70% Complete Draft

PRELIMINARY APPLICATION DOCUMENT (PAD)

Project Description

- *General Description of the River Basin (Section 3)*
- *Project Location, Facilities, and Operation (Section 4)*

BISHOP CREEK HYDROELECTRIC PROJECT

FERC PROJECT NO. 1394

July 2018

3 GENERAL DESCRIPTION OF RIVER BASIN

Bishop Creek is a 10.1-mile-long stream in the eastern Sierra Nevada mountains spanning across two of Inyo County's thirteen watersheds (EPA 2018) and is the largest tributary of the Owens River. Bishop Creek drains a 104-square-mile area which is largely dammed for the purposes of water storage and power generation. The largest dams on-Bishop Creek are Lake Sabrina, South Lake, and Longley Lake Dam (Figure 3-1).

Bishop Creek is composed of three forks: North, Middle and South. The North Fork of Bishop Creek flows into North Lake and is unimpaired while the Middle Fork flows into Lake Sabrina. The two forks then join southeast of the town of Aspendell, California. The South Fork of Bishop Creek flows through South Lake and continues north where it combines with the North and Middle Forks approximately 2.5 miles northeast of Aspendell. Bishop Creek then continues in a northeasterly direction before continuing into the Owens Valley. Bishop Creek flows through the city of Bishop, California before its confluence with the Owens River east of Bishop.

The Bishop Creek Basin is a sub-basin of the Owens River (Figure 3-2). The Owens River is a 183-mile-long river between the eastern Sierra Nevada mountains and the Inyo and White mountains, that flows southeasterly through Lake Crowley reservoir and descends through the Owens River Gorge, emerging at the north end of the Owens Valley, and terminating at Owens Lake south of the city of Lone Pine, California. The Owens River forms a 2,600-square-mile watershed. Tributaries to the Owens River include Spring Valley Wash, Silver Canyon Creek, Coldwater Canyon Creek, Hot Creek, Rock Creek, Bishop Creek, Big Pine Creek, Birch Creek, Independence Creek, and Lone Pine Creek. These tributaries provide nearly 50 percent of the surface water flows of the Owens River Valley. The mouth of the Owens River begins approximately 6 miles southeast of the city of Lone Pine near Dolomite, California.

Ten miles southeast of Big Pine, the river is diverted into the Los Angeles Aqueduct, which consists of three source aqueducts from the Owens River, Haiwee Reservoir, and the Mono Extension. The Los Angeles Aqueduct was constructed in 1913 and is managed and

maintained by the Los Angeles Department of Water and Power (LADWP). The aqueduct system delivers water from the Owens River to the city of Los Angeles, California. Inyo County, LADWP and others have been implementing the Lower Owens River Plan since the early 2000s. This plan provides for re-watering a 62-mile-long stretch of river and adjacent floodplain left essentially dry after the river was diverted into the Los Angeles aqueduct in 1913.

The largest cities in the Owens River Valley are Bishop, Lone Pine, Independence, and Big Pine.

