STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

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In the Matter of Water Quality Certification for the

**SOUTHERN CALIFORNIA EDISON COMPANY**

**SIX BIG CREEK HYDROELECTRIC PROJECTS:**

**BIG CREEK NOS. 2A, 8, AND EASTWOOD HYDROELECTRIC PROJECT**

**BIG CREEK NO. 3 HYDROELECTRIC PROJECT**

**MAMMOTH POOL HYDROELECTRIC PROJECT**

**VERMILION VALLEY HYDROELECTRIC PROJECT**

**PORTAL HYDROELECTRIC PROJECT**

**BIG CREEK NOS. 1 AND 2 HYDROELECTRIC PROJECT**

**FEDERAL ENERGY REGULATORY COMMISSION PROJECT NOS. 67, 120, 2085, 2086, 2174, AND 2175**

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SOURCES: San Joaquin River and its tributaries, including the North Fork, Middle Fork, and South Fork San Joaquin River

COUNTIES: Fresno and Madera

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**WATER QUALITY CERTIFICATION FOR FEDERAL PERMIT OR LICENSE**

**State Water Resources Control Board**
**Division of Water Rights – Water Quality Certification Program**
**P.O. Box 2000**
**Sacramento, CA 95812-2000**

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## ACRONYMS

| | |
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| ALP | Alternative Licensing Process |
| Basin Plan | *Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basins* |
| BCHS | Big Creek Hydroelectric System |
| Big Creek ALP Projects | Big Creek Alternative Licensing Process Projects |
| Big Creek ALP Settlement Agreement | *Big Creek Alternative Licensing Process Hydroelectric Projects Settlement Agreement* |
| BMI | benthic macroinvertebrate |
| Bureau | United States Bureau of Reclamation |
| Certification | Water Quality Certification |
| CDFW | California Department of Fish and Wildlife |
| CEDEN | California Environmental Data Exchange Network |
| CEQA | California Environmental Quality Act |
| CRMFs | Channel Riparian Maintenance Flows |
| CSCI | California Stream Condition Index |
| cfs | cubic feet per second |
| Deputy Director | Deputy Director of the Division of Water Rights |
| DWR | Department of Water Resources |
| EA | Environmental Assessment |
| EIR | Environmental Impact Report |
| EIS | Environmental Impact Statement |
| ESA | Endangered Species Act |
| FEA | Final Environmental Assessment |
| FEIS | Final Environmental Impact Statement |
| FERC | Federal Energy Regulatory Commission |
| FONSI | Finding of No Significant Impact |
| FPA | Federal Power Act |
| Hydropower IBI | Hydropower-specific IBI (Rehn et al.) |
| LWM | large woody material |
| MIF | minimum instream flow |
| MPOA | Mammoth Pool Operating Agreement |
| msl | mean sea level |
| MW | megawatts |
| ND | Negative Declaration |
| NEPA | National Environmental Policy Act |
| NGO | Non Governmental Organizations |
| NPDES | National Pollutant Discharge Elimination System |
| Regional Water Boards | California Regional Water Quality Control Boards |
| RRW | Ramping Rate Workgroup |
| SCE | Southern California Edison Company |
| State Water Board | State Water Resources Control Board |
| SWAMP | Surface Water Ambient Monitoring Program |
| TLP | Traditional Licensing Process |
| USEPA | United States Environmental Protection Agency |
| USFS | United States Forest Service |
| USFWS | United States Fish and Wildlife Service |
| USGS | United State Geological Survey |

## 1.0 Background and Introduction

The Big Creek Hydroelectric System (BCHS) is an integrated network of seven individually-licensed hydroelectric projects in the upper San Joaquin River watershed of central California (Figure 1). All seven BCHS projects are owned and operated by the Southern California Edison Company (SCE or Licensee), and were originally licensed by the Federal Energy Regulatory Commission (FERC) in the early to mid-1900s. This water quality certification (certification) covers the following six hydroelectric projects[1] – referred to collectively as the Six Big Creek Hydroelectric Projects – that make up the majority of the BCHS:

- Big Creek Nos. 2A, 8, and Eastwood Hydroelectric Project (FERC Project No. 67)
- Big Creek No. 3 Hydroelectric Project (FERC Project No. 120)
- Mammoth Pool Hydroelectric Project (FERC Project No. 2085)
- Vermilion Valley Hydroelectric Project (FERC Project No. 2086)
- Portal Hydroelectric Project (FERC Project No. 2174)
- Big Creek Nos. 1 and 2 Hydroelectric Project (FERC Project No. 2175)

SCE filed a single, joint application for certification of the Six Big Creek Hydroelectric Projects with the State Water Resources Control Board (State Water Board) in 2009 and has annually withdrawn and resubmitted its certification application. The FERC licenses for the Six Big Creek Hydroelectric Projects expired between 2003 and 2009 (Table A) and the projects are now operating under annual licenses until their relicensing processes are complete.

Section 1.0 of this document presents an overview of the entire BCHS, including a discussion of system operations, water rights, water management, power generation, and reservoir storage practices. Section 2.0 presents detailed descriptions of the existing facilities and operations for the Six Big Creek Hydroelectric Projects, as well as a summary description of SCE's relicensing proposal for each. Section 3.0 provides a brief overview of the FERC relicensing proceedings and the associated settlement agreement that is central to SCE's relicensing proposal. Section 4.0 describes the State Water Board's and other related regulatory authorities, and Section 5.0 summarizes the environmental review process conducted by the State Water Board pursuant to the requirements of the California Environmental Quality Act (CEQA). Section 6.0 describes the body of information considered and rationale for certification conditions. Section 7.0 provides a summary conclusion statement. Section 8.0 describes the certification conditions that will become effective once FERC issues a new hydropower license(s) for the Six Big Creek Hydroelectric Projects.

The majority of BCHS facilities are located on national forest land administered by the Sierra National Forest, at elevations ranging from 1,000 to 9,000 feet above mean sea level (msl). The major components of the BCHS include six reservoirs, 23 smaller water diversions and impoundments, eight powerhouses and one underground power station, 54 miles of water conveyance systems, three transmission lines, and various access roads and other appurtenant facilities. The combined authorized generation capacity of the seven BCHS projects is 949.405 megawatts (MW). A brief overview of the BCHS is provided in the following sections: operations, water rights and contractual obligations, water management, and reservoir storage.

[1] Big Creek No. 4 Hydroelectric Project (FERC Project No. 2017) is not part of this water quality certification as a water quality certification and corresponding FERC license for the project were issued on June 20, 2003 and December 4, 2003, respectively.

**Table A.** Individually licensed Big Creek Hydroelectric Projects

| FERC Project No. | FERC Project Name | County | FERC License Issued | FERC License Expiration | Authorized Generation Capacity (megawatts) |
|---|---|---|---|---|---|
| **SIX BIG CREEK HYDROELECTRIC PROJECTS COVERED BY THIS CERTIFICATION** | | | | | |
| 67 | Big Creek Nos. 2A, 8, and Eastwood Hydroelectric Project | Fresno | March 27, 1959 | February 28, 2009 | 373.32 |
| 120 | Big Creek No. 3 Hydroelectric Project | Fresno and Madera | September 7, 1977 | February 28, 2009 | 165.375 |
| 2085 | Mammoth Pool Hydroelectric Project | Fresno and Madera | December 30, 1957 | November 30, 2007 | 150.938 |
| 2086 | Vermilion Valley Hydroelectric Project | Fresno | September 1, 1953 | August 31, 2003 | 0 |
| 2174 | Portal Hydroelectric Project | Fresno | April 19, 1955 | March 31, 2005 | 10.80 |
| 2175 | Big Creek Nos. 1 and 2 Hydroelectric Project | Fresno and Madera | March 27, 1959 | February 28, 2009 | 150.15 |
| **BCHS PROJECT WITH EXISTING CERTIFICATION (ISSUED JUNE 2003)** | | | | | |
| 2017 | Big Creek No. 4 Hydroelectric Project | Fresno and Madera | December 4, 2003 | December 4, 2039 | 98.82 |
| | | | | **Combined Authorized Generation Capacity:** | **949.403** |

## 1.1 Big Creek Hydroelectric System Operations

SCE operates the seven individually-licensed projects that comprise the BCHS. In general, BCHS operations are coordinated to meet multiple purposes, including the demand for power, to maximize the value of the power produced from available water supply, to fulfill downstream water rights agreements and contractual obligations, and to comply with the terms and conditions of existing FERC hydropower licenses. Water is routed through individual BCHS projects in a manner that is consistent with available water supply, power demand, the physical limitations of BCHS infrastructure, and operational constraints imposed by regulatory permits and contractual operating agreements. The BCHS has three interlinked water pathways or "chains" through which water may be transported and used to produce power (Figure 2):

- *Huntington Water Chain:* This chain consists of the Portal Powerhouse (FERC Project No. 2174); Big Creek Powerhouse Nos. 1 and 2 (FERC Project No. 2175); Powerhouse No. 3 (FERC Project No. 120); Powerhouse No. 4 (FERC Project No. 2017); and Powerhouse No. 8 (FERC Project No. 67).

- *Shaver Water Chain:* This chain consists of the Portal Powerhouse (FERC Project No. 2174); Big Creek Powerhouse Nos. 2A, 8, and Eastwood Power Station (FERC Project No. 67); Powerhouse No. 3 (FERC Project No. 120); and Powerhouse No. 4 (FERC Project No. 2017).
- *Mammoth Water Chain:* This chain consists of the Mammoth Pool Powerhouse (FERC Project No. 2085); Big Creek Powerhouse No. 3 (FERC Project No. 120); and Powerhouse No. 4 (FERC Project No. 2017).

Some of the factors that most influence BCHS operations include: (1) available water supply; (2) electrical system demands and California Independent System Operator requirements; (3) planned and unplanned maintenance outages; (4) reservoir water storage limits; and (5) regulatory instream flow requirements.

## 1.2 Big Creek Hydroelectric System Water Rights and Contractual Obligations

SCE holds or claims water rights for each of the seven hydroelectric projects in the BCHS. Some are specific to an individual BCHS project, while others are shared by two or more BCHS projects. These water rights legally entitle SCE to divert, store, and use water for BCHS operations. Most are appropriative rights issued to SCE or its predecessors by the State Water Board following implementation of the Water Commission Act of 1914. Others were obtained through appropriation of water prior to 1914 (i.e., pre-1914 water rights) plus prescription against other parties in the San Joaquin River watershed. As a riparian land owner, SCE also has several active and inactive riparian water right claims. Table B lists the riparian claims and appropriative water rights associated with the Six Big Creek Hydroelectric Projects.

**Table B.** Summary of Riparian and Appropriative Water Rights/Claims for the Six Big Creek Hydroelectric Projects

| Application ID | Water Right Type | Status | Status Date | Face Amount (acre-feet) | Source/Location |
|---|---|---|---|---|---|
| **(FERC Project No. 67) – Big Creek Nos. 2A, 8, and Eastwood Hydroelectric Project** | | | | | |
| A001341 | Appropriative | Licensed | 07/03/1919 | 146,000 | Mono Creek |
| A001342 | Appropriative | Licensed | 07/03/1919 | 81,000 | Bear Creek |
| A001343 | Appropriative | Licensed | 07/03/1919 | 229,000 | South Fork San Joaquin River |
| A001344 | Appropriative | Licensed | 07/03/1919 | 41,000 | South Fork San Joaquin River |
| A001345 | Appropriative | Licensed | 07/03/1919 | 50,000 | Pitman Creek |
| A001346 | Appropriative | Licensed | 07/03/1919 | 62,000 | Stevenson Creek |
| A011115 | Appropriative | Licensed | 07/23/1945 | 81,942.6 | Bolsillo, Hooper, North Slide, South Slide, and Tombstone Creeks |
| A026533 | Appropriative | Revoked | 01/29/1999 | 0 | West Fork Balsam Creek |
| A026534 | Appropriative | Permitted | 09/24/1980 | 134,422 | Crater, Camp 62, and Chinquapin Creeks |
| A026542 | Appropriative | Permitted | 09/24/1980 | 72,270 | Big Creek |
| S001827 | Riparian | Inactive | 04/11/1976 | 0 | Unnamed Spring |
| **(FERC Project No. 120) – Big Creek No. 3 Hydroelectric Project** | | | | | |
| A002522 | Appropriative | Licensed | 08/26/1921 | 1,279,268.2 | San Joaquin River |
| A011352 | Appropriative | Licensed | 03/27/1946 | 506,784.3 | South Fork San Joaquin River |

| Application ID | Water Right Type | Status | Status Date | Face Amount (acre-feet) | Source/Location |
|---|---|---|---|---|---|
| A024701 | Appropriative | Permitted | 10/30/1974 | 301,038 | San Joaquin River |
| A026546 | Appropriative | Permitted | 09/24/1980 | 54,202 | San Joaquin River |
| **(FERC Project No. 2085) – Mammoth Pool Hydroelectric Project** | | | | | |
| A013929 | Appropriative | Licensed | 08/31/1950 | 1,483,159.5 | Rock Creek, Ross Creek, San Joaquin River |
| A026543 | Appropriative | Permitted | 09/24/1980 | 36,135 | San Joaquin River |
| A026544 | Appropriative | Permitted | 09/24/1980 | 289,080 | San Joaquin River |
| A026545 | Appropriative | Permitted | 09/24/1980 | 144,540 | San Joaquin River |
| **(FERC Project No. 2086) – Vermilion Valley Hydroelectric Project** | | | | | |
| A013928 | Appropriative | Licensed | 08/31/1950 | 110,500 | Mono Creek |
| A016102 | Appropriative | Licensed | 10/18/1954 | 11,859.7 | Warm Creek |
| **(FERC Project No. 2174) – Portal Hydroelectric Project** | | | | | |
| A026534 | Appropriative | Permitted | 09/24/1980 | 134422 | Camp 61, Camp 62, Chinquapin, and Crater Creeks |
| **(FERC Project No. 2175) – Big Creek Nos. 1 and 2 Hydroelectric Project** | | | | | |
| A026535 | Appropriative | Permitted | 09/24/1980 | 20,958 | Adit No. 8., Balsam, and Ely Creeks |
| A026536A | Appropriative | Permitted | 09/24/1980 | 194.4 | Adit No. 8, Big, Pitman, and Snowslide Creeks |
| A026536B | Appropriative | Permitted | 09/24/1980 | 72 | Big, Pitman, and Snowslide Creeks |
| S001828 | Riparian | Claimed | 01/01/1972 | 1 | Ely Meadow – unnamed stream |

**Mammoth Pool Operating Agreement**

In addition to complying with the terms and conditions of BCHS water right permits and licenses, SCE operates the BCHS in accordance with the Mammoth Pool Operating Agreement (MPOA). The MPOA went into effect in 1957, the same year that FERC issued the last long-term hydropower license for the Mammoth Pool Hydroelectric Project (FERC Project No. 2085). It specifies cumulative reservoir storage limits and release requirements based on annual runoff forecasts at Friant Dam (Millerton Reservoir) - a major United States Bureau of Reclamation (Bureau) flood control and irrigation water storage facility located on the San Joaquin River downstream of the BCHS. Meetings between SCE, the Bureau, and the downstream irrigators are held annually following the March 1 runoff forecast to coordinate BCHS power production with Millerton Reservoir operations for flood control and water supply. The MPOA includes specific requirements for the timing and volume of releases from BCHS reservoirs, maximum year-end storage limits, and minimum seasonal flow from Dam No. 7- the lowermost dam in the BCHS (part of the Big Creek No. 4 Hydroelectric Project) (Figure 1).

## 1.3 Big Creek Hydroelectric System Water Management

Annual runoff forecasts are central to water management planning for the BCHS. Runoff forecasts are developed based on available snowpack and precipitation data, and certain assumptions about future precipitation and air temperature. SCE uses annual forecasts to develop operational plans for hydropower generation, instream flow releases, and reservoir storage, and to ensure compliance with associated regulatory requirements and contractual water management obligations.

Although there are subtle differences in the way that SCE manages BCHS operations during different water year[2] types, operations are similar from one year to the next in that water diverted by BCHS facilities is used to generate power. Some BCHS reservoirs spill in wet and above normal water years and are filled to maximum capacity when spill ceases. When the reservoirs stop spilling, SCE is able to manage the system with available inflows and begin managing the water to meet the demand for power by providing both base load and peak cycling energy.

In the upper basin area, water from the South Fork, Middle Fork, and North Fork San Joaquin River drainages is collected in Mammoth Pool Reservoir and Florence Lake, and water from the upper Mono Creek drainage is stored in Lake Thomas Edison. Water from Mammoth Pool Reservoir and two associated backcountry diversions is diverted to the upper San Joaquin River via Mammoth Pool Powerhouse. Water from Florence Lake, Lake Thomas Edison, and several smaller backcountry diversions is diverted into Huntington Lake via the Ward Tunnel and the Mono-Bear Siphon. The volume of water that can pass through the Ward Tunnel and the Mono-Bear Siphon (1,760 cfs and 650 cfs, respectively) is limited by the physical size and layout of these conduits, so water deliveries to Huntington Lake are prioritized as follows: first priority is given to water from Florence Lake; second priority is given to water from Bear Creek Diversion and Lake Thomas Edison; and third priority is given to water diverted from the small diversions at Camp 61 Creek, Camp 62 Creek, Chinquapin Creek, and Bolsillo Creek. The water delivered to Huntington Lake may also pass through Portal Powerhouse at the exit of the Ward Tunnel, depending on the amount of water being transported (Figure 2).

After passing through or bypassing the Portal Powerhouse, water entering Huntington Lake is directed to either the Huntington Water Chain or the Shaver Water Chain. Water from Big Creek Powerhouse Nos. 1 and 2 in the Huntington Water Chain joins water from the Shaver Water Chain at the Big Creek Powerhouse No. 2 and 2A Tailrace (Dam 5). Water from these two chains is then diverted through Big Creek Powerhouse No. 8, and then joins the San Joaquin River and water from the Mammoth Chain at the Big Creek No. 8 Tailrace (Dam 6 Impoundment). Water from all three chains then continues through Big Creek Powerhouse Nos. 3 and 4.

Water from the Middle Fork and North Fork San Joaquin River drainages, and water from the South Fork San Joaquin River drainage (that is not diverted at Florence Lake, Lake Thomas Edison, Bear Creek Diversion, or one of the other small backcountry diversions) is collected in Mammoth Pool Reservoir and routed through the Mammoth Water Chain. Mammoth Pool Powerhouse usually runs at maximum capacity during the spring runoff period to prevent or delay spill at Mammoth Pool Reservoir.

The Portal Powerhouse, Eastwood Power Station, and Big Creek Powerhouse No. 4 generally operate independently of other powerhouses in the BCHS. The Portal Powerhouse opportunistically uses water passing through the Ward Tunnel for power generation. Generation at the Eastwood Power Station normally occurs during the peak demand period of the day, unless water is being moved continuously from Huntington Lake to Shaver Lake to avoid spill at Huntington Lake, or to increase storage at Shaver Lake for use during peaking periods. Big Creek Powerhouse No. 4 is the last power generation opportunity in the BCHS,

[2] A *water year* is defined as the 12-month period extending from October 1 of one year through September 30 of the following year. The *water year* is designated by the calendar year in which it ends. For example, Water Year 2016 covers October 1, 2015 through September 30, 2016.

and as such, adjustments to the operation of Big Creek Powerhouse No. 4 do not affect the operation of other upstream powerhouses in the BCHS.

The three water chains of the BCHS are operated around-the-clock during the spring runoff period, except during dry water years. Operational flexibility is limited during wetter water years because the amount of water available for power generation exceeds the combined generation and storage capacity of the BCHS, resulting in spill from system reservoirs. After the end of the spill period, daily powerhouse schedules are established to maximize hydropower resources during peak load periods. Powerhouses that are not needed for BCHS water management are run preferentially during peak hours. Due to the nature of the energy market and SCE's power generation resources, it is generally beneficial for the BCHS to provide power during peak hours once the spring runoff period is over. Since BCHS powerhouses discharge to reservoirs and forebays, peaking operations generally do not cause varying instream flows in bypass reaches as long as adjustments are made to match reservoir outflows with reservoir inflows. SCE uses a proprietary computer model to predict inflow to the BCHS and to plan monthly flow through the system to meet operating constraints while maximizing power generation during peak hours.

## 1.4 Big Creek Hydroelectric System Reservoir Storage

Table C lists the reservoirs associated with the BCHS. Summary descriptions of the water storage operations for these six reservoirs are provided below.

**Table C.** Reservoirs associated with Big Creek Hydroelectric System

| Reservoir (FERC Project No.) | Maximum Pool Elevation (feet above msl) | Usable Storage Capacity at Maximum Pool (acre-feet) | Surface Area at Maximum Pool (acres) |
|---|---|---|---|
| Florence Lake (FERC Project No. 67) | 7,327.5 | 64,406 | 962 |
| Shaver Lake (FERC Project No. 67) | 5,370 | 135,568 | 2,184 |
| Redinger Lake (FERC Project No. 2017) | ~1,440 | 26,119 | ~465 |
| Mammoth Pool Reservoir (FERC Project No. 2085) | 3,330 | 119,940 | 1,435 |
| Lake Thomas Edison (FERC Project No. 2086) | 7,643 | 125,035 | 1,853 |
| Huntington Lake (FERC Project No. 2175) | 6,950 | 89,166 | 1,435 |

### 1.4.1 Florence Lake (FERC Project No. 67)

Florence Lake is a high elevation reservoir that stores water from the South Fork San Joaquin River and other small tributary streams including Hooper Creek, Tombstone Creek, and Crater Creek. Water stored in Florence Lake is diverted to Ward Tunnel along with water from the Bolsillo, Chinquapin, Camp 62, and Camp 61 Creek Diversions. Priority is given to water being diverted from Florence Lake if a spill is imminent at that location. Water diverted through Ward Tunnel is stored in Huntington Lake.

SCE maintains Florence Lake at its minimum level (1,000 acre-feet) during the winter months to avoid damage on the dam face from freezing water. Storage usually begins to increase in late April. After the maximum storage volume is attained in late spring or early summer, the

reservoir elevation begins to gradually decline until it again reaches its minimum storage level in late fall.

### 1.4.2 Shaver Lake (FERC Project No. 67)

Shaver Lake is a moderate elevation reservoir that stores water from Huntington Lake via Eastwood Power Station or Tunnel 7, as well as local inflows from North Fork Stevenson Creek and other small tributary streams in the vicinity. Water storage at Shaver Lake is not noticeably altered on a daily basis by pump-back operations[3] at the Eastwood Power Station, which typically occur during the late night/early morning hours from spring through fall. During this period, Shaver Lake is generally held at high levels to maintain pump-back capability. When in pump-back mode, the Eastwood Power Station pumps water from Shaver Lake and delivers it to Balsam Meadow Forebay. This water is then used the following day for generation through Eastwood Power Station before being returned to Shaver Lake. In wet water years, Shaver Lake is drawn down below the minimum pump-back elevation (5,342 feet) in the spring/early summer to create storage space and minimize the potential for spilling at Shaver Dam. Water from Shaver Lake is diverted to Powerhouse 2A through Tunnel 2, and is also released to meet minimum streamflow requirements (FERC license issued in 1978 for FERC Project No. 67) into Stevenson Creek, which is tributary to the San Joaquin River downstream of Dam 6.

### 1.4.3 Redinger Lake (FERC Project No. 2017)

Redinger Lake is a lower elevation reservoir that stores water from local inflows and water from Big Creek Powerhouse No. 3. Water storage at Redinger Lake is normally kept near capacity (35,033 acre-feet) throughout most the year. The California Division of Dam Safety requires annual maintenance on the spillway gates at Redinger Lake, which makes it necessary to reduce storage in the reservoir to below 13,000 acre-feet. These maintenance operations typically occur in later October, and affect water surface elevations for about three weeks each year.

### 1.4.4 Mammoth Pool Reservoir (FERC Project No. 2085)

Mammoth Pool Reservoir is a moderate elevation reservoir that stores water from the San Joaquin River and other smaller tributary streams in the watershed. The drainage area of the Mammoth Pool Reservoir is large relative to reservoir size, and as a result, it spills more often than the other reservoirs in the BCHS. In most cases, spill at Mammoth Pool Dam will also result in spills below Dam 6 and Redinger Lake, the lowermost reservoir in the BCHS. Ideally, minimum storage at Mammoth Pool Reservoir will occur just prior to the beginning of spring snowmelt to maximize storage space in the reservoir. After the threat of spill has passed, storage at Mammoth Pool Reservoir declines at a rate necessary to ensure compliance with the MPOA's September 30th storage provisions[4]. Consideration is given to flood control needs when determining the optimal storage level at Mammoth Pool Reservoir during the winter months.

[3] The "pump-back" approach is a combination of pumped storage and conventional hydroelectric plants that use natural streamflow. In this case, the "pumped-back" operations allow SCE to recycle water through the system to generate power.

[4] The MPOA's September 30th storage provision is dependent on the computed natural runoff at Friant Dam (acre-feet) and storage of Mammoth Pool Reservoir on October 1 (acre-feet).

### 1.4.5 Lake Thomas Edison (FERC Project No. 2086)

Lake Thomas Edison is a high elevation reservoir that collects water from the upper Mono Creek watershed and several other smaller streams, including Warm Creek and Boggy Meadow Creek. Lake Thomas Edison has a relatively large storage capacity compared to its drainage area, and as such, the majority of inflow to the lake in drier water years is stored and not released until late summer. In wetter water years inflow to Lake Thomas Edison is stored until the threat of spill at Florence Lake and the Bear Creek Diversion has subsided, at which point SCE starts to release water from Lake Thomas Edison to avoid having to use the emergency spillway at a later date. Peak storage at Lake Thomas Edison normally occurs sometime during July and August. Water released from Lake Thomas Edison is diverted into the Mono-Bear Siphon approximately one mile downstream at the Mono Creek Diversion (part of FERC Project No. 67). Water diverted into the Mono-Bear Siphon flows into Ward Tunnel and then into Huntington Lake.

### 1.4.6 Huntington Lake (FERC Project No. 2175)

Huntington Lake is a relatively high elevation reservoir that stores water from backcountry lakes and diversions via the Ward Tunnel. Water from Huntington Lake may be sent to Big Creek Powerhouse No. 1, Shaver Lake via Balsam Forebay, or North Fork Stevenson Creek. In order to support reservoir-based recreation, SCE makes a good faith effort to maintain high lake levels with minimum fluctuation from Memorial Day through Labor Day weekend. However, in wet water years, SCE reduces storage during periods of peak runoff to avoid spill at Huntington Lake.

## 2.0 Descriptions of Six Big Creek Hydroelectric Projects

Following are summary descriptions of each of the Six Big Creek Hydroelectric Projects. Each includes a detailed description of existing project facilities and operations. SCE proposes to continue operation of the Six Big Creek Hydroelectric Projects without major modification of project boundaries, facilities, or operations. However, SCE's relicensing applications and the *Big Creek Alternative Licensing Process (ALP) Hydroelectric Projects Settlement Agreement* (Big Creek ALP Settlement Agreement)[5] include several new and substantive environmental measures that are central to the relicensing proposals. SCE proposes to implement the new measures in addition to those already in place under the existing FERC licenses to monitor, protect, and mitigate damage to, and enhance environmental conditions and recreational opportunities affected by the Six Big Creek Hydroelectric Projects. A full listing and description of these measures is provided in SCE's license application, the Big Creek ALP Settlement Agreement, the Final Environmental Impact Statement[6] (FEIS), and the Environmental

[5] Big Creek Alternative Licensing Process (ALP) Hydroelectric Projects Settlement Agreement. February. 2007. By and Among Southern California Edison Company and Settlement Parties.

[6] Federal Energy Regulatory Commission. March. 2009. Environmental Impact Statement for Hydropower licenses, Big Creek Nos. 2A, 8, and Eastwood – FERC Project No. 67, Big Creek Nos. 1 and 2 – FERC Project No. 2175, Mammoth Pool – FERC Project No. 2085, Big Creek No. 3 – FERC Project No. 120, California. Office of Energy Projects, Division of Environmental and Engineering Review. Washington, DC.

Assessments (EA) for the Portal Hydroelectric Project[7] and Vermilion Valley Hydroelectric[8] Project.

## 2.1 Big Creek Nos. 2A, 8, and Eastwood Hydroelectric Project (FERC Project No. 67)

The Big Creek Nos. 2A, 8, and Eastwood Hydroelectric Project (FERC Project No. 67) is the most geographically extensive of the Six Big Creek Hydroelectric Projects and occupies approximately 2,389 acres of national forest land administered by the Sierra National Forest. FERC Project No. 67 is located in Fresno County entirely within national forest and SCE-owned lands. Major FERC Project No. 67 facilities were constructed between 1920 and 1987 and include three powerhouses, an underground power station, two major dams and reservoirs, [9] five moderate-sized dams or diversions forming two forebays and three small diversion pools, eight small diversions, six water conveyance systems, and one transmission line. FERC Project No. 67 facilities are situated on and adjacent to the South Fork San Joaquin River and 15 other smaller streams that are tributary to the upper San Joaquin River, including but not limited to Big Creek, Stevenson Creek, and Balsam Creek. The Big Creek Nos. 2A, 8, and Eastwood Hydroelectric Project is located entirely within Fresno County and has an authorized generation capacity of 373.32 MW, the highest of all projects in the BCHS.

### 2.1.1 Source Rivers and Streams

- Balsam Creek
- Bear Creek
- Big Creek
- Bolsillo Creek
- Boulder Creek
- Camp 61 Creek (East and West Forks)
- Camp 62 Creek
- Chinquapin Creek
- Crater Creek
- Hooper Creek
- Mono Creek
- Pitman Creek
- Slide Creek (North and South Forks)
- South Fork San Joaquin River
- Stevenson Creek
- Tombstone Creek

[7] Federal Energy Regulatory Energy Commission. 2004. May. Final Environmental Assessment, Portal Hydroelectric Project, California, (Project No. 2174-012). Office of Energy Projects. Division of Hydropower Licensing. Washington, DC.

[8] Federal Energy Regulatory Energy Commission. 2004. May. Environmental assessment for hydropower license, Vermilion Valley Hydroelectric Project, FERC Project No. 2086-035, California. Office of Energy Projects. Division of Hydropower Licensing. Washington, DC.

[9] For purposes of this document, a “reservoir” has a capacity greater than 20,000 acre-feet. A “moderate-sized diversion impoundment” has a capacity of less than 20,000 acre-feet to greater than three acre-feet; and “small diversions and forebays” are those with a capacity of less than three acre-feet.

### 2.1.2 Existing FERC Project No. 67 Facilities

POWERHOUSES AND POWER STATION

- *Big Creek Powerhouse No. 2A* has two generator units and a dependable operating[10] capacity of approximately 98.5 MW.
- *Big Creek Powerhouse No. 8* has two generator units and a dependable operating capacity of approximately 64.5 MW.
- *Eastwood Power Station* has one turbine/pump/generator unit and a dependable operating capacity of approximately 207 MW.

MAJOR DAMS AND RESERVOIRS

- *Shaver Dam* (concrete) forms *Shaver Lake*, which has a usable storage capacity of approximately 135,568 acre-feet and a maximum pool elevation of 5,370 feet above msl.
- *Florence Dam* (concrete) forms *Florence Lake*, which has a usable storage capacity of approximately 64,406 acre-feet and a maximum pool elevation of approximately 7,327.5 feet above msl.

MODERATE-SIZED DAMS, DIVERSIONS, AND IMPOUNDMENTS

- *Balsam Meadow Forebay Dam* forms *Balsam Meadow Forebay*, which has a usable storage capacity of approximately 1,547 acre-feet and a maximum pool elevation of approximately 6,670 feet above msl.
- *Bear Creek Diversion* forms the *Bear Diversion Pool*, which has a usable storage capacity of approximately 103 acre-feet and a maximum pool elevation of approximately 7,350 feet above msl.
- *Dam 5* forms the *Dam 5 Impoundment* (*also known as Powerhouse 8 Forebay*), which has a usable storage capacity of approximately 49 acre-feet and a maximum pool elevation of approximately 2,943 feet above msl.
- *Hooper Creek Diversion* has a usable capacity of approximately three acre-feet and a maximum pool elevation of approximately 7,505 feet above msl.
- *Mono Creek Diversion* forms the *Mono Diversion Pool*, which has a usable capacity of approximately 47 acre-feet and a maximum pool elevation of approximately 7,350 feet above msl.

[10] SCE defines dependable operating capacity as "the capacity that may be available for system use from the individual resources listed under favorable conditions. Where common facilities are shared between units, capacity ratings should be based on the Company's [SCE's] operating experience and exclude capacity associated with auxiliary, house, and fishwater turbine generators, and emergency engine-generators."

SMALL DIVERSIONS AND IMPOUNDMENTS

- *Bolsillo Creek Diversion* has a usable capacity of less than one acre-foot and a maximum pool elevation of approximately 7,532 feet above msl.
- *Camp 62 Creek Diversion* has a usable capacity of less than one acre-foot and a maximum pool elevation of approximately 7,257 feet above msl.
- *Chinquapin Creek Diversion* has a usable capacity of less than one acre-foot and a maximum pool elevation of approximately 7,628 feet above msl.
- *Crater Creek Diversion* has a usable capacity of less than one acre-foot and a maximum pool elevation of approximately 8,764 feet above msl.
- *North Slide Creek Diversion* (currently out of service) has a prior usable capacity of less than one acre-foot and a maximum pool elevation of approximately 7,501 feet above msl.
- *Pitman Creek Diversion* forms the *Pitman Diversion Pool*, which has a usable capacity of approximately one acre-foot and a maximum pool elevation of approximately 6,998 feet above msl.
- *South Slide Creek Diversion* (currently out of service) has a prior usable capacity of less than one acre-foot and a maximum pool elevation of approximately 7,501 feet above msl.
- *Tombstone Creek Diversion* (currently out of service) has a prior usable capacity of less than one acre-foot and a maximum pool elevation of approximately 7,673 feet above msl.

WATER CONVEYANCES

- *Ward Tunnel* conveys water to Huntington Lake from Florence Lake, Mono Creek, Bear Creek, Hooper Creek, North Slide Creek, South Slide Creek, Chinquapin Creek, Camp 62 Creek, Bolsillo Creek, and the East and West Forks of Camp 61 Creek. The tunnel is approximately 12.8 miles long and has a conveyance capacity of approximately 1,760 cfs.
- *Mono-Bear Siphon* conveys water to Ward Tunnel from the Mono Creek and Bear Creek Diversions. Water is conveyed from the Mono Creek Diversion through approximately 1.6 miles of flowline, or conduits for water conveyance, and from Bear Creek Diversion through approximately 1.4 miles of combined tunnel and flowline to where the two tunnels connect, known as the Mono-Bear Wye. From this point, water is conveyed another 2.6 miles through a combined flowline/siphon to Ward Tunnel. The Mono Tunnel and Bear Tunnel have conveyance capacities of 450 cfs each, and the combined flowline/siphon has a conveyance capacity of approximately 650 cfs.
- *Huntington-Pitman-Shaver Conduit*, also known as *Tunnel No. 7*, conveys water from Huntington Lake and the Pitman Creek Diversion to Shaver Lake through North Fork Stevenson Creek or through Balsam Forebay and the Eastwood Power Station. Tunnel No. 7 is approximately 5.4 miles long.
- *Eastwood Power Station and Tailrace Tunnels* convey water from the Balsam Meadow Forebay through the Eastwood Power Station to Shaver Lake. The Eastwood Power Station and Tailrace Tunnels are also used to convey water back from Shaver Lake to Balsam Meadow Forebay during pump-back operations. The Eastwood Power Station Tunnel is about one mile long, and the Tailrace Tunnel is about 1.4 miles long. The combined conveyance capacity of the two tunnels is approximately 2,500 cfs.

- *Tunnel No. 5* conveys water from Shaver Lake to Big Creek Powerhouse No. 2A. The tunnel is approximately 2.6 miles long and has a conveyance capacity of approximately 650 cfs.
- *Tunnel No. 8* conveys water from the Dam 5 Impoundment just downstream of Big Creek Powerhouse No. 2/2A to Big Creek Powerhouse No. 8. The tunnel is about one mile long and has a conveyance capacity of approximately 1,173 cfs.

