of the new license, protection measures would be implemented as part of an Historic Properties Management Plan (HPMP) (refer to Appendix 4-A). Specifically, the HPMP would include stipulations regarding the management and protection of a tribal resources or TCPs; documentation and evaluation requirements; treatment and protection measures; and consultation protocol related to any identified tribal resource or TCP. Ongoing maintenance activities would have no effect on tribal resources and TCPs with implementation of the HPMP.

Additionally, under the Proposed Action, an annual environmental training program would be administered to educate personnel and contractors about cultural resources, including tribal resources, in the vicinity of the Project and measures to protect these resources during routine maintenance activities. Implementation of the environmental training program would result in a beneficial effect on tribal resources.

### 8.13.4 Unavoidable Adverse Effects

There are no unavoidable adverse effects to tribal resources under the Proposed Action.

### 8.13.5 Literature Cited

SCE (Southern California Edison Company). 2019. CUL 1 – Cultural Resources Ethnographic Technical Study Report, available in SD A.

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| | |
|---|---|
| Project | Kaweah Project |
| SCE | Southern California Edison Company |

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## 8.14 SOCIOECONOMICS ENVIRONMENTAL EFFECTS

This section describes potential effects to socioeconomics under the Proposed Action for the Southern California Edison Company's (SCE) Kaweah Project (Project). Potential effects to socioeconomic resources were evaluated based on continued operation and maintenance of the Project under the Proposed Action.

Potential effects to socioeconomics were evaluated as follows:

- Changes in workforce;
- Changes in housing demand and real estate/property tax base;
- Demand for public services;
- Effects on local and regional economy and local and state tax revenue;
- Displacement of residences/business establishments and effects on property value; and
- Effects on low-income and minority populations (environmental justice).

A description of potential effects to socioeconomics from implementation of the Proposed Action, considering new environmental measures; management and monitoring plans; and programs is provided below. Unavoidable adverse effects are also discussed at the end of this section.

### 8.14.1 Changes in Workforce

Under the Proposed Action, the workforce associated with the Project would not change. There are no new facilities or modifications to existing facilities included under the Proposed Action that would result in the need for a temporary workforce or additional full-time personnel. The existing SCE workforce of 11 full-time personnel is sufficient to operate and maintain the Project over the term of the new license. Implementation of the Proposed Action would have no effect on Project workforce.

### 8.14.2 Changes in Housing Demand and Real Estate/Property Tax Base

The workforce necessary to operate and maintain the Project over the term of the new license would not change. As a result, implementation of the Proposed Action would have no effect on housing demand, or the real estate/property tax base in the local community.

### 8.14.3 Demand for Public Services

The demand for public services including law enforcement and public safety; fire protection; emergency services/response; road maintenance and repairs; and educational facilities does not measurably increase under the Proposed Action. No

additional temporary or full-time workers would be added to SCE's workforce creating demand for public services. Installation of the new Porta-Potty and trash receptacle at the Kaweah No. 2 Powerhouse River Access Parking Area would require periodic pumping and disposal, however, implementation of this recreation enhancement would have a negligible effect on public services.

### 8.14.4 Effects on Local and Regional Economy and Local and State Tax Revenue

The Project's contribution to the local and regional economy would remain relatively unchanged, as no new facilities or modifications to existing facilities are proposed, and the current SCE workforce is sufficient to operate and maintain the Project over the term of the new license. Environmental measures to be implemented under the Proposed Action would require periodic monitoring of resources and facilities. These activities would occur once every 5 or 10 years depending on the measure and involve SCE's consultant visiting the Project to conduct monitoring activities. This would result in a benefit to the local economy and increase local tax revenue.

Under the Proposed Action, implementation of the Instream Flow Measure (Appendix 4-A, Section 4.1.1) reduces average annual generation would be reduced by 6.0% at the Kaweah No. 1 Powerhouse and 0.8% at the Kaweah No. 2 Powerhouse. This equates to a reduction of approximately $50,000 in Project value per year. In addition, increased maintenance requirements under the Proposed Action would further reduce net Project revenue (Section 4.0). Overall, these changes would have a negligible effect on the local/regional economy and local/state tax revenue.

### 8.14.5 Displacement of Residences/Business Establishments and Effects on Property Value

The Project is located proximate to the unincorporated town of Three Rivers, a rural, commercial-tourist area with a population of approximately 2,200 people. The Project facilities are located on private property and public lands administered by the U.S. Bureau of Land Management. There are private residences and businesses located in the vicinity of the Project, and several Project facilities cross private parcels via easement/agreement with the land owner.

There are no new facilities or modifications to existing facilities included under the Proposed Action that would result in the displacement of residences/businesses in the Project vicinity. Further, minor changes in operation and maintenance activities and enhancements included under the Proposed Action would not affect residences/businesses or property values.

### 8.14.6 Effects on Low-income and Minority Populations (Environmental Justice)

Environmental justice effects occur if low-income or minority populations incur a disproportionately high share of adverse socioeconomics effects caused by implementation of an action. Implementation of the Proposed Action would not result in adverse socioeconomic effects. Therefore, there are no effects related to environmental justice.

### 8.14.7 Unavoidable Adverse Effects

There are no unavoidable adverse socioeconomic effects under the Proposed Action.

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| | |
|---|---|
| ac-ft | acre-foot/feet |
| BLM | Bueear of Land Management |
| CAMX | California-Mexico Power Area |
| CCAR | California climate Action Registry |
| CEC | California energy Commission |
| $CH_4$ | methane |
| $CO_2$ | carbon dioxide |
| $CO_2e$ | carbon dioxide equivalents |

| | |
|---|---|
| eGrid | Emissions and Generation Resource Integrated Database |
| EPA | U.S. Environmental Protection Agency |
| ESM | Entrainment Study Measure |
| ETP | Environmental Training Program |
| FERC | Federal Energy Regulatory Commission |
| FPMP | Fish Population Monitoring Plan |
| GHG | greenhouse gases |
| GWP | global warming potential |
| IFM | Instream Flow Measure |
| IPCC | Intergovernmental Panel on Climate Change |
| IRP | Integrated Resource Plans |
| mg/L | milligrams per liter |
| MT | metric tons |
| MW | megawatts |
| MWh | megawatt hours |
| $N_2O$ | nitrous oxide |
| NEPA | National Environmental Policy Act |
| NPS | National Park Service |
| PAD | Pre-Application document |
| Project | Kaweah Project |
| SB | Senate Bill |
| SCE | Southern California Edison Company |
| SMECP | Seidment Management and Erosion control Plan |
| SNP | Sequoia National Park |
| SUP | special Use Permit |
| USACE | United States Army Corps of Engineers |
| Watershed | Kaweah River Watershed |
| WECC | Western Electricity Coordination Council |
| WQMP | Water Quality Monitoring Plan |
| WTMP | Water Temperature Monitoring Plan |

# 9.0 CUMULATIVE EFFECTS ANALYSIS

The regulations implementing the National Environmental Policy Act (NEPA) define a cumulative effect as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR § 1508.7). Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time, including hydropower development.

The Proposed Action is operation and maintenance of the Kaweah Project (Project), with increased minimum instream flows, modified ramping rates, and implementation of new environmental programs and measures as described in Section 4.0 – Proposed Action.

Projects/actions considered in this cumulative effects analysis include:

- Operation and management of non-Federal Energy Regulatory Commission (FERC or Commission) facilities by Southern California Edison Company (SCE) located in the Sequoia National Park (SNP) that are not subject to a FERC License. This includes the upper portion of the Kaweah No. 1 and the Kaweah No. 3 developments, that are operated under a Special Use Permit (SUP) (Permit PWR-SEKI-6000-2016-015) issued to SCE by the National Park Service (NPS). Refer to Section 3.0 – No-Action Alternative for a detailed description of elements of the developments both within and outside of FERC jurisdiction. The following briefly describes SCE's non-FERC facilities.

    - Upper portion of the Kaweah No. 1 Development – The upper portion of the Kaweah No. 1 Development includes four small reservoirs—Eagle Lake, Lady Franklin Lake, Crystal Lake, and Upper Monarch Lake (collectively referred to as the Mineral King Lakes)—that release water during the late summer and fall months to augment flows in the East Fork Kaweah River and generating capacity of the Kaweah No. 1 Powerhouse.

    - Upper portion of the Kaweah No. 3 Development – The upper portion of the Kaweah No. 3 Development, includes the Middle Fork and Marble Fork diversion dams, and water conveyance system (Kaweah No. 3 Flowline) that divert water from the Middle Fork and Marble Fork river reaches to the Kaweah No. 3 Powerhouse.

- Operations and management of SNP – The SNP is managed by the NPS to protect the greater Sierran ecosystem, including the sequoia groves and high Sierra regions of the parks, and its natural evolution, and to provide appropriate opportunities for present and future generations to experience and understand park resources and value. SNP borders the Kaweah Project to the north and east.

- Management of federal land by Bureau of Land Management (BLM) – BLM manages federal lands located both within the FERC Project boundary and immediately adjacent to the Project to protect resources consistent with the Bakersfield Field Office Resource Management Plan.

- Operations and maintenance of the Terminus Dam and Lake Kaweah – The U.S. Army Corps of Engineers (USACE) operates and maintains Terminus Dam and Lake Kaweah. The Dam is located on the Kaweah River approximately 10 miles downstream of the Project. Terminus Dam was constructed in 1962 for flood control and irrigation purposes. During the spring runoff season, the reservoir stores up to 185,000 acre-feet (ac-ft) of water. Downstream of Terminus Dam, the Kaweah River flows are diverted for irrigation of adjacent farmlands. The Terminus Power Plant (FERC Project No. 3947), completed in 1992 by the Kaweah River Power Authority, generates hydroelectricity at the dam. The power plant is jointly managed by Tulare Irrigation District and the Kaweah Delta Water Conservation District. The power plant has a capacity of 20.09 megawatts (FERC 2003a, 2003b).

### 9.10.1 Target Resources

The target resources considered for inclusion in the cumulative impact analysis were identified based on FERC's Scoping Document 2 (FERC 2017) and a review of the technical information developed in support of this Application for New License (License Application). For this analysis, target resources that may be cumulatively affected by the incremental actions of the Project, in combination with other past, present, and reasonably foreseeable future actions, include water use (hydrology), water quality (water temperature and dissolved oxygen), and aquatic resources (aquatic habitat, fish, and entrainment).

### 9.10.2 Geographic Scope

The geographic scope for the cumulative impact analysis defines the physical limits or boundaries of the effects on target resources from implementation of the Proposed Action when considering effects from other projects/actions. The geographic scope of analysis for cumulatively affected resources is defined by the physical limits or boundaries of: (1) the Proposed Action's effect on the resources; and (2) contributing effects from other hydropower and non-hydropower activities within the Kaweah River Basin. The geographic scope appropriate for evaluating cumulative effects for the Project is the:

- Kaweah River from Terminus Dam upstream to the confluence with the Middle Fork Kaweah River and Marble Fork Kaweah River;

- Middle Fork Kaweah River from the confluence with the Kaweah River upstream to the Middle Fork Diversion Dam;

- Marble Fork Kaweah River from the confluence with the Kaweah River upstream to the Marble Fork Diversion Dam; and

- East Fork Kaweah River from the confluence with the Kaweah River upstream to the confluence with tributaries receiving water from the Mineral King Lakes.

### 9.10.3 Temporal Scope

The temporal scope for the cumulative impact analysis defines the length of time analyzed when evaluating resource effects of the Proposed Action in the context of past, present, and reasonably foreseeable future actions. Evaluations of past and future actions are limited by the amount of available information for each target resource and by information defining future projects and actions. Based on the anticipated term of the new license for the Kaweah Project, the temporal scope used for the analysis of reasonably foreseeable future actions is 50 years.

## 9.11 CUMULATIVE EFFECTS ON WATER RESOURCES

### 9.11.1 Water Use (Hydrology)

Information on the hydrologic effects of operations of the Kaweah Project is provided in Section 4.0 – Proposed Action, Sections 7.2 – Water Use and Hydrology Affected Environment, 8.2 – Water Use and Hydrology Environmental Effects, and SCE's Pre-Application Document (PAD). Other water projects/actions, in addition to the Kaweah Project, that affect hydrology in the Kaweah River Watershed (Watershed) include the following:

- Operation of SCE's non-FERC facilities located within the SNP – SCE's non-FERC facilities have: (1) resulted in run-of-the-river diversion of water from the Marble Fork and Middle Fork Kaweah rivers, which create bypass reaches, and, then re-entry of the water back into the Kaweah River at the Kaweah No. 3 Powerhouse; and (2) allow for temporary storage of a small of amount of headwater flow (1,152 ac-ft) in Mineral King Lakes located in the upper East Fork Kaweah Watershed and subsequent annual release of the water into the East Fork Kaweah River in late summer/fall.

- USACE's Terminus Dam and Kaweah Lake – USACE operation and maintenance of Terminus Dam and Lake Kaweah impounds water for irrigation and flood control.

A discussion of the cumulative effects of these projects/actions on hydrology in the Kaweah River is provided below.

SCE's Kaweah Project operational effects, as modified under the Proposed Action, on hydrology are analyzed in Section 8.2 – Water Use and Hydrology. The Proposed Action affects a relatively small portion of the Watershed (4.1 miles of the Kaweah River and 4.7 miles of the East Fork Kaweah River). The Proposed Action includes the Instream Flow Measure (IFM) (new minimum instream flows and modified ramping rates), and continued forebay spills and flowline draining during Project outages and sediment

management. The IFM increases minimum flows in the bypass reaches and provides for a better environmental balance of water use between power generation and environmental flow. Under the Proposed Action, there is an approximately 6.0% and 0.8% decrease in water available for power generation at the Kaweah No. 1 and Kaweah No. 2 powerhouses, respectively. This results in a commensurate increase in flows and habitat in the bypass reaches (Section 8.4 – Fish and Aquatic Resources). The IFM also maintains pre-1914 consumptive water right deliveries of 1 cubic foot per second (cfs) and 3 cfs in the Kaweah No. 1 and No. 2 flowlines, respectively. This reduces the need for flow modifications/variances in years when natural flows are too low to meet both minimum flows and consumptive water rights requirements.

Ramping rates in the IFM protect environmental resources (Section 8.4 – Fish and Aquatic Resources) and public safety (Section 8.10 – Recreation Resources), but have limited hydrology effects (only modify flows over a few hours at a time), and do not significantly affect water available for generation or water supply. Forebay spills and draining of flowlines and forebays during Project outages and sediment management are the same under the No-Action and Proposed Action. Because the Project does not include storage and is composed of run-of-the-river diversions, downstream of the Project (downstream of Kaweah No. 2 Powerhouse), essentially full natural hydrology exists in the Kaweah River; and natural seasonal patterns of high and low flow are not altered.

SCE's non-FERC facilities located within the SNP on the Marble Fork and Middle Fork Kaweah rivers include run-of-the-river water diversions, which bypass 0.58 mile of the Marble Fork, 0.87 mile of the Middle Fork Kaweah River, and 3.57 miles of the Kaweah River. Diverted water re-enters the Kaweah River at the Kaweah No. 3 Powerhouse. Up to 80 cfs may be diverted into flowlines and re-enter the river. Natural seasonal patterns of high and low flow are not altered. The amount of flow in the upstream bypass reaches, related to environmental and recreational hydrology resources, is governed by requirements in NPS SUP.