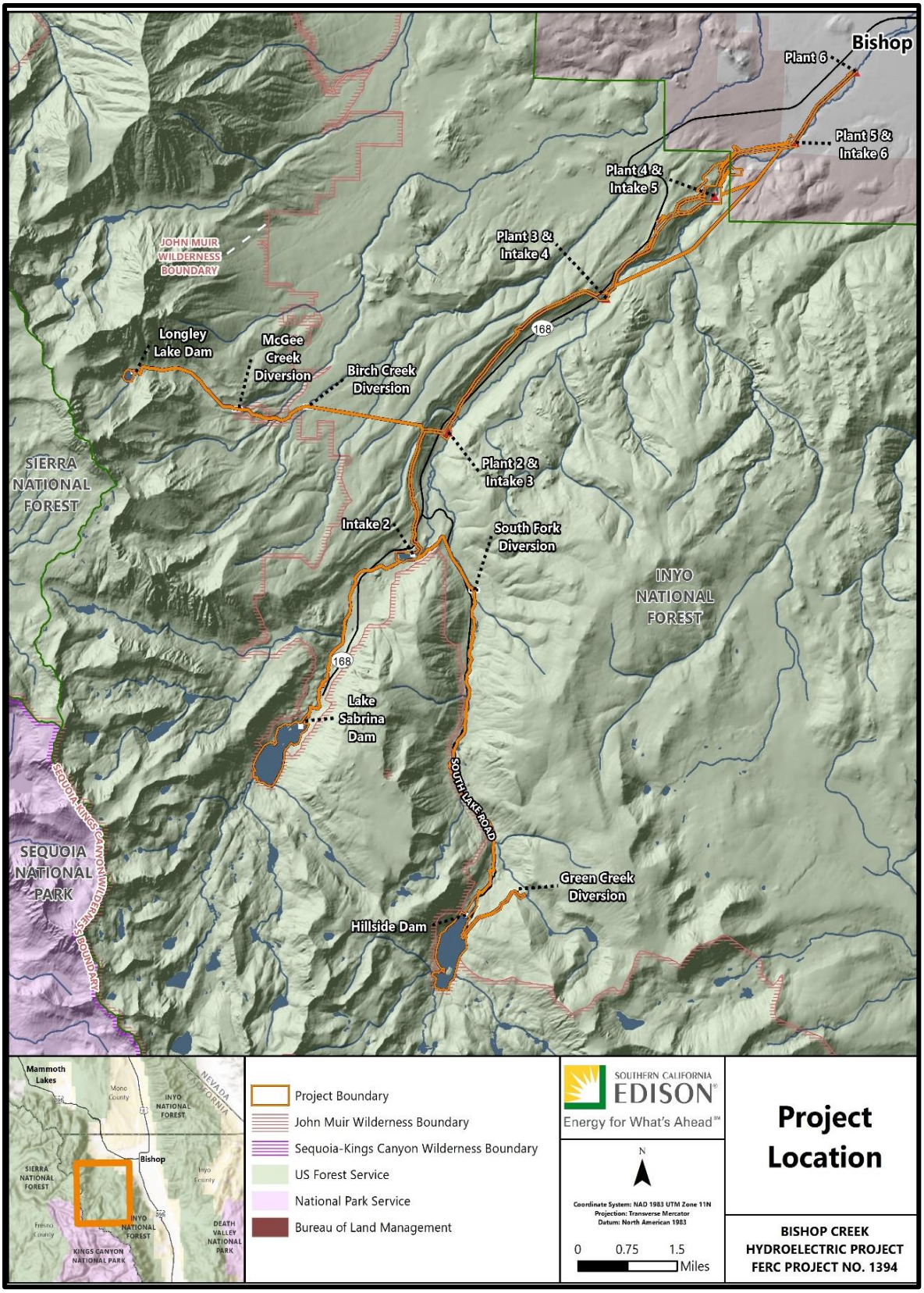

FIGURE 3-1 LOCATION OF THE BISHOP CREEK HYDROELECTRIC PROJECT

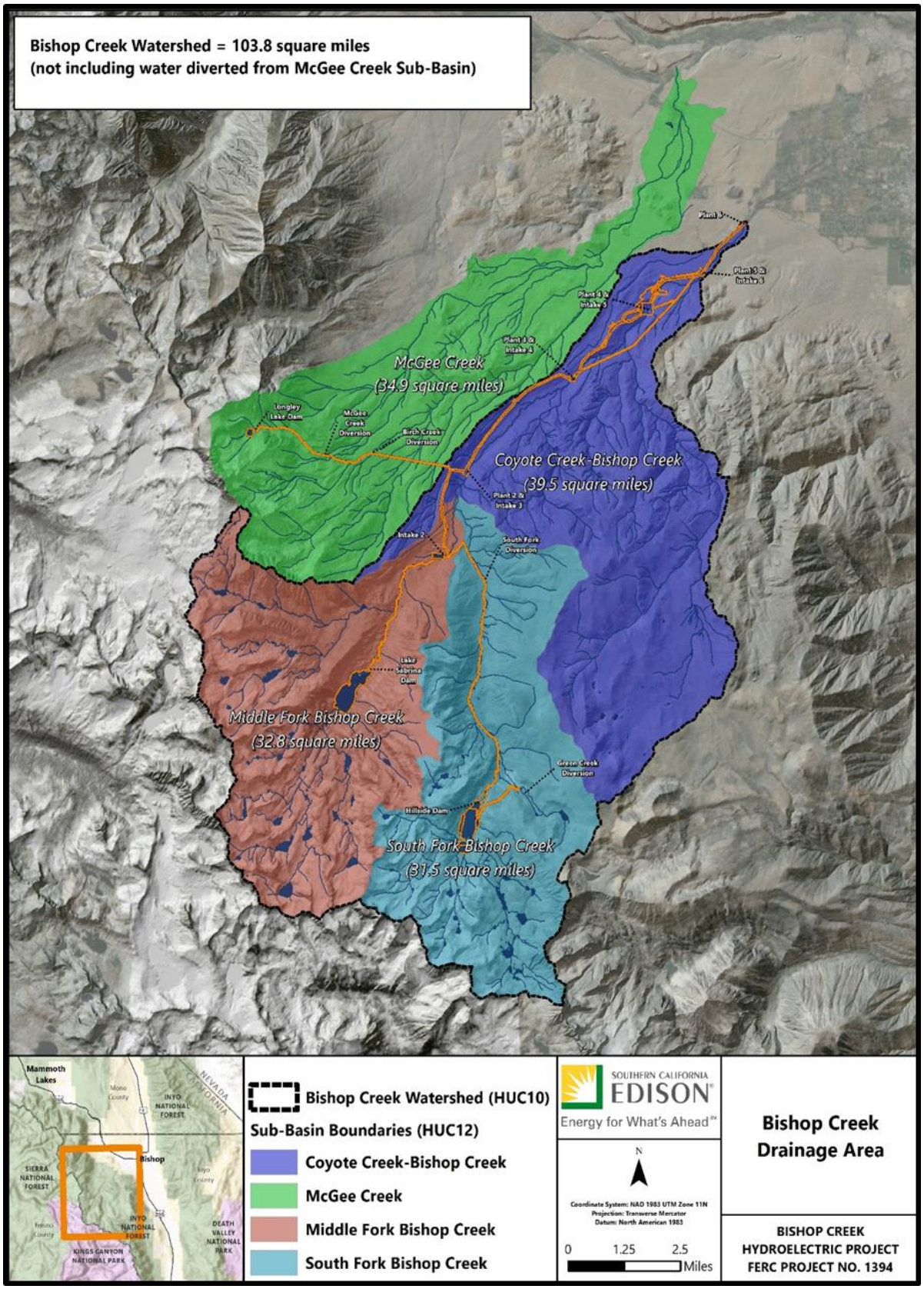

FIGURE 3-2 BISHOP CREEK DRAINAGE AREA

3.1 MAJOR LAND AND WATER USES

3.1.1 California Water Right Law

Water right laws in the western states differs from water right laws in the eastern United States. California's water system is dictated heavily on seasonal, geographic, and quantitative differences in precipitation, which has resulted in two types of water system management: riparian and appropriative. Additionally, California has two other types of water rights: reserved (water set aside by the federal government when it reserves land for public domain), and pueblo rights (a municipal water right based in Spanish and Mexican law). Riparian rights have a higher priority than appropriative rights.

California Water Code 1943 establishes the foundation for the acquisition and protection of water rights (Inyo County Planning Department 2014). The California State Water Resources Control Board (CSWRCB) manages and administers various federal and state water quality programs. Locally, the Lahontan Regional Water Quality Control Board (RWQCB) is responsible for oversight in the Owens Valley. The Inyo County General Plan Land Use Elements contains the provisions related to both land use, and public services and utilities. Inyo County and LADWP have a cooperative long-term water resources management agreement (1991) to ensure that there is a reliable water supply for export to Los Angeles, and for use in Inyo County (Inyo County Water Department 2017).

3.1.2 Bishop Creek Land and Water Uses

Southern California Edison (SCE) has nine claimed Supplement Statements of Water Diversion and Use rights in Inyo County beginning on January 1, 1974 and six appropriative licensed water rights beginning in 1918 according to the State of California Electronic Water Rights Information Management System (eWRIMS). SCE's water rights are outlined in Section 3.1.1.

Land ownership within and adjacent to the FERC Project boundary is predominantly composed of federal lands jointly administered by the Inyo National Forest and Bureau of Land Management; a small portion of Inyo National Forest lands within the FERC Project boundary are also managed as a National Wilderness Area (John Muir Wilderness). The

remainder of lands are owned by SCE, LADWP, or private landowners, much of which is classified as rurally protected lands. While there is only a small portion of residential lands adjacent to the FERC Project boundary, the Inyo National Forest provides many recreation opportunities in the area that attracts visitors to the area. The FERC Project boundary includes only lands necessary for Project operations and maintenance and for the conveyance of water throughout the Bishop Creek system.

3.1.3 Owens River Land and Water Uses

The Owens River forms a 2,600-square-mile watershed, of which the Bishop Creek is the largest tributary. The confluence of the Bishop Creek and Owens River is east of the town of Bishop, California. Ten miles southeast of Big Pine, what remains of the Owens River is diverted into the Los Angeles Aqueduct, which consists of three source aqueducts from the Owens River, Haiwee Reservoir, and the Mono Extension. The Los Angeles Aqueduct was constructed in 1913 and is managed and maintained by the LADWP. The aqueduct system delivers water from the Owens River to the city of Los Angeles, California.

Much of the land in the Owens Valley drainage basin is either owned by the United States Government or the LADWP (307,000 acres). A small portion is owned by private citizens and municipalities. Of the United States Government land in the area, the two agencies that own the land generally located in the mountains and along the edges of the mountains are the U.S. Forest Service (USFS) and the U.S. Bureau of Land Management (BLM) (USGS 1998).

The primary economic activities in the valley are livestock ranching and tourism. Approximately 190,000 acres of the valley floor is leased by the LADWP to ranchers for grazing, and 12,400 acres are leased for pasture for growing alfalfa. Most of the land in the area is open to the public and is used for hunting, fishing, skiing, and camping (USGS 1998).

The major historical periods of water use are summarized in Table 3-1.

TABLE 3-1 MAJOR HISTORICAL PERIODS OF WATER USE

Time Period	Characteristics of Water Use
Pre-1913	Prior to the first export of water from the Owens Valley. Installation of canals to dewater the valley floor and supply water for farming and ranching.
1913 to 1969	Export of surface water from the Owens Valley by diversion of the Owens River and tributary streams into the Los Angeles Aqueduct. General decrease of farming and ranching in the valley. Brief periods of pumping to augment local surface-water supplies.
1970 to 1984	Export of some additional surface water. Beginning export of ground water with the addition of new wells and second aqueduct. Major fish hatcheries switch supply from surface water to ground water. Decrease in consumptive use of water by remaining ranches.
1985 to 1988	Continued export of surface and ground water. Design of cooperative water-management plan between Inyo County and the LADWP. Installation and initial operation of enhancement and mitigation wells.

Source: USGS 2017

Post-1988, the water in the Owens Valley has primarily been used for surface-water diversions and/or ground-water pumping. 1,200 to 2,000-acre feet of ground water is supplied by the four largest towns: Bishop (population 3,879), Big Pine (1,756), Independence (669), and Lone Pine (2,035). Other uses of water in the Owens Valley include water delegated for Indian Reservations, stock water, irrigation for pastures, and irrigation of alfalfa (USGS 1998). There are numerous wells that are not maintained and monitored by the LADWP for domestic water supply, primarily at Mt. Whitney Fish Hatchery, on isolated ranches in Bishop, and on four very small Indian Reservations (USGS 1998).

3.2 OTHER DIVERSION STRUCTURES

There are eight dams (Hillside, Sabrina, Longley, Intake No. 2, Intake No. 3, Intake No. 4, Intake No. 5, and Intake No. 6) and four diversions (Green Creek, Birch-McGee Diversion pipe, Birch Creek [West], and McGee Creek) on Bishop Creek. A description of each can be found in Section 4.3.2.

3.3 TRIBUTARIES

The Bishop area has the most abundant native water supplies of any area in the Owens Valley as indicated by the large discharge of Bishop Creek (average annual discharge is more than 90 cubic feet per second [ft^3/s]). In the Bishop Basin, most of the tributary streamflow that reaches the valley floor is diverted to canals that distribute water for agricultural uses, wildlife habitat, or ground-water recharge. Excess water is returned to the canals and eventually to the Owens River (USGS 1998).