TRANSMISSION LINE

- *Eastwood Power Station-Big Creek 1 Transmission Line* connects Eastwood Power Station to a switchyard at Big Creek Powerhouse No. 1, and is approximately 4.7 miles long.

### 2.1.3 Existing FERC Project No. 67 Operations

Big Creek Powerhouses Nos. 2A and 8 and the Eastwood Power Station can be operated locally or remotely from the Big Creek Dispatch Center at Big Creek Powerhouse No. 3 (FERC Project No. 120), which serves as the main control center for the entire BCHS. The flow of water through powerhouses and power stations is dependent on available water supply and on the operation of BCHS facilities located at higher elevations in the watershed. Big Creek Powerhouse No. 2A and the Eastwood Power Station are in the Shaver Water Chain and Powerhouse No. 8 is in both the Shaver Water Chain and the Huntington Water Chain. The Eastwood Power Station receives water from Balsam Meadow Forebay and discharges to Shaver Lake. The Balsam Meadow Forebay is filled via the Huntington-Pitman-Shaver Conduit from Huntington Lake or through water pumped back from Shaver Lake. The Eastwood Power Station can operate as a pump storage facility in all water year types after peak runoff has receded and SCE gains control of BCHS reservoir inflows. Powerhouse No. 2A receives water from Shaver Lake and discharges to the Dam 5 Impoundment on Big Creek. Powerhouse No. 8 uses water from the Dam 5 Impoundment and discharges to the Dam 6 Impoundment on the San Joaquin River.

Powerhouse operation is similar in all water year types in that water diverted to FERC Project No. 67 from remote impoundments and diversions is used to generate power when water is available. Power generation is greatest in wet water years when SCE operates at full capacity beginning in mid-April to May until the end of the peak runoff period, which typically occurs in late July. At that time, SCE gains control of reservoir inflows and begins managing powerhouse operations to meet power grid requirements by providing both base load and peak cycling energy.

In above normal water years, FERC Project No. 67 generally runs at full capacity beginning in May and continues until peak flows recede, which typically occurs in July. Some of the BCHS reservoirs spill in above normal water years and are filled to maximum capacity until spills cease. At that point, SCE gains control of inflows and begins managing powerhouse operations to meet power grid requirements by providing both base load and peak cycling energy. Power generation is lower in dry water years, when very little water other than dam seepage and mandatory instream flow releases bypass the powerhouses. In some dry water years, SCE operates FERC Project No. 67 at full capacity for a short duration in May and June. In other years, SCE operates the FERC Project No. 67 at less than full capacity in order to fill the reservoirs to maximum capacity.

## 2.2 Big Creek No. 3 Hydroelectric Project (FERC Project No. 120)

The Big Creek No. 3 Hydroelectric Project (FERC Project No. 120) is located on the Upper San Joaquin River in Fresno and Madera Counties, and occupies approximately 508 acres of national forest land administered by the Sierra National Forest. FERC Project No.120 is entirely within national forest and SCE-owned lands. Major FERC Project No. 120 facilities were constructed between 1923 and 1980 and consist of one powerhouse, one moderate-sized dam, and one water conveyance system. FERC Project No. 120 has an authorized generation capacity of 165.375 MW, the second highest in the BCHS.

### 2.2.1 Source Rivers and Streams

- San Joaquin River and tributaries above Big Creek Powerhouse No. 3, including the North, Middle, and South Fork San Joaquin River and their associated tributaries.

### 2.2.2 Existing FERC Project No. 120 Facilities

POWERHOUSE

- *Big Creek Powerhouse No. 3* has five turbine generator units and a dependable operating capacity of approximately 182 MW.

MODERATE-SIZED DAMS AND IMPOUNDMENT

- *Dam 6* forms the *Dam 6 Impoundment*, which has a usable storage capacity of approximately 993 acre-feet at an elevation of approximately 2,230 feet above msl.

WATER CONVEYANCE

- *Powerhouse No. 3 Water Conveyance System* conveys water from the Dam 6 Impoundment to Big Creek Powerhouse No. 3. The conveyance system consists primarily of 5.3 miles of tunnel with a capacity of approximately 3,250 cfs.

### 2.2.3 Existing FERC Project No. 120 Operations

Big Creek Powerhouse No. 3 can be operated locally from the Big Creek Powerhouse No. 3 control room, or remotely from the Big Creek Dispatch Center, which serves as the main control center for the entire BCHS. The flow of water through FERC Project No. 120 is dependent on water supply during periods of snowmelt and wet weather, and the operation of other components of the BCHS that are located at higher elevations in the watershed. Big Creek Powerhouse No. 3 is one of the last generating opportunities in each of the three water chains (Huntington, Shaver, and Mammoth). FERC Project No. 120 receives water from the Dam 6 impoundment and discharges to Redinger Lake (FERC Project No. 2017).

Operation of the FERC Project No.120 is similar in all water year types in that water diverted into the project from remote impoundments and diversions is used to generate power when water is available. In wet water years, the FERC Project No. 120 is typically run at full capacity beginning in May until late July, when peak runoff recedes. Once SCE gains control of inflows to BCHS reservoirs, powerhouse operation is managed to meet power grid requirements by providing both base load and peak cycling energy. Power generation is greatest during wet water years. If necessary, (i.e. if inflows exceed powerhouse intake capacity) the Dam 6 outlet works may be used to bypass water around the Big Creek Powerhouse No. 3.

In above normal water years, FERC Project No. 120 generally runs at full capacity beginning in May until the end of peak runoff, which typically occurs in July. Some of the BCHS reservoirs

spill in above normal water years and are filled to maximum capacity until spills cease. At that time, SCE gains control of inflows and begins managing powerhouse operations to meet the demand for power by providing base load and/or peak cycling energy. Water flow through FERC Project No. 120 is generally matched to the flow entering the Dam 6 Impoundment.

In dry water years, the FERC Project No. 120 may run at full capacity for a short duration in May and June. In some dry water years, the FERC Project No. 120 is operated at less than full capacity in order to fill BCHS reservoirs to maximum capacity. Generation is lower in dry water years and very little water other than dam seepage and mandatory instream flow releases bypass Big Creek Powerhouse No. 3.

## 2.3 Mammoth Pool Hydroelectric Project (FERC Project No. 2085)

The Mammoth Pool Hydroelectric Project (FERC Project No. 2085) is located on and adjacent to the upper San Joaquin River in Fresno and Madera Counties, and occupies approximately 2,030 acres of national forest land administered by the Sierra National Forest. FERC Project No. 2085 is entirely within national forest and SCE-owned lands, with the exception of a private land parcel that is crossed by the Mammoth Pool Powerhouse-Big Creek No. 3 transmission line. Major FERC Project No. 2085 facilities were constructed between 1958 and 1960 and consist of one powerhouse, one compacted earthen-fill dam and reservoir on the upper San Joaquin River, two small diversion dams, two water conveyances, and one transmission line. FERC Project No. 2085 has an authorized generation capacity of 150.938 MW, the third highest in the BCHS.

### 2.3.1 Source Rivers and Streams

- San Joaquin River and tributaries above Mammoth Pool Dam, including the North, Middle, and South Fork San Joaquin River and associated tributaries
- Rock Creek
- Ross Creek

### 2.3.2 Existing FERC Project No. 2085 Facilities

POWERHOUSE

- *Mammoth Pool Powerhouse* contains two turbine generator units with a total dependable operating capacity of approximately 187 MW.

MAJOR DAM AND RESERVOIR

- *Mammoth Pool Dam* (earthen-fill) forms *Mammoth Pool Reservoir*, which has a usable storage capacity of approximately 119,940 acre-feet and a maximum pool elevation of 3,330 feet above msl.

SMALL DIVERSIONS

- *Rock Creek Diversion* has a usable capacity of less than one acre-foot and a maximum pool elevation of 3,336 feet above msl.
- *Ross Creek Diversion* has a usable capacity of less than one acre-foot and a maximum pool elevation of 3,359 feet above msl.

WATER CONVEYANCES

- *Mammoth Pool Power Tunnel* is approximately 7.5 miles long and is used to convey water from Mammoth Pool Reservoir to the penstock at Mammoth Pool Powerhouse. Water from the Ross Creek and Rock Creek Diversions also enters the tunnel between Mammoth Pool Reservoir and the Mammoth Pool Powerhouse.
- *Mammoth Pool Diversion Tunnel* is approximately 2,092 feet long and is used to convey water from Mammoth Pool Reservoir to the fish-water generator, Howell-Bunger valve, and minimum instream flow release valve in Mammoth Pool Dam.

TRANSMISSION LINES

- *The Mammoth Pool Powerhouse-Big Creek No. 3 Transmission Line* is approximately 6.7 miles long and connects the Mammoth Pool Powerhouse to the Big Creek No. 3 Switchyard.

### 2.3.3 Existing FERC Project No. 2085 Operations

The Mammoth Pool Powerhouse can be operated locally from the Mammoth Pool Powerhouse control room or remotely from the Big Creek Dispatch Center at Big Creek Powerhouse No. 3 (FERC Project No. 120), which serves as the main control center for the entire BCHS. The flow of water through the FERC Project No. 2085 is dependent on available water supply during periods of snowmelt and wet weather, and on the operation of other BCHS components that are located at higher elevations in the watershed. Mammoth Pool Reservoir receives inflow from a large watershed that includes the North, Middle, and South Forks of the San Joaquin River and associated tributaries. The Mammoth Pool Powerhouse is the first generating opportunity in the Mammoth Chain, which moves water from Mammoth Pool Reservoir to the Dam 6 Impoundment.

Under existing operations, water for the FERC Project No. 2085 is diverted at the Mammoth Pool Reservoir on the San Joaquin River, and from Rock Creek and Ross Creek Diversions. Water passing through the Mammoth Pool Powerhouse enters the San Joaquin River just upstream of the Dam 6 Impoundment, also known as the Big Creek No. 3 Forebay (FERC Project No. 120).

In wet water years, SCE typically operates the FERC Project No. 2085 at full capacity beginning in April and continuing well into the summer months. Mammoth Pool Reservoir usually begins to spill earlier than other upstream reservoirs in the BCHS due to its lower elevation and large watershed size. Once SCE gains control of inflows to Mammoth Pool Reservoir, powerhouse operations are managed to meet base load and/or peak cycling energy needs.

In above normal water years, the FERC Project No. 2085 may run at full capacity beginning in April or May, providing base load power until the end of the peak runoff in June. Mammoth Pool Reservoir typically spills in above normal water years. When SCE has the ability to control reservoir inflows, Mammoth Pool Powerhouse operations are managed to match reservoir inflows as necessary to meet base load and peak cycling energy demands. As inflows decrease during the summer, less flow is available for power generation, and water is used during periods of peak demand in order to maximize the value of the energy produced. In the fall, the water is released from Mammoth Pool Reservoir to create storage capacity in accordance with the terms and conditions of the MPOA. Power generation is lowest from October through December when reservoir inflows decrease.

Power generation is lowest in drier water years, when little or no water spills from Mammoth Pool Dam. The FERC Project No. 2085 may run at full capacity for a short duration in May and June, but if both reservoir storage and inflows are low, the Mammoth Pool Powerhouse will operate at less than full capacity in order to fill the reservoir to maximum capacity for the summer recreation season.

## 2.4 Vermilion Valley Hydroelectric Project (FERC Project No. 2086)

The Vermilion Valley Hydroelectric Project (FERC Project No. 2086) is located on Mono Creek in Fresno County, where it occupies approximately 2,202 acres of national forest land administered by the Sierra National Forest. FERC Project No. 2086 is entirely within national forest land. FERC Project No. 2086 consists of water diversion and storage facilities only and does not include any water conveyance or power generation facilities. Major FERC Project No. 2086 facilities were constructed in the early 1950s and consist of one major dam on Mono Creek, one small diversion located on nearby Warm Creek, and a small diversion channel.

### 2.4.1 Source Rivers and Streams

- Boggy Meadow Creek
- Cold Creek
- Mono Creek
- Warm Creek

### 2.4.2 Existing FERC Project No. 2086 Facilities

MAJOR DAM AND RESERVOIR

- *Vermilion Valley Dam* is a 4,234-foot-long earthen-fill dam that impounds Lake Thomas Edison, which has a usable storage capacity of 125,035 acre-feet and a maximum pool elevation of 7,642 feet above msl. Water stored in Lake Thomas Edison can be used to generate power at any of the nine powerhouses in the BCHS, which includes Big Creek No.4 Hydroelectric Project (FERC Project No. 2017).

SMALL DIVERSION

- *Warm Creek Diversion* diverts water from Warm Creek into Lake Thomas Edison via the Warm Creek Diversion Channel and nearby Boggy Meadow Creek.

WATER CONVEYANCE

- *Warm Creek Diversion Channel* is approximately two miles long and conveys water from the Warm Creek Diversion to Boggy Meadow Creek, which then drains to Lake Thomas Edison.

### 2.4.3 Existing FERC Project No. 2086 Operations

FERC Project No. 2086 diverts and stores water from the upper Mono Creek and Warm Creek watersheds. Flows from Warm Creek are diverted into Lake Thomas Edison via the Warm Creek Diversion Channel, which conveys water from Warm Creek to Lake Thomas Edison via Boggy Meadow Creek. The diverted reach of Warm Creek extends about four miles from the diversion dam downstream to its confluence with the South Fork San Joaquin River.

The FERC Project No. 2086 does not include any power generating facilities. Its sole function is the storage of water for use elsewhere in the BCHS. Water stored in Lake Thomas Edison is released into Mono Creek, where it is subsequently diverted to Huntington Lake via the Mono

Bear Siphon and Ward Tunnel. From Huntington Lake the water can be used to generate power in the Huntington and Shaver Water Chains.

## 2.5 Portal Hydroelectric Project (FERC Project No. 2174)

The Portal Hydroelectric Project (FERC Project No. 2174) is located on Camp 61 Creek in Fresno County, and occupies approximately 77 acres of national forest land administered by the Sierra National Forest. FERC Project No. 2174 is entirely within national forest land. Major FERC Project No. 2174 facilities were constructed in the early- to mid-1950s and consist of a mid-sized dam and impoundment, one powerhouse, two small water conveyances, and one transmission line. FERC Project No. 2174 has an authorized generation capacity of 10.8 MW.

### 2.5.1 Source Rivers and Streams

- Camp 61 Creek
- Camp 61 Creek (East and West Forks)
- Sources for FERC Projects Nos. 67 and 2086

### 2.5.2 Existing FERC Project No. 2174 Facilities

POWERHOUSE

- *Portal Powerhouse* contains one turbine generator and has a dependable operating capacity of 10.5 MW.

MODERATE SIZED DAM AND IMPOUNDMENT

- *Portal Forebay Dam* is a 795-foot-long compacted earth and rock-fill dam that forms Portal Forebay. The forebay has a usable storage capacity of 325 acre-feet and a maximum pool elevation of 7,180 feet above msl.

WATER CONVEYANCES

- *Adit 2 Tunnel and Shaft* conveys water from the Portal Forebay to Ward Tunnel (FERC Project No. 67
- An unnamed 1,180-foot-long penstock.

TRANSMISSION LINE

- An unnamed 2.5-mile-long transmission line.

### 2.5.3 Existing FERC Project No. 2174 Operations

The Portal Powerhouse is located at the downstream end of Ward Tunnel, immediately upstream of Huntington Lake. Ward Tunnel (FERC Project No. 67) transports water from reservoirs and small diversions in the South Fork San Joaquin River watershed (FERC Project Nos. 67 and 2086) to Huntington Lake for power production in the lower BCHS. Portal Powerhouse generates power from the differential head available during this transfer. Portal Powerhouse operations can be managed locally from the Portal Powerhouse control room or remotely from the Big Creek Dispatch Center at Big Creek Powerhouse No. 3 (FERC Project No. 120), which serves as the main control center for the entire BCHS.

The majority of the water being used for power production at the Portal Powerhouse is sourced from other projects in the BCHS (FERC Projects Nos. 67 and 2086). The remainder of the water being transferred through Ward Tunnel is sourced from small diversions on Camp 61

Creek and its tributaries, which are part of FERC Project No. 2174. Water diverted from these sources is impounded to create the Portal Forebay. The Portal Forebay is not intended to serve as a water storage facility. Water from the Portal Forebay is diverted through a vertical shaft into the Adit 2 Tunnel (a small branch of the Ward Tunnel) into Ward Tunnel. The primary function of Portal Forebay is to equilibrate hydraulic head in the downstream portion of Ward Tunnel to facilitate power production at the Portal Powerhouse. Depending on operating conditions, the Adit 2 Tunnel allows water to flow into or out of the Portal Forebay.

## 2.6 Big Creek Nos. 1 and 2 Hydroelectric Project (FERC Project No. 2175)

The Big Creek Nos. 1 and 2 Hydroelectric Project (FERC Project No. 2175) is located on Big Creek and several smaller tributary streams in Fresno County, and occupies approximately 2,018 acres of national forest land administered by the Sierra National Forest. FERC Project No. 2175 is entirely within national forest and SCE-owned lands. Major FERC Project No. 2175 facilities were constructed between 1913 and 1925 and consist of four concrete dams that form one reservoir, one moderate-sized dam and impoundment, three small diversions, three water conveyance systems, and two powerhouses with a total of eight generating units and an authorized generating capacity of 150.15 MW.

### 2.6.1 Source Rivers and Streams

- Adit 8 Creek
- Balsam Creek
- Big Creek
- Billy Creek
- Coon Creek
- Ely Creek
- Horsecamp Creek
- Rancheria Creek
- Sources for FERC Project Nos. 67 and 2086

### 2.6.2 Existing FERC Project No. 2175 Facilities

POWERHOUSES

- *Big Creek Powerhouse No. 1* has four generator turbine units and a total dependable operating capacity of approximately 82.9 MW.
- *Big Creek Powerhouse No. 2* has four generator turbine units and a total dependable operating capacity of approximately 67.1 MW.

MAJOR DAM AND RESERVOIR

- *Dams 1, 2, 3, and 3a* form *Huntington Lake*, which has a usable storage capacity of approximately 89,166 acre-feet and a maximum pool elevation of approximately 6,950 feet above msl.

MODERATE SIZED DAMS AND IMPOUNDMENTS

- *Dam 4* forms the *Dam 4 Impoundment (Powerhouse 2 Forebay),* which has a usable storage capacity of approximately 60 acre-feet and a maximum pool elevation of approximately 4,810 feet above msl.

SMALL DIVERSIONS

- *Balsam Creek Diversion* has a usable storage capacity of less than one acre-foot and a maximum pool elevation of approximately 4,880 feet above msl.
- *Ely Creek Diversion* has a usable storage capacity of less than one acre-foot and a maximum pool elevation of approximately 4,844 feet above msl.
- *Adit 8 Creek Diversion* has a usable storage capacity of less than one acre-foot and a maximum pool elevation of approximately 4,825 feet above msl.

WATER CONVEYANCES

- *Tunnel No. 1* is approximately two miles long and is used to convey water from Huntington Lake to Big Creek Powerhouse No. 1.
- *Tunnel No. 2* is approximately 4.1 miles long and is used to convey water from the Dam 4 Impoundment to Big Creek Powerhouse No. 2. Water from Ely and Balsam Creek Diversions also enters into Tunnel No. 2 between the Dam 4 Impoundment and Big Creek Powerhouse No. 2. SCE's diversion on Adit 8 Creek can be used to transfer water from Tunnel 5 to Tunnel 2 in the event of an outage at Powerhouse 2A, but this diversion has not been used since about 1980.
- *The Shoo Fly* is used to convey water from Shaver Lake (FERC Project No. 67) through Tunnel 5 and into Tunnel 2 leading to Big Creek Powerhouse No. 2. The Shoo Fly was used during the construction of Shaver Lake Dam and Powerhouse No. 2A to keep water off the Shaver Lake Dam and to get more generation from Powerhouse No. 2. Upon completion of Shaver Lake Dam and Powerhouse No. 2A, the Shoo Fly Complex was no longer used. Although not currently in use, the Shoo Fly Complex gives SCE the flexibility to divert water from Shaver Lake to Powerhouse No. 2.

### 2.6.3 Existing FERC Project No. 2175 Operations

Big Creek Powerhouses Nos. 1 and 2 can be operated locally from the control rooms at Powerhouses Nos. 1 or 2, or remotely from the Big Creek Dispatch Center at Big Creek Powerhouse No. 3 (FERC Project No. 120), which serves as the main control center for the entire BCHS. The water used by FERC Project No. 2175 is stored in Huntington Lake, which captures local runoff and water conveyed through Ward Tunnel from Florence Lake (FERC Project No. 67), Lake Thomas Edison (FERC Project No. 2086), and from various small and moderate size stream diversions. Big Creek Powerhouse No. 1 uses water from Huntington Lake and discharges into the Dam 4 Impoundment on Big Creek. Big Creek Powerhouse No. 2 receives water from the Dam 4 Impoundment and discharges to the Dam 5 Impoundment on Big Creek.

Big Creek Powerhouses Nos. 1 and 2 represent the second and third generating opportunities in the Huntington Water Chain, respectively. The flow of water through Powerhouses Nos. 1 and 2 is dependent on natural runoff during periods of snowmelt and wet weather and the operation of reservoirs in the BCHS that are located at higher elevations in the watershed. FERC Project No. 2175 operation is similar in all water year types in that water diverted into the project from remote impoundments and diversions is used to generate power when water is available. In wet water years, FERC Project No. 2175 usually runs at full capacity beginning in mid-April to May, until the end of peak runoff, which typically occurs in late July. Once SCE gains control of reservoir inflows, FERC Project No. 2175 is operated to meet base load requirements and/or peak cycling energy demands.

In above normal water years, FERC Project No. 2175 typically runs at full capacity beginning in May until the end of peak runoff, which typically occurs in July. Some of the BCHS reservoirs spill in above normal water years and are filled to capacity until spill ceases. At that time, SCE gains control of inflows and begins managing the water to meet grid requirements by providing both base load and peak cycling energy.

During dry water years, FERC Project No. 2175 may run at full capacity for a short duration in May and June. In some dry water years, FERC Project No. 2175 does not run at full capacity so that BCHS reservoirs can fill to maximum capacity. Generation is lower in dry water years; very little water other than dam seepage and mandatory instream flow releases bypass the FERC Project No. 2175 powerhouses.

## 3.0 FERC Proceedings and SCE Settlement Agreement

SCE used two different FERC regulatory processes for the relicensing of the Six Big Creek Hydroelectric Projects. SCE used the Traditional Licensing Process[11] (TLP) for the Portal Hydroelectric Project and Vermilion Valley Hydroelectric Project (FERC Project Nos. 2174 and 2086, respectively). SCE used the Alternative Licensing Process[12] (ALP) for the remaining four of the Six Big Creek Hydroelectric Projects (Big Creek ALP Projects – FERC Projects Nos. 67, 120, 2085, and 2175). The license application dates for each of the Six Big Creek Hydroelectric Projects are listed in Table D, followed by a brief description of the *Big Creek Alternative Licensing Process (ALP) Hydroelectric Projects Settlement Agreement* (Big Creek ALP Settlement Agreement) that was submitted to FERC as part of SCE's relicensing applications for the four Big Creek ALP Projects.

**Table D.** FERC Licensing Process and Application Date

| FERC Project No. | FERC Project Name | FERC Licensing Process | FERC License Application Filing Date |
|---|---|---|---|
| 67 | Big Creek Nos. 2A, 8, and Eastwood Hydroelectric Project | ALP | February 21, 2007 |
| 120 | Big Creek No. 3 Hydroelectric Project | ALP | February 21, 2007 |
| 2085 | Mammoth Pool Hydroelectric Project | ALP | November 21, 2005 |
| 2086 | Vermilion Valley Hydroelectric Project | TLP | August 29, 2001 |
| 2174 | Portal Hydroelectric Project | TLP | March 26, 2003 |
| 2175 | Big Creek Nos. 1 and 2 Hydroelectric Project | ALP | February 21, 2007 |

[11] The Traditional Licensing Process, or TLP, consists of consultation with stakeholders, and regulatory and resource management agencies. The TLP begins with the sharing of initial project information and ends with the filing of the final license application with FERC.

[12] The Alternative Licensing Process, or ALP, has similar regulatory requirements as the TLP, but follows a different sequence of steps. In contrast to the TLP, the ALP is typically a more collaborative process in which the applicant and FERC engage stakeholders and resources agencies early in the relicensing process. The collaborative process often results in the development of a settlement agreement that resolves issues associated with the relicensing.

### 3.1 Big Creek ALP Settlement Agreement

In March 2000, SCE engaged various BCHS stakeholders with the goal of achieving a settlement that would resolve resource management and monitoring issues identified during the BCHS relicensing process. SCE filed the resulting Big Creek ALP Settlement Agreement with FERC on February 21, 2007, in accordance with FERC regulations pertaining to the submission of settlement offers (18 C.F.R. 385.602).

The Big Creek ALP Settlement Agreement describes a wide range of resource management and monitoring conditions that reflect the consensus of signatory parties, and establishes certain contractual obligations for the protection, mitigation, and enhancement of environmental conditions and recreational opportunities once FERC issues new licenses for the four Big Creek ALP Projects. SCE has requested that FERC approve the terms and conditions listed in Appendix A of the Big Creek ALP Settlement Agreement, and subsequently incorporate them into the new hydropower licenses for the four Big Creek ALP Projects. Conversely, SCE has recommended that FERC exclude the conditions listed in Appendix B of Big Creek ALP Settlement Agreement, describing these as contractual obligations unrelated to operations or maintenance activities of the four Big Creek ALP Projects. In its license application, SCE states that these items were provided for informational purposes, and to support FERC's analysis of cumulative impacts.

Because the Big Creek ALP Settlement Agreement is the direct result of ALP process, most of the resource management and monitoring conditions described therein pertain to the four Big Creek ALP Projects (FERC Project Nos. 67, 120, 2085, and 2175). However, due to the integrated nature of hydropower projects within the BCHS, the Big Creek ALP Settlement Agreement also includes a limited number of resource management and monitoring conditions for the two Big Creek TLP Projects – the Vermilion Valley and Portal Hydroelectric Projects (FERC Project Nos. 2086 and 2174, respectively).

Although State Water Board staff were active participants in the Big Creek ALP process, the State Water Board is not a party to the Big Creek ALP Settlement Agreement. A complete listing of organizations signatory to the Big Creek ALP Settlement Agreement is provided in Table E. In its applications for certification, SCE requests that the State Water Board accept and incorporate, without material modification, all of the measures included in Appendix A of the Big Creek ALP Settlement Agreement necessary to ensure compliance with applicable state water quality standards. Most of the resource monitoring and management conditions included in the Big Creek ALP Settlement Agreement were used for conditions of this certification. Table F provides a list of Settlement Agreement provisions that have been incorporated into this certification, as well as the corresponding certification condition number.

**Table E.** Parties Signatory to Big Creek ALP Settlement Agreement

| **Applicant** | |
|---|---|
| Southern California Edison | |
| **Governmental Organizations** | |
| California Department of Fish and Game (now California Department of Fish and Wildlife) | Sierra Resource Conservation District of the County of Fresno |
| Fresno County Sheriff's Department | United States Department of Agriculture, Forest Service |

| | |
|---|---|
| Friant Water Authority | United States Department of the Interior, Office of Environmental Policy & Compliance |
| **Nongovernmental Organizations** | |
| American Whitewater | SAMS Coalition |
| Fly Fishers for Conservation | San Joaquin Paddlers Club |
| Friends of the River | San Joaquin River Trail Council |
| Huntington Lake Association | Shaver Crossing Railroad Station Group |
| Huntington Lake Big Creek Historical Conservancy | Sierra Mono Museum |
| Huntington Lake Volunteer Fire Department | Trout Unlimited |
| Natural Resources Defense Council | |
| **Tribes** | |
| Michahai Wuksachi (Eshom Valley Band of Michahai and Wuksachi) | |

**Table F.** Incorporated Big Creek ALP Settlement Agreement Items and Corresponding Certification Conditions

| Big Creek ALP Settlement Agreement Section | Big Creek ALP Settlement Agreement Description | Corresponding Certification Condition |
|---|---|---|
| Appendix A §1.1 | Instream Flows | Condition 3 |
| Appendix A §1.2, D,E,F | Channel and Riparian Maintenance Flows, Mono Creek Channel Riparian Maintenance Flow Plan, Camp 61 Creek Channel Riparian Maintenance Flow Plan, Channel Riparian Maintenance Flows for the South Fork San Joaquin River Below Florence Reservoir | Condition 6 |
| Appendix A §1.7 | Large Wood Debris Management License Article | Condition 17 |
| Appendix B §1.1 | Vermilion Valley Leakage Channel Macroinvertebrate Study Plan | Condition 15 |
| Appendix B §1.2 | Gravel Augmentation Plan | Condition 11 |
| Appendix B §4.0 | Recreation Management | Condition 21 |
| Appendix B §4.9 | Big Creek Fish Hatchery | Condition 25 |
| Appendix G | Small Diversion Decommissioning Plan | Condition 7 |
| Appendix H | Temperature Monitoring and Management Plan | Condition 20 |
| Appendix I | Fish Monitoring Plan | Condition 18 |
| Appendix J | Sediment Management Prescriptions | Condition 12 |
| Appendix K | Riparian Monitoring Plan | Condition 16 |
| Appendix L | Flow Monitoring and Reservoir Water Level Measurement Plan | Condition 2 |
| Appendix N | Transportation System Management Plan | Condition 23 |
| Appendix O §5.5 | Reservoir Recreation | Condition 8 |
| Appendix O §5.6 | Whitewater Boating | Condition 9 |
| Appendix P | Bald Eagle Management Plan | Condition 22 |
| Appendix R | Vegetation and Integrated Pest Management Plan | Condition 26 |

## 4.0 Regulatory Authority

### 4.1 Water Quality Certification and Related Authorities

The federal Clean Water Act (33 U.S.C. §§ 1251-1387) was enacted "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." (33 U.S.C. § 1251(a).) Section 101 of the Clean Water Act (33 U.S.C. § 1251(g)) requires federal agencies to "co-

operate with the State and local agencies to develop comprehensive solutions to prevent, reduce and eliminate pollution in concert with programs for managing water resources."

Section 401 of the Clean Water Act (33 U.S.C. § 1341) requires every applicant for a federal license or permit which may result in a discharge into navigable waters to provide the licensing or permitting federal agency with certification that the project will be in compliance with specified provisions of the Clean Water Act, including water quality standards and implementation plans promulgated pursuant to section 303 of the Clean Water Act (33 U.S.C. § 1313). Clean Water Act section 401 directs the agency responsible for certification to prescribe effluent limitations and other limitations necessary to ensure compliance with the Clean Water Act and with any other appropriate requirements of state law. Section 401 further provides that certification conditions shall become conditions of any federal license or permit for the project. The State Water Board is the state agency responsible for such certification in California. (Wat. Code § 13160.) The State Water Board has delegated authority to act on applications for certification to the Executive Director. (Cal. Code Regs., tit. 23, § 3838, subd. (a).)

Water Code section 13383 provides the State Water Board with the authority to "establish monitoring, inspection, entry, reporting, and recordkeeping requirements… and [require] other information as may be reasonably required" for activities subject to certification under section 401 of the Clean Water Act that involve the diversion of water for beneficial use. The State Water Board delegated this authority to the Deputy Director of the Division of Water Rights (Deputy Director), as provided for in State Water Board Resolution No. 2012-0029. In the *Redelegation of Authorities Pursuant to Resolution No. 2012-0029* memo issued by the Deputy Director on October 19, 2017, this authority is redelegated to the Assistant Deputy Directors of the Division of Water Rights.

SCE originally applied for certification by submitting a separate, individual application for each of the Six Big Creek Hydroelectric Projects. SCE combined the Six Big Creek Hydroelectric Projects into one application, which was received in March 3, 2009. The State Water Board provided public notice of the joint application on June 2, 2009, pursuant to section 3858 of title 23 of the California Code of Regulations. The State Water Board's records and the FERC docket for the Six Big Creek Projects contain more detail about ongoing work associated with the Six Big Creek Hydroelectric Projects after this date.

On August 13, 2018, the State Water Board released a draft certification for the Project for public comment, with a comment deadline of October 12, 2018, and providing additional notice of the amended application pursuant to California Code of Regulations, title 12, section 3858. On September 12, 2018, SCE requested an extension to the comment period. On September 27, 2018, the State Water Board extended the comment period for the draft certification to December 7, 2018. The State Water Board received comments from the following stakeholders: SCE, United States Forest Service (USFS); and American Whitewater. On December 6, 2018, SCE submitted comments on the draft certification. For purposes of Section 401 of the Clean Water Act, SCE's comments on the draft certification may be and are being treated as a request for certification. The State Water Board considered all comments in development of the final certification.

On April 29, 2019, State Water Board staff forwarded the draft certification to the Central Valley Regional Water Quality Control Board (Central Valley Regional Water Board) for review. Central Valley Regional Water Board staff responded with no comments on April 30, 2019.

### 4.2 Water Quality Control Plans

The California Regional Water Quality Control Boards (Regional Water Boards) have primary responsibility for the formulation and adoption of water quality control plans for their respective regions, subject to State Water Board and United States Environmental Protection Agency (USEPA) approval, as appropriate. (Wat. Code, § 13240 et seq.) The State Water Board may also adopt water quality control plans, which will supersede regional water quality control plans for the same waters to the extent of any conflict. (*Id*., §13170.) For a specified area, the water quality control plans designate the beneficial uses of water to be protected, water quality objectives established for the reasonable protection of those beneficial uses or the prevention of nuisance, and a program of implementation to achieve the water quality objectives. (*Id*., § 13241, § 13050, subds. (h), (j).) The beneficial uses together with the water quality objectives that are contained in the water quality control plans, and state and federal anti-degradation requirements constitute California's water quality standards.

The Central Valley Regional Water Board adopted, and the State Water Board and USEPA approved, the *Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basins* (Basin Plan).[13] The Basin Plan designates the beneficial uses of water to be protected along with the water quality objectives necessary to protect those uses. The Basin Plan identifies existing beneficial uses for surface waters in the upper San Joaquin River watershed (i.e., sources to Millerton Lake) as: municipal and domestic supply; irrigation; stock watering; power; contact recreation; canoeing and rafting; other noncontact recreation; warm freshwater habitat; cold freshwater habitat; and wildlife habitat.

### 4.3 Construction General Permit

SCE may need to obtain coverage under the State Water Board's Construction General Permit.[14] Coverage under the Construction General Permit may be required for activities that disturb one or more acres of soil or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres. Construction activity subject to the Construction General Permit includes clearing, grading and disturbances to the ground such as stockpiling or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

## 5.0 California Environmental Quality Act

The State Water Board is the lead agency for the purpose of California Environmental Quality Act (CEQA) compliance. (Pub. Resources Code, §§ 21000, et seq.)

When a project requires compliance with both CEQA and the National Environmental Policy Act (NEPA), CEQA Guidelines (Cal. Code Regs., tit. 14, §§15000 et seq.) encourage the lead agency to use the completed NEPA environmental impact statement or finding of no significant impact (FONSI), in lieu of preparing a separate environmental impact report (EIR) or negative declaration (ND) to comply with applicable provisions of the CEQA Guidelines (Cal. Code

[13] *Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region for the Sacramento River Basin and the San Joaquin River Basin.* Fourth Edition. Revised July 2016 (with Approved Amendments).

[14] Water Quality Order 2009-0009-DWQ and National Pollutant Discharge Elimination System No. CAS000002, as amended by Order No. 2010-0014-DWQ and Order No. 2012-0006-DWQ), and any amendments thereto.

Regs., tit. 14, §15221). In accordance with this provision, the State Water Board elected to use FERC's NEPA analysis and prepare a CEQA Supplement for the Six Big Creek Hydroelectric Projects. The CEQA Supplement incorporates the independent NEPA analyses completed by FERC[15,16,17] and supplements these analyses with the following:

- Evaluation of resource areas not addressed in FERC's NEPA documents. These include agriculture and forest resources, greenhouse gas emissions, hazards and hazardous materials, transportation/traffic, and utilities and service systems;
- Determination of "level of significance" for all potential environmental impacts; and
- Description of environmental measures that SCE will implement to avoid or reduce potential environmental impacts to a less-than-significant level.