SCE's non-FERC Mineral King Lakes storage in the SNP affect flows in the East Fork Kaweah River a very small amount. The lakes store up to 1,152 ac-ft in the spring and that water is released into the East Fork Kaweah River in late summer/fall. These flows may be diverted at the Kaweah No. 1 Diversion and re-enter the Kaweah River at the Kaweah No. 1 Powerhouse. The amount of flow change in the East Fork Kaweah River due to storage in the Mineral King Lakes is small.

USACE's Terminus Dam/Lake Kaweah is located approximately 10 miles downstream of the Kaweah Project. During the spring runoff season, the reservoir stores up to 185,000 ac-ft of water. Water is released from the dam by the USACE for flood control and to meet irrigation needs. Downstream of Terminus Dam, the Kaweah River flows are diverted for irrigation of adjacent farmlands. Water releases serve multiple local water districts, including the Tulare Irrigation District and the Kaweah Delta Water Conservation District, and urban areas, including the cities of Tulare and Visalia. The Terminus Power Plant, completed in 1992 by the Kaweah River Power Authority, generates hydroelectricity at the dam. The power plant is jointly managed by Tulare Irrigation District

and the Kaweah Delta Water Conservation District, and the electricity is distributed by SCE. The power plant has a capacity of 20.09 megawatts (FERC 2003a, 2003b).

Overall, in the Watershed, there is no cumulative effect on hydrology. Flow into Kaweah Lake is not affected and water supply in Kaweah Lake and flood control are unaffected by the Proposed Action. The Proposed Action in combination with other projects/actions in the Basin would not cumulatively effect hydrology in the Kaweah River and East Fork Kaweah River.

### 9.11.2 Water Quality (Temperature and Dissolved Oxygen)

Overall, operations of the SCE's Kaweah Project (No-Action Alterative) do not affect water quality, in particular, dissolved oxygen, and only minimally affect water temperature. The Proposed Action slightly improves water temperature in the bypass reaches. The Proposed Action IFM provides higher minimum instream flows (Section 8.4 – Fish and Aquatic Resources) in the bypass reaches during select dry months and water year types. As a result of the increased minimum instream flows, less water is diverted, and more water remains in the Kaweah River and East Fork Kaweah River. The modified minimum instream flows slightly improve summer/fall low flow season water temperatures in the bypass reaches compared to existing conditions (No-Action Alternative) (Section 8.4 – Fish and Aquatic Resources).

Under existing conditions water quality is good and meets all applicable water quality standards (e.g., oxygen) in the bypass reaches (Section 7.3.4.2) except that during the high-flow season, several water quality samples in the Kaweah River bypass reaches and comparison reaches exhibited low alkalinity (<20 mg/L). This appears to be a natural condition of the Watershed during spring high-flow conditions when snowmelt and rainfall runoff have little opportunity to pick up calcium carbonate from the basin geology. Also, there were three ammonia samples in the bypass reaches during the summer low-flow sampling period that exceeded water quality criteria. Because the Project does not have operations that would typically affect ammonia, the source could potentially be septic systems from homes along the river (Section 7.3 – Water Quality). The increased minimum instream flows may slightly improve water quality in the low-flow periods through dilution. The Proposed Action also includes implementation of water temperature (WTMP) and water quality (WQMP) monitoring plans.

SCE's non-FERC facilities located within the SNP on the Marble Fork and Middle Fork Kaweah rivers include run-of-the-river water diversions, similar to the Kaweah Project. The diversion and re-entry of water back into the Kaweah River at Kaweah No. 3 Powerhouse does not affect dissolved oxygen in the rivers (dissolved oxygen would be naturally saturated from the open flowlines and rivers). It is anticipated, that similar to the Kaweah Project, the diversions and bypass reaches may have a very small effect on water temperature (very slight increase in the warm months when diversions are occurring). During the driest months and water year types diversions would cease and water temperature would be unaffected.

SCE's non-FERC Mineral King Lakes storage in the SNP affect flows in the East Fork Kaweah River (a very small amount) in late summer/fall. The increased flows in late summer/fall could potentially have a small beneficial effect (cooling) on East Fork Kaweah River water temperature upstream of the Kaweah No. 1 Diversion and downstream of the Kaweah No. 1 Powerhouse in the Kaweah River. Water in the bypass reaches and other river reaches would maintain high dissolved oxygen levels.

USACE's Terminus Dam/Lake Kaweah impounds water, and typical of storage reservoirs, it is anticipated that the reservoir creates a warm epilimnon and cooler hypolimnion during the summer/early fall season that creates warm water conditions suitable for warm water fishes and a cooler water conditions suitable for cool water fishes (assuming oxygen is not depleted). Dissolved oxygen and water temperature inflows to Lake Kaweah would not be altered from existing conditions; therefore, the oxygen and temperature stratification dynamics that are currently occurring in the reservoir would remain unchanged.

The Proposed Action, including the IFM, WTMP, and WQMP measures in combination with other projects/actions in the Watershed, would have no effect on dissolved oxygen/water quality. There would be small local beneficial effect on water temperature in the bypass reaches, but overall a negligible effect on water temperature in the larger Kaweah River, downstream or upstream of the Kaweah Project, compared to the No-Action Alternative.

## 9.12 CUMULATIVE EFFECTS ON AQUATIC RESOURCES

### 9.12.1 Aquatic Habitat

The Proposed Action, with the IFM increased minimum instream flows in the bypass reaches, would have a beneficial effect on aquatic habitat in the bypass reaches. There would be a small benefit in water temperature (slightly cooler) and a benefit to aquatic physical habitat for both wetted perimeter (algae and benthic macroinvertebrates) and habitat for the dominate fishes in the bypass reaches (hardhead, Sacramento pikeminnow, Sacramento sucker, and rainbow trout) (Sections 8.4.1 and 8.4.2). Other physical habitat features such as sediment/spawning gravels and riparian vegetation would remain suitable and similar to existing conditions (No-Action Alternative). The Proposed Action WTMP and WQMP measures would also require periodic monitoring of water temperature and water quality. The Sediment Management and Erosion Control Plan (SMECP) would maintain suitable water quality during Project operations and maintenance activities.

SCE's non-FERC facilities located within the SNP on the Marble Fork and Middle Fork Kaweah rivers include run-of-the-river water diversions similar to the Kaweah Project. Aquatic habitat in the bypass reaches is governed by minimum instream flow requirements in the NPS SUP. Relative aquatic habitat amounts, compared to unimpaired habitat, is similar to those in the bypass reaches (e.g., a high percentage of the unimpaired habitat).

SCE's non-FERC Mineral King Lakes storage in the SNP affects flows in the East Fork Kaweah River, a very small amount, in late summer/fall. The increased flows in late summer/fall could potentially have a small beneficial effect on aquatic habitat on East Fork Kaweah River upstream of the Kaweah No. 1 Diversion and downstream of the Kaweah No. 1 Powerhouse in the Kaweah River during the low flow season compared to unimpaired conditions.

USACE's Terminus Dam/Lake Kaweah impounds water and creates a warm epilimnon during the summer/early fall season, which provides warm water conditions for transition zone and warm water fish community and provides a cool hypolimnion for cold-water species (i.e., trout). Inflows to Lake Kaweah would not be altered from existing conditions; therefore, the amount of aquatic habitat present in the reservoir would remain the same.

The Proposed Action, including the IFM, WTMP, WQMP, and SMECP measures in combination with other projects/actions in the Watershed, would have a beneficial effect on aquatic habitat in the Kaweah River and East Fork Kaweah rivers compared to the No-Action Alternative.

### 9.12.2 Resident Fish

The existing conditions (No-Action Alternative) within the study area exhibit a distribution and diversity of resident fish species typical of Sierra Nevada transition zone fisheries (Section 7.4 – Fish and Aquatic Resources). This includes primarily minnow species (hardhead and Sacramento pikeminnow), Sacramento suckers, and rainbow trout (Section 7.4 – Fish and Aquatic Resources). The growth, condition, abundance, and timing of fishes observed in the Project area was similar to those in other west slope Sierra streams and there were no observable differences in abundance (or other factors) in the bypass reaches compared to the comparison reaches. The Proposed Action, with the IFM increased minimum instream flows and modified ramping rates, Fish Population Monitoring Plan (FPMP), SMECP, WTMP, WQMP and Environmental Training Program (ETP) would provide beneficial effects to resident fish species compared to the No-Action Alternative.

SCE's non-FERC facilities located within the SNP on the Marble Fork and Middle Fork Kaweah rivers include bypass reaches, similar to the Kaweah Project. Resident fish species distribution and abundance are similar to those in the bypass reaches, except the higher elevation streams have cooler water temperature and have a higher abundance of trout compared to the study area. Also, within these bypass reaches, the upstream distribution limit of transition minnow species (hardhead and Sacramento pikeminnow) occurs.

SCE's non-FERC Mineral King Lakes storage in the SNP affects flows in the East Fork Kaweah River a very small amount in late summer/fall, and has a negligible effect on the distribution and abundance of fish in the East Fork Kaweah River.

USACE's Terminus Dam/Lake Kaweah creates a warm epilimnon during the summer/early fall season, which provides warm water conditions suitable for transition and warm water fishes. It is anticipated that a suite of warm water fishes (e.g., centrarchids) inhabit the reservoir. Likely, some cooler water fishes also exist in the reservoir. Lake Kaweah would not be altered from existing conditions due to the Proposed Action; therefore, the fishes currently occurring in the reservoir would remain the same.

The Proposed Action, including the IFM, FPMP, SMECP, WTMP, WQMP, and ETP in combination with other projects/actions in the Watershed, would have a beneficial effect on fish in the Kaweah River and East Fork Kaweah rivers compared to the No-Action Alternative.

### 9.12.3 Entrainment

Under existing conditions (No-Action Alternative), potential entrainment of fish into the Kaweah No. 1 and No. 2 flowlines and Kaweah No. 1, No. 2, and No. 3 powerhouses is discussed in Section 7.4.11.3. The AQ 9 – Entrainment Technical Study is currently being conducted. Sampling to date has shown very little entrainment (one 200 millimeter pikeminnow has been captured) and anecdotal information from maintenance workers and field biologists' observations indicate that entrainment is very low. The Proposed Action does not change the diversions or diversion timing and does not change the diversion amounts appreciably (slight decrease due to the IFM); therefore, the Proposed Action would have no effect on entrainment of fish compared to existing conditions (No-Action Alternative).

SCE's non-FERC facilities located within the SNP on the Marble Fork and Middle Fork Kaweah rivers include two diversions and the Kaweah No. 3 Powerhouse. Entrainment sampling to date for the Kaweah Project has found very low entrainment and anecdotal information from maintenance workers and field biologists' observations indicate that entrainment at the facilities in the SNP is also very low.

SCE's non-FERC Mineral King Lakes storage in the SNP slightly changes the timing of diversions in the East Fork Kaweah River, but does not affect the amount of diversion. It is anticipated that the Project does not significantly affect entrainment of fish.

USACE's Terminus Dam/Lake Kaweah creates habitat for various species of fish. Entrainment of fish could occur at the hydropower facility at Terminus Dam. Conditions in Lake Kaweah would not be altered by the Proposed Action; therefore, any potential entrainment in the reservoir would continue to occur.

The Proposed Action, including the Entrainment Study Measure (ESM) in combination with other projects/actions in the Watershed, would not affect fish entrainment in the Kaweah River and East Fork Kaweah rivers compared to the No-Action Alternative.

## 9.13 CUMULATIVE EFFECTS ON GLOBAL CLIMATE CHANGE (GREENHOUSE GAS EMISSIONS)

Global climate change is the common nomenclature used to describe an increase in the average temperature of the Earth's atmosphere and oceans, and its projected continuation. The causes of global climate change have been linked to both natural processes and human actions. Gases that trap heat in the atmosphere are often called greenhouse gases (GHG). The greenhouse effect traps heat in the troposphere through a threefold process: short-wave radiation emitted by the sun is absorbed by the earth; the earth emits a portion of this energy in the form of long-wave radiation; and GHGs in the upper atmosphere absorb this long-wave radiation and emit it into space and back toward the earth. This "trapping" of the long-wave (thermal) radiation emitted back toward the earth is the underlying process of the greenhouse effect. According to the Intergovernmental Panel on Climate Change (IPCC), global increase in GHG emissions are primarily associated with fossil fuel combustion and industrial processes, as a result of global, economic, and population growth (IPCC 2014). Furthermore, it is estimated that human activities have caused a 1 degree Celsius (°C) increase above pre-industrial levels with global warming estimated to reach 1.5°C between 2030 and 2052, if the current GHG emissions rates continue (IPCC 2018).

Principal GHGs include carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), and fluorinated gases (i.e., hydroflurocarbons, perfluorocarbons, sulfur hexafluoride). Some GHGs, such as $CO_2$, $CH_4$, and $N_2O$, can occur naturally and are emitted into the atmosphere through natural processes and human activities.

The potential heat trapping ability of each GHG varies substantially. To account for these differences in warming effect, GHGs are defined by their global warming potential (GWP). The GWP value for a GHG depends on the time span over which it is calculated and on how the gas concentration decays in the atmosphere over time. For that reason, slightly different GWP values appear in scientific literature. This impact assessment is based on the GWP values for a 100-year time horizon as provided in the IPCC Fourth Assessment Report. Under this methodology, the GWP of $CO_2$ is set to 1, the GWP of $CH_4$ is 25, and the GWP of $N_2O$ is 298.

In this analysis, GHGs are reported as carbon dioxide equivalents ($CO_2e$) to measure their relative potency. $CO_2e$ takes into account the relative potency of the non-$CO_2$ GHGs and converts quantities to an equivalent amount of $CO_2$, so that all emissions are reported as a single quantity.

This analysis focuses on the potential incremental (cumulative) effects of the Proposed Action on GHG emissions within California considering legislation developed in the state to address global warming from past and current projects and reasonably foreseeable future projects. At present, the State of California is the controlling legal authority on GHG emissions. The following compares GHG emission between the No-Action Alternative and Proposed Action in context with other SCE hydroelectric projects.

The Project, under the No-Action Alternative, generates electricity via renewable, hydroelectric power. Hydroelectric power from the Project is produced at three Project powerhouses with a total installed capacity of 8.85 megawatts (MW) and an annual average energy production of 39,124 megawatt hours (MWh)[1] under the No-Action Alternative.

Conventional hydroelectric generation is a reliable, efficient, economical, and less-polluting source of energy resulting in low GHG emissions. Although considered a small hydroelectric project, energy from the Project is used to meet California's energy demand, renewable energy goals, and provide a source of energy with low GHG emissions. The Project's hydroelectric facilities do not produce GHG emissions, rather the Project produces an "offset" in terms of the GHGs that would otherwise be generated by more $CO_2$ intense energy sources (i.e., natural gas). As shown in Table 9-1, existing Project generation results in a total offset of 9,404 metric tons (MT) $CO_2e$ annually.

Under the Proposed Action, overall Project generation would be reduced by 6.0% at the Kaweah No. 1 Powerhouse and 0.8% at the Kaweah No. 2 Powerhouse due to higher instream flow releases in new environmental measures proposed by SCE (Section 4, Appendix 4-A). This equates to an annual generation loss of 664 MWh and results in an overall annual average energy production of 38,460 MWh. Project generation under the Proposed Action results in a total offset of 9,245 MT $CO_2e$ annually. A difference of 160 MT $CO_2e$ annually between the No-Action and the Proposed Action Alterative (Table 9-1). Appendix 9-A provides a description of the methodology used to determine the effect of this loss in generation on GHGs.