3.4 CLIMATE

Most of the water supply for the state of California comes from snowmelt in the Sierra Nevada mountain range, therefore, climate change and how it affects precipitation is importance to the region. As the temperatures in the Sierra Nevada increase, snowmelt increases as does precipitation, resulting in earlier snowmelt which increases the risk of flooding in the spring and water shortages in the summer (USDA 2009).

The climate in the Sierra Nevada is largely influenced by the Mediterranean climate that is similar in the rest of the state of California. The Mediterranean climate is marked by rainy winters, and dry and warm to hot summers. Between 5,000 and 8,000 feet elevation, precipitation is the highest, although the eastern range receives 25 inches or less of precipitation per year. Summer highs average between 42 and 90 degrees Fahrenheit.

With the snowpack being a major source of water and therefore electric power in California, there were several reservoirs constructed in the canyons of the Sierra Nevada throughout the 20th Century. Despite this, the Sierra Nevada still casts a large rain shadow that makes it largely responsible for the state of Nevada being the driest state in the United States (NOAA Earth Systems Research Laboratory n/d).

3.5 REFERENCES

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4 PROJECT LOCATION, FACILITIES, AND OPERATIONS

4.1 PROJECT INTRODUCTION, LOCATION, FACILITIES, AND OPERATIONS

The Bishop Creek Hydroelectric Project facilities are located in the Owens Valley and in areas of the eastern Sierra Nevada mountains in the County of Inyo, southwest of the City of Bishop. The Project's facilities are sited along Bishop Creek and its tributaries including South Fork, Middle Fork, Green Creek, Birch Creek, and McGee Creek. Bishop Creek is a tributary to the Owens River. The Project facilities are located within the Inyo National Forest, the John Muir Wilderness (both of which are managed by the USFS), lands managed by BLM, and on private lands.

The Project area is one of moderate to steep ridge and valley topography. Elevations within the drainages range from approximately 4,000 feet mean sea level (MSL) to over 13 ,000 feet MSL. Bishop Creek is a major stream with a total drainage area of approximately 70-square-miles, flowing northeastward approximately 28 miles from its headwaters in the Sierra Nevada mountains to its confluence with the Owens River at the City of Bishop. The North, Middle, and South forks of Bishop Creek originate in nearby glacial basins separated by ridges. South Lake and Lake Sabrina are the major storage reservoirs in the watershed.

Water from McGee and Birch creeks is diverted to Bishop Creek through the existing hydroelectric facilities. Both streams originate on alpine slopes north of Bishop Creek. McGee and Birch creeks have a combined drainage area of approximately 25-square-miles. McGee Creek flows approximately 15 miles to its confluence with the Owens River. Birch Creek flows approximately 5 miles to the existing diversion and then becomes intermittent.

This section describes existing facilities and operations, as well as the licensees anticipated changes to the Project's facilities; operations; and protection, mitigation, and enhancement (PME) measures that are expected to be implemented over the course of the next license term. The Federal Energy Regulatory Commission (FERC) would review the applicant's proposal and incorporate conditions and recommendations into a new license consistent with the Federal Power Act and other applicable statutes.

As the action agency, FERC will conduct a National Environmental Policy Act (NEPA) review of the proposed action. FERC's analysis of the proposed action would compare the applicant's proposal against the existing conditions (baseline) to determine the likely effects of issuing a new license.

SCE is proposing only limited modifications to facilities and operations for the next license term that are intended to facilitate implementation of long-term operating and maintenance (O&M) procedures.

4.2 MEASUREMENT OF ELEVATION AT THE PROJECT

Elevations referenced match those from previous license exhibits. Vertical surveys were performed by SCE in 1980. See document titled "Reservoir Surveys 1980" for description.

4.3 PROJECT FACILITIES

The Project consists of 13 dams/diversions, and 5 powerhouses with a combined generating capacity of 28.565 megawatts (MW). The Project diverts water for power generation from the Middle and South forks of Bishop Creek, McGee Creek, and Birch Creek through the five powerhouses and associated intakes as follows: (1) Powerhouse No. 2, immediately below the confluence of the Middle ad South forks of Bishop Creek; (2) Powerhouse No. 3, 3 miles below Powerhouse No. 2; (3) Powerhouse No. 4, approximately 3 miles below Powerhouse No. 3; (4) Powerhouse No. 5, approximately 1 mile below Powerhouse No. 4; and (5) Powerhouse No. 6, approximately 2 miles below Powerhouse No. 5.

4.3.1 Reservoir

South Lake is operated as a store and release facility for water storage and downstream hydropower generation of electricity. South Lake holds and releases spring runoff to allow for regulated flows during the summer months to the powerhouses and provides for water recreation. South Lake has a net storage capacity of 12,883 acre-feet at normal full pool elevation (El. 9,751.3 feet). The surface area of the reservoir when full is approximately 173 acres. The flow is regulated with an unlined tunnel with a capacity of 178 cfs. The

submerged outlet tunnel intake portal is located approximately 1,200 feet upstream of the dam.

Lake Sabrina has a net storage capacity of approximately 8,376 acre-feet at normal maximum reservoir level (El. 9,131.62 feet). The surface area of the reservoir when full is approximately 184 acres. Water is released to the downstream channel via low-level outlets; the intake is a fully submerged concrete box supporting three steel trash racks that is integral with the upstream side the dam. The invert of the intake is at elevation 9,067.42 feet.

4.3.2 Dams and Diversions

Green Creek Diversion is located 0.8 miles east northeast of the Hillside Dam (South Lake) spillway. A wooden head gate 3-feet-long by 2-feet-high is located approximately 80 feet downstream from Bluff Lake on Green Creek. The headgate diverts water into an open channel approximately 1,400 feet in length to the Green Creek diversion intake. The diversion is earth and rockfill, located at 10,264 feet elevation, approximately 51 feet along the crest and 9 feet above streambed. The diversion is equipped with a 12.5-foot-wide by 1-foot-deep spillway. The intake consists of a 16-inch-diameter steel pipe with slide gate and a trash rack. A 16-inch-diameter drain pipe passes through the intake chamber which is constructed of concrete masonry. A 16-inch-diameter steel pipe which is approximately 4,750-feet-long extending into a natural channel, 1,150 feet in length, carries water to South Lake.

South Fork Diversion is earth and rockfill with a crest elevation at 8,211 feet, crest length of approximately 65 feet, and crest height of 10 feet above the streambed. The diversion is equipped with a 40-foot-wide by 6-foot-deep spillway. A 38-inch-diameter steel pipe with a gate valve and trash rack comprises the outlet. The spillway height may be raised or lowered by 4-inch by 6-inch flashboards, each 4 feet in length. A 12-inch-diameter drain pipe passes through the base of the intake chamber and a 36-inch-diameter drainpipe passes through the diversion. The flowline consists of approximately 4,104 feet of 38-inch-diameter steel pipe connected to 4,059 feet of 34-inch-diameter steel pipe. The flowline extends from the South Fork diversion to Intake No. 2 reservoir. The flowline is protected with air valves, expansion joints, a sand box, and a sand trap. The sand box is concrete lined approximately 17 feet by

24 feet with exit to a 38-inch steel pipe extending to Intake No. 2. The sand box has two drain gates.

Hillside Dam is an 81.5-foot-high rockfill timber face (covered with geomembrane) dam completed in 1910 to enlarge an existing natural lake (South Lake). The crest is 645-feet-long and is at an elevation of 9,757.6 feet. There is a 40-foot spillway; and a 1,900-foot unlined outlet tunnel that discharges into the South Fork of Bishop Creek 600 feet downstream of the dam. The reservoir is operated as a regulating reservoir for a series of hydroelectric powerhouses including Bishop Creek Powerhouses 2 through 6.

Weir Lake Weir, located approximately 1,800 feet below Hillside Dam, is used for flow monitoring. Weir Lake Weir, also known as South Lake Weir, is a structure of concrete approximately 70-feet-long and varying in height from 2 feet to 4 feet. The weir is 25-feet-wide by 1-foot-high.