The State Water Board issued a Notice of Availability for the Draft CEQA Supplement on August 13, 2018. The comment period for the CEQA Supplement closed on October 12, 2018, with one comment letter from SCE submitted. The State Water Board considered all comments and prepared responses to comments.

The documents and other material that constitute the public record are located at the State Water Board, Division of Water Rights, 1001 I Street, Sacramento, California. The State Water Board will file a Notice of Determination with the Office of Planning and Research within five days of issuance of this certification.

## 6.0 Rationale for Water Quality Certification Conditions

The certification conditions were developed to protect and enhance existing beneficial uses of California's waters and achieve compliance with associated water quality objectives.[18] Section 401 of the federal Clean Water Act (33 U.S.C. §1341) provides that the conditions contained in this certification be incorporated as mandatory conditions of the new license(s) issued by FERC for the Six Big Creek Hydroelectric Projects.

When preparing the conditions in this certification, State Water Board staff reviewed and considered the following information:

(1) SCE's applications for new hydropower licenses, including the Big Creek ALP Settlement Agreement, submitted to FERC pursuant to 18 C.F.R. Parts 4 and 16;

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[15] Federal Energy Regulatory Energy Commission. April. 2006. Environmental assessment for hydropower license, Portal Hydroelectric Project, FERC Project No. 2174-012, California. Office of Energy Projects. Division of Hydropower Licensing. Washington, DC

[16] Federal Energy Regulatory Energy Commission. May. 2004. Environmental assessment for hydropower license, Vermilion Valley Hydroelectric Project, FERC Project No. 2086-035, California. Office of Energy Projects. Division of Hydropower Licensing. Washington, DC.

[17] Federal Energy Regulatory Commission. March. 2009. Environmental impact statement for hydropower licenses, Big Creek Nos. 2A, 8, and Eastwood – FERC Project No. 67, Big Creek Nos. 1 and 2 – FERC Project No. 2175, Mammoth Pool – FERC Project No. 2085, Big Creek No. 3 – FERC Project No. 120, California. Office of Energy Projects, Division of Environmental and Engineering Review. Washington, DC.

[18] Designated beneficial uses and associated water quality objectives for surface waters in the area of the Six Big Creek Hydroelectric Projects are described in Section 4.0 of this water quality certification document, and in Chapters II and III of the Sacramento and San Joaquin Rivers Basin Plan.

(2) Supplemental information and technical studies filed with FERC by SCE in support of the new hydropower license applications;

(3) FERC's EA for the Vermilion Valley Hydroelectric Project, FERC's EA for the Portal Hydroelectric Project, and FERC's EIS for the four Big Creek ALP Projects, all prepared pursuant to NEPA (42 U.S.C. sections 4321 et seq.);

(4) Final hydropower license conditions issued by USFS pursuant to Section 4(e) of the Federal Power Act (FPA);

(5) Fishway prescriptions issued by the United States Department of the Interior, United States Fish and Wildlife Service pursuant to FPA Section 18;

(6) Recommended license terms and conditions submitted by state and federal agencies pursuant to FPA Sections 10(a) and 10(j);

(7) SCE's application for water quality certification, submitted to the State Water Board pursuant to Section 401 of the federal Clean Water Act;

(8) State Water Board's CEQA Supplement, prepared pursuant to California Code of Regulations, title 14, sections 15163 and 15225;

(9) Comments submitted to FERC and the State Water Board in response to the applications for new hydropower licenses and the issuance of notices and public draft NEPA, CEQA, and water quality certification documents;

(10) Existing and potential beneficial uses, associated water quality objectives, and implementation measures and programs described in the Basin Plan;

(11) Existing water quality conditions in the vicinity of the Six Big Creek Hydroelectric Projects and downstream receiving waters;

(12) Project-related, controllable water quality factors; and

(13) Other information in the record.

The following describes the rationale used to develop the conditions in this certification.

## 6.1 Rationale for Condition 1 – Water Years

Water year classifications can be used to characterize the relative wetness of a given water year and often serve as the basis for establishing annual stream flow requirements for hydropower projects in California. Establishing flow requirements based on water year type provides SCE and other interested parties with known minimum instream flows, which are based on the relative water supply in a given water year and consideration for potentially competing beneficial uses.

Condition 1 of this certification specifies that the San Joaquin Valley Water Year Index and associated Water Year Hydrologic Classification published by the California Department of Water Resources (DWR), Bulletin 120, will be used annually to determine the water year type for the Six Big Creek Hydroelectric Projects. The designated water year type will trigger applicable minimum instream flows, channel and riparian maintenance flows, and recreational flow requirements for the Six Big Creek Hydroelectric Projects.

## 6.2 Rationale for Condition 2 – Gaging

To implement and document compliance with stream flow, reservoir water level, and dam seepage characterization and remediation requirements, SCE will be required to install new water control infrastructure and stream and dam seepage gaging equipment, and perform stream flow, dam seepage, and reservoir water level monitoring, as specified in Conditions 3-6, 8, and 13-15 of this certification.

The Flow Monitoring and Reservoir Water Level Measurement Plan contained in Appendix L of the Big Creek ALP Settlement Agreement (Appendix L Plan) lays out a general process and preliminary schedule for the design, permitting, and installation of new water control infrastructure and flow monitoring equipment. The Appendix L Plan also describes SCE's general approach to measurement, documentation, and dissemination of stream flow and reservoir water surface level data for five of the Six Big Creek Hydroelectric Projects. However, the Appendix L Plan lacks provisions for stream flow and reservoir water level monitoring of the Vermilion Valley Hydroelectric Project (FERC Project No. 2086). In addition, Appendix L Plan does not include:

- Design, permitting, and construction schedules;
- Sufficient detail on design and construction methods for proposed infrastructure and stream gaging improvements;
- Measures that will be implemented to protect water quality and beneficial uses during construction activities; and
- Timelines for installation of proposed infrastructure and stream gaging improvements, and implementation of associated stream flow and reservoir monitoring programs.

Additional detail on these items is necessary for the protection of beneficial uses, coordination between SCE and resources agencies, and compliance monitoring. Condition 2 of this certification identifies these missing items and requires the development of a comprehensive Flow Monitoring and Reservoir Water Level Gaging Plan (Gaging Plan) for the Six Big Creek Hydroelectric Projects.

## 6.3 Rationale for Condition 3 – Minimum Instream Flows

Regulation of instream flows by the Six Big Creek Hydroelectric Projects influences water quantity, water quality, and the health, quality, and function of aquatic and riparian ecosystems in bypass stream reaches and downstream receiving waters. Some of the bypassed reaches associated with the Six Big Creek Hydroelectric Projects in the Big Creek Hydroelectric System (BCHS) do not currently have mandatory instream flow requirements, while others do but provide instream flow releases that are insufficient to protect the beneficial uses of water.

Condition 3 of this certification establishes new, year-round minimum instream flow (MIF) requirements for bypass stream and river reaches located downstream of all of dams and diversions that will remain in operation under the new Six Big Creek Hydroelectric Project license(s). The new MIF requirements establish the seasonal timing, minimum magnitude, and minimum duration of instream flow releases for all water year types. The MIF requirements are designed to provide: higher flows during spring and early summer to correspond with expected unimpaired peak flows; environmental cues for aquatic and riparian organisms; cooler water temperatures to offset the thermal warming effects of operations associated with the Six Big Creek Hydroelectric Projects; enhanced flows and fish passage during spawning periods; more abundant and higher quality habitat for various life stages of resident fish populations; and cold water refugia for fish and other aquatic organisms.

The MIFs are predicated on the natural inflows to the diversions and dams. If the natural inflows are less than the required MIFs, then SCE will bypass all natural inflows to the diversions and dams. It is unclear how SCE will determine the natural inflows for each of the waterbodies associated with MIFs, therefore, Condition 3 of this certification also requires the development and approval of a Natural Inflow Report.

### 6.4 Rationale for Condition 4 – Operational Release Limitations — Mono Creek (Vermilion Valley Hydroelectric Project)

Lower Mono Creek supports resident populations of brown trout. Brown trout fry are expected to emerge from spawning gravels in the May-June timeframe, when MIF releases from Vermilion Valley Dam (FERC Project No. 2086) will provide optimal or near optimal rearing habitat for fry. However, habitat analyses conducted in support of the relicensing effort suggest that Brown trout fry in this reach may be susceptible to flushing by larger operational releases from Vermilion Valley Dam. Condition 4 of this certification addresses this concern by requiring SCE to consult with State Water Board staff before making operational releases greater than 50 cfs from Vermilion Valley Dam during the period of April 16 through June 15.

### 6.5 Rationale for Condition 5 – Ramping Rates

Natural spills and operational releases[19] from the Six Big Creek Hydroelectric Projects could cause abrupt flow and stage fluctuations in project-affected stream reaches. These fluctuations and the rate at which they occur may strand or otherwise impact aquatic species and create hazardous conditions for recreationists in project-affected stream reaches. The Big Creek ALP Settlement Agreement does not contain provisions for ramping rates on stream reaches affected by the Six Big Creek Hydroelectric Projects. Condition 12(C) of the USFS final 4(e) conditions for the Vermilion Valley Hydroelectric Project (FERC Project No. 2086), requires SCE to submit a study plan to evaluate negative ecological effects of unnaturally rapid flow and stage fluctuations resulting from operational flow releases into the Mono Creek project reach[20].

This certification requires implementation of ramping rates to regulate flow fluctuations in a gradual, step-wise manner. Condition 5 of this certification requires SCE to implement a Ramping Rate Study Plan to assess the need for ramping rates in the Six Big Creek Hydroelectric Projects-affected stream reaches. The results of the Ramping Rate Study Plan will be documented in a study report. Condition 5 also requires SCE to determine long-term ramping rates that are protective of designated beneficial uses and aquatic wildlife for each stream reaches identified in the study report. The long-term ramping rates will be used to guide spill and operational release management throughout the duration of the new license(s) for the Six Big Creek Hydroelectric Projects.

[19] The following terms are defined for the purposes of this condition. A “natural spill” is defined as a flow event that is initially outside the control of the Licensee (e.g., flood flows), in which water flows into a channel because available capacity of storage facilities (e.g., reservoirs, diversion structures, etc.) are exceeded. Operational releases include both releases from Project facilities (e.g., outlets) and “operational spills” that are within the control of the Licensee. “Operational spill” is defined as a flow event into a channel that could have been held as storage.

[20] The Mono Creek project reach refers to the portion of Mono Creek from Vermilion Valley Dam to Mono Creek Diversion, which is part of the Vermilion Valley Hydroelectric Project (FERC Project No. 2086).

## 6.6 Rationale for Condition 6 – Channel and Riparian Maintenance Flows

Regulation of stream and river flows by the Six Big Creek Hydroelectric Projects can impede important fluvial processes that affect water quality, and riparian and instream habitat on bypassed stream reaches and downstream receiving waters. Condition 6 of this certification requires SCE to periodically release channel and riparian maintenance flows (CRMFs) in excess of designated MIF requirements on eight bypassed stream reaches. CRMFs are designed to: maintain and improve riparian and instream habitat by providing greater floodplain connectivity; reduce fine sediment accumulation and riparian vegetation encroachment; and recruit large wood and other material.

CRMFs are scheduled primarily for wet and above normal water years. The magnitude, duration, and total volume of specified CRMF releases vary by water year type in order to balance CRMFs with other beneficial uses of water. Condition 6 of this certification also includes provisions for modification of initial CRMFs during the term of the new hydropower license(s) based on data and information from riparian area monitoring, fine sediment monitoring, and meadow inundation studies, that are designed to gauge the effectiveness of the initial CRMFs in meeting CRMF objectives.

The CRMF provisions described in Condition 6 of this certification are based largely on the content of Appendices A, D, E, and F in the Big Creek ALP Settlement Agreement, and the USFS final 4(e) conditions, with amendments for additional study, monitoring, reporting, and adaptive management to ensure attainment of CRMF objectives.

## 6.7 Rationale for Condition 7 – Small Diversions Decommissioning

Appendix G of the Big Creek ALP Settlement Agreement contains a Small Water Diversion Decommissioning Plan (Appendix G Plan) that describes SCE's general approach and timeline for decommissioning six small water diversion structures and appurtenant facilities that are currently part of the Big Creek Nos. 1 and 2 Hydroelectric Project (FERC Project No. 2175) and the Big Creek Nos. 2A, 8, and Eastwood Hydroelectric Project (FERC Project No. 67). The six subject diversions consist of four backcountry hydroelectric generation diversions (North and South Slide Creek Diversions, Tombstone Diversion, and Crater Creek Diversion) and two domestic water diversions (Pitman Creek Diversion and Snow Slide Creek Diversion) that are no longer needed for operation of FERC Project Nos. 67 and 2175.

## 6.8 Rationale for Condition 8 – Reservoir Water Level Management

Manipulation of reservoir elevations through operations of the Six Big Creek Hydroelectric Projects affects the quantity, quality, and availability of reservoir-based fisheries and recreational opportunities in the Upper San Joaquin River watershed. The Recreation Management Plan contained in Section 5.5 in Appendix O of the Big Creek ALP Settlement Agreement (Section 5.5 in Appendix O) describes general and specific provisions for the management of reservoir water surface elevations and storage volumes to support reservoir-based recreation and fisheries in four BCHS reservoirs (Shaver Lake, Florence Lake, Huntington Lake, and Mammoth Pool Reservoir) (FERC Project Nos. 67, 2085, and 2175). Section 5.5 in Appendix O does not, however, include management objectives, adaptive management provisions, or provisions for documenting and reporting compliance.

Condition 8 of this certification requires SCE to prepare a Reservoir Water Level Management Plan no later than one year following issuance of the license(s) for the Six Big Creek

Hydroelectric Projects. The Reservoir Water Level Management Plan will provide information on plan objectives, adaptive management, monitoring, agency consultation, and reporting.

## 6.9 Rationale for Condition 9 – Whitewater Flows

Regulation of instream flows by the Six Big Creek Hydroelectric Projects affects the quantity, quality, and availability of whitewater recreation opportunities in the Upper San Joaquin River watershed. The Whitewater Boating section of the Recreation Management Plan contained in Appendix O of the Big Creek ALP Settlement Agreement (Section 5.6 in Appendix O) contains general and adaptive management provisions for pre-spill whitewater boating releases on the San Joaquin River downstream of Mammoth Pool Dam in Wet and Above Normal water years. Section 5.5.1 in Appendix O contains provisions for the dissemination of real-time stream flow information for use by whitewater recreationists. Section 5.6 in Appendix O incorporates by reference certain whitewater boating release provisions for the South Fork San Joaquin River below Florence Lake which will be implemented in conjunction with CRMF releases that are described in Appendix F of the Big Creek ALP Settlement Agreement and Condition 6 of this certification.

Whitewater boating flow requirements for the San Joaquin River, below Dam 6, included in the Big Creek No. 3 Hydroelectric Project (FERC Project No. 120) were determined to be unnecessary and inappropriate due to the fact the reach typically experiences sufficient whitewater flows during Wet and Above Normal water years and due to the fact there are significant safety and accessibility concerns in this reach.

Consultation with agencies, tribes, and non-governmental organizations, revealed project-affected streams below the Vermilion Valley Hydroelectric Project (FERC Project No. 2086) do not have whitewater boating resources, making whitewater boating flow requirements inappropriate for this reach as well.

## 6.10 Rationale for Condition 10 – Erosion and Sediment Control – Warm Creek Diversion Channel (Vermilion Valley Hydroelectric Project)

The Warm Creek Diversion Channel is used to convey water from the Warm Creek Diversion to Lake Thomas Edison via Boggy Meadow Creek. SCE found evidence of bank instability and accelerated soil erosion and sedimentation in the diversion channel corridor during environmental review of the Vermilion Valley Hydroelectric Project (FERC Project No. 2086) in 2000 and 2001. Erosion and sedimentation would likely continue under the proposed operational regime and may produce relatively high volumes of sediment that could adversely affect water quality and aquatic habitat in Boggy Meadow Creek and Lake Thomas Edison. To avoid or reduce potential water quality impacts, Condition 10 of this certification requires SCE develop an Erosion and Sediment Control Plan for the Warm Creek Diversion Channel Corridor in order to map, characterize, stabilize, and monitor erosion and sedimentation sites in the Warm Creek Diversion Channel corridor.

## 6.11 Rationale for Condition 11 – Phased Gravel Augmentation Program – Mammoth Pool Bypass Reach (Mammoth Pool Hydroelectric Project)

Mammoth Pool Reservoir likely traps all but the fine sediment recruited from its upstream watershed on the upper San Joaquin River. As a result, the bypass reach of river located downstream of the Mammoth Pool Dam (Mammoth Pool Bypass Reach) is coarse sediment deficient, which reduces the quantity and quality of spawning habitat available to resident fish

populations. Gravel augmentation by SCE is a potential action to address the coarse sediment deficit and the associated impacts on aquatic habitat in the Mammoth Pool Bypass Reach.

Section 1.2 in Appendix B of the Big Creek ALP Settlement Agreement (Section 1.2 in Appendix B) describes SCE's general approach to gravel augmentation in the Mammoth Pool Bypass Reach. The primary objective of Section 1.2 in Appendix B is to evaluate the feasibility and effectiveness of gravel augmentation. In the event gravel augmentation is not feasible, the section also contains provisions for SCE to supplement fish stocking operations in the Mammoth Pool Bypass Reach as an alternative to increasing fish spawning habitat. Although Section 1.2 in Appendix B describes SCE's general approach for gravel augmentation, it lacks detailed information regarding the process, implementation timelines, proposed pilot gravel augmentation actions, water quality protection measures associated with gravel augmentation activities, and adaptive management.

Condition 11 of this certification requires SCE to develop and implement a phased Gravel Augmentation Program for the Mammoth Pool Bypass Reach. The Gravel Augmentation Program will be implemented in three distinct phases: (1) development and implementation of a gravel augmentation feasibility assessment; (2) development and implementation of a gravel augmentation pilot project; and (3) development and implementation of a long-term gravel augmentation plan.

## 6.12 Rationale for Condition 12 – Sediment Management

Sediment recruited from the BCHS watershed accumulates to varying degrees behind the Six Big Creek Hydroelectric Projects dams and diversions, which can disrupt natural sediment transport and related fluvial processes, and adversely affect operations of the Six Big Creek Hydroelectric Projects. During the relicensing process, sediment pass-through and physical removal and disposal of accumulated sediment were identified as two viable options for addressing sediment accumulation associated with the Six Big Creek Hydroelectric Projects.

Appendix J of the Big Creek ALP Settlement Agreement provides a general description of operational issues associated with the accumulation of sediment behind dams and other water diversion facilities associated with five of the Six Big Creek Hydroelectric Projects (FERC Project Nos. 67, 120, 2085, 2174, and 2175). It also describes: the general sediment management actions that SCE proposes to implement under the new Six Big Creek Hydroelectric Projects license(s) to address sediment accumulation; and general monitoring provisions that would be used to evaluate the effectiveness of these actions and any associated effects on downstream water quality and aquatic habitat. While Appendix J describes general management actions and associated monitoring, it lacks sufficient detail and supporting information related to: process; sediment pass through and removal and disposal actions; schedules; performance monitoring; measures that will be implemented to protect water quality and beneficial uses; and adaptive management to modify future sediment management and monitoring actions based on output from monitoring events.

Condition 12 of this certification addresses these missing elements by requiring SCE to develop and implement a Sediment Management Plan for FERC Project Nos. 67, 120, 2085, 2174, and 2175.

## 6.13 Rationale for Condition 13 – Dam Seepage Remediation – Camp 61 Creek (Portal Hydroelectric Project)

Camp 61 Creek is a small tributary to the South Fork San Joaquin River. Channelized seepage effluent that emanates from Portal Forebay Dam and appurtenant Portal Hydroelectric Project facilities (FERC Project No. 2174) currently discharges directly to Camp 61 Creek, providing the only source of flow in Camp 61 Creek under the Portal Hydroelectric Project's current operational regime. The seepage effluent is characterized by low dissolved oxygen concentrations and elevated levels of iron, manganese, and turbidity, resulting in water quality that is not in compliance with the water quality objectives listed in the Basin Plan. The Big Creek ALP Settlement Agreement and the USFS final 4(e) conditions for the Portal Hydroelectric Project lack provisions for the treatment or monitoring of seepage from Portal Forebay Dam.

Condition 13 of this certification addresses these water quality issues by requiring SCE to develop and implement a phased seepage remediation and monitoring program. The program will be implemented in two phases. Phase I includes: the development and evaluation of seepage remediation design alternatives, and culminates with the selection of a recommended design alternative. Phase II includes: the development and implementation of a remediation and monitoring plan for the approved design alternative; construction of the approved remediation system; adaptive management measures; and development and implementation of a performance monitoring program for the duration of the Portal Hydroelectric Project license.

## 6.14 Rationale for Condition 14 – Stream Stabilization and Seepage Remediation – Adit 2 Creek (Portal Hydroelectric Project)

Adit 2 Creek is a relatively small, steep, actively incising tributary of Camp 61 Creek that developed as a leak from the Ward Tunnel and associated Adit 2 construction conduit before the Portal Hydroelectric Project (FERC Project No. 2174) was constructed. In addition to the seepage emanating from the Adit 2 Conduit, seepage from the Portal Forebay Saddle Dike also contributes flow to Adit 2 Creek. The seepage effluent is characterized by low dissolved oxygen concentrations and elevated levels of iron, manganese, and turbidity, resulting in water quality that is not in compliance with the water quality objectives listed in the Basin Plan. The Big Creek ALP Settlement Agreement lacks provisions for the treatment or monitoring of sediment and seepage in Adit 2 Creek.

Condition 14 of this certification requires SCE to develop and implement a phased Stream Stabilization and Seepage Remediation and Monitoring Program. The program will be implemented in two phases. Phase I includes: the development and evaluation of stream stabilization and seepage remediation design alternatives, and culminates with the selection of a recommended design alternative. Phase II involves: the development and implementation of a stream stabilization remediation and monitoring plan for the approved design alternative; construction of the approved design alternative, adaptive management measures; and development and implementation of a performance monitoring program for the duration of the Portal Hydroelectric Project license. These requirements are consistent with FERC staff alternatives in the Final Environmental Assessment and the USFS final 4(e) conditions for the Portal Hydroelectric Project.

## 6.15 Rationale for Condition 15 – Dam Seepage Assessment and Remediation – Mono Creek (Vermilion Valley Hydroelectric Project)

Section 1.0 of Appendix B of the Big Creek ALP Settlement Agreement (Section 1.0 of Appendix B) describes a general benthic macroinvertebrate (BMI) study plan to investigate the potential impacts of seepage from the Vermilion Valley Hydroelectric Project (FERC Project No. 2086) on the BMI community in Mono Creek. Section 1.0 of Appendix B, however, lacks water quality monitoring requirements to characterize seepage effluent and potential impacts to water quality in Mono Creek, and lacks a decision-making framework that would inform development of a seepage remediation plan or long-term monitoring, in the event it is necessary.

Condition 15 of this certification requires SCE to develop and implement a Dam Seepage Assessment and Water Quality Monitoring Plan for the Vermilion Valley Hydroelectric Project. The plan includes implementation of a three-year water quality and BMI monitoring program to characterize seepage effluent, sources, and potential impacts on water quality in Mono Creek and other receiving waters. The BMI monitoring approach is based on the Vermilion Valley Leakage Channel Macroinvertebrate Study Plan. Two additional monitoring locations were included in this condition. An upstream reference site was included for comparison purposes and a location immediately downstream of Vermilion Valley Dam was included to help identify the effects of dam seepage on the BMI community. Based on the results of plan implementation, a determination will be made on whether seepage remediation and/or long-term monitoring is warranted.

## 6.16 Rationale for Condition 16 – Riparian Areas

Regulation of flows associated with operation of the Six Big Creek Hydroelectric Projects affects the abundance, health, composition, and structure of riparian areas, which can in turn influence water quality and aquatic habitat. Appendix K of the Big Creek ALP Settlement Agreement (Appendix K Plan) describes the general provisions of a status and trend monitoring program that SCE proposes to evaluate the effects of new CRMF and MIF regimes on riparian vegetation and other riparian attributes along select bypass reaches of the Portal Hydroelectric Project (FERC Project No. 2174) and the four Big Creek ALP Projects (FERC Project Nos. 67, 120, 2085, and 2175).

Condition 16 of this certification requires SCE to implement the Riparian Monitoring Plan for the Six Big Creek Hydroelectric Projects identified in the Appendix K Plan. The Riparian Monitoring Plan provides detailed information on plan objectives, monitoring methods, methods of data analysis and interpretation, agency consultation, and reporting.

## 6.17 Rationale for Condition 17 – Large Woody Material

The presence of large woody material (LWM) in river and stream systems can substantially enhance the quantity and quality of habitat for fish and other aquatic organisms. Regulation of stream flows by dams and diversions can interfere with the natural fluvial processes responsible for large woody material recruitment and distribution in stream and river systems.

Section 1.7 in Appendix A of the Big Creek ALP Settlement Agreement describes the general provisions of a Large Wood Debris Management License Article to improve LWM recruitment downstream of the Bear Creek Diversion (Section 1.7 in Appendix A) (FERC Project No. 67). However, Section 1.7 in Appendix A lacks detailed information regarding proposed LWM measures, implementation schedules, performance monitoring, measures to protect water quality and beneficial uses, and adaptive management.

Condition 17 of this certification requires SCE to develop and implement a Large Woody Material Management Plan. The plan will provide information on plan objectives, proposed measures to be implemented with associated schedules, monitoring, adaptive management, agency consultation, and reporting requirements. The plan also requires evaluation of whether additional locations in the Six Big Creek Hydroelectric Project area would benefit from large woody material supplementation, and direct subsequent actions.

## 6.18 Rationale for Condition 18 – Fish

Fish monitoring provides a means of assessing the impacts of the new MIF and CRMF regimes on fish community composition and abundance. Appendix I of the Big Creek ALP Settlement Agreement describes a fish monitoring plan for the four Big Creek Alternative Licensing Process (ALP) Projects (Appendix I Plan). The primary goal of the Appendix I Plan is to monitor fish population composition, abundance, size/age distribution, and condition in bypass reaches and reservoirs, in response to the new MIF and CRMF regimes. The Appendix I Plan does not, however, include fish monitoring for the Traditional Licensing Process (TLP) projects, Portal Hydroelectric Project (FERC Project No. 2174) and Vermilion Valley Hydroelectric Project (FERC Project No. 2086). Condition 18 of this certification requires SCE to develop and implement a Fish Monitoring Plan for all Six Big Creek Hydroelectric Projects, to ensure that beneficial uses of water are adequately protected.

## 6.19 Rationale for Condition 19 – Water Quality Monitoring and Management

Under the new license(s) for the Six Big Creek Hydroelectric Projects, SCE will be required to implement operational changes and environmental protection, mitigation, and enhancement measures, which have the potential to beneficially or adversely affect water quality in the upper San Joaquin River watershed. Monitoring will be conducted to evaluate potential water quality impacts from implementing operational and environmental measures. Condition 19 of this certification requires SCE to develop and implement a Water Quality Monitoring Plan to monitor water quality trends in Six Big Creek Projects-affected stream reaches at regular intervals over the term of the new license(s) and any extensions. Information gathered from implementation of the Water Quality Monitoring Plan will be used to help evaluate the effects of project-related actions on water quality and, in some locations, will be used in combination with BMI monitoring to identify, diagnose, and adaptively manage potential adverse water quality impacts caused by project-related, controllable factors. The State Water Board has used similar water quality monitoring and BMI-based bioassessment programs to monitor water quality and evaluate the potential impacts of projects throughout the state.

## 6.20 Rationale for Condition 20 – Water Temperature Monitoring and Management

Regulation of instream flows and other operational aspects of the Six Big Creek Hydroelectric Projects influence water temperatures in bypass reaches and reservoirs. Appendix H of the Big Creek ALP Settlement Agreement (Appendix H Plan) contains a Temperature Monitoring and Management Plan that describes SCE's proposed approach for monitoring water temperatures and managing effects on water temperature for the four Big Creek ALP Projects (FERC Projects Nos. 67, 120, 2085, and 2175). The Appendix H Plan includes numeric water temperature objectives for designated cold freshwater habitat, a short-term water temperature and meteorological monitoring program, provisions for adaptively managing operations of the Six Big Creek Hydroelectric Projects to maintain compliance with water temperature objectives, provisions for developing a long-term monitoring program, and provisions for evaluating the cold freshwater habitat status of the Stevenson Reach of the San Joaquin River, located between

Dam 6 and Big Creek Powerhouse No. 3 (Big Creek No. 3 Hydroelectric Project, FERC Project No. 120). However, the Appendix H Plan does not include water temperature monitoring and management for the Vermilion Valley Hydroelectric Project (FERC Project No. 2086) and Portal Hydroelectric Project (FERC Project No. 2174). Condition 20 of this certification requires SCE to prepare a Water Temperature Monitoring and Management Plan for all the Six Big Creek Hydroelectric Projects.

## 6.21 Rationale for Condition 21 – Recreation Management

The recreation management plan contained in Appendix O of the Big Creek ALP Settlement Agreement (Appendix O) describes 35 major recreation facility rehabilitation projects and four recreation facility capital improvement projects that SCE plans to implement over the term of the new hydropower licenses for the four Big Creek ALP Projects (FERC Project Nos. 67, 120, 2085, and 2175). Appendix O requires SCE to develop detailed information regarding: project design; construction schedules; potential surface water discharges; impacts to water quality and measures to address potential impacts; water quality monitoring; agency consultation for each project, in accordance with the schedule and requirements specified in Sections 5.2 and 5.3 of Appendix O. Appendix O does not include recreation facility improvement projects proposed for the Portal Hydroelectric Project (FERC Project No. 2174) and the Vermilion Valley Hydroelectric Project (FERC Project No. 2086).

The development of a Recreation Facility Rehabilitation and Improvement Plan for the Vermilion Valley Hydroelectric Project and the Portal Hydroelectric Project is also required. This plan will facilitate implementation of recreation projects in a manner that protects water quality and beneficial uses by providing information on conceptual project design and implementation, information on the measures that will be implemented to protect water quality and beneficial uses, monitoring, agency consultation, and reporting

## 6.22 Rationale for Condition 22 – Bald Eagles

Operation of the Six Big Creek Hydroelectric Projects and associated recreational use could impact bald eagles. Bald eagles are protected by the federal Migratory Bird Treaty Act[21] and the state Bald and Golden Eagle Protection Act.[22] These Acts require that the bald eagle be protected from human activities resulting in "take." Bald eagles are a riparian species that feed on fish and waterfowl, and can be sensitive to human disturbance. Condition 22 requires implementation of the Bald Eagle Management Plan in Appendix P of the Big Creek ALP Settlement Agreement, and the development and implementation of a similar Bald Eagle Management Plan for the Vermilion Valley Hydroelectric Project and the Portal Hydroelectric Project. These plans will serve to minimize conflicts between uses, prevent “take,” and protect the wildlife beneficial use.

## 6.23 Rationale for Condition 23 – Transportation Management

The transportation management measures and plan contained in Appendix N of the Big Creek ALP Settlement Agreement (Appendix N) describe transportation system maintenance activities that may take place during the life of the FERC license(s). Transportation routes in the Six Big Creek Hydroelectric Projects vicinity include state routes, county roads, open access roads on public lands, closed access roads on public lands, closed access roads on private lands, and foot trails. Roads and trails that are part of, or affected by, the Six Big Creek Hydroelectric

[21] The Migratory Bird Treaty Act; USFWS CFR 50 Part 10.13.
[22] The Bald and Golden Eagle Protection Act, USFWS CFR 50 Part 22.

Projects have the potential to cause adverse water quality impacts, such as the introduction of sediment into the San Joaquin River and its tributaries.

Measures in Appendix N are designed to address road and trail issues related to access, maintenance activities, rehabilitation needs, road use, and traffic control measures, and identify measures SCE will implement to repair, minimize, or eliminate impacts to water quality and beneficial uses associated with the maintenance and operation of the four Big Creek ALP Hydroelectric Projects. However, the measures in Appendix N lack detail regarding project-specific design drawings, as well as construction and maintenance schedules. In addition, the measures in Appendix N do not describe transportation management projects and related measures to protect water quality and beneficial uses for the Vermilion Valley Hydroelectric Project (FERC Project No. 2086) and the Portal Hydroelectric Project (FERC Project No. 2174).

Condition 23 of this certification requires SCE to: (1) submit detailed information for each activity implemented under Appendix N to the Deputy Director for review and approval prior to commencement of any construction activities; (2) consult yearly on proposed maintenance and repair activities and associated measures to be implemented to protect water quality and beneficial uses for the Big Creek ALP Projects roads and trails. Condition 23 also requires the development and implementation of a Transportation Management Plan for the Vermilion Valley Hydroelectric Project and the Portal Hydroelectric Project.

## 6.24 Rationale for Condition 24 – Amphibians

Changes in flow and flow fluctuations can reduce habitat suitability, wash out or strand egg masses, increase water temperatures, and change aquatic and riparian vegetation. Surveys will identify whether amphibian populations are present, and help inform whether changes in operation may be necessary to protect listed and special concern amphibian species. Condition 24 of this certification requires the development of an Amphibian Monitoring Plan to monitor state and/or federally listed amphibian populations within the Six Big Creek Hydroelectric Projects-affected stream reaches.

## 6.25 Rationale for Condition 25 – Big Creek Fish Hatchery (Big Creek Nos. 2A, 8, and Eastwood Hydroelectric Project)

The Big Creek Fish Hatchery, located in the town of Big Creek and next to Big Creek Powerhouse No. 1, was operated as a voluntary initiative by SCE from 1956 until the late 1990s, when the hatchery facilities fell into disrepair and operations were discontinued. Rainbow trout raised in the hatchery were stocked in local reservoirs by SCE to enhance recreational fishing. Interest in reopening the hatchery was raised during relicensing proceedings by CDFW. SCE agreed to evaluate the feasibility of re-opening the hatchery as outlined in Section 4.9 in Appendix B of the Big Creek ALP Settlement Agreement.

Fish hatchery operations have the potential to adversely impact water quality and beneficial uses. If, following its investigation and consultation with CDFW, SCE proposes to reopen the Big Creek Fish Hatchery, Condition 25 of this certification requires SCE to consult with resource agencies and submit a Big Creek Fish Hatchery Water Quality and Monitoring Plan.

## 6.26 Rationale for Condition 26 – Vegetation and Integrated Pest Management

The Vegetation and Integrated Pest Management Plan contained in Appendix R of the Big Creek ALP Settlement Agreement (Appendix R Plan) describes vegetation and pest management activities that may take place during the life of the FERC license(s). The

application of herbicides and rodenticides as part of the operation of the Six Big Creek Hydroelectric Projects has the potential to cause impacts to water quality and beneficial uses.

The Appendix R Plan includes measures SCE will implement to minimize or eliminate impacts associated with vegetation and pest management operations in the four Big Creek ALP Hydroelectric Projects. However, the Appendix R Plan does not describe vegetation and integrated pest management actions for the Vermilion Valley Hydroelectric Project (FERC Project No. 2086) and the Portal Hydroelectric Project (FERC Project No. 2174).

Condition 26 of this certification requires SCE to prepare a Vegetation and Integrated Pest Management Plan for the Six Big Creek Hydroelectric Projects The plan will: provide information on the application of herbicides, insecticides and rodenticides; describe measures and monitoring that will be implemented to protect water quality; require agency consultation; and outline reporting.

### 6.27 Rationale for Condition 27 – Annual Consultation Meetings

Monitoring plans and studies required under this certification contain adaptive management provisions to allow the resource agencies to determine, in consultation with SCE, whether changes in operations of the Six Big Creek Hydroelectric Projects and/or monitoring is necessary during the life of the new FERC license(s). Maintaining flexibility in monitoring and, where feasible, operations, will help ensure adequate protection of water quality and beneficial uses. Therefore, Condition 27 of this certification requires SCE to conduct annual consultation meetings with resource agencies and other interested parties to review monitoring reports and discuss ongoing and forecasted operations, including revisions or modifications to monitoring and/or operations that may be needed to protect water quality and beneficial uses.