The Kaweah Project falls under SCE's small hydropower portfolio. As such, the offset loss that would occur under the Proposed Action is minor in comparison to larger hydropower projects like the Big Creeks Nos. 2A, 8, and Eastwood Hydroelectric Project (FERC Project No. 67) with installed capacity of 373 MW, and Big Creek No. 3 Hydroelectric Project (FERC Project No. 120) with installed capacity of 165 MW.

Although relatively small compared to other SCE hydropower projects, power generated by the Project would offset negative impacts associated with non-renewable energy sources. The slight reduction in net GHG emissions offsets under the Proposed Action would have a negligible effect on global climate change. While SCE would have to replace the loss of generation under the Proposed Action, any replacement generation would be consistent with current legislative mandates adopted by the State of California requiring reduction in statewide GHG emissions from current levels. These include:

- **Senate Bill 32 (SB 32)**: On September 8, 2016, former governor Jerry Brown signed Senate Bill (SB) 32 that extends the state's target to reduce GHG emissions. The bill mandates a 40% reduction in GHG emissions below 1990 levels by 2030 and essentially builds upon the Assembly Bill (AB) 32 GHG reduction target to reduce GHG to 1990 levels by 2020. To achieve the SB 32 reductions the plan is to increase renewable energy use, improve energy

[1] Period of record used to determine annual average energy production was 1992–2018.

efficiency, get more zero emissions vehicles on California's roadways, and curb emissions from key industries (State of California 2019).

- **SB 350**: Signed into law in 2015, SB 350 increases California's renewable electricity procurement requirements from 33% by 2020 to 50% by 2030. This will increase the use of Renewables Portfolio Standard eligible resources, including solar, wind, biomass, geothermal, and others. SB 350 requires the state to double statewide energy efficiency savings in electricity and natural gas end uses by 2030.

- **SB 100**: Signed into law in 2018, SB 100 increases California's renewable electricity procurement requirements from 50% by 2030, with the passage of SB 350, to 50% by 2026, 60% by 2030, and ultimately 100% carbon free resources by 2045.

To help ensure the renewable electricity requirements of SB 350 and SB 100 are met and GHG emission reductions in SB 32 are realized, large utilities are required to develop and submit Integrated Resource Plans (IRP). These IRPs detail how each utility will meet their customers resource needs, reduce greenhouse gas emissions and ramp up the deployment of clean energy resources (CEC 2019).

Despite the loss of generation associated with implementation of the Proposed Action, the Project would continue to produce electric energy with low GHG emissions and operation of the Project would continue to provide a valuable offset for GHGs. The Project's continued operation, even considering the loss of generation, helps California move toward a lower carbon future and meet the goals of SB 32 and SB 350. In addition, SCE would have to replace any loss of generation from the Project with an alternative source that has low GHG emissions to comply with current legislative requirements. Therefore, impacts of the Proposed Action on GHG emissions and the resulting effect on global warming, when considering other projects/actions, are negligible.

No unavoidable cumulative adverse effects to climate change have been identified under the Proposed Action.

## 9.14 UNAVOIDABLE ADVERSE EFFECTS

No unavoidable cumulative adverse effects have been identified under the Proposed Action.

## 9.15 LITERATURE CITED

CCAR (California Climate Action Registry). 2009. General Reporting Protocol, Version 3.1. Available at: http://www.caclimateregistry.org/tools/protocols/general-reporting-protocol.html

CEC (California Energy Commission). 2019. Available at: https://www.energy.ca.gov/sb350/.

EPA (U.S. Environmental Protection Agency). 2016. Emissions and Generation Resource Integrated Database (eGRID). Available at: https://www.epa.gov/energy/emissions-generation-resource-integrated-database-egrid

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IPCC (Intergovernmental Panel on Climate Change). 2014. IPCC Assessment Reports, Climate Change 1990, 1995, 2001, 2007, 2014, (Reports 1-5). Available at: https://www.ipcc.ch/reports/.

IPCC. 2018. Special Report: Global Warming of 1.5°C, Summary for Policymakers. Available at: https://www.ipcc.ch/reports/.

State of California. 2019. California Climate Change Legislation. Available at: https://www.climatechange.ca.gov/state/legislation.html.

# TABLES

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## Table 9-1. Estimated Annual Hydroelectric Generation Offsets - Greenhouse Gas Emissions

| Greenhouse Gas Emissions | GWP Coefficient | Emission Factors GHG lbs/MW-hr | GWP lbs/MW-hr | Generation Offset Generation MW-hrs/yr | GHG tonnes/yr | $CO_2$ eqv tonnes/yr |
|---|---|---|---|---|---|---|
| **Existing** | | | | | | |
| Carbon Dioxide (GHG - $CO_2$) | 1 | 527.90 | 527.90 | 39,124 | 9,368 | 9,368 |
| Methane (GHG - $CH_4$) | 25 | 0.0330 | 0.83 | 39,124 | 0.59 | 15 |
| Nitrous Oxide (GHG - $N_2O$) | 298 | 0.0040 | 1.19 | 39,124 | 0.07 | 21 |
| Carbon Dioxide Equivalents ($CO_2$ eqv) | | | 529.92 | 39,124 | | **9,404** |
| **With Project** | | | | | | |
| Carbon Dioxide (GHG - $CO_2$) | 1 | 527.90 | 527.90 | 38,460 | 9,209 | 9,209 |
| Methane (GHG - $CH_4$) | 25 | 0.0330 | 0.83 | 38,460 | 0.58 | 14 |
| Nitrous Oxide (GHG - $N_2O$) | 298 | 0.0040 | 1.19 | 38,460 | 0.07 | 21 |
| Carbon Dioxide Equivalents ($CO_2$ eqv) | | | 529.92 | 38,460 | | **9,245** |
| **Decrease in Total GHG Offsets** | | | | | | **-160** |

Source: CCAR 2009

Notes:

Global Warming Potentials (GWP) per IPCC Fourth Assessment Report (SAR)

GHG Emission Factors per eGRID Summary Tables 2016

GWP factors = GWP x GHG factors (respectively)

Estimated Proposed Project generation = 38,460 MW-hrs/yr

Less existing No-Action generation = 39,124 MW-hrs/yr

Estimated change in generation = (664) MW-hrs/yr

Generation offset is increase in GHG emissions elsewhere due to loss of hydroelectric generation output under Proposed Action

Offset units are metric tonnes (1,000 kilograms or 2,204.6 pounds)

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# APPENDIX 9-A

## Methodology to Determine Effect of Loss of Generation on Greenhouse Gases

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The following describes the methodology used to determine the effect of this loss in generation on GHGs. A loss of generation capacity would have to be made up for by other electric energy retailers (i.e., purchased on the market) to meet demand. Electricity purchased on the California grid could include a variety of generation sources, including non-renewable (fossil fuel) sources, which generate GHGs, as well as renewable sources with negligible GHG emissions. To estimate the equivalent amount of GHGs produced by replacement electric generation, the methodology presented in the California Climate Action Registry (CCAR 2009) was used. This methodology is based on a database for GHGs associated with electric production (Emissions and Generation Resource Integrated Database, or eGRID) developed for the United States Environmental Protection Agency (EPA). The eGRID database is a globally recognized source of emissions data for electric power generated in the United States. eGRID is widely used for many other applications, such as EPA's Power Profiler and Carbon Footprint Tools, indirect emissions under the World Resources Institute, the Climate Registry, California Climate Action Registry, EPA Climate Leaders protocols, and many non-governmental organization tools and methodologies.

The eGrid divides the United States into regions and sub-regions. The region for California (California-Mexico Power Area [CAMX]) is a sub-region within the Western Electricity Coordination Council (WECC) area. The eGrid contains the most recent emissions operating data for California from all electricity providers, including coal and gas-fired power plants, cogeneration, biomass, solar, geothermal, nuclear, wind, hydroelectric, and other sources. Emissions are reported for three GHGs: carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$). The eGRID provides total output emission rates, as pounds per megawatt hour (lb/MWh), for $CO_2$, $CH_4$, and $N_2O$. The total output emission rates are the appropriate value to use for carbon foot printing and to assign an emissions value from the consumption of purchased electricity (EPA 2016). These output emissions rates were then converted to carbon dioxide equivalents, using the global warming potential (GWP) factors presented in IPCC (2014).

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## LIST OF ACRONYMS

| | |
|---|---|
| Project | Kaweah Project |
| SCE | Southern California Edison Company |

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# 10.0 ENVIRONMENTAL ANALYSIS OF OTHER ALTERNATIVES

In the Application for New License, the following alternatives were considered:

- No-Action Alternative; and
- Southern California Edison Company's (SCE) Proposed Action.

The No-Action Alternative is defined as the alternative under which the Kaweah Project, as currently configured, will continue to be operated and maintained under the terms and conditions of the existing license, without modification. That is, Project operation and maintenance will not be subject to any new or different protection, mitigation, or enhancement measures. Continued operation and maintenance of the Project in this fashion will not alter the existing environment as it is described under the resource-specific subsections in Section 7.0 – Affected Environment. Accordingly, implementation of the No-Action Alternative will have no environmental effects, and as such, is considered the baseline for the purposes of this environmental analysis.

SCE's Proposed Action considers input from state and federal resource agencies, Native American Tribes, non-governmental organizations, members of the public (collectively referred to as stakeholders) acquired during consultation activities completed for the relicensing of the Project (refer to Chapter 14.0 – Consultation Documentation). The Proposed Action includes: Project boundary modifications; changes to Project operations and maintenance; recreation enhancements; and implementation of new environmental measures; management and monitoring plans; and programs designed to protect, maintain, or enhance environmental and cultural resources over the term of the new license. Environmental analysis of the Proposed Action is provided in Sections 8.1 through 8.14.

To date, no formal alternatives have been proposed by stakeholders for consideration in the Application for New License.

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# 11.0 ECONOMIC ANALYSIS

This section is a placeholder.

In the Final License Application, this section will compare costs associated with the No-Action Alternative (existing condition) with costs associated with the Proposed Action for the Kaweah Project (Project). This analysis will include a comparison of economic benefits; costs of new environmental programs and measures; and power generation.

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## LIST OF ACRONYMS

| | |
|---|---|
| BLM | Bureau of Land Management |
| CDFG | California Department of Fish and Game (now known as CDFW) |
| CDFW | California Department of Fish and Wildlife (formerly known as CDFG) |
| COLD | Freshwater Habitat |
| DCU | Deer Conservation Units |
| EIS | Environmental Impact Statement |
| FERC or Commission | Federal Energy Regulatory Commission |
| FPA | Federal Power Act |
| FRSH | Freshwater Replenishment |
| IRWMP | Integrated Regional Water Management Plan |
| MUN | Municipal and Domestic Supply |
| NPS | National Park Service |
| NRI | Nationwide Rivers Inventory |
| ORV | outstandingly remarkable value |
| POW | Hydropower Generation |
| RARE | Rare, Threatened, or Endangered Species |
| REC-1 | Water Contact Recreation |
| REC-2 | Non-Contact Water Recreation |
| RMP | Resource Management Plan |
| ROD | Record of Decision |
| RWQCB | Regional Water Quality Control Board |
| SCE | Southern California Edison Company |
| SIP | State Implementation Plan |
| SNP | Sequoia National Park |
| SPWN | Spawning, Reproduction, and/or Early Development |
| SUP | Special Use Permit |

| | |
|---|---|
| SWRCB | State Water Resources Control Board |
| TSR | Technical Study Report |
| USACE | U.S. Army Corps of Engineers |
| USFWS | U.S. Fish and Wildlife Service |
| W&SR | Wild and Scenic Rivers |
| WARM | Warm Freshwater Habitat |
| WILD | Wildlife Habitat |

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# 12.0 CONCLUSIONS AND RECOMMENDATIONS

This section compares the developmental and non-developmental effects of the Proposed Action and the No-Action Alternative for the Kaweah Project (Project); identifies the recommended alternative; summarizes unavoidable adverse effects; discusses the recommendations of fish and wildlife agencies; and describes the Project's consistency with comprehensive plans.

## 12.1 COMPARISON OF ALTERNATIVES

This section includes a comparison of the developmental and non-developmental effects (resource conditions) resulting from operation and maintenance of the Project under the Proposed Action and the No-Action Alternative.

### 12.1.1 Proposed Action

Overall, the Proposed Action protects and enhances resource conditions in the vicinity of the Kaweah Project. The key consideration in developing the Proposed Action was to ensure that future operation and maintenance of the Project protects power generation, consumptive water supply, and system capability and reliability, while maintaining and enhancing environmental and cultural resources in the Project vicinity. Resource effects under the Proposed Action are described in detail in Section 8.0 – Environmental Effects.

Under the Proposed Action, ongoing Project operation and maintenance activities are memorialized in environmental measures; management and monitoring plans; and programs (collectively referred to as measures) which are designed to protect, maintain, or enhance environmental and cultural resources over the term of the new license (Appendix 4-A). The measures also include new resource protection measures; new monitoring requirements; new resource agency consultation and reporting requirements; and improved compliance mechanisms compared to the No-Action Alternative.

The Project's annual average energy generation (1992–2018) under the No-Action Alternative is 39,124 megawatt-hours (MWh); and it is estimated that the annual average energy generation under the Proposed Action will be 38,460 MWh. This annual average loss of generation (adverse effect) under the Proposed Action (6.0% at the Kaweah No. 1 Powerhouse and 0.8% and the Kaweah No. 2 Powerhouse) is a result of new instream flow measures developed to benefit resources in the Kaweah River Watershed (Watershed).

The Proposed Action results in a benefit to resources compared to the No-Action Alternative, as identified below.

### Water Use and Hydrology

- Protects pre-1914 consumptive water rights users' water supply.
- Maintains existing water uses and water rights.
- Maintains beneficial uses as defined by State Water Resources Control Board (State Water Board).

### Water Quality

- Enhances water quality in the bypass reaches.
- Protects water quality during Project maintenance.
- Requires periodic water quality monitoring.

### Aquatic Resources

- Restores a portion of the low flow natural hydrograph (late summer/fall/early winter low flows) in the bypass reaches.
- Enhances aquatic habitat during the low flow period (late summer/fall/early winter low flows) in the bypass reaches, which enhances the aquatic community (fish and macroinvertebrates).
- Maintains sediment supply and transport in the bypass reaches.
- Maintains/enhances healthy stream channel conditions (substrate, channel dimensions, riparian vegetation).
- Protects special-status aquatic species and their habitat (hardhead and western pond turtle).
- Requires periodic fish population monitoring.
- Requires periodic water temperature monitoring.
- Formally commits to completion of the entrainment study.

### Botanical and Wildlife Resources

- Protects populations of Munz's iris.
- Requires periodic botanical surveys and reporting.
- Reduces the potential spread or introduction of non-native invasive plants.

- Maintains/enhances habitat for riparian special-status plants and riparian-nesting birds.
- Reduces the potential risk of raptor electrocutions.
- Maintains/enhances aquatic foraging habitat for special-status raptors and bats.
- Protects special-status bats roosting in the interior of Project facilities.
- Maintains protective measures and habitat connectivity for special-status and game mammals along Project flowlines (i.e., wildlife bridges, escape ramps, escape fencing, and hazers).

**Geology and Soils**

- Maintains natural channel and hillslope stability.
- Maintains natural channel topography in the bypass reaches.

**Geomorphology**

- Maintains channel forming flows (scouring flows).
- Maintains channel geomorphology.

**Riparian Resources**

- Maintains conditions suitable for riparian recruitment.
- Maintains/enhances riparian and wetland habitats along the bypass reach.
- Reduces the potential spread or introduction of non-native invasive plant species to riparian and wetland habitats.