Sabrina Dam and associated facilities consist of a 70-foot by 900-foot timber face (covered with geomembrane) rockfill dam, an uncontrolled main spillway formed by an ogee crest, an uncontrolled auxiliary spillway formed by a concrete wall, and three low-level outlets. The dam forms Lake Sabrina, which is operated as a regulating reservoir for a series of hydroelectric powerhouses which include Bishop Creek Powerhouses 2 through 6.

Longley Dam is an earth and rockfill dam constructed with a reinforced concrete core wall. The dam has a crest elevation of 10,708 feet, crest length of 120 feet, and crest height of 27 feet above streambed. The upstream face of the dam has a slope of 2 to 1 and a downstream face slope of 1.5 to 1. There are two 8-inch-diameter steel outlet pipes encased in concrete which pass through the base of the dam. Flow is controlled by two 10-inch gate valves. The spillway is 8-feet-wide by 2-feet-deep. The spillway channel is excavated in 8-foot-wide solid rock. Water is diverted into McGee Creek.

Intake No. 2 Dam is a 41-foot-high, 443-feet-long, earthfill dam with a concrete core wall extending over approximately half its length. The concrete corewall is discontinued on the right side of the dam where the dam is less than 20-feet-high. There is a service spillway with an ogee crest and an auxiliary spillway with an ungated concrete ogee crest, two low

level outlet conduits, and one intake structure. Water is conveyed to **Flowline/Penstock No. 2** through a 48-inch-diameter steel pipe that passes under the dam near the left abutment. The steel pipe connects to a second hydraulically operated, 48-inch-diameter butterfly valve located in a small building at the downstream toe of the dam. The butterfly valves control flow through a 48-inch to 60-inch diameter expansion to the 60-inch diameter flowline to Bishop Creek Powerhouse No. 2. The valves are normally open but are operable remotely from the SCE's Bishop Control Center located next to Powerhouse No. 4.

A 24-inch-diameter sand sluice pipe runs parallel to the 48-inch-diameter pipe and passes under the dam. A 20-inch fish water release pipe branches off the 24-inch sluice line directly above the valve house. The fish water release piping was reconfigured and a new acoustic velocity meter (AVM) to measure flow was installed in 2008 to monitor and record minimum releases.

- **Intake No. 3 Dam**: 20-foot by 225-foot concrete arch; 40-foot by 3.5-foot spillway; 60-inch by 6,421-foot-long steel pipe; 60-inch by 6,209-foot steel pipe; 54-foot to 48-inch by 4,673-foot penstock

- **Intake No. 4 Dam:** 28-foot by 323-foot concrete arch; 50-foot by 5-foot spillway; 60-foot steel intake pipe; 60-inch by 6,242-foot steel pipeline; 30-foot by 24-inch by 5,314-foot penstock; 30-inch by 5,665-foot penstock

- **Intake No. 5 Dam:** 20-foot by 275-foot concrete; 60-inch by 3foot spillway; 60-foot steel pipe; 60-inch by 2,933-foot steel pipe; 60-inch by 540-foot concrete pipe; 2 – 42-inch by 4,800-foot penstocks

- **Intake No. 6 Dam:** 26-inch by 320-foot concrete dam; 6-foot spillway; 3,000-foot steel pipe; 54-inch x 4,360-foot penstock

- **Diversion Pipe**: The Birch-McGee Diversion pipe connects to the lower end of Flowline No. 2. This 24-inch-diameter steel pipe conveys water from Birch and McGee creeks to Flowline No. 2. The rated capacity of the Birch-McGee Diversion pipe is approximately 40 cfs. The flowline collects water from the following:

    - **Birch Creek (West) Diversion:** a 6-foot by 22-foot stone and concrete diversion dam; a 22-inch steel pipe connects to Penstock 2 above Powerhouse 2.

    - **McGee Creek Diversion** is a 6-foot by 22-foot concrete dam on McGee Creek, with a 12-foot by 1-foot spillway. Water is diverted into an 18-inch steel outlet pipe and into a flowline, which discharges into Birch Creek above the Birch Creek Diversion.

4.3.3 Powerhouse

Table 4-1 below summarizes attributes of the powerhouses and associated facilities.

TABLE 4-1 SUMMARY OF BISHOP CREEK GENERATION EQUIPMENT

Power House	Turbines	Installed Capacity	Net Head
2	Three main horizontal-shaft, single-overhung, single-jet, impulse turbines rated at 10,870 HP total	7,300 kW	875 feet
3	Three main horizontal single-overhung, single-jet, impulse turbines rated at 12,000 HP total	6.600 kW	730 feet
4	Five main horizontal-shaft, single-overhung, single-jet impulse turbines rated at 14,700 HP total	7,250 kW	1053 feet
5	Two main horizontal-shaft reaction turbines rated at 5,700 HP total	3,500 kW	382 feet and 350 feet
6	One main Pelton-type, horizontal-shaft, single jet, double overhung, hydraulic impulse turbine rated at 2,850 HP	1,600 kW	220 feet

Note that Powerhouses are numbered 2 through 6.
Key: HP horsepower
kW kilowatt

4.3.4 Project Transmission

The Project included the following transmission lines:

1. A 3.7-mile-long, 115-kV transmission line from Powerhouse No. 3 to the Control Substation; (Control-Plant 3-Plant 4)

2. A 0.7-mile-long, 115-kV transmission line which runs from the Powerhouse No. 4 switchyard to the transmission line connecting Powerhouse 3 to the Control Substation; and (Control-Plant 3-Plant 4)

3. A 150-foot-long, 55-kV transmission line which runs from the Powerhouse No. 5 to tap the transmission line between Powerhouse No. 6 switchyard and the Control Substation (Control-Mt. Tom).

Historically, the Project also included:

1. A 1.3-mile-long, 55-kV transmission line which runs from the Powerhouse No. 6 switchyard the Control Substation; and (Control-Mt. Tom)

2. A 6.9-mile-long, 55-kV transmission line which runs from the switchyard at Powerhouse No. 2 to the Control Substation (Control-Plant 2).

In 2001, SCE proposed removing the Control-Mt. Tom and the Control-Plant 2 transmission lines from the FERC license and FERC Project boundary since they are part of the its transmission and distribution system, carrying power from both Project and non-project sources. By order dated February 28, 2002, FERC removed the 6.9-mile-long and the 1.3-mile-long transmission lines from the Project, effective upon receiving permits from the federal land managers. These permits were received and accepted by SCE from the BLM and the USFS on December 5, 2001 and March 12, 2007 respectively.

4.4 CURRENT AND PROPOSED PROJECT OPERATIONS

The Bishop Creek Hydroelectric Project starts diverting water at three points: Green Creek at the Green Creek Diversion, McGee Creek at the McGee Creek Diversion, and Middle Fork Bishop Creek at Lake Sabrina.

Water starting at the Green Creek Diversion (10,264 feet MSL) flows through a pipeline to South Lake and is then released through Hillside Dam (9,757.6 feet MSL) into South Fork where it meets with the remaining flows from Green Creek that were not diverted. Together this water flows down the South Fork to the South Fork Diversion (8,211 feet MSL). At the South Fork Diversion structure, a portion of the flow is diverted through a pipeline to Intake No. 2 (8,105 feet MSL), and the rest continues to flow down South Fork. Upper watershed areas contributing to the Middle Fork drain into Lake Sabrina. Reservoir water outlets through Sabrina Dam (9,137.9 feet MSL) into the Middle Fork which flows approximately 1 mile before converging with North Fork. The combined waters from the Middle and North forks of Bishop Creek flow to Intake No. 2 Dam (8,104.8 feet MSL) which also receives water from the South Fork Diversion flowline. From Intake No. 2 Dam, the water enters a 2.1-mile-long flowline and a 0.5-mile-long penstock which connects to Powerhouse No. 2 sited on Bishop Creek.

Powerhouse No. 2 also receives water which originates from Longley Lake Dam (McGee Lake) and upper portions of the Birch Creek watershed. Longley Lake Dam (10,708 feet MSL) discharges water to McGee Creek where it flows over a mile before it is intercepted by

the McGee Creek Diversion (9,192 feet MSL). The diversion spillway connects to an open ditch and steel pipe which outlets to Birch Creek. After entering the creek, the water flows approximately 0.5 mile before being diverted again by the Birch Creek Diversion (8,304 feet MSL). At this point, the water enters a pipe where it descends over 1,100 feet in elevation to Bishop Powerhouse No. 2.