### 6.28 Rationale for Condition 28 – Extremely Dry Conditions

California's history of drought and dry years illustrates the importance of contingency planning for multiple dry years or drought. It is difficult to anticipate the specific impacts of consecutive dry years, or a long-term drought, and identify where limited water supplies may be best used during times of shortage. Condition 28 of this certification provides the opportunity, following consultation with the State Water Board staff and participating agencies and notice to interested parties, to request Deputy Director approval of a Revised Operations Plan during consecutive Dry or Critical water year types or drought years. This condition provides flexibility for adaptive management during times of extreme water shortage.

### 6.29 Rationale for Conditions 29 – 50

In order to ensure that the Six Big Creek Hydroelectric Projects operate to meet water quality standards as anticipated, to ensure compliance with other relevant state and federal laws, and to ensure that the Six Big Creek Hydroelectric Projects will continue to meet state water quality standards and other appropriate requirements of state law over their lifetime, this certification imposes conditions regarding monitoring, enforcement, and potential future revisions. Additionally, California Code of Regulations, title 23, section 3860 requires imposition of certain mandatory conditions for all water quality certifications, which are included in this certification.

## 7.0 Conclusion

The State Water Board finds that, with the conditions and limitations imposed under this certification, the proposed Six Big Creek Hydroelectric Projects will be protective of state water quality standards and other appropriate requirements of state law.

## 8.0 Water Quality Certification Conditions

**ACCORDINGLY, BASED ON ITS INDEPENDENT REVIEW OF THE RECORD, THE STATE WATER RESOURCES CONTROL BOARD CERTIFIES THAT OPERATION OF THE SIX BIG CREEK HYDROELECTRIC PROJECTS (BIG CREEK NOS. 2A, 8, AND EASTWOOD HYDROELECTRIC PROJECT [FERC PROJECT NO. 67], BIG CREEK NO. 3 HYDROELECTRIC PROJECT [FERC PROJECT NO. 120], MAMMOTH POOL HYDROELECTRIC PROJECT [FERC PROJECT NO. 2085], VERMILION VALLEY HYDROELECTRIC PROJECT [FERC PROJECT NO. 2086], PORTAL HYDROELECTRIC PROJECT [FERC PROJECT NO. 2174], AND BIG CREEK NOS. 1 AND 2 HYDROELECTRIC PROJECT [FERC PROJECT NO. 2175])** will comply with sections 301, 302, 303, 306, and 307 of the Clean Water Act, and with applicable provisions of State law, if Southern California Edison complies with the following terms and conditions.

### CONDITION 1. Water Years

**FERC Project Nos. 67, 120, 2085, 2086, 2174, and 2175**

The water year type (e.g., Wet, Above Normal, Below Normal, Dry, and Critical) shall be based on the March 1 forecast from the Department of Water Resources (DWR) Bulletin 120, San Joaquin Valley Index or its successor index. By March 15 of each year, the Licensee shall notify the Deputy Director of the Division of Water Rights (Deputy Director) of the March 1 determination of the water year type. By April 1 of each year, the Licensee shall implement minimum instream flows, channel and riparian maintenance flows, and recreational flow requirements based on the March 1 water year type in accordance to Conditions 3 (Minimum Instream Flows), 6 (Channel and Riparian Maintenance Flows), and 9 (Whitewater Flows) of this certification, respectively. The Licensee shall adjust flows based on the April 1 and May 1 DWR water year forecasts if the water year forecast is updated. Within three business days of a published change in water year type by DWR the Licensee shall notify the Deputy Director of the change and implement the associated flows in compliance with Conditions 3, 6, and 9 of this certification. By May 31 of each year, the Licensee shall submit written documentation to the Deputy Director of the final water year type determination, as well as the March 1, April 1, and May 1 water year type determinations associated with that year. The final water type and associated flow requirements shall remain in effect until March 31 of the following year. Any changes in flows made in response to the change in water year type shall comply with Condition 5 (Ramping Rates) of this certification.

### CONDITION 2. Gaging

**FERC Project Nos. 67, 120, 2085, 2086, 2174, and 2175**

Except as otherwise approved in this certification, as soon as practicable, but no later than 30 days following issuance of the license(s) for the Six Big Creek Hydroelectric Projects, flows and reservoir levels shall be measured at the gages listed in Tables 2 and 3.

No later than one year following issuance of the license(s) for the Six Big Creek Hydroelectric Projects, the Licensee shall submit a Flow Monitoring and Reservoir Water Level Gaging Plan (Gaging Plan) for the Six Big Creek Hydroelectric Projects to the Deputy Director for review and approval. The Deputy Director may require modifications to the Gaging Plan as part of any approval. The Gaging Plan shall be developed in consultation with staff from California Department of Fish and Wildlife (CDFW), United States Forest Service (USFS), United States Fish and Wildlife Service (USFWS), and the State Water Resources Control Board (State Water Board). The Licensee shall file with FERC the Deputy Director-approved Gaging Plan, and any approved amendments thereto. Any construction, or other activities associated with the gages listed in Tables 2 and 3 that may impact water quality or beneficial uses are subject to review and approval by the Deputy Director prior to implementation.

The *Flow Monitoring and Reservoir Water Level Measurement Plan* contained in Appendix L of the Big Creek ALP Settlement Agreement: (a) outlines compliance gages (shown in Table 1 and Table 2) for minimum instream flows (Condition 3), channel riparian maintenance flows (Condition 6), and reservoir levels (Condition 8) of this certification; and (b) lays out a general process and preliminary schedule for the design, permitting, and installation of new water control infrastructure (shown in Table 1). Appendix L shall serve as the starting point for the Gaging Plan required per this condition.

The primary goal of the Gaging Plan shall be to: (a) list the gages that will be operated and maintained to effectively implement and document compliance with the conditions of this certification; (b) provide descriptions of the proposed water control infrastructure improvements necessary to comply with the instream flow, reservoir level, and dam seepage requirements specified in this certification; and (c) provide information on the measures that will be implemented during construction and maintenance of the gages to protect water quality and beneficial uses.

At a minimum, the Gaging Plan shall include:

*(a)* A statement of goals and objectives of the Gaging Plan;

*(b)* Descriptions, maps, and photographs of existing water control infrastructure and gaging equipment and the area of proposed water control infrastructure and flow gaging upgrades;

*(c)* Descriptions of proposed water control infrastructure and gaging improvements described in Tables 2 and 3 in Appendix L of the Big Creek ALP Settlement Agreement;

*(d)* Proposed stream flow and reservoir water level monitoring procedures and schedules for the Six Big Creek Hydroelectric Projects, including proposed operation, maintenance, and calibration protocols and installation schedules for all flow gaging and reservoir water level measurement equipment;

*(e)* Proposal for disseminating flow monitoring and reservoir measurement data, which shall include making data available to State Water Board staff and the public via the internet, as well as other appropriate formats;

*(f)* Updated schedule for the design, permitting, and installation of all proposed water control infrastructure, flow monitoring equipment, and reservoir level measurement equipment necessary to implement and document compliance with the instream flow and reservoir level requirements of this certification; and

*(g)* Proposed measures to protect water quality and beneficial uses during installation, construction, and maintenance of all proposed water control infrastructure and flow monitoring / reservoir measurement equipment, including proposed monitoring and reporting.

The Licensee shall implement the Gaging Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein. Unless otherwise approved by the Deputy Director, the proposed water control infrastructure and flow monitoring described in the Gaging Plan shall be installed and made fully operational in accordance with the schedule shown in Table 1. The Licensee shall submit annual progress reports to the Deputy Director regarding the status of implementation of the Gaging Plan and the need for any updates to the plan.

The Licensee shall update the Gaging Plan as necessary throughout the license period and any extensions, to incorporate: (a) updates to the Reservoir Management Plan (Condition 8 of this certification); (b) dam seepage monitoring and data dissemination requirements (Conditions 13-15); and (c) the installation of new or replacement infrastructure associated with flow monitoring or reservoir level measurement.

**Table 1.** Stream Flow Gages and Water Control Infrastructure Improvements[23]

| Project and Bypass Reach | Currently Gaged [24] | New Gage Proposed [25] | Existing USGS Gage Number | Proposed Water Control Infrastructure Improvements [26] | Deadline for Installation of Proposed Water Control Infrastructure Improvements and/or New Gages |
|---|---|---|---|---|---|
| South Fork San Joaquin (Downstream of Florence Lake Dam) | X | – | 11230215 | – | N/A |
| Bear Creek (Downstream of Diversion) | X | – | 11230530 | – | N/A |
| Hooper Creek (Downstream of Diversion) | X | – | 11230200 | – | N/A |

[23] Prior to installation of new water control infrastructure and/or monitoring equipment, the Licensee shall make a good faith effort to provide the specified minimum instream flows (Condition 3 of this certification) and document compliance using existing infrastructure and flow monitoring equipment.

[24] As soon as practicable, but no later than 30 days following issuance of the license(s) for the Six Big Creek Hydroelectric Projects, minimum instream flows shall be measured at the existing gages identified in Table 2, unless otherwise approved in writing by the Deputy Director.

[25] Minimum instream flows shall be measured at the new gage within 45 days of the new gage's installation, unless otherwise approved in writing by the Deputy Director.

[26] Where new water control infrastructure and/or monitoring equipment is proposed and necessary for compliance, minimum instream flows (Condition 3 of this certification) shall be implemented within 45 days from the date that infrastructure and flow monitoring equipment is installed and fully operational. Items with a "*" indicate water control infrastructure modifications are needed to fully implement required minimum instream flows (outlined in Condition 3 of this certification).

| Project and Bypass Reach | Currently Gaged [24] | New Gage Proposed [25] | Existing USGS Gage Number | Proposed Water Control Infrastructure Improvements [26] | Deadline for Installation of Proposed Water Control Infrastructure Improvements and/or New Gages |
|---|---|---|---|---|---|
| Mono Creek (Downstream of Mono Diversion) | X | X[27] | 11231600 | X | ≤4 years of issuance of the license(s) for the Six Big Creek Hydroelectric Projects |
| Chinquapin Creek (Downstream of Diversion) | X | – | 11230560 | – | N/A |
| Bolsillo Creek (Downstream of Diversion) | X | – | 11230670 | – | N/A |
| Camp 62 Creek (Downstream of Diversion) | X | – | 11230600 | – | N/A |
| Pitman Creek (Downstream of Diversion) | X | – | 11237700 | – | N/A |
| North Fork Stevenson Creek (Downstream of Diversion) | X | – | 11239300 | – | N/A |
| Balsam Creek (Forebay to Diversion) | X | – | 11238270 | – | N/A |
| Stevenson Creek (Downstream of Diversion) | X | – | 11241500 | – | N/A |
| Big Creek (Dam 5 to San Joaquin River) | X | X[28] | 11238500 | X | ≤4 years of issuance of the license(s) for the Six Big Creek Hydroelectric Projects |
| San Joaquin River (Dam 6 to Redinger Reservoir) | X | – | 11238600 | X | ≤5 years of issuance of the license(s) for the Six Big Creek Hydroelectric Projects |
| San Joaquin River (Mammoth Pool Dam to Dam 6) | X | X | 11234760 | X | ≤5 years of issuance of the license(s) for the Six Big Creek Hydroelectric Projects |

[27] A new gage (acoustic velocity meter) is proposed to be installed to monitor increased MIFs under the new license.

[28] An acoustic velocity meter gage is proposed to be installed at Dam 5 to monitor minimum instream flow releases. The existing United States Geological Survey (USGS) gage will be operated to monitor higher flow events.

| Project and Bypass Reach | Currently Gaged [24] | New Gage Proposed [25] | Existing USGS Gage Number | Proposed Water Control Infrastructure Improvements [26] | Deadline for Installation of Proposed Water Control Infrastructure Improvements and/or New Gages |
|---|---|---|---|---|---|
| Ross Creek (Downstream of Diversion) | - | X | - | X* | ≤3 years of issuance of the license(s) for the Six Big Creek Hydroelectric Projects |
| Rock Creek (Downstream of Diversion) | - | X | - | X* | ≤4 years of issuance of the license(s) for the Six Big Creek Hydroelectric Projects |
| Mono Creek (Downstream of Vermilion Valley Dam) | X | – | 11231500 | – | N/A |
| Warm Creek (Downstream of Diversion) | X | – | 11231700 | – | N/A |
| Camp 61 Creek (Downstream of Portal Forebay Dam) | – | X | – | X | Timeline will be in accordance with the Deputy Director approved Phase 2 – Dam Seepage Remediation Plan for Camp 61 Creek (Condition 13 of this certification) |
| Big Creek (Huntington Lake to Dam 4) | X | – | 11237000 | – | N/A |
| Big Creek (Dam 4 to Dam 5) | – | X | – | X | ≤5 years of issuance of the license(s) for the Six Big Creek Hydroelectric Projects |
| Balsam Creek (Downstream of Balsam Creek Diversion) | – | X | – | X | ≤4 years of issuance of the license(s) for the Six Big Creek Hydroelectric Projects |
| Ely Creek (Downstream of Diversion) | – | X | – | X | ≤4 years of issuance of the license(s) for the Six Big Creek Hydroelectric Projects |

**Table 2.** Reservoir Water Level Gages

| Reservoir | Gage Number | Gage Type |
|---|---|---|
| Big Creek 2A, 8, and Eastwood (FERC Project No. 67) | | |
| Florence Lake | USGS No. 11229600 | Water-stage recorder |
| Shaver Lake | USGS No. 11239500 | Water-stage recorder |
| Mammoth Pool (FERC Project No. 2085) | | |
| Mammoth Pool Reservoir | USGS No. 11234700 | Water-stage recorder |
| Big Creek Nos. 1 and 2 (FERC Project No. 2175) | | |
| Huntington Lake | USGS No. 11236000 | Water-stage recorder |
| Huntington Lake* | – | Staff gage |

*A new staff gage shall be installed at the USFS Rancheria Boat Ramp at Huntington Lake, in accordance with Condition 17 of the USFS Section 4(e) for the Big Creek Nos. 1 and 2 Hydroelectric Project (FERC Project No. 2175)

## CONDITION 3. Minimum Instream Flows

**FERC Project Nos. 67, 120, 2085, 2086, 2174, and 2175**

The Licensee shall maintain minimum instream flows (MIFs) downstream of the Six Big Creek Hydroelectric Projects dams and diversions in accordance with the flow requirements set forth in Table 3 through Table 26 or the natural inflow, whichever is less. Instantaneous flows shall be measured at least once every 15 minutes. The 24-hour average flow values shall be determined by calculating the arithmetic mean of the instantaneous flow measurements taken from midnight of one day to midnight of the next day.

No later than two years following issuance of the license(s) for the Six Big Creek Hydroelectric Projects, the Licensee shall submit a Natural Inflow Report to the Deputy Director for review and approval. The Natural Inflow Report shall describe how the Licensee proposes to determine natural inflows for each of the waterbodies listed in Tables 4 through 27. The Deputy Director may require modifications to the Natural Inflow Report as part of any approval. The Natural Inflow Report shall be developed in consultation with staff from CDFW, USFS, USFWS, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Natural Inflow Report and any approved amendments thereto.

Unless otherwise approved in writing by the Deputy Director, the MIFs (Table 3 through Table 26) shall be implemented as soon as practicable, but no later than 30 days following issuance of the license(s) for the Six Big Creek Hydroelectric Projects. Where new water control infrastructure and/or flow monitoring equipment are proposed, MIF requirements shall be implemented in accordance with the schedule provided in Table 1 (see Condition 2 of this certification). Where new water control infrastructure and/or monitoring equipment is proposed and necessary for compliance, MIF requirements shall be implemented no more than 45 days from the date that infrastructure and flow monitoring equipment is installed and fully operational. Prior to installation of new water control infrastructure and/or monitoring equipment, the Licensee shall make a good faith effort to provide the specified MIF and document compliance using existing infrastructure and flow monitoring equipment.

### 3(A) Big Creek Nos. 2A, 8, and Eastwood Hydroelectric Project (FERC Project No. 67) Minimum Instream Flow Requirements (Table 3 through Table 15)

**Table 3.** South Fork San Joaquin River (Downstream of Florence Lake Dam; USGS Gage No. 11230215)

| | All Water Year Types | |
|---|---|---|
| Date Range | Mean Daily Flow | Instantaneous Flow |
| Oct 1 – Oct 31 | 30 cfs | 27 cfs |
| Nov 1 – Mar 31 | 25 cfs | 22 cfs |
| Apr 1 – Jun 30 | 40 cfs | 36 cfs |
| Jul 1 – Sep 30 | 35 cfs | 32 cfs |

**Table 4.** Bear Creek (Downstream of Bear Creek Diversion Dam; USGS Gage No. 11230530)

| | All Water Year Types | |
|---|---|---|
| Date Range | Mean Daily Flow | Instantaneous Flow |
| Jul 1 – Nov 30 | 7 cfs | 5 cfs |
| Dec 1 – Dec 31 | 6 cfs | 4 cfs |
| Jan 1 – Mar 31 | 4 cfs | 3 cfs |
| Apr 1 – Jun 30 | 10 cfs | 8 cfs |

**Table 5.** Hooper Creek (Downstream of Hooper Creek (Downstream of Hooper Creek Diversion Dam; USGS Gage No. 11230200)

| | All Water Year Types | |
|---|---|---|
| Date Range | Mean Daily Flow | Instantaneous Flow |
| Oct 1 – Mar 31 | 2 cfs | 1.5 cfs |
| Apr 1 – Jun 30 | 4 cfs | 3.0 cfs |
| Jul 1 – Sep 30 | 3 cfs | 2.0 cfs |

**Table 6.** Mono Creek (Downstream of Mono Creek Diversion Dam; USGS Gage No. 11231600 and New Gage Proposed)

| | All Water Year Types | |
|---|---|---|
| Date Range | Mean Daily Flow | Instantaneous Flow |
| Sep 1 – Dec 31 | 25 cfs | 22 cfs |
| Jan 1 – Mar 31 | 18 cfs | 16 cfs |
| Apr 1 – Jun 30 | 25 cfs | 22 cfs |
| Jul 1 – Aug 31 | 30 cfs | 27 cfs |

**Table 7.** Chinquapin Creek (Downstream of Chinquapin Creek Diversion Dam; USGS Gage No. 11230560)

| | All Water Year Types | |
|---|---|---|
| Date Range | Mean Daily Flow | Instantaneous Flow |
| Jul 1 – Mar 31 | 0.5 cfs | 0.35 cfs |
| Apr – Jun 30 | 1.0 cfs | 0.75 cfs |

**Table 8.** Bolsillo Creek (Downstream of Bolsillo Creek Diversion Dam; USGS Gage No. 11230670)

| | All Water Year Types | |
|---|---|---|
| Date Range | Mean Daily Flow | Instantaneous Flow |
| Jul 1 – Mar 31 | 0.5 cfs | 0.35 cfs |
| Apr 1 – Jun 30 | 1.0 cfs | 0.75 cfs |

**Table 9.** Camp 62 Creek (Downstream of Camp 62 Creek Diversion Dam; USGS Gage No. 11230600)

| | All Water Year Types | |
|---|---|---|
| Date Range | Mean Daily Flow | Instantaneous Flow |
| Jul 1 – Mar 31 | 0.5 cfs | 0.35 cfs |
| Apr 1 – Jun 30 | 1.0 cfs | 0.75 cfs |

**Table 10.** Pitman Creek (Downstream of Pitman Creek Diversion Dam; USGS Gage No. 11237700)

| | All Water Year Types | |
|---|---|---|
| Date Range | Mean Daily Flow | Instantaneous Flow |
| Jul 1 – Mar 31 | 0.8 cfs | 0.5 cfs |
| Apr 1 – Jun 30 | 2.5 cfs | 2.0 cfs |

**Table 11.** North Fork Stevenson Creek (Downstream of North Fork Stevenson Creek Diversion Dam; USGS Gage No. 11239300)

| Date Range | All Water Year Types |
|---|---|
| Oct 1 – Sep 30 | The minimum release shall be 12 cfs or the flow through the instream flow valve when that valve is wide open. |

**Table 12.** Balsam Creek (From Balsam Meadow Forebay Dam to Balsam Creek Diversion Dam; USGS Gage No. 11238270)

| | All Water Year Types | |
|---|---|---|
| Date Range | Mean Daily Flow | Instantaneous Flow |
| Jul 1 – Mar 31 | 1 cfs | 0.75 cfs |
| Apr 1 – Jun 30 | 2 cfs | 1.50 cfs |

**Table 13.** Stevenson Creek (Downstream of Shaver Lake Dam; USGS Gage No. 11241500)

| | All Water Year Types | |
|---|---|---|
| Date Range | Mean Daily Flow | Instantaneous Flow |
| Oct 1 – Mar 31 | 5 cfs | 4 cfs |
| Apr 1 – Jun 30 | 10 cfs | 8 cfs |
| Jul 1 -- Sep 30 | 8 cfs | 6 cfs |

**Table 14.** Big Creek (From Dam 5 to confluence with San Joaquin River; USGS Gage No. 11238500 and New Gage*)

| | All Water Year Types | |
|---|---|---|
| Date Range | Mean Daily Flow | Instantaneous Flow |
| Oct 1 – Oct 31 | 8 cfs | 6 cfs |
| Nov 1 – Mar 31 | 7 cfs | 5 cfs |
| Apr 1 -- Sep 30 | 12 cfs | 10 cfs |
| *An acoustic velocity meter gage is proposed to be installed at Dam 5 to monitor MIF releases. The existing USGS gage no. 11238500 will be operated to monitor higher flow events. | | |

**Table 15.** Tombstone Creek, North Slide Creek, South Slide Creek, and Crater Creek (Downstream of respective Diversion Dams)

| Date Range | All Water Year Types |
|---|---|
| Year-round | Natural Flow (Diversions are no longer used) |

### 3(B) Big Creek No. 3 Hydroelectric Project (FERC Project No. 120) Minimum Instream Flow Requirements (Table 16)

**Table 16.** San Joaquin River (From Dam 6 to Redinger Reservoir; USGS Gage No. 11238600)

| | All Water Year Types | |
|---|---|---|
| Date Range | Mean Daily Flow | Instantaneous Flow |
| Aug 1 – Oct 31 | 50 cfs | 45 cfs |
| Nov 1 – Nov 30 | 25 cfs | 22 cfs |
| Dec 1 – Feb 28/29 | 20 cfs | 18 cfs |
| Mar 1 – Mar 31 | 50 cfs | 45 cfs |
| Apr 1 – Jun 30 | 80 cfs | 72 cfs |
| Jul 1 – Jul 31 | 60 cfs | 54 cfs |

### 3(C) Mammoth Pool Hydroelectric Project (FERC Project No. 2085) Minimum Instream Flow Requirements (Table 17 through Table 19)

**Table 17.** San Joaquin River (Downstream of Mammoth Pool Dam to Dam 6; USGS Gage No. 11234760 and New Gage Proposed; Water Control Infrastructure Improvement)

| | All Water Year Types | |
|---|---|---|
| Date Range | Mean Daily Flow | Instantaneous Flow |
| Sep 1 – Nov 30 | 80 cfs | 72 cfs |
| Dec 1 – Feb 28/29 | 55 cfs | 50 cfs |
| Mar 1 – Mar 31 | 80 cfs | 72 cfs |
| Apr 1 – Jun 30 | 125 cfs | 112 cfs |
| Jul 1 – Aug 31 | 100 cfs | 90 cfs |

**Table 18.** Rock Creek (Downstream of Rock Creek Diversion Dam; New Gage Proposed)

| | All Water Year Types | |
|---|---|---|
| Date Range | Mean Daily Flow | Instantaneous Flow |
| Aug 1 – Dec 31 | 0.5 cfs | 0.35 cfs |
| Jan 1 – Mar 31 | 1.0 cfs | 0.75 cfs |
| Apr 1 – Jun 30 | 2.0 cfs | 1.50 cfs |
| Jul 1—Jul 31 | 1.0 cfs | 0.75 cfs |

**Table 19.** Ross Creek (Downstream of Ross Creek Diversion Dam; New Gage Proposed)

| | Wet, Above Normal, and Below Normal Water Year Types | | Dry and Critical Water Year Types | |
|---|---|---|---|---|
| Date Range | Mean Daily Flow | Instantaneous Flow | Mean Daily Flow | Instantaneous Flow |
| Oct 1 – Sep 30 | 0.5 cfs | 0.35 cfs | -- | -- |
| Dec 1 – Jun 30 | -- | -- | 0.5 cfs | 0.35 cfs |
| Jul 1 – Nov 30 | -- | -- | No Diversion of Flow | |

### 3(D) Vermilion Valley Hydroelectric Project (FERC Project No. 2086) Minimum Instream Flow Requirements (Table 20 and Table 21)

**Table 20.** Mono Creek (Downstream of Vermilion Valley Dam to Mono Creek Dam; USGS Gage No. 11231500)

| | All Water Year Types | |
|---|---|---|
| Date Range | Mean Daily Flow | Instantaneous Flow |
| Sep 15 – Dec 15 | 25 cfs | 20 cfs |
| Dec 16 – Apr 30 | 18 cfs | 15 cfs |
| May 1 – Sep 14 | 20 cfs | 16 cfs |

**Table 21.** Warm Creek (Downstream of Warm Creek Diversion Dam; USGS Gage No. 11231700)

| | All Water Year Types |
|---|---|
| Date Range | Instantaneous Flow |
| When diversion is in operation | 0.2 cfs |

### 3(E) Portal Hydroelectric Project (FERC Project No. 2174) Minimum Instream Flow Requirements (Table 22)

**Table 22.** Camp 61 Creek (Downstream of Portal Forebay Dam; New Gage Proposed)

| | Wet, Above Normal and Below Normal Water Year Types | | Dry and Critical Water Year Types | |
|---|---|---|---|---|
| Date Range | Mean Daily Flow | Instantaneous Flow | Mean Daily Flow | Instantaneous Flow |
| Oct 1 – Mar 31 | 2 cfs | 1.5 cfs | | |
| Apr 1 – Jun 30 | 4 cfs | 3 cfs | | |
| Jul 1 – Sep 30 | 3 cfs | 2 cfs | | |
| Oct 1 – Sep 30 | | | 1.25 cfs | 0.75 cfs |

### 3(F) Big Creek Nos. 1 and 2 Hydroelectric Project (FERC Project No. 2175) Minimum Instream Flow Requirements (Table 23 through Table 26)

**Table 23.** Big Creek (From Huntington Lake to Dam 4; USGS Gage No. 1123700)

| | All Water Year Types | |
|---|---|---|
| Date Range | Mean Daily Flow | Instantaneous Flow |
| Oct 1 – Mar 31 | 2 cfs | 1.5 cfs |
| Apr 1 – Jun 30 | MIF release valve shall be fully open | |
| Jul 1 – Sep 30 | 3 cfs | 2 cfs |

**Table 24.** Big Creek (From Dam 4 to Dam 5; New Gage Proposed)

| | All Water Year Types | |
|---|---|---|
| Date Range | Mean Daily Flow | Instantaneous Flow |
| Oct 1 – Oct 31 | 8 cfs | 6 cfs |
| Nov 1 – Mar 31 | 7 cfs | 5 cfs |
| Apr 1 – Sep 30 | 12 cfs | 10 cfs |

**Table 25.** Balsam Creek (Downstream of Balsam Creek Diversion Dam to Confluence with Big Creek; New Gage Proposed)

| | All Water Year Types | |
|---|---|---|
| Date Range | Mean Daily Flow | Instantaneous Flow |
| Oct 1 – Jun 30 | 0.5 cfs | 0.35 cfs |
| Jul 1 – Sep 30 | 1.0 cfs | 0.75 cfs |

**Table 26.** Ely Creek (Downstream of Ely Creek Diversion Dam to Confluence with Big Creek; New Gage Proposed)

| | All Water Year Types | |
|---|---|---|
| Date Range | Mean Daily Flow | Instantaneous Flow |
| Jun 1 – Feb 28/29 | 0.5 cfs | 0.35 cfs |
| Mar 1 – Mar 31 | 1.0 cfs | 0.75 cfs |
| Apr 1 – May 31 | 2.0 cfs | 1.50 cfs |

### 3(G) Compensatory Flow Releases

**FERC Project Nos. 67, 120, 2085, and 2175**

The Licensee shall avoid under-release of minimum instream flows whenever possible. In accordance with Appendix A and Appendix L of the Big Creek ALP Settlement Agreement for the four Big Creek ALP Hydroelectric Projects, the Licensee may provide compensatory flow releases in a rare instance when an under-release of MIFs occurs in accordance with the terms of this condition. Within seven days of discovery of an under-release, the Licensee shall begin compensatory flow releases. The Licensee shall notify the Deputy Director of an under-release within five days of discovery of the under-release. As part of Deputy Director notification, the Licensee shall identify the reason for the under-release and actions the Licensee will take in the future to avoid similar under releases. The Deputy Director may require additional action in the event of a pattern of under releases.

The compensatory flow release schedule shall be as follows:

*(a)* If a measured 24-hour average flow value (mean daily flow) is less than the required mean daily flow, but greater than the associated instantaneous flow, the Licensee shall begin releasing a volume of water equivalent to the under-released volume within seven days of discovering the under-release.

*(b)* The rate of such compensatory flow releases shall not exceed 120 percent of the applicable MIF requirement.

The 15-minute recordings used to construct the mean daily flow, as well as the under-releases and volumes released to compensate for under-releases, shall be documented and submitted to State Water Board staff. Diversion schedules for small diversions shall also be available upon request.

The mean daily flow values shall be reported to the United States Geological Survey (USGS) on an annual basis.

### 3(H) Unplanned Temporary Minimum Instream Flow Modifications

The MIFs may be temporarily modified if required by equipment malfunction reasonably beyond the control of the Licensee, as directed by law enforcement authorities or in emergencies. An emergency is defined as an unforeseen event that is reasonably out of the control of the Licensee and requires the Licensee to take immediate action, either unilaterally or under instruction by law enforcement or other regulatory agency staff, to prevent imminent loss of human life or substantial property damage. An emergency may include, but is not limited to: natural events such as landslides, storms, or wildfires; malfunction or failure of project works;[29] and recreation accidents. Drought is not considered an emergency for purposes of this condition.

When possible, the Licensee shall notify the Deputy Director prior to any unplanned temporary MIF modification. In all instances, the Licensee shall notify the Deputy Director within 24 hours of the beginning of any unplanned temporary streamflow modification. Within 96 hours of the beginning of any unplanned temporary stream flow modification, the Licensee shall provide the Deputy Director with an update of the conditions associated with the modification and an estimated timeline for returning to the required MIFs.

Within 30 days of any unplanned temporary MIF modification, the Licensee shall provide the Deputy Director with: (1) a written description of the modification and reason(s) for its necessity; (2) photo documentation of the emergency or reason for the stream flow modification; (3) a timeline for returning to the required MIFs or timeline when the MIFs resumed; (4) a description of corrective actions taken in response to an unplanned under-release of flow; and (5) a plan to prevent the need for modification of minimum instream flows resulting from a similar emergency or event in the future.

[29] Project works must be inspected and maintained to manufacturers' specified schedule or at least annually. The inspection schedule default is the most rigorous schedule. Upon State Water Board staff, USFS, CDFW, or USFWS' request, the Licensee shall provide documentation of all inspections, results, dates, staff performing inspections, and recommended maintenance, schedule for performing maintenance, and the date maintenance was performed. Lack of appropriate inspections, maintenance, or documentation may remove events from the "emergency" category, as determined by the Deputy Director.

### 3(I) Planned Temporary Minimum Instream Flow Modifications

The Licensee may request temporary MIF variances for non-emergency facility construction, modification, or maintenance. Non-emergency variance requests shall be submitted to the Deputy Director for approval as far in advance as practicable, but no less than three months in advance of the desired effective date. The Licensee shall notify the Technical Review Group (Condition 27 of this certification) and other interested parties of the proposed temporary MIF variance. The request shall include: a description of construction, modification, or maintenance; documentation of notification to the Technical Review Group and other interested parties, and any comments received; measures that will be implemented to protect water quality and beneficial uses; and a schedule for the construction, modification, or maintenance. The Deputy Director may require modifications as part of any approval. The Licensee shall file with FERC the Deputy Director-approved modification to minimum instream flow requirements and any approved amendments thereto.

## CONDITION 4. Operational Release Limitations – Mono Creek (Vermilion Valley Hydroelectric Project)

**FERC Project Nos. 2086**

The Licensee shall not conduct an operational release greater than 50 cfs into Mono Creek downstream of Vermilion Valley Dam during the period of April 16 through June 15 without first notifying, consulting with, and obtaining written approval from the Deputy Director. The Deputy Director may require modifications as part of any approval. For purposes of this condition, an operational release is defined as a flow event into the Mono Creek channel that could otherwise have been held as storage in Lake Thomas Edison.

## CONDITION 5. Ramping Rates

**FERC Project Nos. 67, 120, 2085, 2086, 2174, and 2175**

### 5(A) Ramping Rates Study Plan

No later than nine months following issuance of the license(s) for the Six Big Creek Hydroelectric Projects, the Licensee shall submit a Ramping Rates Study Plan for Deputy Director review and approval. The Deputy Director may require modifications to the Ramping Rates Study Plan as part of any approval. The Ramping Rates Study Plan shall be developed in consultation with staff from USFS, CDFW, USFWS, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Ramping Rates Study Plan and any approved amendments thereto. The Ramping Rates Study Plan shall evaluate the need for ramping rates in streams affected by the Six Big Creek Hydroelectric Projects, focused on the ecological effects of unnaturally rapid flow and stage fluctuations, which include: (a) natural spills (ramp down only); (b) operational releases[30] (ramp up and down); and (c) ramping rates for channel and riparian maintenance flows (Condition 6 of this certification), which do not have numeric requirements specified in the Big Creek ALP Settlement Agreement. The Ramping

[30] The following terms are defined for the purposes of this condition. A “natural spill” is defined as a flow event that is initially outside the control of the Licensee (e.g., flood flows), in which water flows into a channel because available capacity of storage facilities (e.g., reservoirs, diversion structures, etc.) are exceeded. Operational releases include both releases from project facilities (e.g., outlets) and “operational spills” that are within the control of the Licensee. “Operational spill” is defined as a flow event into a channel that could have been held as storage.

Rates Study Plan shall include the Mono Creek Ramping Rate Study Plan[31], with any proposed changes.

The Licensee shall implement the Ramping Rates Study Plan within 30 days of receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

Within one year of implementation of the Ramping Rates Study Plan, the Licensee shall submit a Ramping Rates Study Report to the Deputy Director for review and approval. The Deputy Director may require modifications to the Ramping Rates Study Report as part of any approval. The Ramping Rates Study Report shall be developed in consultation with staff from USFS, CDFW, USFWS, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Ramping Rates Study Plan and any approved amendments thereto. At a minimum, the Ramping Rates Study Report shall include:

*(a)* A determination of and justification for whether ramping rates are needed for the Six Big Creek Hydroelectric Projects-affected streams;
*(b)* A determination of and justification for the exclusion of ramping rates for the Six Big Creek Hydroelectric Projects-affected streams, if applicable; and
*(c)* A summary of consultation, including comments received and how those comments were addressed.

**5(B) Long-term Ramping Rates**

No later than four years following issuance of the license(s) for the Six Big Creek Hydroelectric Projects, the Licensee shall submit a Long-term Ramping Rates Plan (Ramping Rates Plan) to the Deputy Director for review and approval. The Deputy Director may require modifications to the Ramping Rates Plan as part of any approval. The Ramping Rates Plan shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Ramping Rates Plan for all Six Big Creek Hydroelectric Projects-affected streams[32] and any approved amendments thereto. Long-term ramping rates shall be developed for natural spills (ramp down only) and operational releases (ramp up and down), including channel and riparian maintenance flows (Condition 6 of this certification). At a minimum, the Ramping Rates Plan shall include:

*(a)* An evaluation of the potential impacts and benefits of ramping rates on fish and amphibian populations in the Six Big Creek Hydroelectric Projects-affected stream reaches identified for ramping rates in the Deputy Director-approved Ramping Rates Study Report;

*(b)* Proposed ramping rates for Six Big Creek Hydroelectric Projects-affected streams identified in the Ramping Rates Study Report;

*(c)* Measures to reduce stranding or trapping of fish and amphibians and to provide for recreationists' safety in the Six Big Creek Hydroelectric Projects-affected stream reaches (e.g., Mono Creek project reach[33]);

[31] Described in the 2004 USFS 4(e) Condition 12(C) for the Vermilion Valley Hydroelectric Project (FERC Project No.2086).
[32] Ramping rates shall be developed for all Six Big Creek Hydroelectric Projects-affected streams unless determined unnecessary by the Deputy Director in writing, following consultation.
[33] The Mono Creek project reach refers to the portion of Mono Creek from Vermilion Valley Dam to Mono Creek Diversion, which is part of the Vermilion Valley Hydroelectric Project (FERC Project No. 2086).