**Land Use and Management**

- Ensures that only land that is necessary for operation and maintenance of the Project is encompassed by the FERC Project boundary.
- Maintains consistency with established land management plans and policies, and land use designations.
- Maintains consistency with the Bureau of Land Management's (BLM) goals and objectives for the Case Mountain Extensive Recreation Management Area ERMA).

### Recreation Resources

- Enhances recreation opportunities by providing modified instream minimum flows that will benefit aquatic resources, riparian vegetation, water quality and overall visual quality, all of which are associated with a positive recreation experience.

- Maintains whitewater boating opportunities and other stream-based recreation opportunities in the bypass reaches.

- Maintains and enhances trail use opportunities along the Kaweah No. 2 Flowline.

- Maintains non-motorized trail use opportunities on the Kaweah No. 1 Forebay Road.

- Maintains recreation opportunities on the Kaweah River by continuing to provide parking for river access at the Kaweah No. 2 Powerhouse River Access Parking Area.

- Enhances recreation opportunities and experience at the Kaweah No. 2 Powerhouse River Access Parking Area through installation of recreation enhancements, including a portable bathroom and trash receptacle.

- Enhances stream-based recreation opportunities by providing real-time flow information that can be used by whitewater boaters and other stream-based recreation users for trip planning and scheduling purposes.

### Aesthetic Resources

- Enhances visual quality by providing modified minimum instream flows and maintaining/enhancing riparian habitat and water quality, which are associated with scenic quality.

- Enhances visual quality by providing a bathroom and trash receptacle at the Powerhouse No. 2 River Access Parking Area, which will reduce litter and contain human waste and garbage.

### Cultural and Tribal Resources

- Maintains tribal resources and Traditional Cultural Properties (TCPs).

- Maintains involvement of Project stakeholders, including Native American Tribes.

- Establishes clear protocols for protection and management of cultural resources, including protection, identification, and National Register of Historic Places (NRHP) evaluation.

- Establishes protocols for environmental review of Project operations and maintenance activities to ensure protection of cultural resources.

- Maintains public and worker education.
- Requires periodic resource condition monitoring and reporting.

**Socioeconomics**

- Maintains the local/regional economy and local/state tax revenue.

### 12.1.2 No-Action Alternative

The No-Action Alternative maintains the existing baseline conditions, with no additional benefits to resources (status quo). The Kaweah Project would continue to operate under the current license conditions. No new environmental or cultural measures would be implemented.

## 12.1 RECOMMENDED ALTERNATIVE

Section 4(e) of the Federal Power Act (FPA) requires the Federal Energy Regulatory Commission (FERC or Commission) to, in addition to the power and development purposes for which licenses are issued, give equal consideration to the purposes of energy conservation; the protection, mitigation of damage to, and enhancement, of fish and wildlife (including related spawning grounds and habitat); the protection of recreational opportunities; and the preservation of other aspects of environmental quality. Further, Section 10(a) of the FPA requires that a project, as licensed, be in the judgment of the Commission, best adapted to a comprehensive plan for improving or developing a waterway for beneficial public purposes. The following describes the basis for selecting the Proposed Action as the preferred alternative.

The Commission could choose the No-Action Alternative, with a few additional mitigation measures, as the preferred alternative. The status quo would be maintained and resources in the area would remain at current conditions, without any additional degradation, and existing power generation would be maintained. However, the Proposed Action is better adapted to a comprehensive plan for improving or developing a waterway for beneficial public purposes based on the Commission's mandate under the FPA. The Proposed Action results in a better balance between developmental and non-developmental resources compared to the No-Action Alternative.

The Proposed Action is recommended as the preferred alternative because: (1) issuance of a new hydropower license by the Commission will allow Southern California Edison Company (SCE) to continue operating the Kaweah Project as a beneficial and dependable source of clean renewable electric energy; and (2) the recommended measures will protect, maintain, or enhance environmental and cultural resources in the vicinity of the Project.

## 12.2 UNAVOIDABLE ADVERSE EFFECTS

There are no unavoidable adverse effects to environmental resources as a result of implementation of the Proposed Action (refer to Section 8.0 – Environmental Effects). However, there is an unavoidable adverse effect related to Project generation.

## 12.3 RECOMMENDATIONS OF FISH AND WILDLIFE AGENCIES

The Proposed Action considers input from federal and state resource agencies, Native American Tribes, non-governmental organizations, members of the public (collectively referred to as Project stakeholders) acquired during consultation activities completed for relicensing of the Project. No formal recommendations from fish and wildlife agencies have been submitted to date. Therefore, the Proposed Action represents only SCE's recommended protection, mitigation, and enhancement measures.

## 12.4 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2)(A) of the FPA, 16 U.S.C. Section 803 (a)(2)(A), requires FERC to consider the extent to which a project is consistent with federal and state comprehensive plans for improving, developing, and conserving the waterways associated with a project.

The following sections identify the comprehensive plans that are relevant to the relicensing of the Kaweah Project (Project), based on a review of FERC's List of Comprehensive Plans (List) dated May 2019 (FERC 2019) and other documents. This section summarizes the content of each relevant comprehensive plan, discusses the plans applicability to the Kaweah Project, and provides a statement of the Project's consistency with each plan. The purpose of the evaluation is to ensure that operation and maintenance of the Project under the Proposed Action is consistent with pertinent goals and objectives outlined in each comprehensive plan.

This Draft Application for New License is being submitted to resource agencies and Tribes for a 90-day comment period to allow review of the consistency determinations.

### 12.4.1 Relevant Plans from FERC's List of Comprehensive Plans

The FERC's List includes six plans, which are relevant to the Kaweah Project. These plans are identified below. In some cases, updated versions of the plans identified in FERC's List were available and are used in this document. Planning documents that have been updated since FERC published their List are identified with an asterisk (*). The FERC List includes the following plans:

- Bureau of Land Management. 2014. Bakersfield Field Office Resource Management Plan. Department of the Interior. Bakersfield, California. December 2014.

- California Department of Fish and Game*. 2007. California Wildlife: Conservation Challenges, California's Wildlife Action Plan. Sacramento, California. 2007.

- California Department of Fish and Game. 2003. Strategic Plan for Trout Management: A Plan for 2004 and Beyond. Sacramento, California. November 2003.

- California State Water Resources Control Board. 2018. Water Quality Control Plan for the Tulare Lake Basin. Sacramento, California. May 2018.

- Department of the Army Corps of Engineers. Sacramento District. 1996. Kaweah River Basin Investigation: Final Feasibility Report and Final Environmental Impact Statement. Sacramento, California. September 1996.

- National Park Service. The Nationwide Rivers Inventory. Department of the Interior, Washington, DC. 1993.


#### 12.4.1.1 Bakersfield Field Office Resource Management Plan

The Bureau of Land Management (BLM), Bakersfield Field Office Record of Decision (ROD) and Approved Resource Management Plan (RMP) (BLM 2014) provides broad-scale direction for the future management of BLM-administered public lands and resources located in an eight-county region of southern-central California. The RMP Planning Area encompasses about 17 million acres throughout Kings, San Luis Obispo, Santa Barbara, Tulare, Ventura, Madera, eastern Fresno, and western Kern counties. The BLM Bakersfield Field Office is directly responsible for the management of approximately 400,000 acres of public land and 1.2 million acres of federal mineral estate (i.e., the Bakersfield Decision Area). The decisions included in the Bakersfield Field Office ROD and RMP supersede previous planning documents for this region, including the 1997 Caliente RMP and its subsequent amendments.

The RMP presents desired outcomes – expressed in terms of goals and objectives for resource conductions and uses, and establishes the allowable uses, management actions, and special designations that will enable the BLM to achieve the desired outcomes. The RMP guides the Bakersfield Field Office in the implementation of all its subsequent management actions and site-specific activities.

The Bakersfield Field Office RMP is applicable to the Kaweah Project as it provides management directives for lands administered by the BLM in the vicinity of the Project. Related goals and objectives contained in the RMP include enhancement, protection, and preservation of biological, cultural, visual, water, and recreation resources, as well as, management of livestock grazing, areas of critical environmental concern, wilderness study areas, and wild and scenic rivers.

Implementation of the Proposed Action, including new environmental measures; management and monitoring plans; and programs, supports management direction, goals, and objectives contained in the Bakersfield Field Office RMP, and therefore is consistent with the Bakersfield Field Office RMP.

#### 12.4.1.2 California Wildlife: Conservation Challenges, California's Wildlife Action Plan

In 2000, Congress enacted the State Wildlife Grants Program to support state programs that broadly benefit wildlife and habitats but particularly "species of greatest conservation need". As a requirement for receiving funding under this program, state wildlife agencies were to have submitted a Wildlife Action Plan (comprehensive wildlife conservation strategy) to the U.S. Fish and Wildlife Service (USFWS) in 2005. The California Department of Fish and Game (CDFG, now known as California Department of Fish and Wildlife [CDFW] as of 2013), in partnership with the Wildlife Health Center, University of California, Davis, directed the development of California's Wildlife Action Plan.

To meet current requirements of the grant program CDFW (formerly CDFG), released the first comprehensive update of the plan in 2015 (CDFW 2015a). The revised plan includes updated statewide and regional conservation actions based on current stressors and circumstances. Statewide actions are those actions that are important across most or all regions. Regional actions are based on the state's physiographic characteristics (i.e., watersheds and vegetation communities) coupled with the consideration of wildlife and natural resources management areas of responsibility. The regional approach facilitated the discussion of habitats, ecosystems, and conservation issues at a scale appropriate for conservation planning and compatible with resource management jurisdictions and decision-making authorities. The Kaweah Project is located within the Sierra Nevada regional province, proximate to the Central Valley province, identified in the plan.

Implementation of the Proposed Action, including new environmental measures; management and monitoring plans; and programs, is consistent with the statewide and regional actions contained in California's 2015 SWAP intended to restore and conserve California's wildlife.

#### 12.4.1.3 Strategic Plan for Trout Management: A Plan for 2004 and Beyond

This plan was developed to identify key issues and concerns relative to non-anadromous salmonid resources and fisheries in California, and to develop goals and strategies to address these issues. The scope of the plan includes all resident forms of salmonids. The goals and strategies articulated in the plan were developed around two main themes that reflect the general mission of CDFW: (1) habitat and native species protection and management; and (2) public use, including recreational angling. The plan calls for an ecosystem (watershed) approach for trout resource management, the protection and restoration of cold-water ecosystems, and improved education and communication with landowners and managers, as well as maintaining and enhancing trout angling opportunities statewide and improved effectiveness of how hatchery trout are utilized. The plan also includes strategies to improve and update trout resource status and recreational use information, strategies for using hatchery-produced trout more efficiently, and strategies for integrating educational opportunities to improve the general public's interest and understanding of trout related resources. The plan identifies changes in direction for trout management that include a broader view and appreciation of the aquatic ecosystem.

While there are no trout management plans/programs that apply specifically to the Kaweah River Watershed, rainbow trout and brown trout are present in the vicinity of the Project.

The environmental measures included in the Proposed Action were designed to benefit fish populations and habitats in the river reaches associated with the Project. Implementation of the Proposed Action is consistent with management strategies outlined in the Strategic Plan for Trout Management.

#### 12.4.1.4 Water Quality Control Plan for the Tulare Lake Basin

Water quality control plans, or basin plans, contain California's administrative policies and procedures for protecting state waters. Basin plans are required by the state Porter-Cologne Water Quality Control Act (California Water Code Section 13240). In addition, Section 303 of the federal Clean Water Act requires states to adopt water quality standards that "consist of the designated uses of the navigable waters involved and the water quality criteria for such waters based upon such uses."

Each of California's nine regional water quality control boards must formulate and adopt a basin plan for all areas within its region. The basin plans must conform with statewide policy set forth by the legislature and by the State Water Resources Control Board. Basin plans consist of designated beneficial uses to be protected, water quality objectives to protect those uses, and a program of implementation needed for achieving the objectives.

Beneficial uses, together with their corresponding water quality objectives, meet federal regulatory criteria for water quality standards. Hence, California's basin plans serve as regulatory references for meeting both State and federal requirements for water quality control.

The Water Quality Control Plan for the Tulare Lake Basin (CVRWQB 2018) covers the Project area and identifies eighteen surface water beneficial uses. Of those, the following ten are applicable to the Kaweah River above Lake Kaweah:

- Municipal and Domestic Supply (MUN) – Uses of water for community, military, or individual water supply systems, including, but not limited to, drinking water supply.

- Hydropower Generation (POW) – Uses of water for hydropower generation.

- Water Contact Recreation (REC-1) – Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs.

- Non-Contact Water Recreation (REC-2) – Uses of water for recreational activities involving proximity to water, but where there is generally no body contact with water, nor any likelihood of ingestion of water. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating,

tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

- Warm Freshwater Habitat (WARM) – Uses of water that support warm water ecosystems, including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates. WARM includes support for reproduction and early development of warm water fish.

- Cold Freshwater Habitat (COLD) – Uses of water that support cold-water ecosystems, including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

- Wildlife Habitat (WILD) – Uses of water that support terrestrial or wetland ecosystems, including, but not limited to, preservation and enhancement of terrestrial habitats or wetlands, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

- Rare, Threatened, or Endangered Species (RARE) – Uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened or endangered.

- Spawning, Reproduction, and/or Early Development (SPWN) – Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish. SPWN shall be limited to cold-water fisheries.

- Freshwater Replenishment (FRSH) – Uses of water for natural or artificial maintenance of surface water quantity or quality.

The Basin Plan also provides a list of water quality objectives that set limits or levels of water quality constituents or characteristics that are established for the protection of the beneficial uses of the river. The achievement of these objectives depends on applying them to controllable water quality factors. The applicant is responsible for (1) identifying the water quality impacts caused by controllable factors from operation of the Project, and (2) recommending measures that may be reasonably applied to control impacts to beneficial uses (including water quality). The water quality parameters identified for waters in the basin include ammonia, bacteria, biostimulatory substances, chemical constituents, color, dissolved oxygen, floating material, oil and grease, pH, pesticides, radioactivity, salinity, sediment, settleable material, suspended material, tastes and odors, temperature, toxicity, and turbidity.

The environmental measures included in the Proposed Action were designed to protect beneficial uses and meet water quality objectives as defined in the Basin Plan. Implementation of the Proposed Action is consistent with the goals and management direction included in the updated Basin Plan.

#### 12.4.1.5 Kaweah River Basin Investigation: Final Feasibility Report and Final Environmental Impact Statement

The FERC's List cites the 1996 Kaweah River Basin Investigation: Final Feasibility Report and Final Environmental Impact Statement (EIS), published in December 1996 by the U.S. Army Corps of Engineers (USACE) (USACE 1996). The purpose of the study was to determine if there was a feasible flood control and water resources project in the Kaweah River Basin. The study area included the Terminus Dam and Kaweah River Basin (including Lake Kaweah and its watershed) and downstream areas. Terminus Dam and Reservoir (Lake Kaweah) are a multi-purpose dam and reservoir completed by the USACE in 1962 to provide flood control and irrigation water supply storage. The study investigated the feasibility of providing: (1) increased flood protection to the downstream area which includes the City of Visalia and agricultural land, and (2) increased upstream storage for irrigation water supply. The study concluded that enlarging the existing Lake Kaweah by constructing a 21-foot-high concrete ogee across the spillway at Terminus Dam and widening it by 148 feet produced the greatest net annual benefits by increasing flood protection to downstream areas, creating additional storage for irrigation water, and minimizing environmental impacts.