From this point on, a portion of the water flows down Bishop Creek and a portion is conveyed through a series of pipes and penstocks connecting Powerhouses Nos. 2, 3, 4, 5, and 6. Each powerhouse and intake controls the portion of water entering the creek and the portion directed into the pipe/penstock conveyances. After Powerhouse No. 6, Bishop Creek flows to the Bishop community and the Owens Valley. In addition, a 1.79-mile ditch (Abelour ditch) carries water discharged from the Powerhouse No.6 penstock to the Rocking K subdivision.

4.5 WATER USE AND STORAGE

Flow varies monthly, depending on the amount of runoff and SCE's release schedule, which is dictated by snowpack, snow melt, spring rain events, drought, power demand, and irrigation. At the lower end of the system, the peak runoff occurs from May to August. Annual runoff averages 100 cubic feet per second (cfs), with calculated monthly mean flows ranging from 41 cfs to 285 cfs. These numbers will be updated as part of the relicensing process.

The regulated reaches between Lake Sabrina and Intake No. 2 and between South Lake and South Fork Diversion experience similar flow fluctuations. Because these reaches aggregate and convey all Project flows, they are never as low as the flows in the diverted sections. During wet years, the regulated reaches have much higher flows. The current license requires minimum flow releases into diverted reaches.

Figure 4-1 through Figure 4-3 below represent the operating rule curve for mean, high, and low water years.