*(d)* A description of compliance will be documented through the use of stream flow gages (Condition 2 of this certification);

*(e)* A description of adaptive management measures that provide for updates to the ramping rates to protect beneficial uses from potential impacts associated with changes in flow; and

*(f)* Documentation of consultation with the USFS, USFWS, CDFW, and State Water Board staff, copies of comments and recommendations, and how the comments and recommendations were addressed.

The Licensee shall implement the Ramping Rates Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

## CONDITION 6. Channel and Riparian Maintenance Flows

**FERC Project Nos. 67, 2086, and 2174**

The Licensee shall develop and implement channel and riparian maintenance flows (CRMFs) for the Vermilion Valley Hydroelectric Project (FERC Project No. 2086), Portal Hydroelectric Project (FERC Project No. 2174), and Big Creek 2A, 8, and Eastwood Hydroelectric Project (FERC Project No. 67). Ramping rates developed in accordance with Condition 5 shall be applied to CRMF requirements.

### 6(A) CRMF Reporting and Adaptive Management

By November 15 of each year following CRMFs, the Licensee shall submit an Annual CRMF Report to the Deputy Director for review and approval. The Deputy Director may require modifications to the Annual CRMF Report as part of any approval, if necessary. The Annual CRMF Report shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Annual CRMF Report and any approved amendments thereto. The Annual CRMF Report shall document compliance with the CRMF requirements, summarize CRMF-related information, and propose CRMF modifications, as appropriate.

The Annual CRMF Report shall include, but not be limited to:

*(a)* Flow magnitude, duration, ramping rates, cumulative release volume, and timing for the reporting year;

*(b)* Details of under-released CRMFs or other instances of non-compliance;

*(c)* Corrective measures taken to address the identified under-release of flows or other instances of non-compliance;

*(d)* Measures that will be taken to avoid similar under-release of flows or other instances of noncompliance in the future;

*(e)* Sediment monitoring results and assessment of CRMF effectiveness for the following reaches:

*(i)* Camp 61 Creek; and

*(ii)* Mono Creek (downstream of the Mono Creek diversion);

*(f)* Riparian monitoring results and assessment of the CRMFs effectiveness for the following reaches:

*(i)* Camp 61 Creek;

*(ii)* Mono Creek (Vermilion Valley Dam to Mono Creek diversion);

*(iii)* Mono Creek (downstream of the Mono Creek diversion); and

*(iv)* South Fork San Joaquin River (downstream of Florence Lake);

*(g)* Proposed modifications to CRMFs; and

*(h)* A summary of consultation, including comments received and how the comments were addressed.

**6(B) Vermilion Valley Hydroelectric Project (FERC Project No. 2086)**

**6(B)(1) Warm Creek (Downstream of Warm Creek Diversion Dam)**

*(a) CRMF.* In Wet water years (Condition 1 of this certification), the Licensee shall not divert water at the Warm Creek Diversion Dam from April 1 through June 30.

*(b) CRMF Monitoring.* No later than two years following issuance of the license for the Vermilion Valley Hydroelectric Project, the Licensee shall develop a CRMF Monitoring Plan for Warm Creek (Warm Creek CRMF Plan), and submit it to the Deputy Director for review and approval. The Deputy Director may require modifications to the Warm Creek CRMF Plan as part of any approval. The Warm Creek CRMF Plan shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Warm Creek CRMF Plan and any approved amendments thereto. The Licensee shall implement the Warm Creek CRMF Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

At a minimum, the Warm Creek CRMF Plan shall include:

*(i)* A statement of CRMF goals and objectives, including relevant background information;

*(ii)* CRMFs, as outlined in 6(B)(1)(a);

*(iii)* A proposed monitoring schedule and methodologies;

*(iv)* Criteria to evaluate the effects of CRMFs on sediment transport;

*(v)* Incorporation of CRMF reporting and adaptive management provisions outlined in Section 6(A), above; and

*(vi)* A summary of consultation, including comments received and how the comments were addressed.

**6(B)(2) Mono Creek (Vermilion Valley Dam to Mono Creek Diversion)**

*(a) CRMF.* The Licensee shall implement CRMFs below Vermilion Valley Dam unless one or both of the flow standards (Standard 1 or Standard 2, outlined below) have been met. No later than June 20 of each calendar year, the Licensee shall notify the Deputy Director whether one or both of the following flow standards have been met in Mono Creek below Vermilion Valley Dam:

*(i)* Standard 1: One or more natural spill events occurs between February 1 and June 15 of the current or preceding water year, with: (a) an average daily flow of at least 450 cfs for at least two consecutive days; and (b) at least 14 days (cumulative) of average daily flow greater than 150 cfs; and (c) a total cumulative flow volume of at least 9,000 acre-feet during those 14 days.

*(ii)* Standard 2: One or more natural or operational release events occurs during the period of June 16 to July 31 of the preceding water year, with: (a) an average daily flow of at least 450 cfs for at least two consecutive days; and (b) at least 14 days (cumulative) of average daily flow greater than 150 cfs; and (c) a total cumulative flow volume of at least 9,000 acre-feet during those 14 days.

If either Standard 1 or Standard 2 is met, the Licensee shall provide documentation of compliance with the flow standards as part of Deputy Director notification.

If the Licensee is unable to provide documentation demonstrating that one or both of the above listed flow standards have been met, the Licensee shall provide CRMF releases between June 15 and July 31 of the current year into Mono Creek below Vermilion Valley Dam. The June 15 through July 31 CRMF releases shall meet or exceed the flow magnitude (i.e., average daily flow of at least 450 cfs for at least two consecutive days), cumulative duration (i.e., at least 14 days [cumulative] of average daily flow greater than 150 cfs), and cumulative volume (i.e., total cumulative flow volume of at least 9,000 acre-feet during those 14 days) characteristics described in the above listed flow standards.

Unless otherwise approved by the Deputy Director, all CRMF releases shall be implemented in accordance with the Deputy Director-approved ramping rates (Condition 5 of this certification). In Critical water years (Condition 1 of this certification) preceded by two consecutive Critical water years, the Licensee may submit a written request for variance from these CRMF requirements.

*(b) CRMF Monitoring.* No later than two years following issuance of the license for the Vermilion Valley Hydroelectric Project, the Licensee shall submit the Mono Creek CRMF Monitoring Plan to the Deputy Director for review and approval. The Deputy Director may require modifications to the Mono Creek CRMF Monitoring Plan as part of any approval. The Mono Creek CRMF Monitoring Plan shall be developed in consultation with the staff from USFS, USFWS, CDFW, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Mono Creek CRMF Monitoring Plan and any approved amendments thereto. The Licensee shall implement the Mono Creek CRMF Monitoring Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

At a minimum, the Mono Creek CRMF Monitoring Plan shall include:

*(i)* A statement of CRMF goals and objectives, including relevant background information;
*(ii)* CRMFs, as outlined in 6(B)(2)(a);
*(iii)* A proposed monitoring program to evaluate the effects of CRMFs on riparian habitat in Mono Creek below Vermilion Valley Dam;
*(iv)* Incorporation of CRMF reporting and adaptive management provisions outlined in Section 6(A), above; and

*(v)* A summary of consultation, including comments received and how the comments were addressed.

### 6(C) Portal Hydroelectric Project (FERC Project No. 2174)

### 6(C)(1) Camp 61 Creek (Downstream of Portal Forebay Dam)

The Licensee shall implement the Camp 61 Creek CRMF Plan, included as Appendix E of the Big Creek ALP Settlement Agreement, as amended herein. The objective of the Camp 61 Creek CRMF Plan is to identify and implement water year-based CRMF regimes that are sufficient to maintain reduced accumulation of fine sediment in Camp 61 Creek between Portal Forebay Dam and the South Fork San Joaquin River (subject reach). The Camp 61 Creek CRMF Plan includes initial CRMF schedules for Wet and Above Normal water years (Condition 1 of this certification), a fine sediment monitoring program, and modified CRMF schedules that shall be implemented if the sediment monitoring program results indicate that the initial CRMF schedules are not meeting the Camp 61 Creek CRMF Plan objective. The Licensee shall implement CRMFs identified in Table 27 and Table 28. CRMFs shall be no less than 90% of the mean daily (24-hour) flow identified in Table 27 and Table 28.

*(a)* Initial CRMF Schedule – Wet and Above Normal Water Years

In Wet and Above Normal water years, the Licensee shall implement the initial CRMF schedule (Table 27) corresponding to the appropriate water year classification (Condition 1 of this certification) over a period of 10 consecutive days between May 1 and July 10.

**Table 27.** Initial Channel and Riparian Maintenance Flow Schedule for Camp 61 Creek (New Gage Proposed*)

| CRMF Period | Above Normal Water Year | Wet Water Year |
|---|---|---|
| Day 1 | Ramp up from MIF** to 22 cfs | Ramp up from MIF** to 28 cfs |
| Days 2-3 | 22 cfs*** | 28 cfs*** |
| Days 4-7 | 30 cfs*** | 40 cfs*** |
| Days 8-9 | 22 cfs*** | 28 cfs*** |
| Day 10 | Ramp down to MIF* | Ramp down to MIF** |
| * Prior to the operation of the new compliance stream gage and any associated water control infrastructure improvements on Camp 61 Creek (Condition 2 of this certification), the Licensee shall implement CRMFs to the extent feasible, within the limitations of equipment and measurement.<br>** Minimum Instream Flow (Refer to Condition 3 of this certification)<br>*** Mean daily (24-hour) flow | | |

*(b)* Fine Sediment Monitoring Program

The fine sediment monitoring program shall use the weighted mean fine sediment volume metric (V*w) of Hilton and Lisle (1993)[34] as an index of fine sediment supply and accumulation, and as the primary criteria for identifying and determining the appropriate CRMF regime. Alternative sediment monitoring procedures and CRMF regime criteria may be substituted if approved by the Deputy Director. Alternative procedures and criteria must be peer-reviewed.

[34] Hilton, S. and T. Lisle. 1993. Measuring the fraction of pool volume filled with fine sediment. Res. Note PSW-RN-414. U.S. Forest Service Pacific Southwest Research Station. Albany, CA.

At a minimum, key provisions of the fine sediment monitoring program shall include:

*(i)* The V*w for a given fine sediment monitoring event shall be determined by calculating the weighted mean value of the relative residual fine sediment volume (V*) measured in 10 to 20 pools in the subject reach, in accordance with procedures described by Hilton and Lisle (1993).

*(ii)* Pool locations shall be selected, in consultation with staff from USFS, USFWS, CDFW, and the State Water Board, and sampled either in the first or second summer following issuance of the license(s) for the Six Big Creek Hydroelectric Projects.

*(iii)* Following pool selection and the initial sampling event(s), the Licensee shall resample pools within six months of all Wet water year CRMF releases, with the following exceptions: (a) when Wet water year CRMF releases occur in consecutive years and the V*w value after the first Wet water year release is less than or equal to 0.25; and (b) when the V*w value for three successive sampling events is less than or equal to 0.25, in which case the monitoring frequency may be modified to once after every third Wet water year CRMF release, or a lesser frequency approved by the Deputy Director.

*(iv)* Within six months of each sampling event, the Licensee shall submit a CRMF monitoring report to the State Water Board staff for review and comment. The Licensee shall update the monitoring report to address State Water Board staff comments, and submit the updated report to the Deputy Director no later than 60 days following receipt of State Water Board staff comments. At a minimum, the monitoring report shall include: (a) map showing the locations of pools sampled; (b) discussion of materials and methods; (c) relative residual fine sediment values (V*) for each pool sampled; (d) the weighted mean fine sediment value (V*w) for the most recent sampling event; (e) summary of V* and V*w values from all prior sampling events; and (f) analysis of the most recent monitoring results as well as long-term trends in fine sediment recruitment and accumulation within the subject reach. Monitoring reports do not need to contain the raw data or supporting calculations, but these data and calculations shall be made available to the State Water Board staff upon request.

*(c)* Modified CRMF Schedule – Wet and Above Normal Water Years

If V*w is greater than 0.25 after two Wet water year CRMF releases using the initial CRMF schedule (Table 27), the Licensee shall implement the modified CRMF schedule outlined in Table 28 in the next Above Normal or Wet water year. The modified CRMF schedule (Table 28) shall be implemented over a period of 12 consecutive days between May 1 and July 12.

If V*w is greater than 0.25 after two modified Wet water year CRMF releases (Table 28), the Licensee shall consult with staff from USFS, USFWS, CDFW, and the State Water Board regarding the need for further modification of CRMF regimes to achieve channel and riparian maintenance objectives. The Deputy Director reserves the authority to further modify CRMF requirements as necessary to achieve CRMF objectives outlined in the Camp 61 Creek CRMF Plan.

**Table 28.** Modified Channel and Riparian Maintenance Flow Schedule for Camp 61 Creek (New Gage Proposed)

| CRMF Period | Above Normal Water Year | Wet Water Year |
|---|---|---|
| Day 1 | Ramp up from MIF** to 22 cfs | Ramp up from MIF** to 28 cfs |
| Days 2-3 | 22 cfs*** | 28 cfs*** |
| Days 4-9 | 30 cfs*** | 40 cfs*** |
| Days 10-11 | 22 cfs*** | 28 cfs*** |
| Day 12 | Ramp down to MIF** | Ramp down to MIF** |
| * Prior to the operation of the new compliance stream gage and associated water control infrastructure improvements on Camp 61 Creek (Condition 2 of this certification), the Licensee shall implement CRMFs to the extent feasible, within the limitations of equipment and measurement.<br>** Minimum Instream Flow (Refer to Condition 3 of this certification)<br>*** Mean daily (24 hour) flow | | |

### 6(D) Big Creek No. 2A, 8, and Eastwood Hydroelectric Project (FERC Project No. 67)

#### 6(D)(1) Bear Creek (Downstream of Bear Creek Diversion)

In Wet water years (Condition 1 of this certification), the Licensee shall not divert water at the Bear Creek Diversion for 10 consecutive days between May 15 and July 10.

#### 6(D)(2) Bolsillo Creek (Downstream of Bolsillo Creek Diversion)

In Wet water years, the Licensee shall not divert water at the Bolsillo Creek Diversion from April 1 through June 30.

#### 6(D)(3) Camp 62 Creek (Downstream of Camp 62 Creek Diversion)

In Wet water years, the Licensee shall not divert water at the Camp 62 Creek Diversion from April 1 through June 30.

#### 6(D)(4) Chinquapin Creek (Downstream of Chinquapin Creek Diversion)

In Wet water years, the Licensee shall not divert water at the Chinquapin Creek Diversion from April 1 through June 30.

#### 6(D)(5) Mono Creek (Downstream of Mono Creek Diversion)

The Licensee shall implement the Mono Creek CRMF Plan (Downstream Mono Creek CRMF Plan), included as Appendix D of the Big Creek ALP Settlement Agreement, as amended herein. The objective of the Downstream Mono Creek CRMF Plan is to identify and implement water year based CRMF regimes that are sufficient to maintain reduced accumulation of fine sediment in Mono Creek between Mono Creek Diversion and the South Fork San Joaquin River (downstream Mono Creek reach). The Downstream Mono Creek CRMF Plan prescribes two possible CRMF schedules for Wet water years, a fine sediment monitoring program that will be used to select the appropriate CRMF schedule in any given Wet water year, and one CRMF schedule for Above Normal water years. Water year types are outlined in Condition 1 of this certification.

*(a)* Fine Sediment Monitoring Program

The fine sediment monitoring program shall use the weighted mean fine sediment volume metric (V*w) of Hilton and Lisle (1993)[35] as an index of fine sediment supply and accumulation, and as the primary criteria for determining the appropriate CRMF regime

[35] Hilton, S. and T. Lisle. 1993. Measuring the fraction of pool volume filled with fine sediment. Res. Note PSW-RN-414. U.S. Forest Service Pacific Southwest Research Station. Albany, CA.

in Wet water years. Alternative sediment monitoring procedures and CRMF regime criteria may be substituted if approved by the Deputy Director. Alternative procedures and criteria must be peer-reviewed. Key provisions of the fine sediment monitoring program shall include:

*(i)* The V*w for a given fine sediment monitoring event shall be determined by calculating the weighted mean value of the relative residual fine sediment volume (V*) measured in 10 to 20 pools in the downstream Mono Creek reach, in accordance with procedures described by Hilton and Lisle (1993).

*(ii)* Pool locations shall be selected, in consultation with staff from USFS, USFWS, CDFW, and State Water Board, and sampled in the either the first or second summer following issuance of the license(s) for the Six Big Creek Hydroelectric Projects.

*(iii)* Following pool selection and the initial sampling event(s), the Licensee shall resample pools within six months of all Wet water year CRMF releases, with the following exceptions: (a) when Wet water year CRMFs are released in consecutive years and the V*w value after the first Wet water year release is less than or equal to 0.2; and (b) when the V*w value for three successive sampling events is less than or equal to 0.2, in which case the monitoring frequency may be modified to once after every third Wet water year CRMF release, or a lesser frequency approved by the Deputy Director.

*(iv)* Within six months of each sampling event, the Licensee shall submit a CRMF monitoring report to State Water Board staff for review and comment. The Licensee shall update the monitoring report to address State Water Board staff comments and submit the updated report to the Deputy Director no later than 60 days following receipt of State Water Board staff comments. At a minimum, the monitoring report shall include: (a) map showing the locations of pools sampled; (b) discussion of materials and methods; (c) the relative residual fine sediment values (V*) for each pool sampled; (d) the weighted mean fine sediment value (V*w) for the most recent sampling event; (e) summary of V* and V*w values from all prior sampling events; and (f) analysis of the most recent monitoring results as well as long-term trends in fine sediment recruitment and accumulation within the downstream Mono Creek reach. Monitoring reports do not need to contain the raw data or supporting calculations, but these data and calculations shall be made available to State Water Board staff upon request.

*(b)* CRMF Schedules – Wet Water Years

In Wet water years, the Licensee shall implement the appropriate CRMF schedule in accordance with the following criteria. If the V*w value calculated from the preceding fine sediment monitoring event is greater than 0.2, the Licensee shall implement CRMF Schedule I (Table 29) over a period of 11 consecutive days between July 1 and August 16.

**Table 29.** Channel and Riparian Maintenance Flow Schedule I - Wet Water Years, for Mono Creek below Mono Creek Diversion (USGS Gage No. 11231600 and New Gage Proposed)

| CRMF Period | CRMF Schedule I – Wet Water Year |
|---|---|
| Days 1 – 3 | An average flow of at least 400 cfs, representing a gradual increase, from the MIF* to 800 cfs by Day 3 |
| Days 4 - 6 | 800 cfs** |

| | |
|---|---|
| Days 7 - 8 | Ramp down from 800 cfs to 500 cfs** |
| Days 9 - 10 | Ramp down from 500 cfs to 350 cfs** |
| Day 11 | Ramp down from 350 cfs to MIF* |
| Cumulative CRMF Volume Requirement | ≥ 10,800 acre-feet over 11-day release period |
| * Minimum Instream Flow (Refer to Condition 3 of this certification)<br>** Mean daily (24 hour) flow | |

If the V*w value from the preceding fine sediment monitoring event is less than or equal to 0.2, the Licensee shall implement CRMF Schedule II (Table 30) over a period of 10 consecutive days between July 1 and August 15.

**Table 30.** Channel and Riparian Maintenance Flow Schedule II – Wet Water Years, for Mono Creek below the Mono Creek Diversion (USGS Gage No. 11231600 and New Gage Proposed)

| CRMF Period | CRMF Schedule II – Wet Water Year |
|---|---|
| Day 1 | Gradually ramp up from MIF* to 450 cfs |
| Days 2 - 9 | 450 cfs** |
| Day 10 | Gradually ramp down from 350 cfs to MIF* |
| Cumulative CRMF Volume Requirement | ≥ 7,700 acre-feet over 10-day release period |
| * Minimum Instream Flow (Refer to Condition 3 of this certification)<br>** Mean daily (24 hour) flow | |

*(c)* CRMF Schedule – Above Normal Water Years

In Above Normal water years, the Licensee shall implement CRMF Schedule III (Table 31) over a period of seven consecutive days between July 1 and August 12.

**Table 31.** Channel Riparian Maintenance Flow Schedule III – Above Normal Water Years, for Mono Creek below the Mono Creek Diversion (USGS Gage No. 11231600 and New Gage Proposed)

| CRMF Period | CRMF Schedule III – Above Normal Water Year |
|---|---|
| Days 1 - 2 | Gradually ramp up from MIF* to 450 cfs |
| Days 3 - 4 | 450 cfs** |
| Day 5 | Gradually ramp down from 450 cfs to 345 cfs |
| Day 6 | Gradually ramp down from 345 cfs to 240 cfs |
| Day 7 | Gradually ramp down from 240 cfs to MIF* |
| Cumulative CRMF Volume Requirement | ≥ 4,100 acre-feet over 7-day release period |
| * Minimum Instream Flow (Refer to Condition 3 of this certification)<br>** Mean daily (24 hour) flow | |

### 6(D)(6) South Fork San Joaquin River (Downstream of Florence Lake)

No later than 30 days following issuance of the license for the Big Creek No. 2A, 8, and Eastwood Hydroelectric Project, the Licensee shall implement the CRMFs for the South Fork San Joaquin River outlined in Appendix F of the Big Creek ALP Settlement Agreement, as amended herein. The CRMFs for the South Fork San Joaquin River include: (a) implementation of a Jackass Meadow CRMF Inundation Study; (b) implementation of the CRMF schedule for Wet water years; and (c) implementation of the temporary CRMF schedule for Above Normal water years, and development and implementation, if approved, of an alternate

Above Normal water year CRMF schedule based on the outcome of the Jackass Meadow Inundation Study.

*(a)* Jackass Meadow CRMF Inundation Study

During the first two Wet Water Years following issuance of the license(s) for the Six Big Creek Hydroelectric Projects, the Licensee shall implement the Areal Inundation Mapping of the Jackass Meadow Complex, in accordance with Appendix F of the Big Creek ALP Settlement Agreement.

*(b)* Jackass Meadow CRMF Inundation Study Report and Modified CRMF Proposal

Unless otherwise approved by the Deputy Director in writing, within eight months of the conclusion of the second Wet water year (September 30) in which the Jackass Meadow CRMF Inundation Study is implemented, the Licensee shall submit the Jackass Meadow CRMF Inundation Study Report and Modified CRMF Proposal (Report and Proposal) to the Deputy Director for review and approval. The Report and Proposal shall be developed in consultation with staff from the USFS, USFWS, CDFW, and State Water Board. The Deputy Director may require modification to the Report and Proposal as part of any approval. The Licensee shall file with FERC the Deputy Director-approved Report and Proposal and any approved amendments thereto.

At a minimum, the Report and Proposal shall include:

*(i)* A summary of the Jackass Meadow CRMF Inundation Study findings and preliminary determinations regarding the study plan objectives, including maps, quantified areas, and the associated flow rates;

*(ii)* Calculation of the CRMFs necessary to inundate 75 percent of the areal extent inundated by 1,600 cfs;

*(iii)* Proposed monitoring and methodology to assess effectiveness of CRMFs;

*(iv)* Proposed CRMFs for the South Fork San Joaquin River (below Florence Lake) in Above Normal water years based on the results of the Jackass Meadow CRMF Inundation Study Plan, which shall at a minimum include the following provisions:

*a.* Gradual increase of flow over one day from the MIF to a peak flow that will provide approximately 75 percent of the areal extent of inundation measured at 1,600 cfs;

*b.* Maintenance of a mean daily flow at the peak flow for two consecutive days;

*c.* A decrease from the peak flow to the MIF over the next five days according to the following schedule:

*i.* Flow of at least 700 cfs for one day;

*ii.* Flow of at least 500 cfs for three consecutive days; and

*iii.* Decrease to MIF over one day, in even increments.

*d.* Release of a total volume of at least 6,000 acre-feet plus the volume of the two days of peak flow, with a maximum flow release volume of 13,000 acre-feet;

*e.* At least one day of flow, between approximately 500-700 cfs, during a weekend for whitewater boating purposes. If the Licensee is unable to provide the one weekend day of flow as specified, the Licensee shall, within seven days of completing the CRMFs, notify the Deputy Director of the failure and provide

documentation to support the Licensee's inability to provide the one weekend day of flow;

*f.* Completion of CRMFs before Memorial Day weekend, whenever feasible; and

*g.* Any modifications the Licensee proposes to the CRMF schedule in Wet water years.

*(c)* Wet Water Year CRMF Schedule

In Wet water years, the Licensee shall implement and release sufficient flow or augment a natural spill event which meets all of the characteristics in CRMF Schedule I (Table 32) for 14 consecutive days between June 1 and July 21. The Deputy Director may reduce the CRMF discharge rates and associated cumulative release volume requirements specified in Table 32 if the results of the Jackass Meadow CRMF Inundation Study (i.e., Report and Proposal) demonstrate that a peak CRMF of less than 1,600 cfs is sufficient to meet CRMF objectives outlined in the Jackass Meadow CRMF Inundation Study.

**Table 32.** Channel and Riparian Maintenance Flow Schedule I (mean daily flow in cfs) - Wet Water Years, for the South Fork San Joaquin River below Florence Lake Dam (USGS Gage No. 11230215)

| CRMF Period | CRMF Schedule I – Wet Water Year |
|---|---|
| Days 1 - 3 | Gradually ramp up from MIF* to 1,600 cfs in as even increments as feasible |
| Days 4 - 6 | 1,600 cfs** |
| Day 7 | Gradually ramp down from 1,600 cfs to 1,000 cfs |
| Days 8 - 9 | Gradually ramp down from 1,000 cfs to 750 cfs |
| Days 10 - 12 | Gradually ramp down from 750 cfs to 500 cfs |
| Day 13 | Gradually ramp down from 500 cfs to 150 cfs |
| Day 14 | Gradually ramp down from 150 cfs to MIF* |
| Cumulative CRMF Volume Requirement | ≥ 22,000 acre-feet over 14-day release period |
| * Minimum Instream Flow (Refer to Condition 3 of this certification)<br>** Mean daily (24-hour) flow | |

*(d)* CRMF Natural Spill Event Adjustments for Whitewater Boating

If at any time during a Wet water year a natural spill event meets the CRMF peak flow requirement (1,600 cfs over three consecutive days) as outlined in Table 32, the Licensee shall provide ramp-down releases on the descending limb of the natural spill hydrograph to meet the requirements specified in the Whitewater Boating and CRMF Schedule II (Table 33). To the extent feasible, the Licensee shall provide at least one weekend day of flow between 750 cfs and 500 cfs, and stabilize flows between the hours of 10:00 A.M. and 4:00 P.M., if the area is accessible to boaters. If the Licensee is unable to provide the one weekend day of flow as specified above, the Licensee shall, within seven days of the natural spill event, notify the Deputy Director of the event and provide documentation to support the Licensee's inability to provide one weekend day of flow. For the purposes of this condition, a natural spill is defined as the exceedance of the maximum pool elevation of Florence Lake.

**Table 33.** Whitewater Boating and Channel and Riparian Maintenance Flow Schedule II – Wet Water Years with Qualifying Natural Spill Events, for the South Fork San Joaquin River below Florence Lake Dam (USGS Gage No. 11230215)

| CRMF Period | CRMF Schedule II – Wet Water Year |
|---|---|
| Day 1 – 3 | 750 cfs |
| Days 4 – 5 | 500 cfs** |
| Day 6 | MIF* |
| * Minimum Instream Flow (Refer to Condition 3 of this certification)<br>** Mean daily (24-hour) flow<br>*** To the extent feasible, the Licensee shall provide at least one weekend day of flow between 750 cfs to 500 cfs, and stabilize flows between 10:00 A.M. and 4:00 P.M. | |

*(e)* Above Normal Water Year CRMF Schedule

*(i)* *Initial CRMF*. In Above Normal water years, prior to the completion of the Jackass Meadow CRMF Inundation Study, the Licensee shall provide at least four consecutive days, that include one weekend day, of flow between 500 cfs and 750 cfs for whitewater boating purposes.

*(ii)* *Updated CRMFs following completion of Jackass Meadow CRMF Inundation Study*. Upon Deputy Director approval of the Report and Proposal, the Licensee shall implement the updated CRMFs in subsequent Above Normal water years.

## CONDITION 7. Small Diversions Decommissioning

**FERC Project Nos. 67 and 2175**

The Licensee shall implement the Small Diversions Decommissioning Plan, included in Appendix G of the Big Creek ALP Settlement Agreement, in accordance with the schedule and requirements specified therein, and as modified herein. Tables 34 and 35 list the small water diversion structures to be decommissioned and timeframe for implementation.

**Table 34.** Summary of Small Water Diversions to be Decommissioned

| **Big Creek Nos. 2A, 8, and Eastwood Hydroelectric Project (FERC Project No. 67)** |
|---|
| Crater Creek Diversion |
| North Slide Creek Diversion |
| South Slide Creek Diversion |
| Tombstone Creek Diversion |
| **Big Creek Nos. 1 and 2 Hydroelectric Project (FERC Project No. 2175)** |
| Pitman Creek Domestic Diversion |
| Snow Slide Creek Domestic Diversion |

The Licensee shall submit one comprehensive diversion decommissioning plan or diversion-specific decommissioning plans (Diversion Decommissioning Plan(s)) for each of the diversions listed in Table 34 to the Deputy Director for review and approval. The Diversion Decommissioning Plan(s) shall be submitted to the Deputy Director at least six months prior to the start of the decommissioning work for review and approval. The Deputy Director may require modifications to the Diversion Decommissioning Plan(s) as part of any approval. The Diversion Decommissioning Plan(s) shall be developed in consultation with staff from USFS,

USFWS, CDFW, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Diversion Decommissioning Plan(s) and any approved amendments thereto. At a minimum, the Diversion Decommissioning Plan(s) shall include:

*(a)* Descriptions, plans, and drawings of all proposed decommissioning activities;

*(b)* Measures to protect beneficial uses of state waters from potential impacts associated with implementation of the Diversion Decommissioning Plan;

*(c)* Measures to stabilize the subject diversion sites after diversion decommissioning activities are complete;

*(d)* Details of the existing water rights associated with each of the subject diversions, and a discussion of the Licensee's proposal for the disposition of these water rights once the subject diversion structures have been decommissioned. The request for revocation or transfer of existing water rights to instream use, as applicable, shall be submitted within six months of completion of the on-the-ground decommissioning work; and

*(e)* Monitoring and reporting program that describes how the Licensee will evaluate and report on ongoing implementation of and the success of diversion decommissioning efforts, including measures implemented to protect water quality and beneficial uses.

The Licensee shall implement the Deputy Director-approved Diversion Decommissioning Plan(s) upon receipt of Deputy Director and any other required approvals.

**Table 35.** Small Water Diversion Decommissioning Milestone Timeline

| Milestone | Timeline |
|---|---|
| Submit one comprehensive or diversion-specific decommissioning plan(s) for Deputy Director review and approval. | At least six months prior to the start of decommissioning work. |
| Fully decommission Crater Creek Diversion and appurtenant facilities referenced in the Big Creek ALP Settlement Agreement, Appendix G. | No later than two years following issuance of the license(s) for the Six Big Creek Hydroelectric Projects* |
| Fully decommission Tombstone Creek Diversion and appurtenant facilities referenced in the Big Creek ALP Settlement Agreement, Appendix G. | No later than three years following issuance of the license(s) for the Six Big Creek Hydroelectric Projects* |
| Fully decommission North and South Slide Creek Diversions and appurtenant facilities referenced in the Big Creek ALP Settlement Agreement, Appendix G. | No later than four years following issuance of the license(s) for the Six Big Creek Hydroelectric Projects* |
| Fully decommission Pitman Creek and Snow Slide Creek Diversions and appurtenant facilities referenced in the Big Creek ALP Settlement Agreement, Appendix G. | No later than five years following issuance of the license(s) for the Six Big Creek Hydroelectric Projects* |
| * The Licensee shall file/request/petition the State Water Board for revocation or transfer of the water rights to instream use within six months of completion of the on-the-ground decommissioning activities associated with each diversion. | |

The Licensee may submit a request for Deputy Director approval of modification to the timelines identified in Table 35. If the Licensee anticipates that it may request modifications pursuant to this condition, the Licensee shall notify the Deputy Director as early as possible, and no later

than four months prior to the milestone timeline. The Licensee shall file the Deputy Director-approved timeline modification with FERC.

## CONDITION 8. Reservoir Water Level Management

**FERC Project Nos. 67, 2085, 2086, and 2175**

### 8(A) Reservoir Water Level Management Plan

No later than one year following issuance of license(s) for the Six Big Creek Hydroelectric Projects, the Licensee shall submit a Reservoir Water Level Management Plan (Reservoir Level Plan) to the Deputy Director for review and approval. The Deputy Director may require modifications to the Reservoir Level Plan as part of any approval. The Reservoir Level Plan shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Reservoir Level Plan and any approved amendments thereto.

At a minimum, the Reservoir Level Plan shall include:

*(a)* Shaver Lake and Florence Lake (FERC Project No. 67);

*(b)* Mammoth Pool Reservoir (FERC Project No. 2085);

*(c)* Lake Thomas Edison (FERC Project No. 2086); and

*(d)* Huntington Lake (FERC Project No. 2175).

Except as modified by this certification, the Reservoir Level Plan shall incorporate the annual reservoir water level management objectives and compliance periods contained in Section 5.5 of Appendix O in the Big Creek ALP Settlement Agreement, which are summarized in Table 36.

The Reservoir Level Plan shall include:

*(a)* The basis for the reservoir levels outlined in Table 36, including the primary function(s) of each reservoir and factors other than recreation that may influence water level management decisions, such as the Mammoth Pool Operating Agreement;

*(b)* A proposal and justification for a water surface elevation requirement at Lake Thomas Edison. If a water surface elevation requirement is determined to be necessary:

  *(i)* A proposed water surface elevation and schedule in consideration of hydroelectric generation, existing water rights, existing contracts, licenses associated with Lake Thomas Edison, and other beneficial uses of Lake Thomas Edison;

  *(ii)* A description of monitoring and reporting protocols;

  *(iii)* A description of public notification protocols;

*(c)* A management framework and criteria that will be used to guide water level management based on the factors that influence water level management decisions;

*(d)* A process for annual submittal of drawdown plans for each reservoir no later than April 15, for approval by USFS and State Water Board staff;

*(e)* Process(es) that will be used to evaluate, document, and report compliance with the Reservoir Level Plan and make updates to the Reservoir Level Plan, as appropriate;

*(f)* A summary of and reference to applicable portions of the Gaging Plan required in Condition 2 (Gaging) of this certification, including:

*(i)* Installation and maintenance of a staff gage in Huntington Lake;

*(ii)* Dissemination of reservoir level elevation information and reservoir drawdown plans;

*(iii)* A list of reservoir water level gages, as described in Table 2 of Condition 2 of this certification; and

*(g)* A summary of consultation, including comments received and how the comments were addressed.

The Licensee shall implement the approved Reservoir Level Plan as soon as practicable, but no later than one year following receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein. In the interim period between issuance of the license(s) for the Six Big Creek Hydroelectric Projects and implementation of the Deputy Director-approved Reservoir Level Plan, the Licensee shall implement: (a) the reservoir water levels in Table 36; and (b) Section 10.0 (Reservoir Water Surface Elevation Measurement) in Appendix L of the Big Creek ALP Settlement Agreement.