The study identifies SCE's Kaweah Project as being located 10 miles upstream from Terminus Dam, however, states that the regulatory storage capacity of the Kaweah Project is small and does not affect the operation of Terminus Dam.

The Proposed Action does not include additional facilities or increased generation or storage that would affect inflow or operation of USACE's of Terminus Dam and Lake Kaweah. Further, the environmental measures included in the Proposed Action were designed to protect and maintain downstream resources. Implementation of the Proposed Action is consistent with conclusions and recommendations included in the Kaweah River Basin Investigation: Final Feasibility Report and Final EIS.

#### 12.4.1.6 The Nationwide Rivers Inventory

The National Park Service has compiled and maintains a Nationwide Rivers Inventory (NRI), a register of river segments that potentially qualify as national wild, scenic, or recreational river areas. The NRI is a listing of more than 3,200 free-flowing river segments in the United States that are believed to possess one or more "outstandingly remarkable" natural or cultural values judged to be at least regionally significant. Under a 1979 Presidential directive and related Council on Environmental Quality Procedures, all federal agencies must seek to avoid or mitigate actions that would adversely affect NRI segments (NPS 2017).

In order to meet the criteria for "outstandingly remarkable", a river value must be a unique, rare, or exemplary feature that is significant at a comparative regional or national scale. The eligibility criteria set minimum thresholds and are designed to foster greater consistency within federal river-administering agencies. There are nine eligibility criteria used to assess a river's status, these include: scenery, recreation, geology, fish, wildlife, prehistory, history, cultural, and other values.

The NRI identifies the Marble Fork of the Kaweah River (15 miles) and the Middle Fork of the Kaweah River (19 miles) with potential classification as recreationally important rivers, and wild and scenic river segments for those sections of the river within Sequoia National Park. Both forks of the Kaweah River have been on the NRI listing since 1993 (NPS 2017).

While not identified on the NRI, a 2006 study by the National Park Service (NPS) also found the East Fork Kaweah River from its headwaters to the Sequoia National Park (SNP) boundary and the South Fork Kaweah River from its headwaters to the SNP boundary as eligible and suitable for inclusion in the National Wild and Scenic Rivers (W&SR) System (NPS 2006).

All of the river segments identified above are located outside of the existing Project boundary. Implementation of the Proposed Action, including new environmental measures; management and monitoring plans; and programs, will not result in any changes in status or management of eligible or suitable river segments. All eligible river segments in the vicinity of the Project will continue to be managed to protect the ORV's that cause them to be considered eligible. Implementation of the Proposed Action is consistent with the NRI.

### 12.4.2 Other Relevant Documents

Six additional planning documents that are not included on FERC's List have also been identified as being relevant to the Project, including:

- California Department of Fish and Wildlife. 2015. California Deer Conservation and Management Plan. Public Review Draft, March 2015.

- California Department of Forestry and Fire Protection. 2014. Tulare Unit Strategic Fire Plan.

- Southern Sierra Regional Water Management Group. 2014. Southern Sierra Integrated Regional Water Management Plan. Prepared by Provost & Pritchard Consulting Group in cooperation with Sequoia Riverlands Trust, Kamansky's Ecological Consulting, and GEOS Institute. November 2014.

- Tulare County. 2018. Three Rivers Community Plan Draft. Tulare County, California.

- Tulare County. 2012. Tulare County General Plan 2030. Tulare County, California.

- United States Department of the Interior, National Park Service. 2006. Final General Management Plan and Comprehensive River Management Plan / Environmental Impact Statement, Sequoia and Kings Canyon National Parks, Middle and South Forks of the Kings River and North Fork of the Kern River, September 2006.

#### 12.4.2.1 California Deer Conservation and Management Plan

The California Deer Conservation and Management Plan (public draft) (CDFW 2015b) provides deer population and conservation unit management objectives for lands across California. The Plan was prepared as an update to the CDFG's 1976 deer management plan — "A Plan for California Deer" (CDFG 1976). The Plan provides a framework for updating deer management based on areas called Deer Conservation Units (DCU). This landscape level approach to deer planning replaces herd units with larger DCU's. Using this approach the Department proposes categorizing California deer herd units into 10 DCUs. Unlike the original deer herd boundaries, management at the DCU level will focus on conservation and management at larger scales. The Plan is considered pertinent to the Kaweah Project because the Project is situated within the Sierra Nevada DCU.

The overarching goal of the Plan is conserving the state's deer populations and their habitats. Specific sub-goals identified in the Plan include development of: (1) DCU plans; (2) updated population management objectives; (3) habitat conservation objectives; (4) research, monitoring and adaptive management objectives; and (5) outreach objectives.

The environmental measures included in the Proposed Action were designed to protect wildlife resources in the Project vicinity. Implementation of the Proposed Action is consistent with the goals and management direction included in the California Deer Conservation and Management Plan.

#### 12.4.2.2 Tulare Unit Strategic Fire Plan

The Tulare Unit is 1 of 21 administrative units within CAL FIRE. The Tulare Unit is located in central California and provides fire protection in the vicinity of the Project. The Tulare Unit Strategic Fire Plan (CAL FIRE 2018), was developed to reduce firefighting cost and property loss, increase public and firefighter safety, minimize wildfire risk to communities, and contribute to ecosystem health. The Tulare Unit Strategic Fire Plan is considered pertinent to the Kaweah Project because it contains fire management direction for the land around and within the Project boundary. Key goals and objectives identified in the plan include:

- Support the implementation and maintenance of defensible space inspections around structures.
- Analyze trends in fire cause and focus prevention and education efforts to modify behaviors and effect change to reduce ignitions within Tulare County.
- Continually evaluate the success in achieving the 95% threshold of keeping fires less than 10 acres in size.
- Identify and evaluate wildland fire hazards and recognize assets at risk, collecting and analyzing data to determine fuel reduction projects and other projects.

- Support the availability and utilization of CAL FIRE resources, as well as public and private sector resources for fuels management activities, including ongoing maintenance.

- Assist landowners and local government in the evaluation of the need to retain and utilize features developed during fire suppression efforts, taking into consideration those identified in previous planning efforts.

The environmental measures included in the Proposed Action support the goals and objectives identified in the Tulare Unit Strategic Fire Plan. Continued operation and maintenance of the Project includes extension of SCE's existing fire prevention and suppression policies, including creating defensible space around Project facilities, establishment of procedures in the event of a fire, and conducting safety training. Implementation of the Proposed Action is consistent with the goals included in the Tulare Unit Strategic Fire Plan.

#### 12.4.2.3 Southern Sierra Integrated Regional Water Management Plan

The Southern Sierra Integrated Regional Water Management Plan (IRWMP) (SSRWMG 2018) address water management in the Southern Sierra Region. The Southern Sierra Region covers approximately 6,195 square miles, and includes the foothills and mountain headwater regions of the Kern, Poso, White, Tule, Kaweah, Kings and San Joaquin River watersheds. The Southern Sierra IRWMP is considered pertinent to the Project because it includes the Kaweah River Watershed.

The IRWMP documents regional and local data, issues, water-related objectives, resource management strategies, and collaborative efforts. The IRWMP includes seven broad goals, including: (1) improve water supply management; (2) protect and improve water quality; (3) perform integrated flood management; (4) improve watershed and environmental resource management; (5) expand stakeholder education; (6) protect unique/important environmental resources; and (7) reduce energy consumption and greenhouse gas emissions.

Implementation of the Proposed Action, including new environmental measures; management and monitoring plans; and programs, is consistent with the goals, objectives, and management strategies included in the Southern Sierra IRWMP.

#### 12.4.2.4 Three Rivers Community Plan

The Three Rivers Community Plan (Tulare County 2018) is considered pertinent to the Kaweah Project because it contains management direction regarding the Project area.

The Three Rivers Community Plan, in combination with the Tulare County General Plan, is designed to satisfy the requirements of the California Planning and Zoning law by setting forth the goals, policies, assumptions, guidelines, standards, and implementation measures for the planning area. The Three Rivers Community Plan was adopted in 1980 and updated in 2018. The planning area comprises approximately 21,000 acres, including the Project area.

The goals and policies described in the Three Rivers Community Plan relevant to the Kaweah Project include topics such as maintaining water supply and quality, flood control, riparian habitat management, protecting visual access to and the character of Tulare County's scenic rivers, and maintaining open space character, among many others.

Implementation of the Proposed Action, including new environmental measures; management and monitoring plans; and programs, is consistent with the goals and policies included in the Three Rivers Community Plan.

#### 12.4.2.5 Tulare County General Plan 2030

The Tulare County General Plan 2030 (Tulare County 2012) is considered relevant because the Kaweah Project is located within Tulare County. The Tulare County General Plan includes information regarding land uses in the vicinity of the Kaweah Project and management goals and policies relevant to the Project area.

The General Plan provides an overall framework for development and protection of the County's natural and cultural resources, and is designed to comply with various state regulations and policies for land use and development. The General Plan consists of a general county-wide plan, and a set of more detailed community plans covering specific areas of the unincorporated county. The Three Rivers Community Plan, described above, is an example of a community plan that provides detailed focus on the specific geographic region in which the Kaweah Project is primarily located.

Implementation of the Proposed Action, including new environmental measures; management and monitoring plans; and programs, is consistent with the goals and policies identified in the Tulare County General Plan.

#### 12.4.2.6 Final General Management Plan and Comprehensive River Management Plan / Environmental Impact Statement

The Project makes use of several non-FERC facilities located in SNP that are not subject to the FERC License. All facilities located within SNP are currently operated under a Special Use Permit (SUP) (Permit No. PWR-SEKI-6000-2016-015) issued to SCE by the NPS. The current SUP expires on September 8, 2026. Facilities operated under the SUP include portions of the Kaweah No. 1 and No. 3 developments, as described below and shown on Map 3-1.

- **Kaweah No. 1** – The upper portion of the Kaweah No. 1 Development near the Mineral King Area, including four small lakes—Eagle Lake, Lady Franklin Lake, Crystal Lake, and Upper Monarch Lake (collectively referred to as the Mineral King Lakes)—that release water during the late summer and fall months to augment flows in the East Fork Kaweah River and generating capacity of the Kaweah No. 1 Powerhouse during periods of low flow. The Mineral King Lakes were originally constructed between 1903 and 1905 on public lands that were subsequently included in the Sierra National Forest, and were part of the original license. However in 1978, that portion of Sierra National Forest was added to SNP. The

enabling legislation empowered the NPS to issue SUPs for the continued use of the reservoirs.

- **Kaweah No. 3** – The upper portion of the Kaweah No. 3 Development, including the Middle Fork and Marble Fork Kaweah River diversion dams, and a water conveyance system (Kaweah No. 3 Flowline) that diverts water from these structures to the Kaweah No. 3 Powerhouse. All but the last 2,580 feet of the flowline is located in the SNP and is not part of the FERC License. The Middle Fork and Marble Fork diversions and flowline were constructed within the SNP by permission of the NPS between 1907 and 1913 in exchange for the construction of a park road and annual payments. Select components of the Kaweah No. 3 development appear eligible for listing in the National Register of Historic Places as contributors to the Kaweah No. 3 Hydroelectric System Historic District.

The General Management Plan provides general management direction for Sequoia and Kings Canyon National Parks, and the Comprehensive River Management Plan provides direction and overall guidance on the management of lands and uses within portions of the Middle and South Forks of the Kings River and the North Fork of the Kern River (NPS 2006).

The document discusses evaluation of the five forks of the Kaweah River (North, Marble, Middle, East, and South) as to their eligibility and suitability for inclusion in the national wild and scenic rivers system. All of the rivers except the North Fork of the Kaweah were determined to be eligible. The document acknowledges the presence of hydroelectric facilities within the SNP on the Marble and Middle Forks of the Kaweah River, and on tributaries of the East Fork of the Kaweah, and the SUP that those facilities are managed under. Further, the document considers preservation associated with the Kaweah No. 3 Hydroelectric System Historic District.

Implementation of the Proposed Action, including new environmental measures; management and monitoring plans; and programs, is consistent with the management prescriptions identified in the Final General Management Plan and Comprehensive River Management Plan.

## 12.5 LITERATURE CITED

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Tulare County. 2012. Tulare County General Plan 2030. Tulare County, California.

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# 13.0 FINDING OF NO SIGNIFICANT IMPACT

Continuing to operate and maintain the Kaweah Project (Project) with the recommended environmental measures; management and monitoring plans; and programs (collectively referred to as measures) included under the Proposed Action will not be a major federal action significantly affecting the quality of the environment. Furthermore, implementation of the measures included in the Proposed Action will result in greater resource protection and enhance environmental resources as compared to baseline conditions (No-Action Alternative). These measures are provided in Section 4.0, Appendix 4-A.

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## LIST OF FIGURES

**No table of figures entries found.**

## LIST OF ACRONYMS

| | |
|---|---|
| ACHP | Advisory Council on Historic Preservation |
| APE | Area of Potential Effect |
| BLM | Bureau of Land Management |
| CEII | Critical Energy Infrastructure Information |
| CFR | Code of Federal Regulations |
| DLA | Draft License Application |
| ESA | Endangered Species Act |
| FERC or Commission | Federal Energy Regulatory Commission |
| FLA | Final License Application |
| HPMP | Historic Properties Management Plan |
| MOA | Memorandum of Agreement |
| NAHC | Native American Heritage Commission |
| NGO | Non-governmental Organization |
| NHPA | National Historic Preservation Act |
| NOI | Notice of Intent |
| NRHP | National Register of Historic Places |
| PA | Programmatic Agreement |
| PAD | Pre-Application Document |
| Project | Kaweah Project |
| PSP | Proposed Study Plan |
| RSP | Revised Study Plan |
| SCE | Southern California Edison Company |
| SD1 | Scoping Document 1 |
| SD2 | Scoping Document 2 |
| SHPO | State Historic Preservation Officer |
| TSP | Technical Study Plan |
| TSR | Technical Study Report |
| TWG | Technical Working Group |
| USFWS | U.S. Fish and Wildlife Service |

# 14.0 CONSULTATION DOCUMENTATION

This section describes Southern California Edison Company's (SCE) consultation efforts completed for the relicensing of the Kaweah Project (Project), organized by the following categories:

- Early Outreach Activities
- Pre-Application Document (PAD) Development and Distribution
- Federal Energy Regulatory Commission (FERC or Commission) Scoping
- Study Plan Development and FERC Study Plan Determination
- Technical Study Implementation
- Endangered Species Act – Section 7 Informal Consultation
- National Historic Preservation Act – Section 106 Informal Consultation
- Consultation with Native American Tribes
- Draft License Application Development and Distribution
- License Measures Collaboration

Documents referred to in this section are available on either SCE's relicensing website at www.sce.com/kaweah or FERC's eLibrary at www.ferc.gov/docs-filing/elibrary.asp under Docket P-298.

As required in Title 18 of the Code of Federal Regulations (CFR) §5.18(b)(5)(G), Table 14-1 identifies the name and address of every federal, state, and interstate resource agency, Native American Tribe, or member of the public that SCE consulted during preparation of this Application for New License for the Kaweah Project.

Table 14-2 includes a list of resource agency and stakeholder meeting dates and topics that are identified throughout this section.

## 14.1 EARLY OUTREACH ACTIVITIES

SCE initiated early outreach activities in 2015. Early outreach activities involved: meeting with individual state and federal resource agencies; conducting meetings with stakeholders, including resource agencies, non-governmental organizations (NGO), members of the public, and Native American Tribes; and establishing a publicly accessible website. The intent of these early outreach activities was to identify potential stakeholders and understand their resource interests; provide information related to the FERC relicensing process; describe Project facilities and operations; solicit existing

resource information; and provide a mechanism to distribute Project information, reports, and meeting materials.