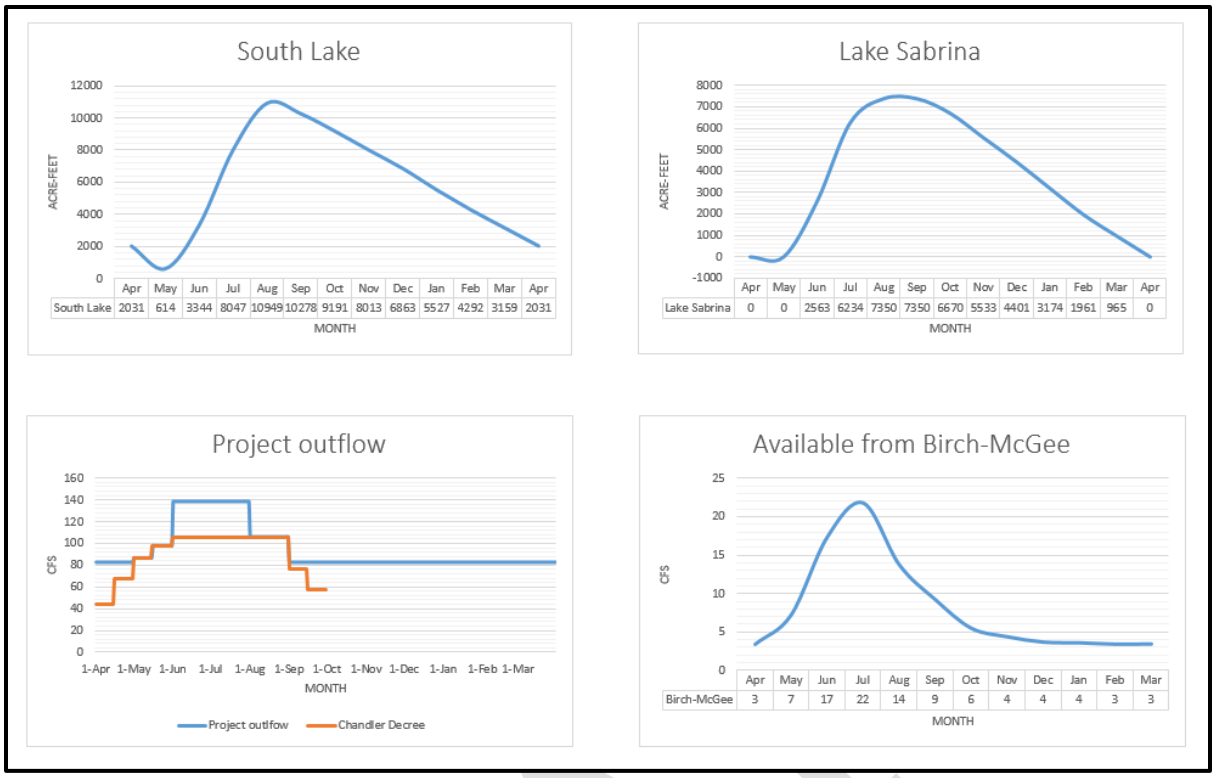

FIGURE 4-1 OPERATING RULE CURVE – MEAN WATER YEAR

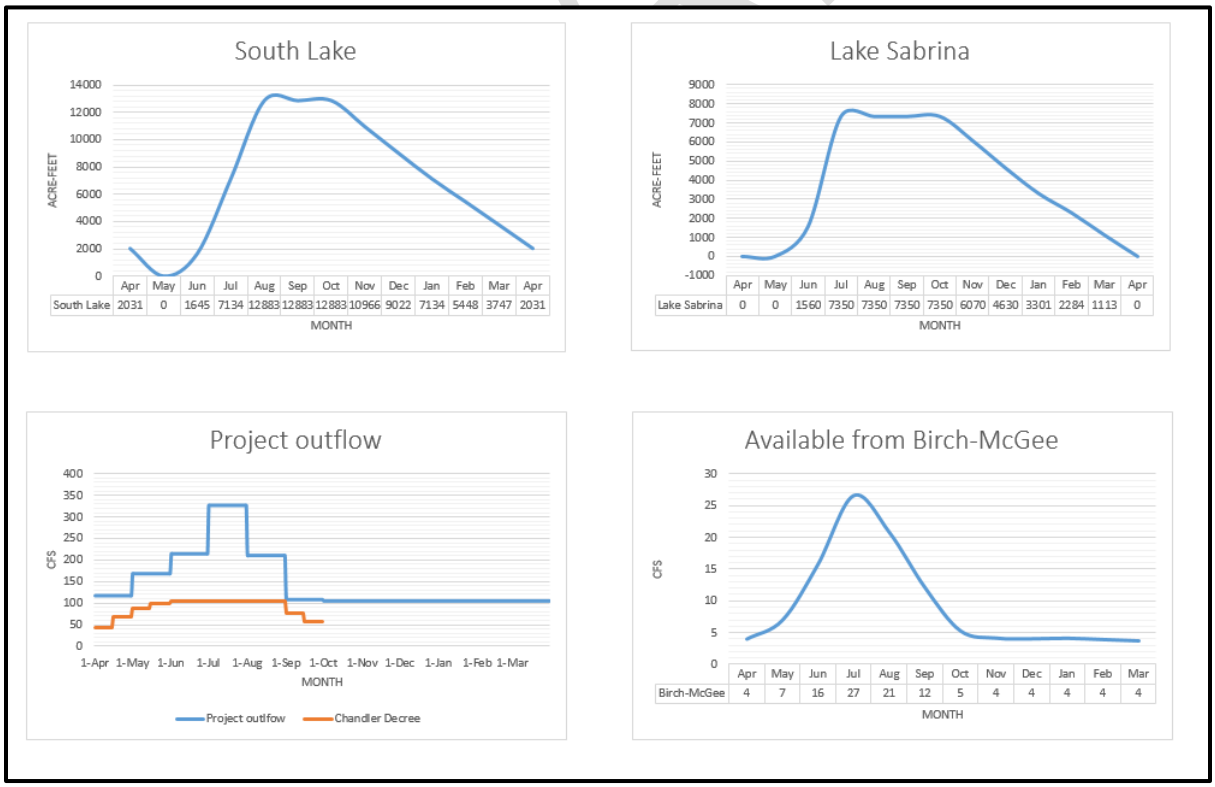

FIGURE 4-2 OPERATING RULE CURVE – HIGH WATER YEAR

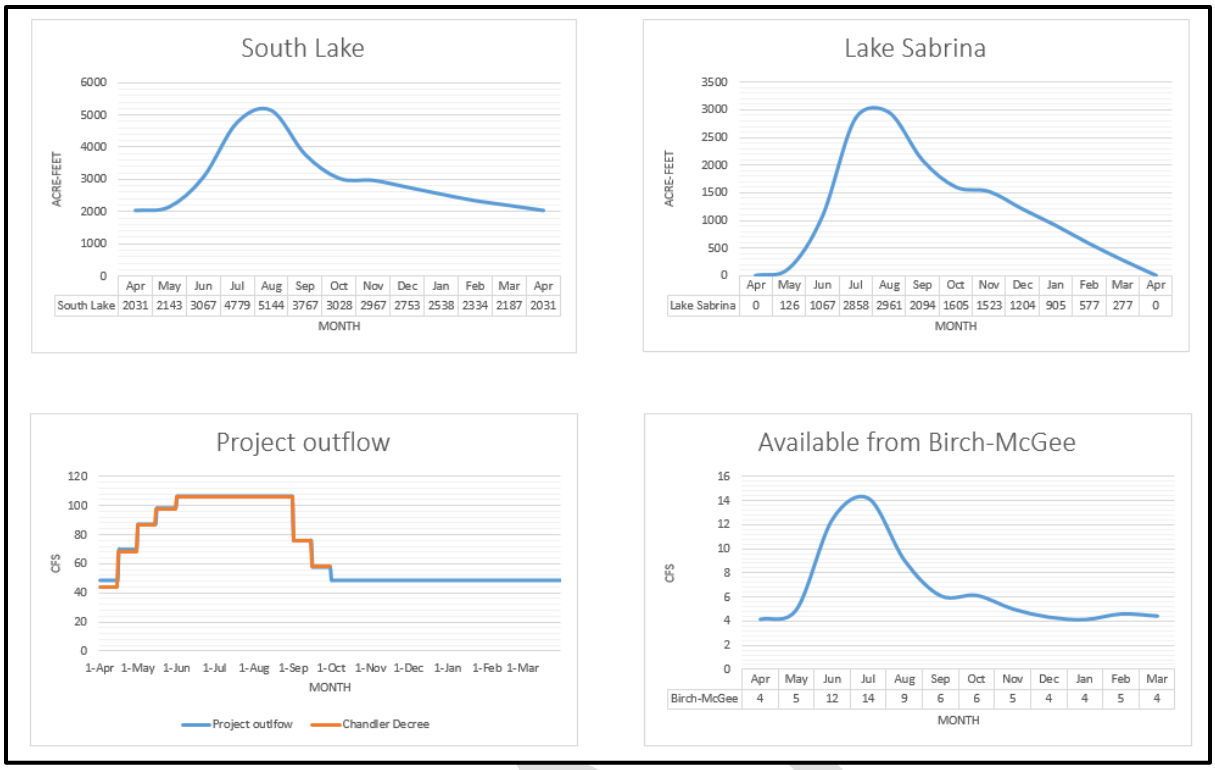

FIGURE 4-3 OPERATING RULE CURVE – LOW WATER YEAR

4.5.1 Summary of Project Generation and Outflow Records

Seven years of Project generation data is summarized in Table 4-2 below.

TABLE 4-2 BISHOP CREEK GENERATION KWH AVERAGE (2011-2017)

	Plant 2	Plant 3	Plant 4	Plant 5	Plant 6	Total
January	939,000	939,000	1,490,400	226,500	354,717	**3,871,450**
February	910,286	977,714	1,463,829	599,000	387,500	**4,338,329**
March	1,442,286	1,603,286	1,440,343	963,429	522,757	**5,972,100**
April	1,963,714	1,899,000	1,616,229	972,500	625,300	**7,076,743**
May	2,840,571	2,719,586	3,252,343	1,593,857	1,073,571	**11,479,929**
June	3,687,000	3,535,500	4,403,200	1,587,000	844,983	**14,057,683**
July	4,024,687	3,795,259	4,186,957	1,640,932	1,078,574	**14,726,410**
August	3,651,248	3,488,064	4,022,588	1,463,147	872,729	**13,497,777**
September	2,365,904	2,198,609	2,765,296	735,377	629,318	**8,694,504**
October	1,756,747	1,494,507	2,441,455	552,933	474,335	**6,719,977**
November	1,600,949	1,060,400	1,360,079	344,000	247,093	**4,612,521**
December	1,101,905	1,071,272	1,626,282	444,457	226,422	**4,470,338**

Source:

4.6 OTHER PROJECT INFORMATION

4.6.1 Current License Requirements

The licensed Project is subject to Articles 1-28 of the FERC's standard terms and conditions set forth in Form L-3, (October 1975) entitled "Terms and Conditions of License for Constructed Major Project Affecting Navigable Waters of the United States." Project-specific license articles are stated in the 1994 license order as amended. These are summarized, along with relevant amendments in Appendix XX

The Project is not subject to a State Water Resources Control Board Water Quality Certificate (WQC). The licensee applied for a WQC on March 28, 1986. Because the State Water Resources Control Board failed to act for over 1 year on the licensee's request for a WQC, FERC waived the Project WQC requirement.

Articles 105 of the current license require the release of various minimum flows. The minimum flow requirements are different for each development.

Table 4-3 below summarizes requirements of principle resource-related license articles. A more detailed summary of all license requirement, including amendment history and those requirements that have been eliminated from the license is included as Appendix XX.

TABLE 4-3 DETAILED SUMMARY OF LICENSE REQUIREMENTS

Requirement Type	Requirement
Annual Consultation (Article 104)	Requires consultation with the USFS regarding measures needed to ensure protection and development of the natural resource values of the Project area. Annual reports are due by July 15 each year.
Maintain Minimum Flows and Summer Operations and Maintenance Plan (Article 105)	Establishes minimum flows (Table 4-4) and requires annual meeting with USFS and California Department of Fish and Wildlife (CDFW) to develop summer operations and maintenance plan, water management of reservoirs, and flushing flows.
Temporary Modification of Minimum Flows (Article 105)	Provides for temporary modification of minimum flows, if required by operating emergencies beyond the control of the licensee; or for short periods upon written consent of the USFS.
Riparian and Aquatic Monitoring Plan (Article 105)	Required implementation of 1993 plan as described by USFS revised conditions. By order dated 1/16/2014 the plan was revised to reflect USFS's 5/31/2013 letter regarding abiotic, vegetation, and aquatic monitoring at the Bishop Creek Project. Monitoring and ongoing reporting is required for term of license. The purpose of the monitoring is to determine if goals and objectives of the minimum flow requirements on riparian dependent species have been met. As needed licensee will propose changes in flows to meet the objectives. Annual reports of streamflows are filed with the Inyo National Forest.
Installation of Stream Gage Device (Article 106)	Provides for installation of stream gages downstream of the point of release of all bypass flows and below South Lake Dam and Lake Sabrina Dam.
Recreation Resource Protection and Mitigation-Recreation Resource Protection and Mitigation Access Trails Operation and Maintenance Costs (Article 107)	Required annual funding to USFS to pay for USFS operations and maintenance expenses. By order dated 11/20/1998, cost was established as one-half of the O&M costs

Requirement Type	Requirement
	generated by day-use recreation at the South Lake and Sabrina reservoirs.
Recreation Resource Protection and Mitigation Erosion, stream sedimentation, dust, and soil mass movement control plan (Article 108)	Before starting land disturbing activities on USFS lands, submit a plan to FERC; plan approved by the USFS for the control of erosion, stream sedimentation, dust, and soil mass movement.
Solid Waste and Waste Water Disposal Plan (Article 109)	Before starting land disturbing activities on USFS lands, submit a plan to FERC; plan approved by the USFS for the treatment and disposal of solid waste and waste water generated during construction and operation of the Project.
Hazardous Substances Plan Updates (Article 110)	Before starting land disturbing activities on USFS lands, submit a plan to FERC; plan approved by the USFS for oil and hazardous substances storage and spill prevention and cleanup.
Spoil Disposal Plan (Article 111)	Before starting land disturbing activities on USFS lands, submit a plan to FERC; plan approved by the USFS for the storage and/or disposal of excess construction/tunnel spoils and slide material.
Visual plan (Article 112)	Before starting land disturbing activities on USFS lands, submit a plan to FERC; plan approved by the FS for the design and construction of the Project facilities to preserve or enhance its visual character.
Threatened, Endangered, and Sensitive Species Management Plan (Article 113)	Before starting land disturbing activities on USFS lands, submit a plan to FERC; plan approved by the USFS for the mitigation of impacts to sensitive, threatened, and endangered plant and animal species located within the area to be disturbed.
Fish Mortality Monitoring Plan (Article 401)	Required a monitoring plan to evaluate turbine-induced injury and mortality to fish resources and their impact on fish abundance in Bishop Creek. The article also required stocking of fish in consultation with CDFW.
Riparian monitoring Plan (Article 405)	Requires the filing of annual riparian vegetation monitoring reports required by article 105.