Each year the Licensee shall monitor reservoir levels to evaluate whether the reservoir level targets (i.e., Florence Lake levels and levels forecasted in each reservoir's drawdown plans) outlined in Table 36 will be met. If the Licensee determines that one or more reservoir level targets will not be met, the Licensee shall notify the Deputy Director at least 30 days in advance of when the Licensee projects the reservoir level target will be missed. The Licensee shall consult with staff from the State Water Board, USFS, USFWS, and CDFW to determine what can be done to notify reservoir users, and maximize access and use of the reservoirs given the low projected reservoir level(s). The Licensee shall provide documentation explaining why the reservoir level target(s) was not met and what steps the Licensee will take in the future to address the reason(s) the reservoir level target(s) was missed, as appropriate.

**Table 36.** Annual Reservoir Levels and Compliance Periods based on Big Creek ALP Settlement Agreement, Appendix O, Section 5.5

| Reservoir | Reservoir Levels | Compliance Period |
|---|---|---|
| **Big Creek Nos. 2A, 8, and Eastwood Hydroelectric Project (FERC Project No. 67)** | | |
| Florence Lake | Licensee shall target a minimum reservoir storage of 21,000 acre-feet (7,274.85 feet* above msl**) | July 1 - August 31 |
| Florence Lake | Licensee shall target a minimum reservoir storage of 1,000 acre-feet (7,230.73 feet* above msl**) | September 1 - June 30 |
| Shaver Lake | Licensee shall maintain the reservoir water surface level at the maximum elevation practical for water storage, with minimal fluctuation | Memorial Day – September 10 |
| **Mammoth Pool Hydroelectric Project (FERC Project No. 2085)** | | |
| Mammoth Pool Reservoir | Licensee shall maintain the reservoir water surface level at the maximum elevation practical for water storage, with minimal fluctuation | June 1 – September 1 |
| **Big Creek Nos. 1 and 2 Hydroelectric Project (FERC Project No. 2175)** | | |

| Reservoir | Reservoir Levels | Compliance Period |
|---|---|---|
| Huntington Lake | Licensee shall maintain the reservoir water surface level at the maximum elevation practical for water storage, with minimal fluctuation | May 1 – September 10 |
| **Vermilion Valley Hydroelectric Project (FERC Project No. 2086)** | | |
| Lake Thomas Edison | To be established in Deputy Director-approved Reservoir Level Plan after consultation with staff from USFS, CDFW, USFWS, and State Water Board | To be established in Deputy Director-approved Reservoir Level Plan after consultation with staff from USFS, CDFW, USFWS, and State Water Board |
| *The measurement indicated references the National Geodetic Vertical Datum of 1929<br>**Mean sea level | | |

### 8(B) Long-Term Reservoir Levels

After seven years of implementing the Reservoir Level Plan, the Licensee shall consult with staff from the State Water Board, USFS, USFWS, and CDFW to assess implementation of the reservoir level targets and propose long-term reservoir levels for each reservoir. The Licensee may request an extension beyond seven years if there have been insufficient water year types over the implementation period to inform long-term reservoir levels. The long-term reservoir level proposal shall be submitted to the Deputy Director for review and approval, as part of an update to the Reservoir Level Plan, no later than May 30 of the eighth year of implementing the Reservoir Level Plan (or later year specified by the Deputy Director if an extension to the timeframe for the long-term reservoir level proposal is granted). The Deputy Director may require modifications to the long-term reservoir level proposal as part of any approval. The Licensee shall file with FERC the Deputy Director-approved long-term reservoir levels. The Licensee shall implement the long-term reservoir levels for the duration of the license(s) for the Six Big Creek Hydroelectric Projects upon receipt of Deputy Director and any other required approvals.

## CONDITION 9. Whitewater Flows

**FERC Project Nos. 67, 120, 2085, and 2086**

No later than 30 days following issuance of the license(s) for the referenced Big Creek Hydroelectric Projects, the Licensee shall implement the whitewater boating flow releases in the San Joaquin River below the Mammoth Pool Dam contained in Section 5.6 in Appendix O of the Big Creek ALP Settlement Agreement (Table 37), and the whitewater flows in the South Fork San Joaquin River below the Florence Dam contained in Condition 6 of this certification. The Licensee shall also implement the stream flow data dissemination provisions for the streams listed in Table 38, as described in Section 5.5.1 in Appendix O of the Big Creek ALP Settlement Agreement. Compliance with whitewater boating flow releases shall be confirmed through the gages indicated in Condition 2 of this certification. Once the Deputy Director approves the Long-term Ramping Rates Plan required in Condition 5 of this certification, all whitewater boating flow releases shall be implemented in accordance with any applicable ramping rates.

Requests for any modification to the whitewater boating provisions contained in this certification must be submitted to the Deputy Director for review and approval. The Deputy Director may require modifications as part of any approval. The request shall be developed in consultation with staff from USFS, USFWS, CDFW, American Whitewater (AW), and the State Water Board. The Licensee shall file the Deputy Director-approved modification with FERC. The Licensee shall not implement any modified whitewater boating flow releases prior to any required approvals.

**Table 37.** Whitewater Boating Releases for San Joaquin River below Mammoth Pool Dam

| Water Year Type (Conditions) | Whitewater Boating Releases |
|---|---|
| Wet Water Years | Mammoth Pool Dam Not Spilling by April 15 (pre-spill): The Licensee shall provide continuous, controlled releases between 350 cfs and 850 cfs from April 15 until Mammoth Pool Dam begins to spill. |
| | Mammoth Pool Dam Spilling by April 15: The Licensee shall have no further obligation to provide controlled whitewater boating flows for the remainder of the year. |
| Above Normal Water Years | Mammoth Pool Dam Not Spilling by April 15: The Licensee shall provide continuous, controlled releases between 350 cfs and 850 cfs between the hours of 10:00 a.m. and 4:00 p.m. for two consecutive weekend days beginning on or after April 15. |
| | Mammoth Pool Dam Spilling by April 15: The Licensee shall have no further obligation to provide controlled whitewater boating flows for the remainder of the year. |

**Table 38.** Stream Reaches Designated for Real-time Flow Data Dissemination

| FERC Project No. | FERC Project Name | Stream Reach |
|---|---|---|
| 67 | Big Creek Nos. 2A, 8, and Eastwood Hydroelectric Project | South Fork San Joaquin River below Florence Dam |
| 67 | Big Creek Nos. 2A, 8, and Eastwood Hydroelectric Project | Stevenson Creek below Shaver Lake Dam |
| 120 | Big Creek No. 3 Hydroelectric Project | San Joaquin River below Dam 6 |
| 2085 | Mammoth Pool Hydroelectric Project | San Joaquin River below Mammoth Pool Reservoir |
| 2086 | Vermilion Valley Hydroelectric Project | Mono Creek between Vermilion Valley Dam and Mono Creek Diversion |

## CONDITION 10. Erosion and Sediment Control – Warm Creek Diversion Channel (Vermilion Valley Hydroelectric Project)

**FERC Project No. 2086**

No later than nine months following issuance of the license for the Vermilion Valley Hydroelectric Project, the Licensee shall submit an Erosion and Sediment Control Plan for the Warm Creek Diversion Channel Corridor (Warm Creek Erosion Plan) to the Deputy Director for review and approval. The Deputy Director may require modifications to the Warm Creek Erosion Plan as part of any approval. The Warm Creek Erosion Plan shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Warm Creek Erosion Plan and any approved amendments thereto. The objectives of the Warm Creek Erosion Plan shall be to: (a) inventory and characterize erosion and sedimentation sites in the Warm Creek diversion channel corridor; and (b) develop erosion and sediment control measures that will be implemented to reduce sediment delivery to the diversion channel and adjoining waters (i.e., Warm Creek and Boggy Meadow Creek).

At a minimum, the Warm Creek Erosion Plan shall include:

*(a)* Area covered by and objectives of the effort;

*(b)* Maps, photographs, and descriptions of environmental conditions and drainage patterns in the area;

*(c)* An inventory and characterization of erosion and sedimentation sites that includes:

*(i)* Detailed information on each erosion and sedimentation site identified in the area, with maps and photographs;

*(ii)* Estimates of erosion and sedimentation rates for each site, and a description of method(s) used to determine the estimates;

*(iii)* Descriptions of factors contributing to erosion and sedimentation at each site, and an analysis of whether the erosion and sedimentation at each site is project- and/or non-project related; and

*(iv)* Measures that will be implemented to address project-related erosion and sedimentation, including best management practices the Licensee will implement to protect water quality and beneficial uses during implementation and maintenance of the erosion and sediment control measures;

*(d)* A prioritized list and schedule for implementation of erosion and sediment control measures. Unless otherwise approved in the Deputy Director-approved Warm Creek Erosion Plan, priority should be based on sites with the highest potential to negatively affect water quality and beneficial uses;

*(e)* A monitoring and reporting program that describes how the Licensee will evaluate and report on the success of the Warm Creek Diversion Channel stabilization effort. The program shall include criteria that will be used to evaluate the performance and success of the implemented erosion and sediment control measures, as well as a proposed timeline for the monitoring and reporting; and

*(f)* A summary of consultation, including comments received and how the comments were addressed.

The Licensee shall implement the Deputy Director-approved Warm Creek Erosion Plan within six months of receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein. The Licensee shall submit annual progress reports to the Deputy Director until implementation of all erosion and sediment control measures are successfully implemented and stabilized.

## CONDITION 11. Gravel Augmentation Program – Mammoth Pool Bypass Reach (Mammoth Pool Hydroelectric Project)

**FERC Project No. 2085**

The Licensee shall develop and implement a Gravel Augmentation Program (Gravel Program) for the bypass reach of the San Joaquin River located downstream of Mammoth Pool Reservoir (Mammoth Pool Bypass Reach[36]). The Gravel Program includes three phases: a gravel augmentation feasibility assessment; a pilot gravel augmentation project; and long-term gravel augmentation.

### 11(A) Phase 1 – Gravel Augmentation Feasibility Assessment

The Licensee shall implement Phase 1 of the Gravel Program to assess the feasibility of gravel augmentation in the Mammoth Pool Bypass Reach. Except as modified by this certification, the Phase 1 Gravel Feasibility Assessment (Feasibility Assessment) shall be developed and implemented in accordance with Section 1.2 in Appendix B of the Big Creek ALP Settlement Agreement. The Feasibility Assessment, including development of the Gravel Augmentation Feasibility Report (outlined below), shall be implemented in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The primary objective of the Feasibility Assessment shall be to evaluate the feasibility of gravel augmentation at one or more locations in the Mammoth Pool Bypass Reach based on site accessibility, cost, dam safety, operational and maintenance considerations, direct and indirect effects on water quality and the environment, and other relevant factors identified during the consultation process. Feasibility assessment activities shall be performed during the construction activities associated with modification of the flow release facilities for the Mammoth Pool Dam (Condition 1 of this certification, Table 2, San Joaquin River [Mammoth Pool Dam to Dam 6][37]).

Within six months of completion of field assessment activities and no later than six years following issuance of the license for the Mammoth Pool Hydroelectric Project, unless otherwise authorized by the Deputy Director, the Licensee shall submit a Gravel Augmentation Feasibility Report (Gravel Feasibility Report) to the Deputy Director for review and approval. The Deputy Director may require modifications to the Gravel Feasibility Report as part of any approval. The Gravel Feasibility Report shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Gravel Feasibility Report and any approved amendments thereto.

At a minimum, the Gravel Feasibility Report shall include the following:

[36] The Mammoth Pool Bypass Reach extends from the Mammoth Pool Dam spillway, continues into the spillway channel, and for the purposes of this condition, extends to just downstream of the confluence of Rock Creek with the San Joaquin River.

[37] The deadline for installation of the water control infrastructure improvements is no later than five years following issuance of the license for the Mammoth Pool Hydroelectric Project.

*(a)* Description of the methodology and/or criteria used to identify, characterize, and delineate candidate gravel augmentation sites;

*(b)* Description of the criteria used to assess the feasibility of gravel placement at each candidate gravel augmentation site, including supporting rationale;

*(c)* Maps, photographs, and descriptions of candidate gravel augmentation sites, as well as relevant environmental conditions;

*(d)* Feasibility assessment for each candidate site, including a relative ranking of candidate sites based on overall feasibility;

*(e)* Summary of consultation, including comments received during consultation and how the comments were addressed; and

*(f)* Recommendation for implementation of one or more pilot gravel augmentation projects based on the results of the Feasibility Assessment. If a pilot gravel augmentation project(s) is not recommended, the Gravel Feasibility Report shall explain the infeasibility.

If Deputy Director approval of the Gravel Feasibility Report includes implementation of a pilot gravel augmentation project, the Licensee shall implement Phase 2 – Pilot Gravel Augmentation Project.

If, as part of review and approval of the Gravel Feasibility Report, the Deputy Director determines that implementation of a pilot gravel augmentation project is not feasible, the Licensee shall make funds available to CDFW to augment its fish stocking program (Condition 21 of this certification) on the Mammoth Pool Bypass Reach. The funding amount shall be sufficient for appropriate fish stocking levels, as determined by CDFW, and cover costs up to 300 tons of gravel. Mammoth Pool Bypass Reach fish stocking shall occur within one year of receipt of Deputy Director and any other required approvals and annually thereafter for the term of the new Mammoth Pool Hydroelectric Project license and any extensions thereto.

**11(B) Phase 2 - Pilot Gravel Augmentation Project**

Except as modified by this certification, the scope of the Pilot Gravel Augmentation Project (Pilot Project) shall be consistent with Section 1.2 in Appendix B of the Big Creek ALP Settlement Agreement. The objective of the Pilot Project is to evaluate the effects of gravel augmentation on gravel distribution, spawning habitat, and trout recruitment in the Mammoth Pool Bypass Reach. The Licensee shall place at least 300 tons of gravel at the location(s) identified in the approved Gravel Feasibility Report and monitor gravel transport and distribution to evaluate whether in the next two Above Normal or Wet Water Year spill events[38] gravel moves from the placement location(s) into the Mammoth Pool Bypass Reach. The Licensee shall begin implementation of the Pilot Project as soon as practicable, but:

*(a)* No sooner than completion of the first fish monitoring event (Condition 18 of this certification)[39] conducted following installation and one year of operation of the new water control infrastructure for the Mammoth Pool Dam to Dam 6 reach (Condition 2 of

[38] Refers to spill events from Mammoth Pool Dam with a peak flow of at least 5,000 cfs.

[39] The Deputy Director reserves the right to require an additional fish monitoring event as necessary to avoid delays in implementation of the Pilot Project.

this certification) that provide the MIFs outlined in Table 18 (Condition 3 of this certification)[40]; and

*(b)* No later than seven years following issuance of the license for the Mammoth Pool Hydroelectric Project, unless otherwise authorized by the Deputy Director in writing.

The Licensee shall implement water quality protection measures identified in the Deputy Director-approved Gravel Feasibility Report. Monitoring shall consist of visual observations and photo documentation to determine that gravels have been transported from the initial placement location(s) into the Mammoth Pool Bypass Reach. The Pilot Project may be considered successful if, after two spill events, more than 50 percent of the gravel has moved downstream into the Mammoth Pool Bypass Reach from the placement location(s).

Within six months of completing gravel movement monitoring following the second spill event, the Licensee shall submit a Pilot Gravel Augmentation Project Report (Pilot Project Report) to the Deputy Director for review and approval. The Deputy Director may require modifications to the Pilot Project Report as part of any approval. Except as modified by this certification, the Pilot Project Report shall be developed in accordance with the provisions described in Section 1.2 in Appendix B of the Big Creek ALP Settlement Agreement and in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Pilot Project Report and any approved amendments thereto.

At a minimum, the Pilot Project Report shall include:

*(a)* Relevant background material from the Gravel Feasibility Report, including the Pilot Project objectives;

*(b)* A summary of the Licensee's implementation of the Gravel Feasibility Report and Pilot Project that includes:

*(i)* Gravel placement location(s);

*(ii)* Maps, photos, and drawings related to implementation of the Pilot Project;

*(iii)* Measures implemented to protect water quality and beneficial uses;

*(iv)* Summary of monitoring activities and results;

*(c)* Summary of consultation, including comments received and how the comments were addressed;

*(d)* Conclusions and supporting rationale regarding the level of success of the Pilot Project; and

*(e)* Recommendations regarding implementation of ongoing gravel augmentation in the Mammoth Pool Bypass Reach or the need for additional studies or pilot projects.

*(i)* If ongoing gravel augmentation is recommended, the Licensee shall provide a plan for implementation of a long-term gravel augmentation program; and

*(ii)* If ongoing gravel augmentation is not recommended, the Licensee shall document the rationale for this determination.

[40] Prior to installation of new water control infrastructure, the Licensee shall make a good faith effort to provide the specified MIF (Condition 3 of this certification) and document compliance using existing infrastructure and flow monitoring equipment.

If Deputy Director approval of the Pilot Project Report includes implementation of a long-term gravel augmentation program, the Licensee shall implement Phase 3 – Long-Term Gravel Augmentation.

If, as part of review and approval of the Pilot Project Report, the Deputy Director determines implementation of a long-term gravel augmentation program is not appropriate, the Licensee shall make funds available to CDFW to augment its fish stocking program (Condition 21 of this certification) on the Mammoth Pool Bypass Reach. The funding amount shall be sufficient for appropriate fish stocking levels, as determined by CDFW, and cover costs up to 300 tons of gravel. Mammoth Pool Bypass Reach fish stocking shall occur within one year of receipt of Deputy Director and any other required approvals and annually thereafter for the term of the new Mammoth Pool Hydroelectric Project license and any extensions thereto.

**11(C) Phase 3 – Long-Term Gravel Augmentation**

Within six months of receiving Deputy Director approval of the Pilot Project Report, which includes recommendations for implementation of a long-term gravel augmentation program, the Licensee shall submit a Long-Term Gravel Augmentation Plan (Long-Term Gravel Plan) for the Mammoth Pool Bypass Reach to the Deputy Director for review and approval. The Deputy Director may require modifications to the Long-Term Gravel Plan as part of any approval. The scope and content of the Long-Term Plan shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Long-Term Gravel Plan and any approved amendments thereto.

The Long-Term Gravel Plan shall detail the Licensee's plan to implement a gravel augmentation program over the term of the license and any extensions thereto. The Long-Term Gravel Plan shall be developed based on the results of Phase 2 and other relevant factors identified during consultation.

At a minimum, the Long-Term Gravel Plan shall include:

*(a)* Objectives and relevant background material from Phase 1 and Phase 2 of the Gravel Program;

*(b)* Maps, plans, drawings, and implementation schedules for gravel augmentation in the Mammoth Pool Bypass Reach;

*(c)* A monitoring and reporting program that describes how the Licensee will evaluate and report on the success of gravel augmentation actions. The program shall include criteria that can be used to evaluate project performance and success;

*(d)* Measures that will be taken to protect water quality and beneficial uses during implementation of the Long-Term Gravel Plan, including information on actions that will be implemented to monitor, document, and report on the performance of the measures;

*(e)* Summary of consultation, including and comments received during consultation and how the comments were addressed; and

*(f)* How coordination will be conducted regarding ongoing implementation of the Long-Term Gravel Plan.

The Licensee shall implement the Long-Term Gravel Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein. Unless otherwise authorized by the Deputy Director, the approved Long-Term Gravel

Plan shall remain in effect for duration of the Mammoth Pool Hydroelectric Project license and any extensions thereto.

## CONDITION 12. Sediment Management

**FERC Project Nos. 67, 120, 2085, 2174, and 2175**

No later than two years following issuance of the license(s) for the referenced Big Creek Hydroelectric Projects, the Licensee shall submit to the Deputy Director for review and approval a Sediment Management Plan (Sediment Plan) for the following five of the Six Big Creek Hydroelectric Projects:

*(a)* Big Creek Nos. 2A, 8, and Eastwood Hydroelectric Project (FERC Project No. 67)

*(b)* Big Creek No. 3 Hydroelectric Project (FERC Project No. 120)

*(c)* Mammoth Pool Hydroelectric Project (FERC Project No. 2085)

*(d)* Portal Hydroelectric Project (FERC Project No. 2174)

*(e)* Big Creek Nos. 1 and 2 Hydroelectric Project (FERC Project No. 2175)

The Deputy Director may require modifications to the Sediment Plan as part of any approval. The Sediment Plan shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Sediment Plan and any approved amendments thereto. The primary objective of the Sediment Plan shall be to facilitate sediment pass-through or removal at project dams and diversions, while minimizing associated impacts on water quality and aquatic habitat.

Except as modified by this certification, the Sediment Plan shall incorporate elements of the Sediment Management Prescriptions described in Appendix J of the Big Creek ALP Settlement Agreement.

At a minimum, the Sediment Plan shall include:

*(a)* Goals and objectives;

*(b)* Description of existing project facilities related to sediment management;

*(c)* Background information on sediment accumulation and associated operational issues (e.g., accumulation of sediment behind dams may block the low-level outlet valves or intake structures);

*(d)* Description of proposed sediment management actions (e.g., sediment pass-through, sediment removal and disposal), including facilities (outlet capacities and locations), and equipment that will be used;

*(e)* Description of monitoring and reporting program that describes how and when the Licensee will evaluate and report on the success of sediment management actions. The program shall include criteria to evaluate performance and success;

*(f)* Measures the Licensee will implement to protect water quality and beneficial uses during implementation of the sediment management actions identified in Table 40 and the Sediment Plan;

*(g)* Implementation schedule;

*(h)* A summary of consultation, including comments received and how the comments were addressed; and

*(i)* A description of the process that will be used to adaptively manage sediment management and updates to the Sediment Plan throughout the term of the FERC license(s).

The Licensee shall implement the Sediment Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein. Unless otherwise approved by the Deputy Director as part of review and approval of the Sediment Plan, the Licensee shall implement the sediment actions and schedules presented in Table 39. During development and review of the Sediment Plan, the Licensee shall not implement any sediment management actions without prior written approval from the Deputy Director.

**Table 39.** Schedule for Sediment Management Actions

| Project Name and FERC Project No. | Project Facility | Sediment Management Actions | Implementation Schedule |
|---|---|---|---|
| Big Creek Nos. 2A, 8, and Eastwood Hydroelectric Project (FERC Project No. 67) | Balsam Creek Diversion<br>Bolsillo Creek Diversion<br>Camp 62 Creek Diversion<br>Chinquapin Creek Diversion<br>Hooper Creek Diversion<br>Pitman Creek Diversion | SPT and SRD | SPT – annually during spring runoff in Wet water years**<br><br>SRD – annually as needed during periods of low flow in spring or fall |
| | Dam 5 Forebay | SPT and SRD | SPT – no later than five years following issuance of the license(s) for the Six Big Creek Hydroelectric Projects (between January 1 and March 31), and every five years thereafter<br><br>SRD – no later than five years following issuance of the license(s) for the Six Big Creek Hydroelectric Projects, and every five years thereafter, as needed |
| | Mono Creek Diversion | SRD | SRD – inspection of sediment accumulation behind diversion structure no later than five years following issuance of the license(s) for the Six Big Creek Hydroelectric Projects and every five years thereafter; sediment removal as needed in Wet water years** prior to implementation of CRMFs* |

| Project Name and FERC Project No. | Project Facility | Sediment Management Actions | Implementation Schedule |
|---|---|---|---|
| | Balsam Meadow Dam Forebay | SRD and SPT | SRD – inspection of sediment accumulation behind dam structure no later than five years following issuance of the license(s) for the Six Big Creek Hydroelectric Projects, and every five years thereafter; sediment removal as needed during fall<br><br>SPT – as needed following SRD operations and implementation of CRMFs* |
| Big Creek No. 3 Hydroelectric Project (FERC Project No. 120) | Dam 6 Forebay | SPT and SRD | SPT – at least every five years (between January 31 and March 1) beginning the year following implementation of sediment actions at Dam 4 Forebay and Dam 5 Forebay<br><br>SRD – inspection of sediment behind dam structure beginning the year following implementation of sediment actions at Dam 4 Forebay and Dam 5 Forebay; sediment removal as needed following inspection |
| Mammoth Pool Hydroelectric Project (FERC Project No. 2085) | Ross Creek and Rock Creek | SPT and SRD | SPT – annually during spring runoff in Wet water years**<br><br>SRD – annually as needed during periods of low flow in spring or fall |
| | Mammoth Pool Reservoir | SPT | SPT – during release of whitewater boating flows in Wet water years** |
| Portal Hydroelectric Project (FERC Project No. 2174) | Portal Dam Forebay | SRD | SRD - inspection of sediment accumulation behind dam structure no later than five years following issuance of the license(s) for the Six Big Creek Hydroelectric Projects and at least every five years thereafter; sediment removal and disposal following inspection, as needed |
| Big Creek Nos. 1 and 2 Hydroelectric Project | Ely Creek Diversion | SPT and SRD | SPT – annually during spring runoff in Wet water years**<br><br>SRD – annually as needed during periods of low flow in spring or fall |

| Project Name and FERC Project No. | Project Facility | Sediment Management Actions | Implementation Schedule |
|---|---|---|---|
| (FERC Project No. 2175) | Dam 4 Forebay | SPT | SPT – no later than five years following issuance of the license(s) for the Six Big Creek Hydroelectric Projects and at least every five years thereafter |
| SPT = *Sediment Pass Through*<br>SRD = *Sediment Removal and Disposal*<br>* CRMFs = *Channel and Riparian Maintenance Flows* (See Condition 6 of this certification)<br>** Water years are outlined in Condition 1 of this certification | | | |

## CONDITION 13. Dam Seepage Remediation – Camp 61 Creek (Portal Hydroelectric Project)

**FERC Project No. 2174**

As part of the Portal Hydroelectric Project, the Licensee shall develop and implement a Dam Seepage Remediation and Monitoring Program for Camp 61 Creek (Camp 61 Remediation Program). The goal of the Camp 61 Remediation Program shall be to collect, treat, and monitor seepage effluent coming from Portal Forebay Dam and appurtenant facilities as necessary to ensure compliance with Basin Plan water quality objectives, including but not limited to: iron, manganese, dissolved oxygen, temperature, settleable solids, suspended solids, turbidity, and other constituents of concern. The Camp 61 Remediation Program shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board, in accordance with the phased planning and implementation sequence described below.

### 13(A) Phase 1 – Concept Design Alternatives Report

No later than 30 months following issuance of the license for the Portal Hydroelectric Project, the Licensee shall submit a Dam Seepage Remediation Concept Design Alternatives Report for Camp 61 Creek (Camp 61 Phase 1 Report) to the Deputy Director for review and approval. The Deputy Director may require modifications to the Camp 61 Phase 1 Report as part of any approval. The Camp 61 Phase 1 Report shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Camp 61 Phase 1 Report and any approved amendments thereto. The Camp 61 Phase 1 Report shall include a minimum of two seepage remediation concept design alternatives. At least one concept design alternative shall be the use of passive biological treatment systems, such as constructed wetlands.

At a minimum, the Camp 61 Phase 1 Report shall include:

*(a)* A statement of goals and objectives;

*(b)* Maps, drawings, photos, and descriptions of relevant environmental conditions, including seepage sites, seepage rates, and Portal Hydroelectric Project facilities used to collect and convey seepage effluent;

*(c)* A summary of available water quality and bioassessment data for seepage effluent, and Camp 61 Creek;

*(d)* Descriptions, maps, and conceptual drawings of proposed design alternatives;

*(e)* Analysis of the probable effectiveness of each design alternative based on a review of relevant scientific literature, pilot or bench-scale studies, and/or rationale and supporting calculations;

*(f)* Description of how water quality will be protected and monitored with implementation of each design alternative presented;

*(g)* Estimated schedule and cost for the design, construction, operation, and maintenance of each design alternative; and

*(h)* The Licensee's recommended alternative for implementation, including: (a) the basis for the selection; (b) comments received during consultation regarding the selection of a preferred alternative and other aspects of the Camp 61 Phase 1 Report; and (c) responses to comments.

**13(B) Phase 2 – Dam Seepage Remediation Plan**

Within two years of Deputy Director approval of the Camp 61 Phase 1 Report, the Licensee shall submit a Dam Seepage Remediation and Monitoring Plan for Camp 61 Creek (Camp 61 Phase 2 Plan) to the Deputy Director for review and approval. The Deputy Director may require modifications to the Camp 61 Phase 2 Plan as part of any approval. The Camp 61 Phase 2 Plan shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Camp 61 Phase 2 Plan and approved amendments thereto.

The Camp 61 Phase 2 Plan shall be developed for the design alternative identified in the Deputy Director's approval of the Camp 61 Phase 1 Report.

At a minimum, the Camp 61 Phase 2 Plan shall include:

*(a)* A statement of goals and objectives;

*(b)* Relevant environmental and conceptual design information from the Camp 61 Phase 1 Report;

*(c)* Construction schedule, design, and specifications (90-100% complete) for the Deputy Director-approved design alternative;

*(d)* Remediation implementation schedule;

*(e)* Description of anticipated maintenance;

*(f)* Measures that will be taken to protect water quality and beneficial uses during construction, operation, and maintenance activities;

*(g)* A monitoring and reporting program that describes how and when the Licensee will evaluate and report on the performance of dam seepage remediation efforts. The program shall include measurable criteria to evaluate the performance of the dam seepage remediation system. The monitoring program shall include a benthic macroinvertebrate (BMI) bioassessment based on current standard bioassessment procedures, quality assurance provisions, and data reporting requirements established by the State Water Board's Surface Water Ambient Monitoring Program (SWAMP) or its successor program, or an alternative methodology approved by the Deputy Director as part of review and approval of the Camp 61 Phase 2 Plan. In addition, the Licensee shall use the California Stream Condition Index (CSCI) and/or the hydropower-specific

multi-metric index of biotic integrity (Hydropower IBI) developed by Rehn (2009),[41] as the primary basis for analysis and interpretation of BMI data sets, unless an alternative methodology is approved by the Deputy Director as part of review and approval of the Camp 61 Phase 2 Plan;

*(h)* An adaptive management process to evaluate, propose, and implement modifications to the seepage remediation efforts or monitoring and reporting provisions throughout the duration of the Portal Hydroelectric Project license and any extensions. The Licensee shall provide background and supporting information for modifications proposed as adaptive management. Modifications to monitoring and reporting provisions shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board and shall be based on documentation demonstrating compliance with Basin Plan objectives and BMI objectives;

*(i)* A summary of consultation, including comments received and how the comments were addressed; and

*(j)* Reporting of water quality and BMI monitoring results to State Water Board staff, and upload of BMI data to the California Environmental Data Exchange Network (CEDEN) or a successor database within six months of collection.

The Licensee shall implement the Camp 61 Phase 2 Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein. The Licensee shall begin the monitoring specified in the Camp 61 Phase 2 Plan within 60 days of commencing operation of the remediation system.

## CONDITION 14. Stream Stabilization and Seepage Remediation – Adit 2 Creek (Portal Hydroelectric Project)

**FERC Project No. 2174**

As part of the Portal Hydroelectric Project, the Licensee shall develop and implement a Stream Stabilization and Seepage Remediation Program for Adit 2 Creek (Adit 2 Remediation Program). The goals of the Adit 2 Remediation Program shall be to: (a) stabilize the bed and bank of Adit 2 Creek to reduce erosion and sediment delivery to downstream receiving waters; and (b) treat and monitor seepage coming from Adit 2 and other appurtenant facilities as necessary to ensure compliance with Basin Plan water quality objectives, including iron, manganese, dissolved oxygen, temperature, settleable solids, suspended solids, and turbidity. The Adit 2 Remediation Program shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board, in accordance with the phased planning and implementation sequence described below.

### 14(A) Phase 1 - Design Alternatives Report

No later than 30 months following issuance of the license for the Portal Hydroelectric Project, the Licensee shall submit a Stream Stabilization and Seepage Remediation Design Alternatives Report (Adit 2 Phase 1 Report) for Adit 2 Creek to the Deputy Director for review and approval. The Deputy Director may require modifications to the Adit 2 Phase 1 Report as part of any approval. The Adit 2 Phase 1 Report shall be developed in consultation with staff from USFS,

[41] Rehn, A.C. 2009. Benthic macroinvertebrates as indicators of biological condition below hydropower dams on west slope Sierra Nevada streams, California, USA. River Research and Applications. 25: 208-228.

USFWS, CDFW, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Adit 2 Phase 1 Report and any approved amendments thereto.

At a minimum, the Adit 2 Phase 1 Report shall include:

*(a)* A statement of goals and objectives;

*(b)* The following information to address stream stabilization:

*(i)* Maps, drawings, photos, and description of relevant environmental conditions and erosion sites;

*(ii)* A summary of available water quality information with regards to stream stabilization for Adit 2 Creek;

*(iii)* Descriptions, maps, and conceptual drawings of proposed alternatives for stream stabilization;

*(iv)* Analysis of the probable effectiveness of each stream stabilization alternative; and

*(v)* Estimated schedule and cost for the design, construction, operation, and maintenance of each stream stabilization alternative.

*(c)* The following information to address seepage:

*(i)* Maps, drawings, photos, and descriptions of relevant environmental conditions, including seepage sites, seepage rates, and the Portal Hydroelectric Project facilities used to collect and convey seepage effluent;

*(ii)* A summary of available water quality and bioassessment data with regard to seepage effluent for Adit 2 Creek to identify the location and cause of water quality problems;

*(iii)* A minimum of two seepage remediation design alternatives. At least one of the seepage remediation design alternatives shall be use of passive biological seepage treatment systems, such as constructed wetlands.

*(iv)* Descriptions, maps, and conceptual drawings of proposed alternatives for seepage remediation;

*(v)* Analysis of the probable effectiveness of each seepage remediation design alternative based on a review of relevant scientific literature, pilot or bench-scale studies, and/or rationale and supporting calculations; and

*(vi)* Estimated schedule and cost for the design, construction, operation, and maintenance of each seepage remediation alternative.

*(d)* Description of how water quality will be protected and monitored during implementation and operation for each of the stream stabilization and seepage remediation alternative presented;

*(e)* The Licensee's recommended seepage remediation and soil stabilization alternatives proposed for implementation, including: (a) the basis for the selection; (b) comments received during consultation regarding the selection of a preferred alternative and other aspects of the Adit 2 Phase 1 Report; and (c) responses to comments.

**14(B) Phase 2 – Stream Stabilization and Seepage Remediation Plan**

Within two years of Deputy Director approval of the Adit 2 Phase 1 Report, the Licensee shall submit a Stream Stabilization and Seepage Remediation Plan for Adit 2 Creek (Adit 2 Phase 2

Plan) to the Deputy Director for review and approval. The Deputy Director may require modifications to the Adit 2 Phase 2 Plan as part of any approval. The Adit 2 Phase 2 Plan shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Adit 2 Phase 2 Plan and any approved amendments thereto.

The Adit 2 Phase 2 Plan shall be developed for the soil stabilization and seepage remediation alternatives identified in the Deputy Director's approval of the Adit 2 Phase 1 Report.

At a minimum, the Adit 2 Phase 2 Plan shall include:

*(a)* A statement of goals and objectives;

*(b)* The following information for the recommended stream stabilization alternative and the recommended seepage remediation alternative from the Deputy Director-approved Adit 2 Phase 1 Report:

*(i)* Relevant environmental and conceptual design information from the Adit 2 Phase 1 Report;

*(ii)* A construction schedule and design specifications (90-100% complete) for the Deputy Director-approved alternatives;

*(iii)* Implementation schedule;

*(iv)* Description of anticipated maintenance;

*(v)* Measures that will be taken to protect water quality and beneficial uses during construction, operation, and maintenance activities;

*(vi)* A monitoring and reporting process that describes how the Licensee will evaluate and report on the performance of stream stabilization and dam seepage remediation efforts. The program shall include measurable criteria to evaluate the performance of the stream stabilization and seepage remediation measures.