## 14.2 PRE-APPLICATION DOCUMENT DEVELOPMENT AND DISTRIBUTION

On December 14, 2016, SCE filed a Notice of Intent (NOI) and PAD with the FERC. The PAD provided FERC, federal and state agencies, and other interested parties with background information related to Project facilities, operations, and maintenance activities; summarized existing, relevant, and reasonably available information; defined pertinent Project issues; and identified potential study needs. The PAD also included 15 draft Technical Study Plans (TSP) that SCE determined were needed to address issues for which existing information was potentially inadequate.

## 14.3 FEDERAL ENERGY REGULATORY COMMISSION SCOPING

On February 10, 2017, the FERC issued a Notice of Commencement of Pre-Filing Process and Scoping Document 1 (SD1) for the Project. SD1 provided interested parties with FERC's preliminary list of issues and alternatives to be addressed in an Environmental Assessment analyzing potential conditions of a new Project license. Additionally, FERC requested that any party interested in providing comments on the PAD and SD1 and/or submitting formal study requests do so by April 13, 2017, in accordance with a 60-day comment period. During the comment period, FERC conducted public scoping meetings (am/pm) in Visalia, California on March 14, 2017 and a site visit on March 15, 2017. Four comment letters were submitted, which included information and study requests. The FERC revised SD1 based on oral comments received at the scoping meetings and written comments received through the scoping process. FERC issued Scoping Document 2 (SD2) on May 18, 2017.

## 14.4 STUDY PLAN DEVELOPMENT AND FERC STUDY PLAN DETERMINATION

The PAD included 15 TSPs for the relicensing of the Project. Based on study requests filed as part of the FERC scoping process, SCE revised one study plan (REC 1 – Recreation Resources) and added two plans (REC 2 – Whitewater Boating and LAND 3 – Land Use). All other study plans remained unchanged from the PAD submittal. On May 24, 2017, SCE filed a Proposed Study Plan (PSP) with FERC that included 17 study plans for the Project. The deadline to file comments on the PSP ended August 28, 2017. During the comment period, SCE conducted a study plan meeting in Visalia, California on June 21, 2017, with stakeholders to: (1) clarify SCE's Proposed Study Plan; (2) discuss information gathering or study requests from stakeholders; and (3) attempt to resolve any outstanding issues with respect to SCE's PSP.

Three comments were filed on the PSP; however, they did not result in revisions to any of the study plans. Therefore, on September 19, 2017, SCE filed a Revised Study Plan (RSP) that stated that the PSP, without revision, constituted its RSP. No comments were filed on the RSP during the 15-day comment period. The FERC subsequently issued a Study Plan Determination on October 24, 2017, approving all study plans for the Project.

## 14.5 TECHNICAL STUDY IMPLEMENTATION

In early 2018, SCE began consultation with resource agencies and interested stakeholders related to implementation of the TSPs. This consultation included establishing Technical Working Groups (TWG) and e-mail/telephone communication to obtain input on study implementation or resource specific information from agencies. Table 14-3 identifies TWG meetings dates and general discussion topics. SCE began implementing the approved TSPs in 2018.

Study progress was documented in SCE's Initial Study Report filed with FERC on October 18, 2018. The Initial Study Report summarized SCE's overall progress through September 30, 2018 in implementing the study plans, including an explanation of any variances and modifications to ongoing studies. SCE held a meeting in Visalia, California on November 1, 2018 to discuss the contents of the report and to address comments regarding study plan implementation. The meeting discussion was documented in a meeting summary that SCE filed with FERC on November 15, 2018. Three comments were filed on the meeting summary. In its determination filed on February 14, 2019, FERC determined that no modifications to the approved studies were warranted based on the comments received.

### 14.5.1 Technical Study Reports

Study methods and results were compiled in a series of Technical Study Reports (TSR). Each TSR included the following information: (1) study objectives; (2) study area; (3) study approach and methods; (4) and study results. Prior to filing of this Draft License Application, several Draft TSRs were distributed to Project stakeholders for a 90-day review and comment period. Draft TSRs were posted to the Project's relicensing website and stakeholders notified of their availability for review. The remaining TSRs are being provided to stakeholders for a 90-day review and comment period as part of this Draft License Application filing. A schedule showing when each Draft TSR was distributed to stakeholders is provided in Table 14-4.

## 14.6 ENDANGERED SPECIES ACT – SECTION 7 INFORMAL CONSULTATION

Pursuant to Section 7 of the federal Endangered Species Act (ESA), consultation with the U.S. Fish and Wildlife Service (USFWS) is required when implementation of a project may affect the continued existence of a federally listed species. Species are defined as threatened or endangered by USFWS if they are listed in Title 50 of the CFRs (§§17.11 or 17.12). SCE's Section 7 consultation efforts are summarized below.

- SCE requested to be designated as the non-federal representative for the purpose of conducting informal Section 7 consultation with the USFWS for the Project on December 14, 2016. FERC granted SCE's request on February 10, 2017.

- On March 26, 2018, SCE e-mailed resource agencies, including USFWS, to provide an updated special-status species list and notification of survey timing.

- On May 2, 2018, SCE e-mailed resource agencies, including USFWS, to provide notification of the timing of special-status bat surveys.

- On April 18, 2018, SCE e-mailed resource agencies, including USFWS, to provide the results of special-status plant reference population monitoring.

- SCE provided Draft TSPs and TSRs to USFWS for review and comment.

- Following filing of the Draft License Application, SCE will conduct a meeting with the USFWS to discuss study results, potential impacts to federally listed species, and any proposed protection, mitigation, and enhancement measures.

## 14.7 NATIONAL HISTORIC PRESERVATION ACT – SECTION 106 INFORMAL CONSULTATION

The Kaweah Project relicensing is an "undertaking" as defined in 36 CFR 800.16(y). Therefore, the relicensing of the Project is subject to Section 106 of the National Historic Preservation Act (NHPA). Section 106 of the NHPA requires FERC to take into account the effect of continued operation and maintenance of the Project on properties that are listed or recommended as eligible for listing on the National Register of Historic Places (NRHP). SCE's Section 106 consultation efforts are summarized below.

- SCE requested to be designated as the non-federal representative for the purpose of conducting informal Section 106 consultation with the State Historic Preservation Officer (SHPO) for the Project on December 14, 2016. FERC granted SCE's request on February 10, 2017.

- SCE initiated consultation with the SHPO and other stakeholders including the Bureau of Land Management (BLM) and interested Native American Tribes during a Cultural Resources TWG meeting held on March 20, 2018. The meeting focused on providing an overview of the Project and the relicensing process; defining the undertaking and proposing an Area of Potential Effects (APE) for the undertaking; and soliciting public involvement and comments on the undertaking and cultural studies to be conducted.

- On April 4, 2018, in accordance with Section 36 §800.4(a)(1), SCE requested concurrence on the appropriateness of the proposed APE for the Project. SCE received concurrence on the APE from SHPO in a letter dated on May 3, 2018.

- On April 18, 2018, SCE coordinated with the BLM to obtain records regarding cultural resources within the FERC Project boundary on BLM lands.

- SCE provided Draft TSPs and TSRs to all stakeholders, including SHPO, BLM, Native American Tribes, and members of the Cultural Resources TWG, for review and comment.

- SCE convened a Cultural Resources TWG meeting on May 7, 2019, to discuss built environment, archaeological, and ethnographic study results, and the development of a Historic Properties Management Plan (HPMP) and Draft NRHP Work Plan for Archaeological Resources.

- Following filing of the Draft License Application, SCE will circulate a Draft HPMP and NRHP Work Plan for Archaeological Resources to members of the Cultural Resources TWG and convene a meeting to discuss both documents.

- After accepting the License Application for filing, FERC will continue consultation with the Advisory Council on Historic Preservation (ACHP) and SHPO regarding the Project. FERC typically completes Section 106 by entering into a Programmatic Agreement (PA) or Memorandum of Agreement (MOA) with the licensee, ACHP, and SHPO. This agreement is then incorporated by reference into the project license when it is issued. Upon issuance of a new license, SCE will be responsible for finalizing and implementing the HPMP and the FERC will be responsible for enforcing compliance with the plan.

### 14.7.1 Section 106 Informal Consultation with Native American Tribes

SCE conducted informal Section 106 consultation with Native American Tribes in association with the Kaweah Project relicensing. SCE coordinated with appropriate tribal representatives to identify properties, plants, and other resources of traditional cultural or religious importance to Native Americans (including "traditional cultural properties" as discussed in National Register Bulletin No. 38) that may be present in the Project vicinity. This informal consultation included a combination of written, telephone, and e-mail correspondence; meetings; and site visits. Native Americans were included in the consultation summarized above. Additional consultation and efforts to include Native American Tribes in the relicensing process are summarized below.

- At the outset of the relicensing effort, representatives of seven federally-recognized tribes were invited to participate in the relicensing process by FERC on January 10, 2017, as part of its initial tribal government-to-government formal Section 106 consultation for the Project. Follow-up e-mails and telephone contacts were made by FERC after sending letters by registered mail.

- SCE contacted the Native American Heritage Commission (NAHC) on February 12, 2018, to request a search of its Sacred Lands File and a contact list of Native Americans knowledgeable about the tribal resources of the Project vicinity. All Native Americans identified by the NAHC were added to the Project distribution list and Cultural Resources TWG.

- On June 5, 2018, SCE coordinated with the BLM to obtain their list of potentially interested Native American Tribes in the Project vicinity. All potentially interested Native Americans identified by the BLM were added to the Project distribution list and Cultural Resources TWG.

- On June 29, 2018, Native American Tribes were invited to participate in the development of the CUL 1 – Ethnography TSR in a letter sent by SCE on behalf of a Secretary of the Interior Qualified Consulting Ethnographer.

- On October 1, 2018, a follow-up e-mail was sent by the Consulting Ethnographer to all Native American Tribes in the Cultural Resources TWG inviting them to participate in the development of the Ethnography TSR.

- Copies of all formal correspondence from FERC and SCE are contained in the CUL 1 – Ethnography TSR, Appendix A (Supporting Document A), along with a detailed contact log with dates of follow-up e-mails and telephone correspondence.

## 14.8 DRAFT LICENSE APPLICATION DEVELOPMENT AND DISTRIBUTION

Pursuant to the FERC's regulations at 18 CFR §5.16, SCE is required to file a preliminary licensing proposal no later than 150 days prior to the deadline for filing a license application. As allowed under §5.16(c), SCE elected to file a Draft License Application which includes the contents of a license application required by §5.18 instead of the preliminary licensing proposal. The regulation at §5.16(c) states that if an applicant elects to file a Draft License Application, a notice of its intent should be included in the updated study report.

The deadline to file a Draft License Application for the Kaweah Project is August 3, 2019. The updated study report is not due to be filed until October 24, 2019. Due to this disparity in the relicensing process schedule, and to satisfy the notification requirement under §5.16(c), SCE filed a notice of its intent to prepare a draft license application with the FERC on February 5, 2019. In addition, the notice went to the Project's distribution list.

The Draft License Application meets the content requirements specified in Title 18 CFR §5.18. Further, as specified in the FERC's regulations in Title 18 CFR §5.18(b), Exhibit E addresses the resources listed in the PAD provided for in 18 CFR §5.6; follows FERC's guidelines in "Preparing Environmental Assessments: Guidelines for Applicants, Contractors, and Staff"; and meets the format and content requirements specified by the Commission.

Exhibit E of the Draft License Application provides the necessary technical information and analyses to identify and evaluate potential impacts of continued operation and maintenance of the Project under the Proposed Action. In addition, the Exhibit E specifies new environmental measures; management and monitoring plans; and programs under the Proposed Action to protect, maintain, and enhance environmental and cultural resources.

An electronic version of the Draft License Application, excluding Critical Energy Infrastructure Information (CEII) and Confidential information is available on SCE's Kaweah Project relicensing website at www.sce.com/kaweah. A paper copy is available for review by appointment only at the Kaweah Hydro Headquarters Office – Carpenter's Shop, 44511 Sierra Drive, Three Rivers, California 93271. Any interested party may request an electronic copy of public portions of the Draft License Application by contacting

David Moore, SCE Relicensing Project Manager at (626) 302-9494 or by e-mail at david.moore@sce.com.

### 14.8.1 Comment Period

Concurrent with the filing of this Draft License Application with the FERC, SCE also notified Project stakeholders on the distribution list of its filing and availability for a 90-day review and comment period. CEII (Exhibit F – Design Drawings) was only provided to the FERC. Information designated as Confidential (e.g., sensitive biological and cultural resource information) was only distributed to the FERC and select resource agencies with jurisdiction over those resources.

SCE will address comments provided on the Draft License Application, as appropriate, in the Final License Application, which will be filed with the FERC and concurrently distributed to stakeholders on or before December 31, 2019, two years prior to the license expiration date.

## 14.9 LICENSE MEASURES COLLABORATION

Following distribution of the Draft License Application, SCE will conduct meetings with stakeholders to discuss the contents and analysis in the application and proposed environmental measures; management and monitoring plans; and programs to be included in the new license. SCE will incorporate stakeholder comments, as appropriate, in the Final License Application.