Requirement Type	Requirement
Raptor Protection Plan (Article 406)	Requires a report outlining the modifications made to the Project transmission line to protect raptors.
Cultural Resources Management Plan (Article 410)	Requires implementation of the cultural resources management plan, filed with FERC on April 3, 1989, to avoid and mitigate impacts of the Project on nine archeological sites and the Bishop Creek Hydroelectric System Historic District (District) determined eligible for inclusion in the National Register of Historic Places. The Article also mandates periodic monitoring be undertaken of each National Register of Historic Places (NRHP) eligible site, as well as one site-specific measure.
Cultural Resources Management Plan (Article 412)	Before starting any land-clearing or land-disturbing activities within the Project boundaries, other than those specifically authorized in this license, licensee must consult with the California State Historic Preservation Officer (SHPO), USFS, and Inyo National Forest, conduct a cultural resources survey of these areas, and shall file for FERC approval of cultural resources management plan to avoid or mitigate impacts to any significant archeological or historic sites identified during the survey.

4.6.1.1 Inspections

Over the term of the existing license, SCE has participated in FERC environmental inspections, operations inspections, and dam safety/operation inspections. Any subsequent FERC directives and items identified during the inspections as requiring attention have been timely addressed by SCE and written documentation filed with FERC.

4.6.1.2 Incident Reporting

SCE has filed five incident reports with FERC over the term of the existing license (2007, 2008, 2016, 2016, 2017). As well, one non-project related safety incident was reported in 2012. In all cases, SCE timely notified FERC of the incident and filed a written incident

report. FERC subsequently issued letter orders concurring that the incident reports filed by SCE satisfy the requirements of 18 CFR § 12.10.

4.6.2 Compliance History of the Project

The licensee has a sound compliance history for the Project with only one violation over the course of the current Project license. In 2004, FERC issued a non-compliance memorandum regarding an Article 19 flow. The licensee files minimum flow, pond level compliance reports, and self-reports to FERC for any incidents of temporary deviation from the required minimum flows. Additionally, the FERC San Francisco Regional Office conducts annual inspections. The licensee completes all necessary corrective actions to address comments and recommendations arising from FERC inspections in a timely manner.

4.6.3 Delivery of Water for Non-Power Uses

Project operations are subject to adjudicated water rights and other agreements that provide for non-power uses. The 1922 Chandler Decree is one of the primary controlling documents. The 1933 Sales Agreement (Sales Agreement) between Southern Sierra Power Company (predecessor to SCE) and LADWP addresses SCE's obligations with respect to the waters of Bishop Creek. Within these constraints, SCE manages the releases from the storage reservoirs, for purposes of hydrogeneration and meeting water allocation requirements.

The Sales Agreement provides for seasonal maximum carry-over limits of 2,147 acre-feet, as measured on or about April 1, annually. Variances from this requirement have been obtained on a case-by-case basis in the past, by mutual-agreement between SCE and LADWP. Additionally, SCE meets with the forest service annually to determine: 1) seasonal minimum storage requirements for recreation purposes; and 2) annual flushing flows.

The Chandler Decree and SWRCB water rights licenses determine how flows are allocated and used, as follows:

- Seasonal diversion/accumulation limit not to exceed historically measured use (*i.e.*, not to exceed current project capacity), including an annual limit of 1,400-acre feet from Green Creek.

- Instantaneous diversion limit at all locations not to exceed historically measured use (*i.e.*, not to exceed current project capacity), including a daily average limit of 1 cfs for domestic use.

- Minimum Project flow-through (downstream delivery) requirements, for senior downstream water rights holders, are measured below Plant 6, as required by the Chandler Decree (Table 4-4).

- Minimum instream flow requirement of 0.25 cfs at the Birch Creek diversion, for senior downstream water rights holders, as stipulated by the Chandler Decree

- Minimum instream flow requirement of 1.6 cfs during the irrigation season, and 0.4 cfs at other times, through the Abelour Ditch, for senior downstream water rights holders in the Rocking K Subdivision.

TABLE 4-4 DAILY AVERAGE FLOW REQUIREMENTS FOR FLOW BELOW PLANT 6 (CHANDLER DECREE)

Time Period	Daily Average Flow (cfs)	Instantaneous Minimum Flow (cfs)
April 1-15	44	33
April 16-30	68	51
May 1-15	87	65
May 16-31	98	74
June 1 - Jul 31	106	90
August 1-31	106	80
September 1-15	76	57
September 16-30	58	44

Source: Compiled from Chandler Decree

In addition, there are required minimum instream flow requirements that are mandated by the Articles 105 of the FERC License, as follows:

- Lake Sabrina to Intake 2: no less than 13 cfs or natural flows, whichever is less, year-round
- South Lake to South Fork Diversion: no less than 13 cfs or natural flows, whichever is less, year- round
- Intake 2: no less than 10 cfs from Friday of the last weekend in April thru October 31; no less than 7 cfs for the remainder of the year; or no less than 5 cfs in all months in dry years
- Plant 2 to Plant 3: no less than 13 cfs year-round
- Plant 3 to Plant 4: no less than 5 cfs year-round

- Plant 4: no less than 12 cfs year-round (Article 105)[1]
- McGee Creek Diversion: no less than 1 cfs or the natural flow, whichever is less, year-round
- Birch Creek Diversion: no less than 0.25 cfs or the natural flow, whichever is less, year-round

4.6.4 FERC Project boundary

Since the July 16, 1994 issuance of a new license for the Bishop Creek Project, several changes have occurred at the Project through a series of amendment applications and FERC orders that began in 1998. The following table summarizes notable FERC Project boundary changes during that period:

[1] Article 114 required 18 CFS (or the natural streamflow, whichever is less), however this license condition was removed by order dated February 1, 1995 because of a conflict with the Energy Policy Act of 1992, which changed how the Federal Land Policy and Management Act (FLPMA) treated lands which had been previously subject to a reservation under section 24 of the Federal Power Act. The remaining language in Article 105 ambiguous as to whether the minimum flow requirement is 12 cfs or some greater amount negotiated with the CDFW. Historically SCE has been releasing 18 cfs.

TABLE 4-5 NOTABLE FERC PROJECT BOUNDARY CHANGES DURING CURRENT FERC LICENSE

FERC Project Boundary Change	Order Approving
Removal of a 1.3-mile-long, 55-kV transmission line which runs from the Powerhouse No. 6 switchyard the control substation	Conditionally approved by FERC Order of February 28, 2002. This order provided final approval and an effective date for deletion of the transmission lines as December 5, 2001 and March 12, 2007, which are the dates that SCE received authorization for continued use of the federal lands from the BLM and the USFS, respectively.
Removal of a 6.9-mile long, 55-kV transmission line which runs from the switchyard at Powerhouse No. 2 to the Control Substation	Conditionally approved by FERC Order of February 28, 2002. This order provided final approval and an effective date for deletion of the transmission lines as December 5, 2001 and March 12, 2007, which are the dates that SCE received authorization for continued use of the federal lands from the BLM and the USFS, respectively.
Removal of 1.07 acres of lands associated with Horse Creek Diversion, which was removed to allow free flow in Horse Creek in compliance with Article 105	Approved by FERC Order of February 28, 2002.
Removal of 33.18 acres of lands surrounding demolished company housing	Approved by FERC Order of February 28, 2002.
Addition of 1.17 acres for gauging stations and access roads	Approved by FERC Order of February 28, 2002.