*(c)* A monitoring program for the seepage remediation alternative that includes a BMI bioassessment component based on current standard procedures, quality assurance provisions, and data reporting requirements established by the SWAMP or its successor program, or an alternative methodology approved by the Deputy Director as part of review and approval of the Adit 2 Phase 2 Plan. In addition, the Licensee shall use the CSCI and/or the Hydropower IBI developed by Rehn (2009),[42] as the primary basis for analysis and interpretation of BMI data sets, unless an alternative methodology is approved by the Deputy Director as part of review and approval of the Adit 2 Phase 2 Plan;

*(d)* An adaptive management process to evaluate, propose, and implement modifications to the stream stabilization measures, seepage remediation efforts, or monitoring and reporting provisions throughout the duration of the Portal Hydroelectric Project license and any extensions. The Licensee shall provide background and supporting information for modifications proposed as adaptive management. Modifications to monitoring and reporting provisions shall be based on documentation demonstrating compliance with Basin Plan and/or BMI objectives;

[42] Rehn, A.C. 2009. Benthic macroinvertebrates as indicators of biological condition below hydropower dams on west slope Sierra Nevada streams, California, USA. River Research and Applications. 25: 208-228.

*(e)* A summary of consultation, including comments received and how the comments were addressed; and

*(f)* Reporting of water quality and BMI monitoring results to State Water Board staff, and upload of BMI data to CEDEN or a successor database within six months of collection.

The Licensee shall implement the Adit 2 Phase 2 Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein. The Licensee shall begin implementation of the monitoring specified in the Adit 2 Phase 2 Plan within 60 days of completing construction of the stream stabilization measures and commencing operation of the seepage remediation system, respectively.

## CONDITION 15. Dam Seepage Assessment and Remediation – Mono Creek (Vermilion Valley Hydroelectric Project)

**FERC Project No. 2086**

No later than 30 months following issuance of the license for the Vermilion Valley Hydroelectric Project, the Licensee shall submit a Dam Seepage Assessment and Water Quality Monitoring Plan for the Vermilion Valley Hydroelectric Project (Vermilion Seepage Plan), to the Deputy Director for review and approval. The goals of the Vermilion Seepage Plan are to characterize seepage effluent and potential impacts to water quality, and to inform the development of a seepage remediation plan if deemed necessary. The Vermilion Seepage Plan shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Deputy Director may require modifications to the Vermilion Seepage Plan as part of any approval. The Licensee shall file with FERC the Deputy Director-approved Vermilion Seepage Plan and any approved amendments thereto.

At a minimum, the Vermilion Seepage Plan shall include:

*(a)* A description of goals and objectives;

*(b)* Maps, drawings, photos, summary descriptions of relevant environmental conditions and information for the area, including seepage sources; and current seepage rates and volumes;

*(c)* A description of the Vermilion Valley Hydroelectric Project facilities used to collect and convey seepage effluent;

*(d)* Existing water quality and bioassessment monitoring data for Mono Creek below Vermilion Valley Dam;

*(e)* An assessment and characterization of the sources, discharge rates, and chemistry of seepage effluent emanating from the Vermilion Valley Dam and appurtenant facilities, including the network of conveyances used to collect and discharge the seepage effluent to Mono Creek. The assessment shall include an evaluation of: (a) existing water quality and BMI monitoring data (iv above) and (b) the effects of the seepage effluent on water quality in seepage conveyances, Mono Creek, and other receiving waters. The Licensee shall use the CSCI and/or Hydropower IBI developed by Rehn (2009),[43] as the primary basis for analysis and interpretation of BMI data sets, unless an alternative

[43] Rehn, A.C. 2009. Benthic macroinvertebrates as indicators of biological condition below hydropower dams on west slope Sierra Nevada streams, California, USA. River Research and Applications. 25: 208-228.

methodology is approved by the Deputy Director as part of review and approval of the Vermilion Seepage Plan;

*(f)* A proposal for water quality and BMI monitoring for a minimum of three years, or other timeframe approved by the Deputy Director as part of review and approval of the Vermilion Seepage Plan. The proposal shall include: (a) a monitoring schedule; (b) use of current standard SWAMP or other Deputy Director-approved BMI and water quality monitoring procedures; and (c) quality assurance and quality control provisions. At a minimum, BMI monitoring locations shall be consistent with the approach detailed in the Vermilion Valley Leakage Channel Macroinvertebrate Study Plan in Appendix B of the Big Creek ALP Settlement Agreement. In addition, the following two locations shall be added to the BMI monitoring program: (1) a location upstream of Lake Thomas Edison and (2) a site immediately below the outflow of the drainage system that controls seepage passing through Vermilion Valley Dam.

*(g)* A summary of consultation, including comments received and how the comments were addressed; and

*(h)* Reporting of water quality and BMI monitoring results to State Water Board staff, and upload of BMI data to the CEDEN or a successor database within six months of collection.

The Licensee shall implement the Vermilion Seepage Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

Within six months of concluding the Vermilion Seepage Plan monitoring program the Licensee shall submit a Vermilion Seepage Report to the Deputy Director for review and approval. The Deputy Director may require modifications to the Vermilion Seepage Report as part of any approval. The Vermilion Seepage Report shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Licensee shall file the Deputy Director-approved Vermilion Seepage Report with FERC. The Vermilion Seepage Report shall: (i) summarize and assess the data and information gathered through implementation of the Vermilion Seepage Plan and other relevant information; and (ii) provide the Licensee's determination and supporting rationale regarding whether or not seepage remediation and/or long-term water quality monitoring is necessary and feasible to protect water quality.

If Deputy Director approval of the Vermilion Seepage Report includes implementation of seepage remediation and/or long-term water quality monitoring, the Licensee shall submit a Vermilion Long-Term Seepage Implementation Plan (Vermilion Long-Term Seepage Plan) to the Deputy Director for review and approval within two years of receiving Deputy Director approval of the Vermilion Seepage Report. The Deputy Director may require modifications to the Vermilion Long-Term Seepage Plan as part of any approval. The Vermilion Long-Term Seepage Plan shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Vermilion Long-Term Seepage Plan and any approved amendments thereto. The Licensee shall implement the Vermilion Long-Term Seepage Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

At a minimum, the Vermilion Long-Term Seepage Plan shall include:

*(a)* A statement of goals and objectives;

*(b)* For seepage remediation, include:

*(i)* Relevant information from the Vermilion Seepage Report that provides background and support for the plan;

*(ii)* The Licensee's recommended alternative for implementation and a summary of other alternatives considered by the Licensee with supporting information for why the selected seepage remediation alternative was chosen;

*(iii)* A description, maps, and drawings of the proposed design alternatives;

*(iv)* An analysis of the probable effectiveness of the recommended and other design alternative(s) based on a review of relevant scientific literature, pilot or bench-scale studies, and/or rationale and supporting calculations;

*(v)* A description of how water quality and beneficial uses will be protected and monitored during implementation of the recommended alternative that includes construction, operation, and maintenance activities;

*(vi)* An estimated schedule and cost for the design, construction, operation, and maintenance of the recommended alternative;

*(vii)*Comments received during consultation regarding the selection of a recommended alternative and other aspects of the Vermilion Long-Term Seepage Plan, and responses to comments;

*(viii)* A description of anticipated maintenance for the recommended alternative;

*(ix)* A monitoring and reporting program that describes how and when the Licensee will evaluate and report on the performance of dam seepage remediation efforts. The program shall include measurable criteria to evaluate the performance of the dam seepage remediation system. The monitoring program shall include BMI monitoring based on current standard procedures, quality assurance provisions, and data reporting requirements established by the State Water Board's SWAMP or its successor program, or an alternative methodology approved by the Deputy Director as part of review and approval of the Vermilion Long-Term Seepage Plan; and

*(x)* An adaptive management process to evaluate, propose, and implement modifications to the seepage remediation efforts or monitoring and reporting provisions throughout the duration of the Vermilion Hydroelectric Project license and any extensions. The Licensee shall provide background and supporting information for modifications proposed as adaptive management. Modifications to monitoring and reporting provisions shall be based on documentation demonstrating compliance with Basin Plan objectives and BMI objectives;

*(c)* For long-term seepage monitoring include:

*(i)* A proposed seepage monitoring program that includes constituents that will be monitored, sampling frequency, locations that will be monitored, and quality assurance and quality control measures; and

*(ii)* A reporting and adaptive management program that describes how and when the Licensee will evaluate, report, and propose modifications to the long-term seepage monitoring program. The Licensee shall provide background and supporting information for modifications proposed under adaptive management.

The Deputy Director may require implementation of the planning and approval process outlined in (ii) of the Long-Term Seepage Plan section if monitoring results indicate seepage remediation is necessary to address water quality violations related to seepage.

## CONDITION 16. Riparian Areas

**FERC Project Nos. 67, 120, 2085, 2174, and 2175**

No later than one year following issuance of the license(s) for the referenced Big Creek Hydroelectric Projects, the Licensee shall implement the Riparian Monitoring Plan (Riparian Plan) included as Appendix K of the Big Creek ALP Settlement Agreement, in accordance with the schedule and requirements specified therein. The reaches identified in the Riparian Plan are included in Table 40, below.

**Table 40.** Riparian Monitoring Sites Identified in Appendix K of the Big Creek ALP Settlement Agreement

| Project | Waterbody | Reach in River Miles |
|---|---|---|
| Portal Hydroelectric Project (FERC Project No. 2174) | Camp 61 Creek | 1.1-1.6 |
| | Camp 61 Creek | 1.87-1.95 |
| Big Creek 2A, 8, and Eastwood Hydroelectric Project (FERC Project No. 67) | Mono Creek | 2.3-2.7 |
| | Mono Creek | 3.5-3.7 |
| | Mono Creek | 4.4-4.7 |
| | South Fork San Joaquin River | 26.1-27.7 |

The Deputy Director may require modifications to the Riparian Plan. Within 6 months of a request for modifications, the Licensee shall submit a revised Riparian Plan to the Deputy Director for review and approval. The revised Riparian Plan shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved revised Riparian Plan. The Licensee shall implement the revised Riparian Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

## CONDITION 17. Large Woody Material

**FERC Project No. 67, 120, 2085, 2086, 2174, 2175**

No later than six months following issuance of the license(s) for the Six Big Creek Hydroelectric Projects, the Licensee shall submit a Large Woody Material Management Plan (LWM Plan) to the Deputy Director for review and approval. The Deputy Director may require modification to the LWM Plan as part of any approval. The LWM Plan shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved LWM Plan and any approved amendments thereto. At a minimum, the LWM Plan shall include the management of large woody material at the Bear Creek Diversion. One goal of the LWM Plan shall be to improve large woody material recruitment downstream of the Bear Creek Diversion by facilitating large woody material

passage and by physically redistributing large woody material from the Bear Creek Diversion forebay to the downstream channel and adjacent floodplain. Another goal of the LWM Plan shall be to assess if large woody material management is necessary and feasible for other locations in FERC Project No. 67, and FERC Project Nos. 120, 2085, 2086, 2174, and 2175.

At a minimum, the LWM Plan shall also include:

*(a)* A description of plan goals and objectives;

*(b)* A determination of and justification for large woody material management at locations within the Six Big Creek Hydroelectric Projects. This determination may be made using existing information;

*(c)* Large woody material management measures for each location identified in part *(b)*, above. Measures shall include those described in Section 1.7 of Appendix A of the Big Creek ALP Settlement Agreement;

*(d)* Specific definitions and classification schemes for large woody material based on peer-reviewed literature;

*(e)* A description of existing conditions and background information on large woody material accumulation behind the Bear Creek Diversion and other locations proposed for large woody material management. The description shall include associated operational and ecological effects associated with large woody material management;

*(f)* A monitoring and reporting program that describes how the Licensee will evaluate and report on the performance of large woody material management efforts. The program shall include the criteria that will be used to evaluate the performance of large woody material management measures;

*(g)* An adaptive management program that describes how the Licensee plans to adjust large woody material management and monitoring methods based on evaluation of information and monitoring resulting from implementation of the LWM Plan; and

*(h)* A summary of consultation, including comments received and how the comments were addressed.

The Licensee shall begin implementation of the Deputy Director-approved LWM Plan within one year of receiving Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein. Prior to Deputy Director-approval of the LWM Plan, the Licensee shall not implement any large woody material management measures without prior written approval by the Deputy Director.

## CONDITION 18. Fish

**FERC Project Nos. 67, 120, 2085, 2086, 2174, and 2175**

No later than one year following issuance of the license(s) for the Six Big Creek Hydroelectric Projects, the Licensee shall submit a Fish Monitoring Plan for the Six Big Creek Hydroelectric Projects to the Deputy Director for review and approval. The Deputy Director may require modifications to the Fish Monitoring Plan as part of any approval. The Fish Monitoring Plan shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Fish Monitoring Plan and any approved amendments thereto.

A primary goal of the Fish Monitoring Plan shall be to characterize fish populations in the Six Big Creek Hydroelectric Projects reservoirs and stream reaches affected by MIF (Condition 3) and CRMF (Condition 6) regimes specified in this certification. Additionally, the Fish Monitoring Plan shall include monitoring provisions for the crayfish population in Mammoth Pool Reservoir, as described in Appendix I of the Big Creek ALP Settlement Agreement and modified by this certification.

Except as modified by this certification, the Fish Monitoring Plan shall be consistent with Appendix I in the Big Creek ALP Settlement Agreement.

At a minimum the Fish Monitoring Plan shall include the following:

*(a)* A description of goals and objectives;

*(b)* A summary of baseline fish population data for the Six Big Creek Hydroelectric Projects reservoirs and bypass reaches, including the sources of information used to prepare the summary;

*(c)* A monitoring program to determine fish and crayfish population composition, relative abundance, size/age distribution, physical condition, and biomass in stream reaches affected by MIF (Condition 3) and CRMF (Condition 6) specified in this certification. Crayfish monitoring is only necessary in the Mammoth Pool Reservoir. The monitoring program shall include: (1) sampling methods; (2) monitoring schedule; and (3) a list of proposed monitoring sites that consider long-term site accessibility and sampling feasibility. Unless an alternative monitoring schedule is approved by the Deputy Director, fish monitoring shall begin in year 3 following issuance of the license(s) for the Six Big Creek Hydroelectric Projects;

*(d)* Additionally, the monitoring program shall include monitoring for silver concentrations in tissue of fish collected from Mammoth Pool Reservoir and Huntington Lake, crayfish collected from Mammoth Pool Reservoir, and any additional reaches identified through the consultation process;

*(e)* Fish tissue silver concentrations which shall trigger consultation with staff from USFS, USFWS, CDFW, and the State Water Board regarding supplemental sampling and/or other appropriate response actions;

*(f)* A reporting and adaptive management program that outlines the reporting schedule and process that will be used to update the Fish Monitoring Plan; and

*(g)* A summary of consultation, including comments received and how the comments were addressed.

The Licensee shall begin implementation of the Deputy Director-approved Fish Monitoring Plan after receiving Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

**Table 41.** Minimum Fish Monitoring Based on Appendix I in the Big Creek ALP Settlement Agreement

| | | Monitoring Requirements[1] | | |
|---|---|---|---|---|
| **FERC Project Name and No.** | **Targeted Reach or Reservoir** | **Fish Population** | **Crayfish Population** | **Tissue Analysis (Silver)** |
| **Stream Reaches** | | | | |
| Big Creek Nos. 2A, 8, and Eastwood Hydroelectric Project (FERC Project No. 67) | Big Creek (Below Dam 5) | X | --- | --- |
| | Stevenson Creek (Downstream of Shaver Lake) | X | --- | --- |
| | North Fork Stevenson Creek (Upstream of Shaver Lake) | X | --- | --- |
| | South Fork San Joaquin River (Downstream of Florence Lake) | X | --- | --- |
| | Bear Creek (Downstream of Diversion) | X | --- | --- |
| | Mono Creek (Downstream of Diversion) | X | --- | --- |
| Big Creek No. 3 Hydroelectric Project (FERC Project No. 120) | San Joaquin River (Downstream of Powerhouse 3) | X | --- | --- |
| Mammoth Pool Hydroelectric Project (FERC Project No. 2085) | San Joaquin River (Downstream of Mammoth Pool) | X | --- | --- |
| Vermilion Valley Hydroelectric Project (FERC Project No. 2086) | Mono Creek (Downstream of Vermilion Valley Dam) | X | --- | --- |
| | Warm Creek (Downstream of Diversion) | X | --- | --- |
| | Boggy Meadow Creek (Downstream of Warm Creek Diversion Channel) | X | --- | --- |
| Portal Hydroelectric Project (FERC Project No. 2174) | Camp 61 Creek (Downstream of Portal Forebay) | X | --- | --- |
| Big Creek Nos.1 and 2 Hydroelectric Project (FERC Project No.2175) | Big Creek (Below Dam 4) | X | --- | --- |
| **Reservoirs** | | | | |
| Big Creek Nos. 2A, 8, and Eastwood Hydroelectric Project (FERC Project No. 67) | Florence Lake | X | --- | --- |
| | Shaver Lake | X | --- | --- |
| Mammoth Pool Hydroelectric Project (FERC Project No. 2085) | Mammoth Pool Reservoir | X | X | X[2] |

| FERC Project Name and No. | Targeted Reach or Reservoir | Monitoring Requirements[1] | | |
|---|---|---|---|---|
| | | Fish Population | Crayfish Population | Tissue Analysis (Silver) |
| **Stream Reaches** | | | | |
| Big Creek Nos.1 and 2 Hydroelectric Project (FERC Project No.2175) | Huntington Lake | X | --- | X[3] |

[1] An "X" indicates that the Licensee committed to perform this monitoring per the Big Creek ALP Settlement Agreement.
[2] Fish and crayfish tissue.
[3] Fish tissue only.

## CONDITION 19. Water Quality Monitoring and Management

**FERC Project Nos. 67, 120, 2085, 2086, 2174, and 2175**

No later than one year following issuance of the license(s) for the Six Big Creek Hydroelectric Projects, the Licensee shall submit a Water Quality Monitoring Plan for the Six Big Creek Hydroelectric Projects to the Deputy Director for review and approval. The Deputy Director may require modifications to the Water Quality Monitoring Plan as part of any approval. The Water Quality Monitoring Plan shall be developed in consultation with staff from USFS, USFWS, CDFW, Central Valley Regional Water Quality Control Board (Central Valley Regional Water Board), and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Water Quality Monitoring Plan and any approved amendments thereto.

At a minimum, the Water Quality Monitoring Plan shall include:

*(a)* A summary of baseline water quality and BMI data, including data collected as part of the relicensing studies and other water quality monitoring conducted thereafter;

*(b)* Proposed monitoring:

*(i)* Sampling locations and water quality parameters, including but not limited to, the locations and parameters where water quality studies previously performed by SCE (2002 and 2003)[44] found exceedances of the Basin Plan and/or California Toxics Rule (CTR) and National Toxics Rule (NTR) standards;

*(ii)* Evaluation of the need for BMI monitoring, including a discussion of why BMI monitoring is not needed, if applicable;

*(iii)* Sampling frequency. At a minimum, water quality monitoring and BMI monitoring (if applicable) shall be conducted annually for the first five years after Deputy Director approval of the Water Quality Monitoring Plan, and then every five years for the term of the license(s), and any extensions, unless an alternative monitoring frequency is approved by the Deputy Director;

*(iv)* Sample handling and quality assurance/quality control protocols; and

[44] CAWG 2002 and 2003 reports by SCE.

*(v)* Laboratory methods[45] and associated reporting and detection limits for all constituents and parameters to be monitored;

*(c)* A summary of consultation, including comments received and how the comments were addressed;

*(d)* A reporting program and schedule, with data and monitoring results summarized in a report and submitted to the State Water Board within six months of performing the monitoring in a given year. Unless otherwise approved by the Deputy Director as part of approval of the Water Quality Monitoring Plan, the Licensee shall also submit all water quality data to CEDEN or its successor database within six months of collection. The report shall include:

*(i)* An evaluation and discussion of the monitoring data, including any trends and exceedances;

*(ii)* A discussion of whether changes in water quality and any exceedances are related to the Six Big Creek Hydroelectric Projects;

*(iii)* Recommendations to address water quality exceedances related to the Six Big Creek Hydroelectric Projects, as appropriate; and

*(iv)* Any proposed modifications to the Water Quality Monitoring Plan, including documentation of consultation that includes comments received and how the comments were addressed.

The Licensee shall implement the Water Quality Monitoring Plan within one year of receiving Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

The Licensee and/or staff from the USFS, USFWS, CDFW, Central Valley Regional Water Board, and the State Water Board may recommend to the Deputy Director modifications to the methodologies and frequencies of data collection if it is determined that: (a) there is a more appropriate or preferable methodology or location to use than that described in the Water Quality Monitoring Plan; or (b) monitoring may be reduced or terminated because the relevant ecological resource objectives are being met or no change in water quality or BMI is expected based on data trends. The Licensee shall submit a revised Water Quality Monitoring Plan to the Deputy Director, based on agency staff recommendations, if requested by the Deputy Director. Revisions to the Water Quality Monitoring Plan must be approved by the Deputy Director prior to implementing the revised Water Quality Monitoring Plan. The Licensee shall file the Deputy Director's approval, together with the revised Water Quality Monitoring Plan, with FERC.

## CONDITION 20. Water Temperature Monitoring and Management

**FERC Project Nos. 67, 120, 2085, 2086, 2174, and 2175**

No later than one year following issuance of the license(s) for the Six Big Creek Hydroelectric Projects, the Licensee shall submit a Water Temperature Monitoring and Management Plan (Water Temperature Plan) for the Six Big Creek Hydroelectric Projects to the Deputy Director for review and approval. The Deputy Director may require modifications to the Water Temperature

[45] Laboratory analyses shall be conducted using United States Environmental Protection Agency analytical methods and/or standard methods adequately sensitive to detect constituent levels for determination of compliance with recognized state and federal criteria and objectives.

Plan as part of any approval. The Water Temperature Plan shall be developed in consultation with staff from USFS, USFWS, CDFW, Central Valley Regional Water Board, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Water Temperature Plan and any approved amendments thereto. The Water Temperature Plan shall ensure compliance with the Basin Plan objectives.

Except as modified by this certification, the Water Temperature Plan shall be consistent with Appendix H in the Big Creek ALP Settlement Agreement.

At a minimum, the Water Temperature Plan shall include the following:

*(a)* A description of goals and objectives;

*(b)* A summary of baseline water temperature and meteorological data for reservoirs, bypass reaches, and non-bypass reaches, including data collected as part of re-licensing studies and other monitoring conducted thereafter;

*(c)* Water temperature and associated meteorological monitoring specified in Table 42 – Table 46[46], as well as any additional monitoring resulting from the consultation process. At a minimum, as part of the consultation process, the Licensee and agencies shall discuss the need for:

*(i)* Monitoring for one full period[47,48] of water temperatures and meteorological data for one Dry water year and one Critical water year (Condition 1 of this certification);

*(ii)* Monitoring for five full periods of water temperatures and meteorological data under the MIF regimes (Condition 3); and

*(iii)* Monitoring tributaries and other stream reaches affected by operations of the Six Big Creek Hydroelectric Projects;

*(d)* A summary of consultation, including comments received and how the comments were addressed;

*(e)* Proposed monitoring:

*(i)* Sampling locations, including but not limited to the locations listed in Table 42 – Table 46;

*(ii)* Sampling frequency. At a minimum, water temperature and meteorological monitoring shall be conducted annually for either three or five years as described in Table 42 – Table 46, which shall include one Dry and one Critical water year type. Water temperature monitoring shall be conducted after implementation of the new MIFs (Condition 3 of this certification) and after Deputy Director approval of the Water Temperature Plan, unless an alternative monitoring frequency is approved by the Deputy Director; and

*(iii)* Quality assurance/quality control protocols;

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[46] Table 42 – Table 46 cover minimum water temperature monitoring locations and durations for four of the Six Big Creek Hydroelectric Projects, as noted in Appendix H of the Big Creek ALP Settlement Agreement. Additional temperature monitoring shall be developed, as appropriate, during consultation.

[47] A sampling period for water temperature monitoring includes June 1 through September 30 of the same year, except where unsafe conditions and limited access delay implementation to July 1.

[48] Starting dates for monitoring at higher elevation sites along Big Creek and the South Fork San Joaquin River (SFSJR) bypass reach and its tributaries, which are generally colder for longer portions of the year, are from July 1 (depending upon access conditions and safety) through September 30.

*(f)* A study plan to evaluate the suitability of the cold freshwater habitat beneficial use designation for the Stevenson Reach of the San Joaquin River, as outlined in Section 4.0 of Appendix H of the Big Creek ALP Settlement Agreement; and

*(g)* A reporting program and schedule, with data and monitoring results summarized in a report and submitted to the Deputy Director within six months of performing monitoring in a given year. Unless otherwise approved by the Deputy Director as part of approval of the Water Temperature Plan, the Licensee shall also submit all water temperature data to CEDEN or its successor database within six months of collection. The report shall include:

*(i)* An evaluation and discussion of the monitoring data, including trends and exceedances;

*(ii)* A discussion of whether changes in water temperature are related to the Six Big Creek Hydroelectric Projects;

*(iii)* Recommendations to address water temperature exceedances related to the Six Big Creek Hydroelectric Projects, as appropriate; and

*(iv)* Any proposed modifications to the Water Temperature Plan, including documentation of consultation that includes comments received and how the comments were addressed.

The Licensee shall implement the Water Temperature Plan within one year of receiving Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

The Licensee and/or staff from the USFS, USFWS, CDFW, Central Valley Regional Water Board, and the State Water Board may recommend to the Deputy Director modifications to the Water Temperature Plan. The Licensee shall submit a revised Water Temperature Plan to the Deputy Director, based on agency staff recommendations, if requested by the Deputy Director. Revisions to the Water Temperature Plan must be approved by the Deputy Director prior to implementation of the revised Water Temperature Plan. The Licensee shall file the Deputy Director's approval, together with the revised Water Temperature Plan, with FERC.

**Table 42.** Water Temperature Monitoring Requirements for Big Creek Nos. 2A, 8, and Eastwood Hydroelectric Project (FERC Project No. 67)

| Monitoring Site | Temperature Gage Location by River Miles (RM) | Temperature Gage Type and Measurement Interval | Minimum Initial Monitoring Period and Minimum Duration* |
|---|---|---|---|
| **STREAM AND RIVER REACHES** | | | |
| Big Creek (BC) (Downstream of Dam 5) | BC RM 1.65 | Data Logger Interval ≤15-minute | June 1 – September 30 3 years |
| Big Creek (Upstream of Powerhouse 8) | BC RM 0.10 | Data Logger Interval ≤15-minute | June 1 – September 30 3 years |
| Camp 61 Creek (C61) (Upstream of South Fork San Joaquin River) | C61 RM 0.10 | Data Logger Interval ≤15-minute | June 1 – September 30 3 years |

| Monitoring Site | Temperature Gage Location by River Miles (RM) | Temperature Gage Type and Measurement Interval | Minimum Initial Monitoring Period and Minimum Duration* |
|---|---|---|---|
| Mono Creek (MC) (Upstream of South Fork San Joaquin River) | MC RM 0.10 | Data Logger Interval ≤15-minute | June 1 – September 30 3 years |
| North Fork Stevenson Creek (NFSC) (USGS Stream Gage No. 11239300) | NFSC RM 1.60 | TBD† Interval ≤15-minute | June 1 – September 30 3 years |
| North Fork Stevenson Creek (Tunnel 7 Outlet) | NFSC RM 3.50 | TBD† Interval ≤15-minute | June 1 – September 30 3 years |
| South Fork San Joaquin River (SFSJR) (Upstream of San Joaquin River) | SFSJR RM 0.10 | Data Logger Interval ≤15-minute | July 1** – September 30 3 years |
| South Fork San Joaquin River (Rattlesnake Crossing) | SFSJR RM 14.35 | Data Logger Interval ≤15-minute | July 1** – September 30 3 years |
| South Fork San Joaquin River (Downstream of Mono Creek) | SFSJR RM 16.55 | Data Logger Interval ≤15-minute | July 1** – September 30 3 years |
| South Fork San Joaquin River (Upstream of Mono Creek) | SFSJR RM 16.65 | Data Logger Interval ≤15-minute | July 1** – September 30 3 years |
| South Fork San Joaquin River (Downstream of Camp 61 Creek) | SFSJR RM 17.80 | Data Logger Interval ≤15-minute | July 1** – September 30 3 years |
| South Fork San Joaquin River (Upstream of Camp 61 Creek) | SFSJR RM 17.90 | Data Logger Interval ≤15-minute | July 1** – September 30 3 years |
| South Fork San Joaquin River (Downstream of Florence Lake) | SFSJR RM 27.85 | Telemetry Interval ≤15-minute | July 1** – September 30 3 years |
| San Joaquin River (SJR) (Upstream of South Fork San Joaquin River) | SJR RM 38.40 | Data Logger Interval ≤15-minute | July 1** – September 30 3 years |
| **RESERVOIR DEPTH PROFILES** | | | |
| Florence Reservoir | Downstream end, upstream end, and middle of reservoir | TBD† Monthly Temperature-Depth Profile | July 1** – September 30 3 years |

| Monitoring Site | Temperature Gage Location by River Miles (RM) | Temperature Gage Type and Measurement Interval | Minimum Initial Monitoring Period and Minimum Duration* |
|---|---|---|---|
| *Unless otherwise approved by the Deputy Director as part of Water Temperature Plan approval, the minimum duration for annual temperature monitoring is as indicated. Monitoring shall begin after implementation of the new MIFs and following approval of the Water Temperature Plan.<br>**These stream reaches are at higher elevations and are generally colder for a longer portion of the year. Therefore, the start date for monitoring shall be from July 1 (depending upon access conditions and worker safety), through September 30. This later monitoring date does not present a water temperature concern as periods of high flow and snow generally correlate with lower water temperatures.<br>† TBD = To be determined based on consultation and upon Deputy Director approval of the Water Temperature Plan. | | | |

**Table 43.** Water Temperature Monitoring Requirements for Big Creek No. 3 Hydroelectric Project (FERC Project No. 120)

| Monitoring Site | Temperature Gage Location byRiver Miles (RM) | Temperature Gage Type and Measurement Interval | Minimum Initial Monitoring Period and Minimum Duration* |
|---|---|---|---|
| **STREAM AND RIVER REACHES** | | | |
| San Joaquin River (SJR) (Upstream of Powerhouse 3) | SJR RM 11.00 | Telemetry After Spill Interval ≤15-minute | June 1 – September 30 5 years |
| San Joaquin River (Upstream of Stevenson Creek) | SJR RM 15.50 | Data Logger Interval ≤15-minute | June 1 – September 30 5 years |
| San Joaquin River (at Dam 6) | SJR RM 17.00 | Telemetry Interval ≤15-minute | June 1 – September 30 5 years |
| *Unless otherwise approved by the Deputy Director as part of Water Temperature Plan approval, the minimum duration for annual temperature monitoring is as indicated. Monitoring shall begin after implementation of the new MIFs and following approval of the Water Temperature Plan. | | | |

**Table 44.** Water Temperature Monitoring Requirements for Mammoth Pool Hydroelectric Project (FERC Project No. 2085)

| Monitoring Site | Temperature Gage Location by River Miles (RM) | Temperature Gage Type and Measurement Interval | Minimum Initial Monitoring Period and Minimum Duration* |
|---|---|---|---|
| **STREAM AND RIVER REACHES** | | | |
| San Joaquin River (SJR) (Upstream of Mammoth Pool Powerhouse) | SJR RM 18.20 | Telemetry After Spill Interval ≤15-minute | June 1 – September 30 5 years |
| San Joaquin River (Upstream of Rock Creek) | SJR RM 22.60 | Data Logger Interval ≤15-minute | June 1 – September 30 5 years |
| San Joaquin River (Downstream of Mammoth Pool) | SJR RM 25.55 | Telemetry Interval ≤15-minute | June 1 – September 30 5 years |
| San Joaquin River (Upstream of Mammoth Pool Reservoir) | SJR 34.60 | Data Logger Interval ≤15-minute | June 1 – September 30 3 years |
| **RESERVOIR DEPTH PROFILES** | | | |
| Mammoth Pool Reservoir | Downstream end, upstream end, and middle of reservoir | TBD† Monthly Temperature-Depth Profile | June 1 – September 30 5 years |

*Unless otherwise approved by the Deputy Director as part of Water Temperature Plan approval, the minimum duration for annual temperature monitoring is as indicated. Monitoring shall begin after implementation of the new MIFs and following approval of the Water Temperature Plan.
† TBD = To be determined based on consultation and upon Deputy Director approval.

**Table 45.** Water Temperature Monitoring Requirements for Big Creek Nos. 1 and 2 Hydroelectric Project (FERC Project No. 2175)

| Monitoring Site | Temperature Gage Location by River Miles (RM) | Temperature Gage Type and Measurement Interval | Minimum Initial Monitoring Period and Minimum Duration* |
|---|---|---|---|
| Big Creek (BC) (Upstream of Powerhouse 2/2A) | BC RM 2.10 | Data Logger Interval ≤15-minute | June 1 – September 30 3 years |
| Big Creek (Release at Dam 4) | BC RM 5.90 | Data Logger Interval ≤15-minute | June 1 – September 30 3 years |

*Unless otherwise approved by the Deputy Director as part of Water Temperature Plan approval, the minimum duration for annual temperature monitoring is as indicated. Monitoring shall begin after implementation of the new MIFs and following approval of the Water Temperature Plan.

**Table 46.** Meteorological Monitoring Requirements

| Monitoring Site | Meteorological Parameters* | Minimum Initial Monitoring Period and Minimum Duration** |
|---|---|---|
| Big Creek (Powerhouse No. 3) | AT – RH – WS – SR | June 1 – September 30 5 years |
| Big Creek (Upstream of Powerhouse 2/2A) | AT – RH | June 1 – September 30 3 years |
| Florence Lake | AT – RH – WS – SR | June 1 – September 30 3 years |
| Huntington Lake | AT – RH – WS – SR | June 1 – September 30 3 years |
| Lake Thomas A. Edison | AT – RH – WS – SR | June 1 – September 30 3 years |
| Mammoth Pool Powerhouse | AT – RH – WS – SR | June 1 – September 30 5 years |
| San Joaquin River (Upstream of Mammoth Pool Reservoir) | AT – RH | June 1 – September 30 3 years |
| South Fork San Joaquin River (Upstream of San Joaquin River) | AT – RH | June 1 – September 30 3 years |

* AT = Air Temperature; RH = Relative Humidity; WS = Wind Speed; SR = Solar Radiation

** Unless otherwise approved by the Deputy Director as part of Water Temperature Plan approval, the minimum duration for annual meteorological monitoring is as indicated. Monitoring shall begin after implementation of the new MIFs and following approval of the Water Temperature Plan.

## CONDITION 21. Recreation Management

### 21(A) Recreation Management Plan for Big Creek ALP Projects

**FERC Project Nos. 67, 120, 2085, and 2175**

No later than 30 days following issuance of the license(s) for the four Big Creek Hydroelectric Projects using the Alternative Licensing Process – FERC Projects Nos. 67, 120, 2085, and 2175 (Big Creek ALP Projects), the Licensee shall implement the provisions of the Recreation Management Plan included in Appendix O of the Big Creek ALP Settlement Agreement in accordance with the schedule therein. Prior to the commencement of construction for each recreation facility rehabilitation project, the Licensee shall submit a Recreation Facility Major Rehabilitation Plan (Rehabilitation Plan) to the Deputy Director for review and approval. The Deputy Director may require modifications as part of any approval. The Rehabilitation Plan shall be developed in consultation with staff from USFS and the State Water Board. The Licensee shall file with FERC each Deputy Director-approved Rehabilitation Plan and any approved amendments thereto.

Each Rehabilitation Plan shall, at a minimum, include the elements detailed in Section 5.2 of Appendix O, as well as:

*(a)* Site photographs prior to construction;

*(b)* A description of measures to protect water quality and beneficial uses;

*(c)* A description of monitoring and reporting protocols for measures designed to protect water quality and beneficial uses; and

*(d)* A summary of consultation, including comments and how the comments were addressed.

The Licensee shall implement construction for the specified recreation facility rehabilitation project upon Deputy Director approval. During development and review of the above information, the Licensee shall not implement any recreation facility rehabilitation or improvement projects without prior written approval from the Deputy Director.