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# TABLES

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## Table 14-1. Parties Consulted in Preparation of the Application for New License

| Organization | Name | Street Address | City, State, Zip | Email |
|---|---|---|---|---|
| **Federal Government / Representatives** | | | | |
| Federal Energy Regulatory Commission | Kimberly D. Bose | 888 First Street, N.E. | Washington, DC 20426 | |
| Federal Energy Regulatory Commission | Frank Winchell | 888 First Street, N.E. | Washington, DC 20426 | frank.winchell@ferc.gov |
| Federal Energy Regulatory Commission | Jim Hastreiter | | | james.hastreiter@ferc.gov |
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| National Marine Fisheries Service | Jeff McLain | | | jeff.mclain@noaa.gov |
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| Sequoia and Kings Canyon National Parks | Nancy Hendricks | 47050 Generals Highway | Three Rivers, CA 93271-9700 | nancy_hendricks@nps.gov |
| Sequoia and Kings Canyon National Parks | Ginger Bradshaw | 47050 Generals Highway | Three Rivers, CA 93271-9700 | ginger_bradshaw@nps.gov |
| National Park Service | Stephen M. Bowes | 333 Bush Street, Suite 500 | San Francisco, CA 94104 | stephen_bowes@nps.gov |
| National Park Service | Susan Rosebrough | 333 Bush Street, Suite 500 | San Francisco, CA 94104 | susan_rosebrough@nps.gov |
| National Park Service | Barbara Rice | 333 Bush Street, Suite 500 | San Francisco, CA 94104 | barbara_rice@nps.gov |
| U.S. Army Corps of Engineers | | 1325 J Street, Room 1513 | Sacramento, CA 95814 | spk-pao@usace.army.mil |
| U.S. Bureau of Indian Affairs | Amy Dutschke | 2800 Cottage Way | Sacramento, CA 95825 | amy.dutschke@bia.gov |
| U.S. Bureau of Land Management | Christina Castellon | 3801 Pegasus Drive | Bakersfield, CA 93308 | ccastellon@blm.gov |
| U.S. Bureau of Land Management | Amy Girado | 3801 Pegasus Drive | Bakersfield, CA 93308 | agirado@blm.gov |
| U.S. Bureau of Land Management | Maria Soto | 3801 Pegasus Drive | Bakersfield, CA 93308 | msoto@blm.gov |
| U.S. Bureau of Land Management | Carly Summers | 3801 Pegasus Drive | Bakersfield, CA 93308 | csummers@blm.gov |
| U.S. Bureau of Land Management | Tamara Whitley | 3801 Pegasus Drive | Bakersfield, CA 93308 | twhitley@blm.gov |
| U.S. Bureau of Land Management | Brien Chartier | 3801 Pegasus Drive | Bakersfield, CA 93308 | bchartie@blm.gov |
| U.S. Bureau of Land Management | Romina Copado | 3801 Pegasus Drive | Bakersfield, CA 93308 | rcopado@blm.gov |

| Organization | Name | Street Address | City, State, Zip | Email |
|---|---|---|---|---|
| U.S. Bureau of Land Management | Alison Lipscomb | 3801 Pegasus Drive | Bakersfield, CA 93308 | alipscomb@blm.gov |
| U.S. Bureau of Land Management | Karen Doran | 3801 Pegasus Drive | Bakersfield, CA 93308 | kdoran@blm.gov |
| U.S. Bureau of Land Management | Sarah Bullock | 3801 Pegasus Drive | Bakersfield, CA 93308 | sbullock@blm.gov |
| U.S. Bureau of Land Management | CJ Clara Hurley | 3801 Pegasus Drive | Bakersfield, CA 93308 | cchase@blm.gov |
| U.S. Bureau of Reclamation | Michael Jackson | 1243 N Street | Fresno, CA 93721-1813 | mjackson@usbr.gov |
| U.S. Fish and Wildlife Service | Daniel Welsh | 2800 Cottage Way, W-2605 | Sacramento, CA 95825 | Daniel_Welsh@fws.gov |
| U.S. Fish and Wildlife Service | Alison Willy | 2800 Cottage Way, W-2605 | Sacramento, CA 95825 | alison_willy@fws.gov |
| U.S. Fish and Wildlife Service | Richard Kuyper | 2800 Cottage Way, W-2605 | Sacramento, CA 95825 | richard_kuyper@fws.gov |
| U.S. Geological Survey | Denis O'Halloran | 6000 J Street | Sacramento, CA 95819 | dohall@usgs.gov |
| U.S. House of Representatives | TJ Cox | 2700 M. Street, Suite 250B | Bakersfield, CA 93301 | |
| U.S. House of Representatives | Devin Nunes | 113 North Church Street, Suite 208 | Visalia, CA 93291 | |
| U.S. House of Representatives | Kevin McCarthy | 4100 Empire Drive, Suite 150 | Bakersfield, CA 93309 | |
| U.S. Senate | Kamala Harris | 501 I Street, Suite 7-800 | Sacramento, CA 95814 | |
| U.S. Senate | Dianne Feinstein | One Post Street, Suite 2450 | San Francisco, CA 94104 | |
| **State Government / Representatives** | | | | |
| California Department of Fish and Wildlife | Julie Vance | 1234 E. Shaw Avenue | Fresno, CA 93710 | julie.vance@wildlife.ca.gov |
| California Department of Fish and Wildlife | Abimael León | 1130 E. Shaw Avenue | Fresno, CA 93710 | abimael.leon@wildlife.ca.gov |
| Office of Historic Preservation | Julianne Polanco | 1725 23rd Street, Suite 100 | Sacramento, CA 95816 | julianne.polanco@parks.ca.gov |
| Office of Historic Preservation | Kathleen Forrest | 1725 23rd Street, Suite 100 | Sacramento, CA 95816 | kathleen.forrest@parks.ca.gov |
| Office of Historic Preservation | Jessica Tudor | 1725 23rd Street, Suite 100 | Sacramento, CA 95816 | jessica.tudor@parks.ca.gov |
| California Public Utilities Commission | | 505 Van Ness Avenue | San Francisco, CA 94102-3214 | |
| California State Senate | Shannon Grove | State Capitol, Room 3048 | Sacramento, CA 95814-4900 | |

| Organization | Name | Street Address | City, State, Zip | Email |
|---|---|---|---|---|
| California State Senate | Melissa Hurtado | State Capitol, Room 2054 | Sacramento, CA 95814-4900 | |
| Central Valley Regional Water Quality Control Board | | 1685 E Street | Fresno, CA 93706-2007 | |
| Native American Heritage Commission | | 1550 Harbor Boulevard, Suite 100 | West Sacramento, CA 95691 | nahc@nahc.ca.gov |
| State Water Resources Control Board | Jeff Wetzel | 1001 I Street, 14th Floor | Sacramento, CA 95814 | jeff.wetzel@waterboards.ca.gov |
| State Water Resources Control Board | Nathan Fisch | PO Box 2000 | Sacramento, CA 95812 | nathan.fisch@waterboards.ca.gov |
| State Water Resources Control Board | Ann Marie Ore | 1001 I Street, 14th Floor | Sacramento, CA 95814 | annmarie.ore@waterboards.ca.gov |
| State Water Resources Control Board | Erin Ragazzi | 1001 I Street, 14th Floor | Sacramento, CA 95814 | erin.ragazzi@waterboards.ca.gov |
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| Tulare County | Michael Washam | 5961 South Mooney Blvd. | Visalia, CA 93277 | mwasham@co.tulare.ca.us |
| Tulare County | | 221 South Mooney Blvd., Room 103 | Visalia, CA 93291 | |
| Tulare County Library | | 200 W. Oak Avenue | Visalia, CA 93291 | |
| Tulare County Water Commission | Denise England | 2800 W. Burrell Avenue | Visalia, CA 93291 | dengland@co.tulare.ca.us |
| Tulare County | Jessica Willis | 5961 South Mooney Blvd. | Visalia, CA 93277 | jwillis@co.tulare.ca.us |
| Tulare County | Hector Guerra | 5961 South Mooney Blvd. | Visalia, CA 93277 | hguerra@co.tulare.ca.us |
| City of Tulare | Josh McDonnell | 411 East Kern Avenue | Tulare, CA 93274 | jmcdonnell@tulare.ca.gov |
| City of Visalia | Paul Bernal | 315 E. Acequia Avenue | Visalia, CA 93291 | paul.bernal@visalia.city |
| **Public Agency** | | | | |
| Exeter Irrigation District | | 150 S. E Street | Exeter, CA 93221 | |
| Ivanhoe Irrigation District | | 33777 Road 164 | Visalia, CA 93292 | |
| Kaweah Delta Water Conservation District | Mark Larsen | 2975 N. Farmersville Blvd. | Farmersville, CA 93223 | mlarsen@kdwcd.com |
| Lindmore Irrigation District | Michael Hagman | PO Box 908 | Lindsay, CA 93247 | mhagman@lindmoreid.com |

| Organization | Name | Street Address | City, State, Zip | Email |
|---|---|---|---|---|
| Tulare Irrigation District | J. Paul Hendrix | 6826 Avenue 240 | Tulare, CA 93274 | jph@tulareid.org |
| Kaweah River Power Authority | Terry Stafford | 2975 N. Farmersville Blvd. | Farmersville, CA 93223 | tstafford@kdwcd.com |
| **Non-Governmental Organization** | | | | |
| American Whitewater | Dave Steindorf | 4 Baroni Drive | Chico, CA 95928-4314 | dave@americanwhitewater.org |
| American Whitewater | Theresa Simsiman | | | theresa@americanwhitewater.org |
| California Sportfishing Protection Alliance | Christopher Shutes | | | cshutes@calsport.org |
| CalTrout – Sierra Headwaters Region | Eric Huber | PO Box 3442 | Mammoth Lakes, CA 93546 | ehuber@caltrout.org |
| CalTrout – Central California Region | Jacob Katz | 930 Shiloh Rd., Bldg. 40-#6 | Windsor, CA 95492 | jkatz@caltrout.org |
| Friends of the River | Eric Wesselman | 1418 20th Street, Suite 100 | Sacramento, CA 95811 | eric@friendsoftheriver.org |
| Trout Unlimited | James Polfer | | | jpolfer@hotmail.com |
| Trout Unlimited | John Sikora | 4005 Manzanita Avenue, Suite 6, Box 302 | Carmichael, CA 95608 | JESIKORA@SBCGLOBAL.NET |
| Trout Unlimited | Walt Bentley | | | bentley46@earthlink.net |
| Advisory Council on Historic Preservation | John Eddins | 401 F Street, NW, Suite 308 | Washington, DC 20001-2637 | jeddins@achp.gov |
| Tulare County Historical Society | Mike Chrisman | PO Box 295 | Visalia, CA 93279 | |
| Three Rivers Historical Museum | Thomas Marshall | PO Box 162 | Three Rivers, CA 93271 | history@3rmuseum.org |
| **Native American Tribes** | | | | |
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| Santa Rosa Indian Community of the Santa Rosa Rancheria | Ruben Barrios Sr. | PO Box 8 | Lemoore, CA 93245 | rbarrios@tachi-yokut-nsn.gov |
| Tule River Indian Tribe | Kerri Vera | PO Box 589 | Porterville, CA 93258 | tuleriverenv@yahoo.com |
| Tule River Indian Tribe | Joseph Garfield | PO Box 589 | Porterville, CA 93258 | joseph.garfield@yahoo.com |
| Tule River Indian Tribe | Zack Jaroko | PO Box 589 | Porterville, CA 93258 | |
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| Tachi-Yokut Tribe | Greg Cuara | PO Box 8 | Lemoore, CA 93245 | gcuara@tachi-yokut-nsn.gov |

| Organization | Name | Street Address | City, State, Zip | Email |
|---|---|---|---|---|
| Tachi-Yokut Tribe | Shana Powers | PO Box 8 | Lemoore, CA 93245 | spowers@tachi-yokut-nsn.gov |
| Dunlap Band of Mono-Indians - Historical Preservation Society | Mandy Marine | PO Box 18 | Dunlap, CA 93621 | mandy_marine@hotmail.com |
| Northem Band of Mono Yokuts | Delaine Bill | PO Box 234 | Dunlap, CA 93621 | |
| Cold Springs Tribe | Carol Bill | PO Box 209 | Tollhouse, CA 93667 | csrchair@netptc.net |
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| Mono Elder | Keith Turner | PO Box 306 | Auberry, CA 93602 | keithturner1950@yahoo.com |
| North Fork Mono Tribe | Ron Goode | 13396 Tollhouse Road | Clovis, CA 93619 | rwgoode911@hotmail.com |
| Kern Valley Indian Community | Julie Turner | PO Box 1010 | Lake Isabella, CA 93240 | administrator@kawaiisu.org |
| Kern Valley Indian Community | Robert Robinson | PO Box 1010 | Lake Isabella, CA 93240 | bbutterbredt@gmail.com |
| Tubatulabas of Kern Valley | Robert L. Gomez Jr. | PO Box 226 | Lake Isabella, CA 93240 | rgomez@tubatulabal.org |
| Wuksache Indian Tribe / Eshom Valley Band | Kenneth Woodrow | 1179 Rock Haven Ct. | Salinas, CA 93906 | kwood8934@aol.com |
| Picayune Rancheria of Chukchansi Indians | Jennifer Ruiz | PO Box 2226 | Oakhurst, CA 93644 | jruiz@chukchansitribe.net |
| Wukchumni Tribal Council | Darlene Franco | 4737 West Concord Avenue | Visalia, CA 93277 | |
| Dunlap Band of Mono Indians | Dirk Charley | 5509 East McKenzie Avenue | Fresno, CA 93727 | dcharley2016@gmail.com |
| Dunlap Band of Mono Indians | Benjamin Charley, Jr. | 470 Winuba Lane | Bishop, CA 93621 | charley07@verizon.net |
| | Rene Roederer | 46468 Mineral King Road | Three Rivers, CA 93271 | reneeroederer@gmail.com |
| **Public** | | | | |
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| Bear Ranch | Philip Armstrong | 1723 Beaver Dam Road | Vilas, NC 28692 | |
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| Organization | Name | Street Address | City, State, Zip | Email |
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| | David Dunham | 44024 Sierra Drive | Three Rivers, CA 93271 | 2shiners@sbcglobal.net |
| | Mike Hauber | P. O. Box 1116 | Three Rivers, CA 93271 | m.d.hauber@gmail.com |
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| | Joy Kunz | 222 E. Constance Avenue | Santa Barbara, CA 93105 | |
| | D. Eleanor Newman | PO Box 66 | Three Rivers, CA 93271 | redbudacres28@aol.com |
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| | Coleen Bath | 43429 Sierra Drive | Three Rivers, CA 93271 | monosail@earthlink.net |
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| | Jonathan Peltzer | PO Box 454<br>44422 Sierra Drive | Three Rivers, CA 93271 | peltzerj@asme.org |
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| | Michael Kunz | 3244 East Kerckhoff | Fresno, CA 93702 | mkunz@fresno.edu |
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| | | | | raftgoodtimes@gmail.com |
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| | | | | evanmoore32@yahoo.com |
| | | | | chasewhitewater@gmail.com |
| | | | | christulley@gmail.com |
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| | | | | d_mcquoid@hotmail.com |
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| | | | | trkayaker@ymail.com |
| | | | | paddle@sierrasouth.com |
| | | | | chris.tulley@gmail.com |
| Sequoia Riverlands Trust | Soapy Mulholland | 427 S. Garden Street | Visalia, CA 93277 | soapy@sequoiariverlands.org |

| Organization | Name | Street Address | City, State, Zip | Email |
|---|---|---|---|---|
| California Water Service | | 216 North Valley Oaks Drive | Visalia, CA 93292 | |
| Consolidated Peoples Ditch Company | James P Silva, Jr | PO Box 366 | Farmersville, CA 93223-0366 | |
| Hurley and Laird | Russell Hurley | 403 N Floral Street | Visalia, CA 93291 | |
| Minasian, Spruance, Baber, Meith, Soares & Sexton, LLP | Jeffrey Meith | 1681 Bird Street | Oroville, CA 95965 | |
| Three Rivers Village Foundation | Tom Sparks | 45001 Sierra Drive | Three Rivers, CA 93271 | tom.sparks@live.com |
| The Kaweah Commonwealth | John Elliott | PO Box 806 | Three Rivers, CA 93271 | tkcplanner@gmail.com |
| **SCE Staff** | | | | |
| Southern California Edison | Jim Kennard | 44511 Sierra Drive | Three Rivers, CA 93271 | james.kennard@sce.com |
| Southern California Edison | Robert Biedermann | 44511 Sierra Drive | Three Rivers, CA 93271 | robert.biedermann@sce.com |
| Southern California Edison | Wayne Allen | 1515 Walnut Grove | Rosemead, CA 91770 | wayne.allen@sce.com |
| Southern California Edison | David Moore | 1515 Walnut Grove | Rosemead, CA 91770 | david.moore@sce.com |
| Southern California Edison | Audry Williams | 1515 Walnut Grove | Rosemead, CA 91770 | audry.williams@sce.com |
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| Southern California Edison | Kelly Henderson | PO Box 800 | Rosemead, CA 91770-0800 | kelly.henderson@sce.com |
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| Southern California Edison | Derrick Tito | | | derrick.tito@sce.com |