On April 2, 2010, FERC issued an order approving SCE's revised Exhibit G drawings and associated federal acreage for the Project. By letter dated May 5, 2010, SCE submitted GIS FERC Project boundary data, as required by paragraph (c) of that order. Table 4-6 below summarizes land ownership within the FERC Project boundary based on this approved data:

TABLE 4-6 LAND OWNERSHIP WITHIN FERC PROJECT BOUNDARY

Ownership	Acreage	Percentage of Total
U.S. Forest Service	733.8	67.8%
Bureau of Land Management	47.6	4.4%
Non-federal	300.9	27.8%
Total Project Acreage	***1082.2***	

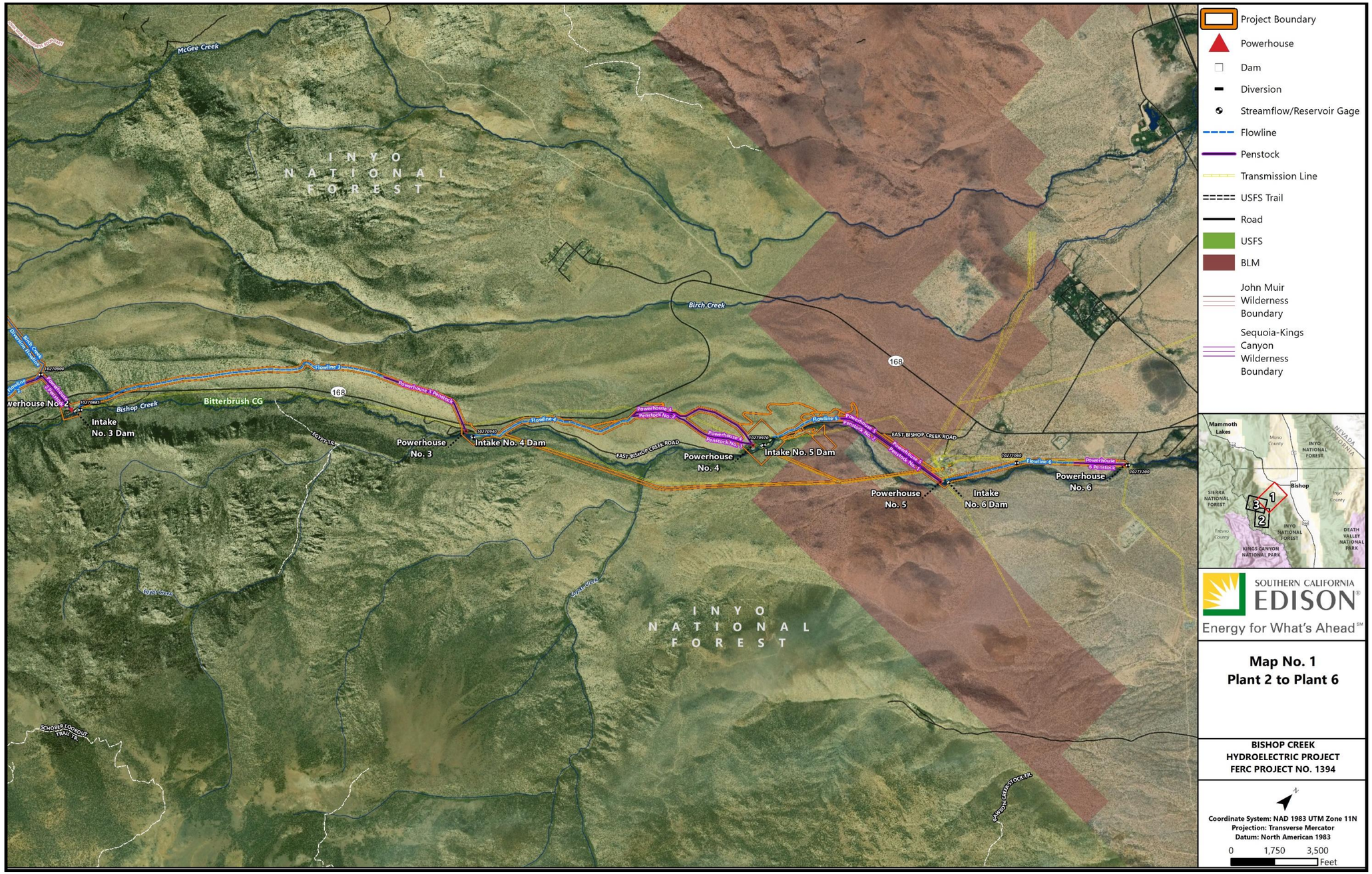

FIGURE 4-4 FERC PROJECT BOUNDARY (PLANT 2 TO PLANT 6)

FIGURE 4-5 FERC PROJECT BOUNDARY (LAKE SABRINA, SOUTH LAKE, INTAKE 2)

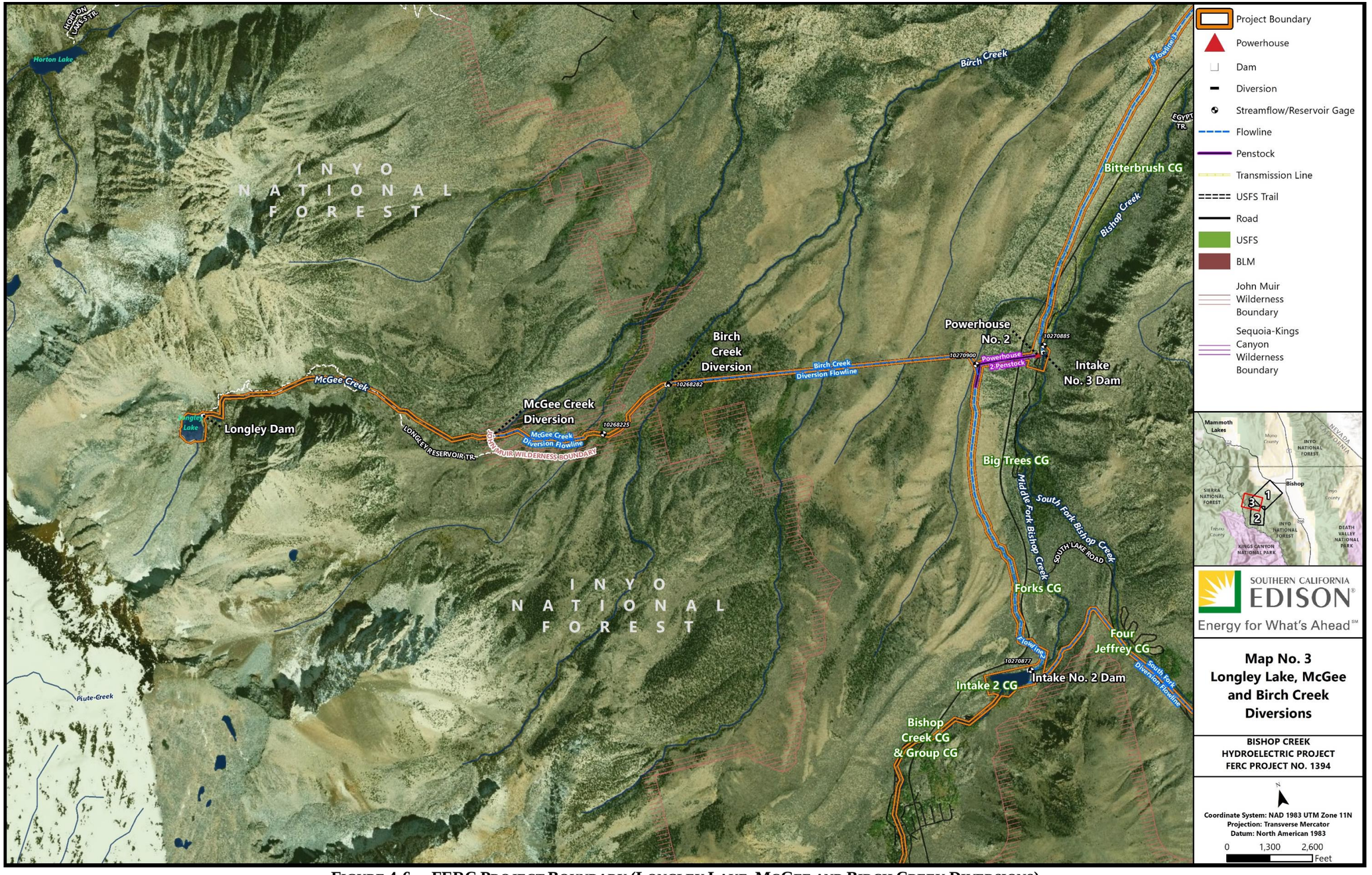

FIGURE 4-6 FERC PROJECT BOUNDARY (LONGLEY LAKE, MCGEE AND BIRCH CREEK DIVERSIONS)