### 21(B) Recreation Facility Rehabilitation and Improvement Plan for Big Creek TLP Projects

**FERC Project Nos. 2086 and 2174**

No later than one year following issuance of the license(s) for the two Big Creek Hydroelectric Projects using the Traditional Licensing Process – FERC Project Nos. 2086 and 2174 (Big Creek TLP Projects), the Licensee shall submit a Recreation Facility Rehabilitation and Improvement Plan (Recreation Plan) for the Big Creek TLP Projects to the Deputy Director for review and approval. The Deputy Director may require modifications to the Recreation Plan as part of any approval. The Recreation Plan shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Recreation Plan and any approved amendments thereto. The Recreation Plan shall provide information for recreation facility rehabilitation and improvement projects proposed under the new license(s) for Big Creek TLP Projects. During development and review of the Recreation Plan, the Licensee shall not implement any recreation facility rehabilitation or improvement projects without prior written approval from the Deputy Director.

The Recreation Plan shall be consistent with Sections 5.2 and 5.3 of Appendix O of the Big Creek ALP Settlement Agreement. At a minimum, the Recreation Plan shall include:

*(a)* A statement of goals and objectives;

*(b)* Overview maps or other graphics showing the locations and extent of all existing and proposed recreation facilities, including any proposed rehabilitation and improvement projects;

*(c)* A description of proposed rehabilitation, improvement, and construction projects, as well as maintenance activities with the potential to impact water quality or beneficial uses;

*(d)* Design drawings, photos, and other information relevant to each recreation facility;

*(e)* A summary of relevant provisions from Section 5.2 of Appendix O of the Big Creek ALP Settlement Agreement which apply to the Big Creek TLP Projects;

*(f)* A timeline and schedule for modifications and maintenance of existing and proposed new recreation facilities;

*(g)* Measures the Licensee will implement to protect water quality and beneficial uses of surface waters during construction and maintenance activities associated with implementation of the Recreation Plan;

*(h)* A description of monitoring and reporting protocols for measures designed to protect water quality and beneficial uses; and

*(i)* A summary of consultation, including comments received and how the comments were addressed.

The Licensee shall implement the Recreation Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein. Depending on the status of each recreation facility project (e.g., planning, design, construction), the Licensee may need to submit recreation facility-specific supplements to the Recreation Plan for Deputy Director review and approval. The Licensee shall only proceed with recreation facility work that is explicitly approved by the Deputy Director as part of the approval of the Recreation Plan or otherwise in writing.

### 21(C) Five-Year Recreation Rehabilitation Report

**FERC Project Nos. 67, 120, 2085, 2175, 2086 and 2174**

No later than one year following issuance of the license(s) for the Six Big Creek Hydroelectric Projects, and every five years throughout the term of the new license(s) and any extensions thereto, the Licensee shall submit a Five-Year Recreation Rehabilitation Report (Five-Year Recreation Report) to the Deputy Director for review and approval. The Deputy Director may require modifications as part of any approval.

The Five-Year Recreation Rehabilitation Report shall include:

*(a)* A summary of recreation rehabilitation activities undertaken during the previous five years; and

*(b)* A proposed schedule of recreation rehabilitation activities planned for implementation in the next five years.

## CONDITION 22. Bald Eagles

### 22(A) Bald Eagle Management Plan for Big Creek ALP Projects

**FERC Project Nos. 67, 120, 2085, and 2175**

No later than 30 days following issuance of the license(s) for the Big Creek ALP Projects, the Licensee shall implement the provisions of the Bald Eagle Management Plan in Appendix P of the Big Creek ALP Settlement Agreement in accordance to the schedule and requirements specified therein. The Licensee shall submit the reports specified in Section 2.5 of Appendix P to the Deputy Director for review and approval. The Deputy Director may require modifications to submittals as part of any approval.

### 22(B) Bald Eagle Management Plan for Big Creek TLP Projects

**FERC Project Nos. 2086 and 2174**

No later than one year following issuance of the license(s) for the Big Creek TLP Projects, the Licensee shall submit a Bald Eagle Plan for the Big Creek TLP Projects to the Deputy Director for review and approval. The Deputy Director may require modifications to the Bald Eagle Plan as part of any approval. The Bald Eagle Plan shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Bald Eagle Plan and any approved amendments thereto.

At a minimum, the Bald Eagle Plan shall be consistent with the most current USFWS *National Bald Eagle Management Guidelines* and include:

*(a)* Statement of the goals and objectives;

*(b)* Summary of consultation, including comments received and how the comments were addressed;

*(c)* Summary of existing information regarding the presence of bald eagles, their nests, and wintering habitat in the vicinity of the Big Creek TLP Projects;

*(d)* Surveys to identify the locations of bald eagles, their nests, and wintering habitat in the vicinity of the Big Creek TLP Projects. Surveys shall be designed and scheduled in accordance with the specifications in Appendix P of the Big Creek ALP Settlement Agreement. The surveys shall be conducted using the *Protocol for Evaluating Bald Eagle Habitat and Populations in California,*[49], or alternate method approved by the Deputy Director;

*(e)* A plan for development of corrective measures and a timetable for actions in cases when the Bald Eagle Plan's goals and objectives are not being achieved or data indicate impacts to bald eagles and/or bald eagle nests; and

*(f)* A reporting program to report on the outcome of surveys and any corrective actions.

The Licensee shall implement the Bald Eagle Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

## CONDITION 23. Transportation Management

### 23(A) Transportation System Management Plan for Big Creek ALP Projects

**FERC Project Nos. 67, 120, 2085, and 2175**

No later than 30 days following issuance of the license(s) for the Big Creek ALP Projects, the Licensee shall implement the Transportation Management Plan contained in Appendix N of the Big Creek ALP Settlement Agreement in accordance with the schedule and requirements specified therein.

Section 8 of Appendix N of the Big Creek ALP Settlement Agreement identifies an annual consultation with USFS to identify specific road rehabilitation and maintenance projects and other activities that will be performed each forthcoming year. The Licensee shall also consult with the State Water Board on an annual basis. Section 8 of Appendix N of the Big Creek ALP Settlement Agreement also specifies that planned road rehabilitation and maintenance activities be documented in the Licensee's Annual Plan of Operations. Based on consultation efforts and the need to protect water quality from ongoing Big Creek ALP Project operations, the Deputy Director may require additional road rehabilitation and maintenance activities be included in the Annual Plan of Operations. The Licensee is required to implement the modifications identified by the Deputy Director.

[49] Jackman and Jenkins (2004), Protocol for Evaluating Bald Eagle Habitat and Populations in California. Report by Pacific Gas and Electric Company for the U.S. Fish and Wildlife Service, Endangered Species Division, Sacramento, CA.

Prior to construction for any project implemented under Appendix N of the Big Creek ALP Settlement Agreement, the Licensee shall submit to the Deputy Director for review and approval the following:

*(a)* Final design drawings;

*(b)* Schedule for construction, inspection, and maintenance; and

*(c)* Measures to protect water quality and beneficial uses.

The Deputy Director may require modifications to the submittals as part of any approval. The Licensee shall file with FERC the Deputy Director-approved submittals and any approved amendments thereto. The Licensee shall not implement any construction activities without prior written approval from the Deputy Director.

### 23(B) Transportation Management Plan for Big Creek TLP Projects

**FERC Project Nos. 2086 and 2174**

No later than one year following issuance of the license(s) for the Big Creek TLP Projects, the Licensee shall submit a Transportation System Management Plan (Transportation Plan) for the Big Creek TLP Projects to the Deputy Director for review and approval. The Deputy Director may require modifications to the Transportation Plan as part of any approval. The Transportation Plan shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Licensee shall file with FERC the Deputy Director-approved Transportation Plan and any approved amendments thereto. The primary goal of the Transportation Plan shall be to maintain and construct roads and trails in a manner that is protective of water quality and beneficial uses.

At a minimum, the Transportation Plan shall be consistent with Appendix N of the Big Creek ALP Settlement Agreement and shall include the following:

*(a)* A statement of goals and objectives;

*(b)* A summary of consultation, including comments received and how the comments were addressed;

*(c)* An inventory and assessment of all Project roads and trails associated with the Big Creek TLP Projects, including a map(s) that documents roads, trails, drainage structures, streams, and other surface water bodies. The assessment shall highlight any drainage structures or road segments that are impacting or have the potential to impact water quality;

*(d)* A summary of proposed Project road and trail maintenance, improvement, or construction activities. The summary shall include any items identified during the assessment that are impacting or have the potential to impact water quality identified as part of the assessment under item (c), above. For each activity, the Licensee shall provide:

  *(i)* A description of the proposed road or trail maintenance, improvement, and/or construction activities, including any available designs (conceptual to final);

  *(ii)* Proposed schedule to complete final design (if applicable) and implement the proposed activities; and

*(iii)* Proposed measures to protect water quality and beneficial uses of surface waters during activities associated with proposed road and trail maintenance, improvement, and construction. Proposed measures designed to improve drainage should be consistent with the most current United States Department of Agriculture, *National Best Management Practices [BMPs] for Water Quality Management on National Forest System Lands, Volume 1: National Core BMP Technical Guide;* [50]

*(e)* A schedule and plan for inspection and maintenance of Project roads and trails throughout the term of the license(s) and any extensions; and

*(f)* A reporting program that includes submittal of annual reports to the State Water Board that provide:

*(i)* An overview of all Project road and trail activities conducted during the prior year, including highlights of any inspection results that indicate existing or potential impacts to water quality and beneficial uses;

*(ii)* Proposed activities for the coming year, including any requests for Deputy Director-approval of proposed road or trail maintenance, improvement, or construction activities not previously approved by the Deputy Director as part of the Transportation Plan; and

*(iii)* Any proposed updates to the Transportation Plan for the subsequent year.

The Licensee shall implement the Transportation Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein. Depending on the status of each trail or road activity (e.g., in design, design complete, new problem identified), the Licensee may need to submit activity-specific supplements to the Transportation Plan for Deputy Director review and approval. No supplements to the Transportation Plan shall be implemented prior to receipt of Deputy Director approval.

## CONDITION 24. Amphibians

**FERC Project Nos. 67, 120, 2085, 2086, 2174, and 2175**

No later than one year following issuance of the license(s) for the Six Big Creek Hydroelectric Projects, the Licensee shall submit an Amphibian Plan to the Deputy Director for review and approval. The Amphibian Plan shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Deputy Director may require modifications to the Amphibian Plan as part of any approval. The Licensee shall file with FERC the Deputy Director-approved Amphibian Plan and any approved amendments thereto. The primary goals of the Amphibian Plan shall be to: (a) determine the presence or absence of amphibians that are defined as Special Status Species (i.e. state and/or federally listed amphibian species, species of special concern, etc.) in the Six Big Creek Hydroelectric Projects-affected stream reaches; and (b) evaluate potential impacts from the new MIFs and CRMFs (Conditions 4 and 7 of this certification, respectively) on listed and special concern amphibian species.

[50] At the time of issuance of the certification, the most current version of the USDA *National Best Management Practices for Water Quality Management on National Forest System Lands, Volume 1: National Core BMP Technical Guide*, is dated April 2012, and is available at: https://www.fs.fed.us/naturalresources/watershed/pubs/FS_National_Core_BMPs_April2012.pdf

At a minimum, the Amphibian Plan shall include:

*(a)* A statement of goals and objectives;

*(b)* A summary of consultation, including comments received and how the comments were addressed;

*(c)* A list of: (a) amphibian species present in the Six Big Creek Hydroelectric Projects area and (b) Special Status Species habitat in the Six Big Creek Hydroelectric Projects area;

*(d)* A summary of existing information regarding the presence of Special Status Species and their habitat in the vicinity of the Six Big Creek Hydroelectric Projects;

*(e)* Proposed monitoring for Special Status Species with potential to be present in the Six Big Creek Hydroelectric Projects area that includes:

*(i)* Monitoring protocol(s);

*(ii)* Monitoring locations, including maps showing the location and extent of proposed survey monitoring reaches; and

*(iii)* Monitoring frequency. Monitoring surveys shall occur annually for the first five years following Deputy Director-approval of the Amphibian Plan, with initial surveys conducted no later than the first spring following Deputy Director-approval of the Amphibian Plan. The monitoring frequency for the remainder of the term of the license(s) and any extensions shall be established as part of Deputy Director approval of the Amphibian Plan;

*(f)* Measures that will be implemented as part of the Six Big Creek Hydroelectric Projects to protect Special Status Species, including measures that will be implemented in conjunction with other conditions of this certification (e.g., construction associated with Recreation Plan [Condition 21], Transportation Plan [Condition 23], etc.)

*(g)* A reporting program with summary reports documenting the results of amphibian monitoring efforts. Summary reports shall be submitted at the same frequency as the monitoring established in the Amphibian Plan. The reports shall include:

*(i)* An evaluation of the data collected during the prior year's amphibian surveys; and

*(ii)* An assessment of the Six Big Creek Hydroelectric Projects' effect on existing Special Status Species and any proposed modifications to the Amphibian Plan or other certification conditions to protect Special Status Species.

The Licensee shall implement the Amphibian Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

## CONDITION 25. Big Creek Fish Hatchery

**FERC Project Nos. 67, 120, 2085, 2086, 2174, and 2175**

The Licensee shall provide documentation of consultation with CDFW regarding the feasibility of re-opening the Big Creek Fish Hatchery. If CDFW determines that re-opening the Big Creek Fish Hatchery is feasible, the Licensee shall submit a Big Creek Fish Hatchery Water Quality and Monitoring Plan (Fish Hatchery Plan) to the Deputy Director for review and approval no later than one year following issuance of the license(s) for the Six Big Creek Hydroelectric Projects. The Fish Hatchery Plan shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Deputy Director may require modifications to

the Fish Hatchery Plan as part of any approval. The Licensee shall file with FERC the Deputy Director-approved Fish Hatchery Plan and any approved amendments thereto.

At a minimum, the Fish Hatchery Plan shall include:

*(a)* An overview of the proposed hatchery and its operation:

*(i)* Maps and/or diagrams of the hatchery;

*(ii)* Target species and production numbers;

*(iii)* Water source, diversion rate, and associated water right information;

*(iv)* List of proposed modifications or enhancements to existing facilities; and

*(v)* Measures that will be implemented prior to initiating hatchery operations (e.g., during construction of modifications, enhancements) to protect water quality and beneficial uses;

*(b)* A summary of consultation, including comments received and how the comments were addressed;

*(c)* Compliance with the *Waste Discharge Requirements for Cold Water Concentrated Aquatic Animal Production Facility Discharges to Surface Waters* permit (General NPDES No. CAG135001) or subsequent National Pollutant Discharge Elimination System (NPDES) permit issued by the Central Valley Regional Water Board;

*(d)* A proposed timeline for completion of any work and initiation of hatchery operations; and

*(e)* A reporting program that includes submittal of reports to the State Water Board regarding the implementation of work to re-open the hatchery, and provide updates on the operation of the hatchery (i.e., fish produced, water quality, etc). The Licensee shall also include any proposed modifications to the hatchery (construction or operation modifications) for Deputy Director approval.

The Licensee shall not conduct work or operate the Big Creek Fish Hatchery without prior written approval from the Deputy Director. The Licensee shall implement the Fish Hatchery Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

## CONDITION 26. Vegetation and Integrated Pest Management

### 26(A) Vegetation and Integrated Pest Management Plan for Big Creek ALP Projects

**FERC Project Nos. 67, 120, 2085, and 2175**

No later than 30 days following issuance of the license(s) for the Big Creek ALP Projects, the Licensee shall implement the provisions of the Vegetation and Integrated Pest Management Plan contained in Appendix R of the Big Creek ALP Settlement Agreement. Additionally, the Licensee shall submit all monitoring and survey reports specified in Appendix R of the Big Creek ALP Settlement Agreement to the State Water Board.

### 26(B) Vegetation and Integrated Pest Management Plan for Big Creek TLP Projects

**FERC Project Nos. 2086 and 2174**

No later than one year following issuance of the license(s) for the Big Creek TLP Projects, the Licensee shall submit a Vegetation and Pest Plan for the Big Creek TLP Projects to the Deputy

Director for review and approval. The Vegetation and Pest Plan shall be developed in consultation with staff from USFS, USFWS, CDFW, and the State Water Board. The Deputy Director may require modifications to the Vegetation and Pest Plan as part of any approval. The Licensee shall file with FERC the Deputy Director-approved Vegetation and Pest Plan and any approved amendments thereto.

At a minimum, the Vegetation and Pest Plan shall include:

*(a)* A statement of goals and objectives;

*(b)* A summary of consultation, including comments received and how the comments were addressed;

*(c)* Maps and lists of all facilities and locations to be managed under the updated Vegetation and Pest Plan, broken out by project. For each facility or location identify:

*(i)* Proposed vegetation and/or pest management action(s);

*(ii)* Measures to protect water quality and beneficial uses associated with implementation of the Vegetation and Pest Plan; and

*(d)* A reporting program that includes submittal of annual reports to the State Water Board that provides:

*(i)* An overview of all vegetation and pest management activities conducted during the prior year, including highlights of any inspection results that may require modifications to the updated Vegetation and Pest Plan to protect water quality and beneficial uses; and

*(ii)* Proposed vegetation and pest management actions for the coming year, including any requests for Deputy Director approval of modifications to the updated Vegetation and Pest Plan.

The Licensee shall implement the Vegetation and Pest Plan for the Big Creek TLP Projects upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

### 26(C) Vegetation and Integrated Pest Annual Report

**FERC Project Nos. 67, 120, 2085, 2086, 2174, and 2175**

No later than one year following issuance of the license(s) for the Six Big Creek Hydroelectric Projects, and every year throughout the term of the new license(s) (and any extensions thereto), Licensee shall submit a Vegetation and Integrated Pest Annual Report (Vegetation and Pest Annual Report) to the Deputy Director for review and approval. The Deputy Director may require modifications to the Vegetation and Pest Annual Report as part of any approval. The Vegetation and Pest Annual Report shall include:

*(a)* A summary of activities under Appendix R of the Big Creek ALP Settlement Agreement, as well as activities under this condition, implemented in the previous year; and

*(b)* A summary and proposed schedule of activities under Appendix R of the Big Creek ALP Settlement Agreement, as well as activities under this condition, that will be implemented during the next year.

## CONDITION 27. Annual Consultation Meetings

**FERC Project Nos. 67, 120, 2085, 2086, 2174, and 2175**

No later than one year following issuance of the license(s) for the Six Big Creek Hydroelectric Projects, the Licensee shall establish a Technical Review Group (TRG) to meet annually regarding implementation of the Six Big Creek Hydroelectric Projects license(s). The first meeting of the TRG shall be held no later than two years following issuance of the license(s) for the Six Big Creek Hydroelectric Projects. At the annual meetings, the Licensee shall: (a) provide a summary of the past year's implementation of the Six Big Creek Hydroelectric Projects license(s), including the status and results of studies, a summary of activities conducted, and an overview and evaluation of data collected as required by conditions of this certification; (b) provide a summary of proposed activities; and (c) solicit input from the TRG to inform the development of adaptive management or other recommendations, as required by conditions of this certification. At a minimum, staff from USFS, USFWS, CDFW, and the State Water Board, Tribes, nongovernmental organizations, and parties signatory to the Big Creek ALP Settlement Agreement shall be invited to participate in the TRG. The annual meeting shall be open to the public. The Licensee shall provide 60-day notice of the annual meeting to the TRG. The Licensee shall work with the TRG to establish communication protocols to facilitate interactions between group members that allow for open participation and communication between all parties.

## CONDITION 28. Extremely Dry Conditions

**FERC Project Nos. 67, 120, 2085, 2086, 2174, and 2175**

In the event of extremely dry conditions, which may include a year in which the Governor of the State of California declares a drought emergency for Fresno County or Madera County, or multiple consecutive Dry or Critical water years (as defined in Condition 1), the Licensee may request modification of the flow and reservoir level requirements of this certification. If the Licensee anticipates that it may request modification pursuant to this condition, the Licensee shall notify the Deputy Director, CDFW, USFS, and USFWS of the Licensee's concerns related to flows or reservoir levels as early as possible, and no later than May 15 of the year in which a request may be submitted. After May 15, the Licensee may only request modifications within 10 business days of an emergency drought declaration by the Governor of California for Fresno County or Madera County. If the Licensee requests modification pursuant to this condition, the Licensee shall develop a Revised Operations Plan in consultation with staff from the State Water Board, CDFW, USFS, and USFWS for flows and/or reservoir operations during the extremely dry conditions.

The Licensee shall provide notice of the proposed Revised Operations Plan to interested parties at least seven days prior to submittal to the Deputy Director. The Licensee's request shall include: (a) an estimate of water to be saved and the alternative beneficial uses for which the water is being conserved; (b) a timeline for the return to regular operations; (c) proposed monitoring for the revised operations, including an estimation of any impacts the revised operations may have on any beneficial uses of water; and (d) proposed water conservation measures that will be implemented. If conservation measures are not applicable, the Licensee shall describe the circumstances and justification for not implementing water conservation measures.

The Licensee shall submit the proposed Revised Operations Plan to the Deputy Director for review and approval. The Licensee shall also provide a summary of any comments received and how the comments were addressed. The Deputy Director may require modifications to the Revised Operations Plan as part of any approval. The Licensee may implement the Revised Operations Plan upon receipt of Deputy Director and other required approvals, in accordance with the schedule and requirements specified therein. The Licensee shall file with FERC the Deputy Director-approved Revised Operations Plan, and any approved amendments thereto.

## CONDITIONS 29 – 50

**CONDITION 29.** The State Water Board's approval authority, including authority delegated to the Deputy Director or others, includes the authority to withhold approval or to require modification of a document prior to approval. The State Water Board may take enforcement action if the Licensee fails to provide or implement a required plan or study in a timely manner. If a time extension is needed to submit a report, study, or plan for Deputy Director approval, the Licensee shall submit a written request for the extension, with justification, to the Deputy Director no later than 60 days prior to the deadline. The Licensee shall file with FERC any Deputy Director-approved time extensions.

**CONDITION 30.** The State Water Board reserves the authority to add to or modify the conditions of this certification: (i) to incorporate changes in technology, sampling, or methodologies; (ii) if monitoring results indicate that continued operation of the Six Big Creek Hydroelectric Projects could violate water quality objectives or impair beneficial uses; (iii) to implement any new or revised water quality standards and implementation plans adopted or approved pursuant to the Porter-Cologne Water Quality Control Act or section 303 of the Clean Water Act; (iv) to coordinate the operations of the Six Big Creek Hydroelectric Projects and other hydrologically connected water development projects, where coordination of operations is reasonably necessary to meet water quality objectives and protect beneficial uses of water; and (v) to require additional monitoring and/or other measures, as needed, to ensure that continued operations of the Six Big Creek Hydroelectric Projects meet water quality objectives and protect beneficial uses of the upper San Joaquin River and its tributaries.

**CONDITION 31.** Future changes in climate projected to occur during the license(s) term(s) may significantly alter the baseline assumptions used to develop the conditions of this certification. The State Water Board reserves authority to modify or add conditions in this certification to require additional monitoring and/or other measures, as needed, to verify that Project operations meet water quality objectives and protect the beneficial uses assigned to the Six Big Creek Hydroelectric Projects-affected stream reaches.

**CONDITION 32.** The State Water Board shall provide notice and an opportunity to be heard in exercising its authority to add to or modify the conditions of this certification.

**CONDITION 33.** This certification is contingent on compliance with all applicable requirements of the Basin Plan.

**CONDITION 34.** Notwithstanding any more specific conditions in this certification, the Six Big Creek Hydroelectric Projects shall be operated in a manner consistent with all applicable water quality standards and implementation plans adopted or approved pursuant to the Porter-Cologne Water Quality Control Act or section 303 of the Clean Water Act. The Licensee must take all reasonable measures to protect the beneficial uses of the upper San Joaquin River watershed.

**CONDITION 35.** Unless otherwise specified in this certification or at the request of the Deputy Director, data and reports shall be submitted electronically in a format accepted by the State Water Board to facilitate the incorporation of this information into public reports and the State Water Board's water quality database systems in compliance with Water Code section 13167.

**CONDITION 36.** This certification does not authorize any act which results in the taking of a threatened, endangered, or candidate species or any act which is now prohibited, or becomes prohibited in the future, under either the California ESA (Fish & G. Code §§ 2050-2097) or the federal ESA (16 U.S.C. §§ 1531 - 1544). If a "take" will result from any act authorized under this certification or water rights held by the Licensee, the Licensee must obtain authorization for the take prior to any construction or operation of the portion of the Project that may result in a take. The Licensee is responsible for meeting all requirements of the applicable ESAs for the Six Big Creek Hydroelectric Projects authorized under this certification.

**CONDITION 37.** The Licensee shall submit any change to the Six Big Creek Hydroelectric Projects, including operations, technology changes or upgrades, or methodology, which would have a significant or material effect on the findings, conclusions, or conditions of this certification, to the State Water Board for prior review and written approval. The State Water Board shall determine significance and may require consultation with state and/or federal agencies. If the State Water Board is not notified of a change to the Six Big Creek Hydropower Projects, it will be considered a violation of this certification. If such a change would also require submission to FERC, the change must first be submitted and approved by the Executive Director of the State Water Board.

**CONDITION 38.** In the event of any violation or threatened violation of the conditions of this certification, the violation or threatened violation is subject to any remedies, penalties, process or sanctions as provided for under applicable state or federal law. For the purposes of section 401(d) of the Clean Water Act, the applicability of any state law authorizing remedies, penalties, process, or sanctions for the violation or threatened violation constitutes a limitation necessary to assure compliance with the water quality standards and other pertinent requirements incorporated into this certification.

**CONDITION 39.** In response to a suspected violation of any condition of this certification, the State Water Board or Central Valley Regional Water Board may require the holder of any federal permit or license subject to this certification to furnish, under penalty of perjury, any technical or monitoring reports the State Water Board deems appropriate, provided that the burden, including costs, of the reports shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. (Wat. Code, §§ 1051, 13165,13267, and 13383.)

**CONDITION 40.** In response to any violation of the conditions of this certification, the State Water Board may add to or modify the conditions of this certification as appropriate to ensure compliance.

**CONDITION 41.** This certification shall not be construed as replacement or substitution for any necessary federal, state, and local approvals. The Licensee is responsible for compliance with all applicable federal, state, or local laws or ordinances and shall obtain authorization from applicable regulatory agencies prior to the commencement of Six Big Creek Hydroelectric Projects-related activities.

**CONDITION 42.** Any requirement in this certification that refers to an agency whose authorities and responsibilities are transferred to or subsumed by another state or federal agency, will apply equally to the successor agency.

**CONDITION 43.** The Deputy Director and the Executive Officer of the Central Valley Regional Water Board (Executive Officer) shall be notified one week prior to the commencement of ground disturbing activities with the potential to adversely affect water quality. Upon request, a construction schedule shall be provided to agency staff. The Licensee shall provide State Water Board and Regional Water Board staffs access to the Six Big Creek Hydroelectric Projects sites to document compliance with this certification.

**CONDITION 44.** Onsite containment for storage of chemicals classified as hazardous shall be located away from watercourses and include secondary containment and appropriate management as specified in California Code of Regulations, title 27, section 20320.

**CONDITION 45.** Activities associated with operation and maintenance of the Six Big Creek Hydroelectric Projects that threaten or potentially threaten water quality shall be subject to further review by the Deputy Director and Executive Officer.

**CONDITION 46.** This certification is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to Water Code section 13330 and California Code of Regulations, title 23, division 3, chapter 28, article 6 (commencing with section 3867).

**CONDITION 47.** Nothing in this certification shall be construed as State Water Board approval of the validity of any water rights, including pre-1914 claims. The State Water Board has separate authority under the Water Code to investigate and take enforcement action if necessary to prevent any unauthorized or threatened unauthorized diversions of water.

**CONDITION 48.** A copy of this certification shall be provided to all contractors and subcontractors conducting work related to the Six Big Creek Hydroelectric Projects, and copies shall remain in their possession when on-site. The Licensee shall be responsible for work conducted by its contractor, subcontractors, or other persons conducting work related to the Six Big Creek Hydroelectric Projects.

**CONDITION 49.** This certification is conditioned upon total payment of any fee required under California Code of Regulations, title 23, division 3, chapter 28.

**CONDITION 50.** This certification is not intended and shall not be construed to apply to any activity involving a hydroelectric facility and requiring a FERC license or an amendment to a FERC license unless the pertinent application for certification was filed pursuant to California Code of Regulations, title 23, section 3855, subdivision (b) and that application for certification specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.

MAY 3 1 2019

Eileen Sobeck, Executive Director

Date

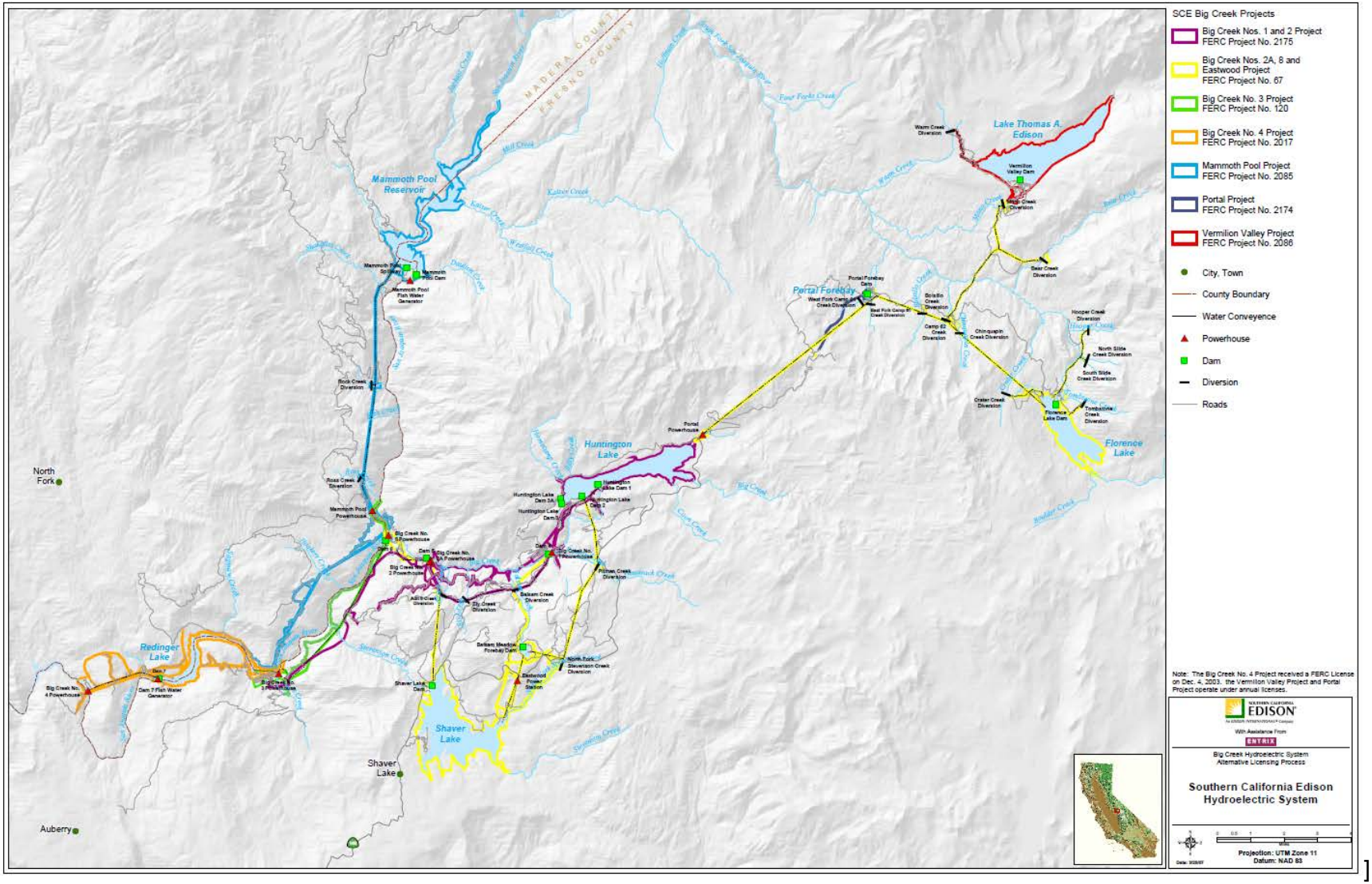


**Figure 1.** Map of the seven individually-licensed hydroelectric projects in the Big Creek Hydroelectric System within the upper San Joaquin River watershed of central California.

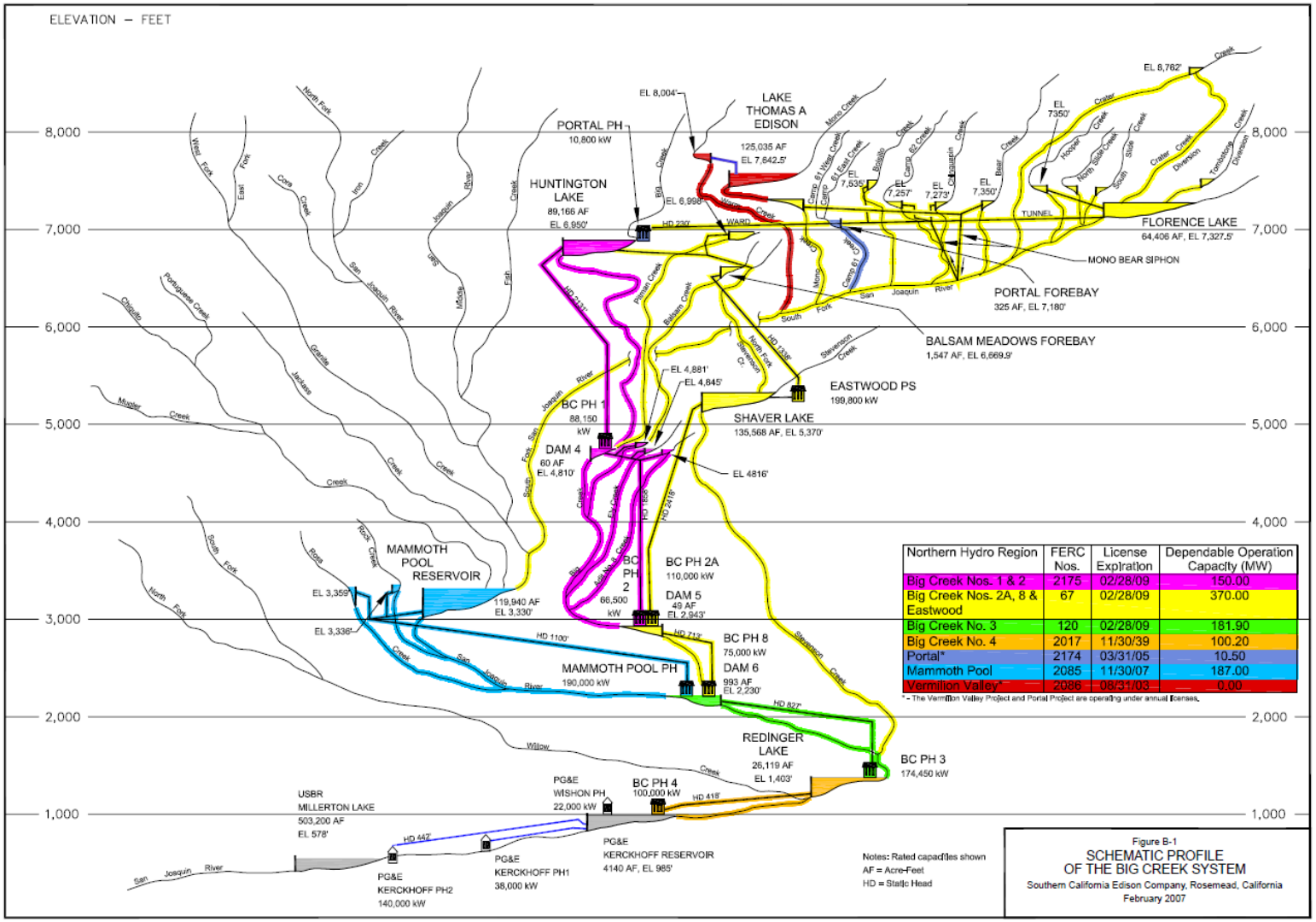


**Figure 2.** Schematic profile of the Big Creek Hydroelectric System.