**Table 14-2. Resource Agency and Stakeholder Meeting Dates and Topics**

| Date | Type / Purpose | General Attendance | Location | Relicensing Process Overview | Project Description Overview | Existing Information Data Request | Stakeholder Interest Statements | Project Schedule | Project Facilities and Operations | Relicensing Process Plan / Communication Protocols | Existing Resource Information | Technical Study Plan Development | Technical Study Implementation Progress |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mar 31, 2015 | Project Introduction | BLM | Bakersfield, CA | ● | ● | ● | | ● | | | | | |
| Apr 8, 2015 | Project Introduction | NPS | Three Rivers, CA | ● | ● | ● | | ● | | | | | |
| Apr 9, 2015 | Project Introduction | CDFW | Fresno, CA | ● | ● | ● | | ● | | | | | |
| Jun 8, 2015 | Informational | Water Users | Three Rivers, CA | ● | ● | | ● | ● | ● | | | | |
| Jun 9, 2015 | Project Kick-off | Interested Stakeholders | Visalia, CA | ● | ● | | ● | ● | ● | ● | | | |
| Aug 11, 2015 | Informational / Plenary | Interested Stakeholders | Visalia, CA | | ● | | ● | | ● | ● | ● | | |
| Feb 24, 2016 | Informational / Plenary | Interested Stakeholders | Visalia, CA | ● | ● | | | | | | | ● | |
| May 24, 2016 | Study Coordination | BLM | Teleconference | | | | | | | | | ● | |
| Aug 18, 2016 | Study Coordination | BLM | Bakersfield, CA | | | | | | | | | ● | |
| Mar 14, 2017 | FERC Scoping | Interested Stakeholders | Visalia, CA | ● | ● | | | ● | ● | | | | |
| Mar 15, 2017 | FERC Site Visit | Interested Stakeholders | Three Rivers, CA | | | | | | ● | | | | |
| Jun 21, 2017 | Proposed Study Plan | Interested Stakeholders | Visalia, CA | ● | | | | ● | | | | ● | |
| Mar 1, 2018 | Study Plan Kick-off | Interested Stakeholders | Teleconference | ● | ● | | | | | | | ● | |
| Apr 4, 2018 | Annual Agency Coordination | NPS | Three Rivers, CA | | | | | | | | | ● | |
| Nov 1, 2018 | Initial Study Report Meeting | Interested Stakeholders | Visalia, CA | | | | | | | | | | ● |

BLM = Bureau of Land Management
CDFW = California Department of Fish and Wildlife
FERC = Federal Energy Regulatory Commission
NPS = National Park Service

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## Table 14-3. Technical Working Group and Focus Group Meeting Dates and Topics

| Date | General Topics of Discussion / Objectives |
|---|---|
| **Aquatic Resources TWG** | |
| Mar 26, 2018 | • Select instream flow modeling sites and transects<br>• Select fish population sampling sites<br>• Select macroinvertebrate sampling sites<br>• Select foothill yellow-legged frog modeling sites |
| Jun 8, 2018 | • Study sites and specific habitat units and transects to model<br>• Obtain concurrence on cross-section placement within mesohabitat units<br>• Select location and lengths of reach study sites<br>• Select geomorphic and riparian quantitative transects<br>• Entrainment study approach |
| Jun 25, 2018 | • Site visit with interested agencies and Aquatic Resources TWG participants |
| Nov 15, 2018 | • Revised entrainment study |
| Dec 4, 2018 | • Revised entrainment study |
| **Cultural Resources TWG** | |
| Mar 20, 2018 | • Built environment, archaeological, and ethnographic study implementation<br>• Initiate consultation regarding the proposed APE for the studies<br>• Proposed field study plans and timelines |
| May 7, 2019 | • Built environment, archaeological, and ethnographic study results<br>• NRHP Work Plan |
| **Whitewater Boater Focus Group** | |
| Apr 3, 2018 | • Project hydrology<br>• Collect whitewater boating resource information |

## Table 14-4. Technical Study Report Distribution Dates

| Technical Study Report[1] | Draft TSR Distribution Date | Revised TSR Distribution Date | |
|---|---|---|---|
| | | DLA Aug 3, 2019 | FLA Dec 31, 2019 |
| **Aquatic Resources** | | | |
| AQ 1 – Instream Flow | Aug 3, 2019 (DLA) | | X |
| AQ 2 – Fish Population | Apr 2, 2019 | X | |
| AQ 3 – Macroinvertebrates | Aug 3, 2019 (DLA) | | X |
| AQ 4 – Water Temperature | Aug 3, 2019 (DLA) | | X |
| AQ 5 – Geomorphology | Aug 3, 2019 (DLA) | | X |
| AQ 6 – Water Quality | Apr 2, 2019 | X | |
| AQ 7 – SS Amphibians and Aquatic Reptiles | Aug 3, 2019 (DLA) | | X |
| AQ 8 – Fish Passage | Apr 2, 2019 | X | |
| AQ 9 – Entrainment[2] | TBD | TBD | TBD |
| **Cultural Resources[3]** | | | |
| CUL 1 – Cultural, Built Environment | Jan 22, 2019 | X | |
| CUL 1 – Cultural, Archaeology | Jan 22, 2019 | X | |
| CUL 1 – Cultural, Ethnography | Feb 15, 2019 | X | |
| **Land Resources** | | | |
| LAND 1 – Transportation | Jan 22, 2019 | X | |
| LAND 2 – Aesthetic Resources | Jan 22, 2019 | X | |
| LAND 3 – Land Use | Feb 15, 2019 | X | |
| **Recreation Resources** | | | |
| REC 1 – Recreation Resources | Aug 3, 2019 (DLA) | | X |
| REC 2 – Whitewater Boating | Jan 22, 2019 | X | |
| **Terrestrial Resources** | | | |
| TERR 1 – Botanical Resources | Jan 22, 2019 | X | |
| TERR 2 – Wildlife Resources | Jan 30, 2019 | X | |

1 For Draft TSRs included in the Draft License Application (DLA), comments will be addressed and the Final TSR included in the Final License Application (FLA).

2 The AQ 9 – Entrainment study is ongoing and will not be complete until after the FLA is filed with FERC. A Draft TSR will be distributed to stakeholders for review and comment in 2020 upon completion of the study.

3 To aid in clarity and ease of stakeholder review, the CUL 1 – TSR was distributed as three separate reports – Built Environment, Archaeology, and Ethnography.

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## LIST OF FIGURES

**No table of figures entries found.**

## LIST OF ACRONYMS

| | |
|---|---|
| Project | Kaweah Project |
| SCE | Southern California Edison Company |

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# 15.0 LIST OF PREPARERS

This section provides the names and titles of Southern California Edison Company (SCE) personnel that provided senior management and technical review of the Kaweah Project (Project) Application for New License, including Exhibit E (Table 15-1). In addition, a complete list of preparers is provided in Table 15-2 that includes the firm, personnel name, current position, highest degree received, the field in which the degree was received, and section(s) prepared.

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# TABLES

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## Table 15-1. Southern California Edison Company Personnel Providing Review of the License Application – Exhibit E

| Southern California Edison Company (SCE) | |
|---|---|
| **Senior Management/Review** | |
| Wayne Allen | Principal Manager, Regulatory Support Services |
| Martin Ostendorf | Senior Manager, Regulatory Support Services |
| David Moore | Relicensing Project Manager |
| Kelly Henderson | Senior Attorney |
| **Technical Review** | |
| Robert Biedermann | Senior Supervisor |
| Derrick Tito | Hydrographer Foreman |
| Tim Condit | Senior Advisor |
| Audry Williams | Senior Archaeologist |
| Martin Blagaich | Senior Advisor |
| Cindy Calemmo | SCE Lands Department |

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## Table 15-2. List of Preparers of the Application for New License – Exhibit E Development

| Staff | Position | Degree | Major | Senior Management & Review | Technical Review | Project Coordination | Production / Technical Editing | GIS/Graphics | Modeling | Exhibit E Sections: -- Introduction | 1.0 Application | 2.0 Purpose of Action & Need for Power | 3.0 No-Action Alternative | 4.0 Proposed Action Alternative | 5.0 Other Alternatives | 6.0 Statutory & Regulatory Requirements | 7.1 General Description of the River Basin | 8.1 Analytical Approach | 7.2 8.2 Water Use & Hydrology | 7.3 8.3 Water Quality | 7.4 8.4 Fish & Aquatic Resources | 7.5 8.5 Botanical & Wildlife Resources | 7.6 8.6 Geology & Soils | 7.7 8.7 Geomorphology | 7.8 8.8 Riparian Resources | 7.9 8.9 Land Use | 7.10 8.10 Recreation Resources | 7.11 8.11 Aesthetic Resources | 7.12 8.12 Cultural Resources | 7.13 8.13 Tribal Resources | 7.14 8.14 Socioeconomics | 9.0 Cumulative Effects Analysis | 10.0 Environmental Analysis of Other Alternatives | 11.0 Economic Analysis | 12.0 Conclusions & Recommendations | 13.0 Finding of No Significant Impact | 14.0 Consultation Documentation | 15.0 List of Preparers | 16.0 Literature Cited |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Cardno, Inc.** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ed Bianchi | Project Director | PhD | Fisheries Science | ● | ● | | | | | | | | | | | | | ● | | | | | | | | | | | | | | ● | | ● | ● | | | | |
| Julie Smith | Project Manager | BA | Environmental Studies | | | ● | | | | ● | ● | ● | ● | ● | ● | ● | | | | | | | | | | | | | | ● | | ● | ● | ● | ● | ● | ● | |
| Eric Lee | GIS Specialist | BA | English/Geography | | | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Iris Eschen | Production Supervisor | Cert | Office Administration | | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| Craig Addley | Sr. Aquatic Ecologist | PhD | Civil & Environmental Engineering | | ● | | | | ● | | | | | | | | ● | | ● | ● | ● | | | | | | | | | | | | | | | | | |
| Polly Allen | Sr. Architectural Historian | MS | Historic Preservation | | | | | | | | | | | | | | | | | | | | | | | | | | ● | ● | | | | | | | | |
| Byron Amerson | Sr. Project Scientist | MS | Geology | | | | | | | | | | | | | | ● | | | | | | ● | ● | | | | | | | | | | | | | | |
| Jennifer Chase | Sr. Project Scientist | MEM | Forest Ecology & Management | | | | | | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | |
| Keven Ann Colgate | Sr. Project Scientist | BS | Forestry & Natural Resources Management | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | |
| Peter Drobny | Sr. Staff Scientist | MS | Natural Resources (Fisheries) | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| Richard Evans | Sr. Staff Scientist | BS | Environmental Science | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | | | | | | | |
| Caroline Hamilton | Environmental Scientist | BA | Environmental Science & Policy | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | ● | | | ● | | | ● | |
| Jennifer Hammond | Engineer | MS | Civil & Environmental Engineering | | | | | | ● | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | | |
| Chris Hogle | Sr. Staff Scientist | MS | Biology (Ecology) | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | | | | | | | |
| Dave Martinez | Sr. Recreation Specialist | MS | Recreation Administration | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | |
| Katie McLean | Aquatic Scientist | MS | Biology | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| Norm Ponferrada | Hydro Relicensing Specialist | BS | Fish Conservation Biology and Physiology | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | | | | | | | |

| Staff | Position | Degree | Major | Senior Management & Review | Technical Review | Project Coordination | Production / Technical Editing | GIS/Graphics | Modeling | Exhibit E Sections: -- Introduction | 1.0 Application | 2.0 Purpose of Action & Need for Power | 3.0 No-Action Alternative | 4.0 Proposed Action Alternative | 5.0 Other Alternatives | 6.0 Statutory & Regulatory Requirements | 7.1 General Description of the River Basin | 8.1 Analytical Approach | 7.2 8.2 Water Use & Hydrology | 7.3 8.3 Water Quality | 7.4 8.4 Fish & Aquatic Resources | 7.5 8.5 Botanical & Wildlife Resources | 7.6 8.6 Geology & Soils | 7.7 8.7 Geomorphology | 7.8 8.8 Riparian Resources | 7.9 8.9 Land Use | 7.10 8.10 Recreation Resources | 7.11 8.11 Aesthetic Resources | 7.12 8.12 Cultural Resources | 7.13 8.13 Tribal Resources | 7.14 8.14 Socioeconomics | 9.0 Cumulative Effects Analysis | 10.0 Environmental Analysis of Other Alternatives | 11.0 Economic Analysis | 12.0 Conclusions & Recommendations | 13.0 Finding of No Significant Impact | 14.0 Consultation Documentation | 15.0 List of Preparers | 16.0 Literature Cited |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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| Robert Stoddard | Sr. Staff Scientist | BA | Biology | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | | | | | | | |
| Matthew Walker | Architectural Historian | MA | History (Public History) | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | |
| Sandra Walter-Perry | Sr. Project Scientist | BA | Geological Sciences | | | | | | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | |
| Crystal West | Hydro Relicensing Specialist | BA | Anthropology/Archaeology | | | | | | | | | | | | | | | | | | | | | | | | | | ● | ● | | | | | | | |
| **Janelle Nolan & Associates Environmental Consulting** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Janelle Nolan | Resource Director | BS | Wildlife & Fisheries Biology | | ● | | | | | | | | ● | ● | | | | ● | | | | ● | | | | | | | | | ● | ● | | | | | |
| Sara Gillespie | Project Biologist | BS | Wildlife, Fisheries, & Conservation Biology | | ● | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | |
| Robyn Smith | Biologist | MS | Ecology | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | |
| **Watercourse Engineering** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Michael L. Deas | Principal | PhD | Civil & Environmental Engineering | | | | | | ● | | | | | | | | | | ● | ● | | | | | | | | | | | | | | | | | |
| Andrew E. Bale | Sr. Water Resources Engineer | PhD | Civil and Environmental Engineering | | | | | | ● | | | | | | | | | | ● | ● | | | | | | | | | | | | | | | | | |
| Ibrahim Ertugrul Sogutulgil | Civil Engineer | MS | Civil and Environmental Engineering | | | | | | ● | | | | | | | | | | ● | ● | | | | | | | | | | | | | | | | | |
| **Statistical Research** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Michael K. Lerch | Ethnographer | MA | Anthropology | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | |

| Staff | Position | Degree | Major | Senior Management & Review | Technical Review | Project Coordination | Production / Technical Editing | GIS/Graphics | Modeling | Exhibit E Sections: -- Introduction | 1.0 Application | 2.0 Purpose of Action & Need for Power | 3.0 No-Action Alternative | 4.0 Proposed Action Alternative | 5.0 Other Alternatives | 6.0 Statutory & Regulatory Requirements | 7.1 General Description of the River Basin | 8.1 Analytical Approach | 7.2 8.2 Water Use & Hydrology | 7.3 8.3 Water Quality | 7.4 8.4 Fish & Aquatic Resources | 7.5 8.5 Botanical & Wildlife Resources | 7.6 8.6 Geology & Soils | 7.7 8.7 Geomorphology | 7.8 8.8 Riparian Resources | 7.9 8.9 Land Use | 7.10 8.10 Recreation Resources | 7.11 8.11 Aesthetic Resources | 7.12 8.12 Cultural Resources | 7.13 8.13 Tribal Resources | 7.14 8.14 Socioeconomics | 9.0 Cumulative Effects Analysis | 10.0 Environmental Analysis of Other Alternatives | 11.0 Economic Analysis | 12.0 Conclusions & Recommendations | 13.0 Finding of No Significant Impact | 14.0 Consultation Documentation | 15.0 List of Preparers | 16.0 Literature Cited |
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| Walter J. Van Groningen | President | BA | Environmental Geography | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | |
| **RCS Corporation** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| David Wyatt | Wildlife Biologist | MS | Biological Conservation | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| Sarah Kupferberg | Ecologist | PhD | Integrative Biology | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| Andrea Adams | Ecologist | PhD | Ecology, Evolution & Marine Biology | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |

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