Version 3.0 Plan Issued on November 15, 2018 Comments Due on January 7, 2019		Word versions will be distributed via secure ShareFile link provided in an email. Comments may be submitted via similarly provided link

REVISED DRAFT BISHOP CREEK RESERVOIRS BASELINE FISH DISTRIBUTION STUDY PLAN

BISHOP CREEK HYDROELECTRIC PROJECT (FERC PROJECT NO. 1394)

Prepared for:

SOUTHERN CALIFORNIA EDISON®
Energy for What's Ahead℠

Bishop, California

Prepared by:

Kleinschmidt

Portland, Oregon
www.KleinschmidtGroup.com

September 2018

DRAFT

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SOUTHERN CALIFORNIA EDISON

1.0 INTRODUCTION

Southern California Edison Company (SCE) is the licensee, owner and operator of the Bishop Creek Hydroelectric Project (Project) (Federal Energy Regulatory Commission [FERC] Project No. 1394). The Project is located on Bishop Creek in Inyo County, California, approximately 5 miles southwest of the city of Bishop (Figure 1-1). The licensee operates the Project under a 30-year license issued by FERC on July 19, 1994. As the current license is due to expire on June 30, 2024, SCE has initiated the formal relicensing process utilizing the Integrated Licensing Process (ILP) by filing the Notification of Intent (NOI) and Pre-Application Document (PAD) with FERC on XXXX.

In advance of filing the NOI and PAD, SCE worked with stakeholders to identify necessary studies, with the goal of accelerating FERC's ability to issue a Study Plan Determination. Efforts began over 1 year prior to the formal initiation of the process with FERC, through a series of Technical Working Group (TWG) meetings held in Bishop, California.

During these TWG meetings, stakeholders identified the need for a Baseline Fish Distribution Study Plan (Study Plan) that focus on Project reservoirs. A separate effort will be described that also examines fish distribution in the creeks below the reservoirs and diversions. This Study Plan details SCE's proposal for study objectives, study area, methods and schedule for the effort. Appendix A is a consultation summary of discussions specific to this Study Plan, along with a table that summarizing stakeholders' comments on previously reviewed versions, and how SCE addressed those comments. If SCE did not incorporate a comment or request, SCE will provide rationale based on Project specific information and FERC ILP study plan criteria.

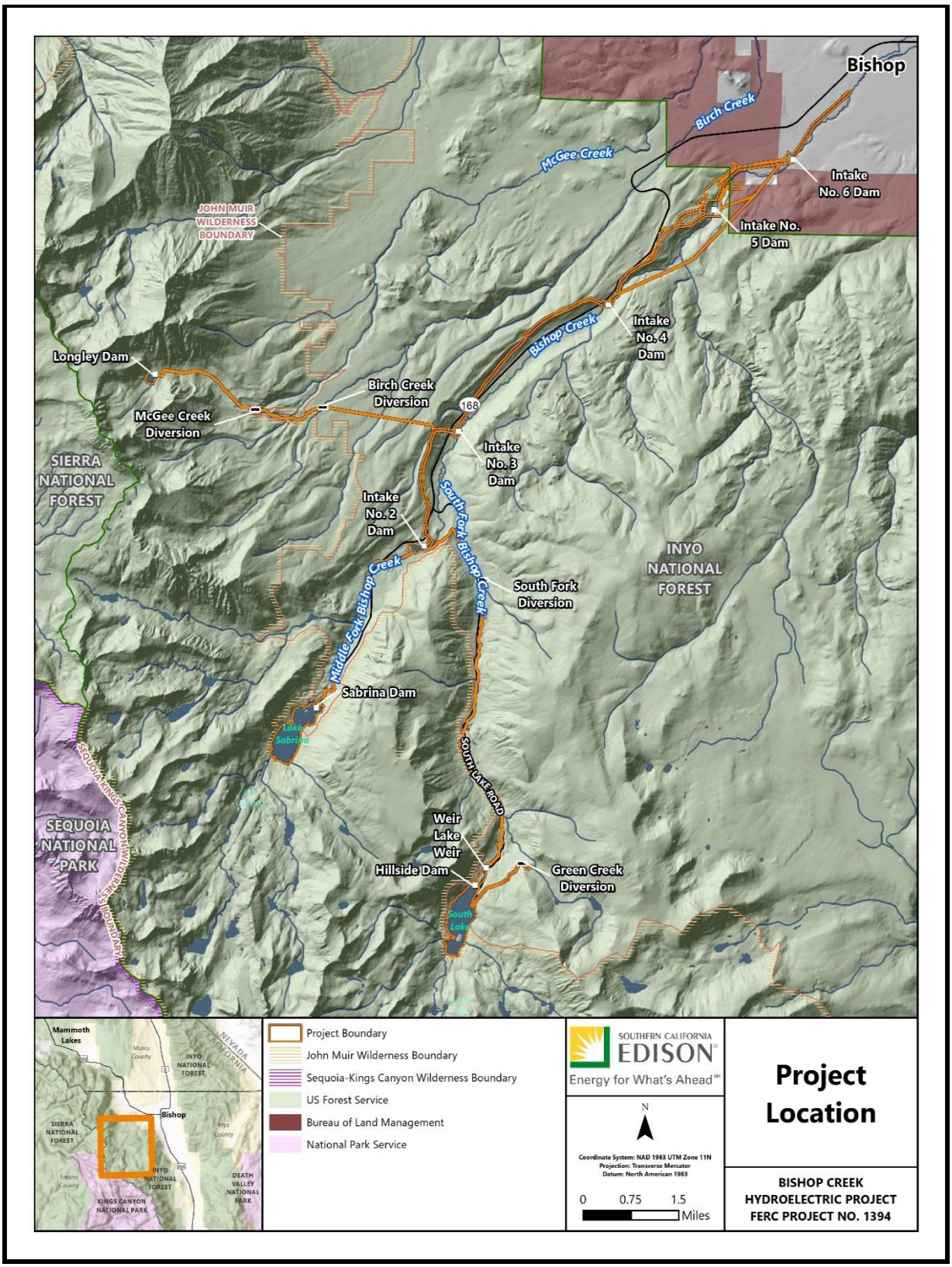

FIGURE 1-1 PROJECT LOCATION MAP

2.0 PROJECT NEXUS

Project operations may indirectly or directly influence fish resources occupying Project waters, primarily by regulating water levels of the reservoirs or by flows throughout the creek basin. The effect may be direct (e.g., altered hydrology due to flow management), or indirect (e.g., public access to Project areas). Future Project facilities and operations should not be inconsistent with the Desired Conditions described in the "Land Management Plan for the Inyo National Forest" (USDA 2018) as they relate to ecological sustainability and diversity of plant and animal communities. Therefore, this Study Plan focuses on identifying the presence and distribution of fish species within the two reservoirs (South Lake and Lake Sabrina) within the Project area that may be affected.

3.0 STUDY GOALS AND OBJECTIVES

Study goals and objectives were determined based on input received in consultation with stakeholders participating in the Aquatic Resources Technical Working Group (TWG) during the March 2018 through June 2018 timeframe, information reviewed from SCE files, a Project area site visit during June 2018 and additional TWG input obtained on August 14, 2018, and written comments received by August 31, 2018. The TWG stated that there is no current information regarding the distribution of both game and non-game fish species of management interest in the Project area. Study Plan goals and objectives include:

- Characterize populations and status of fish species in Lake Sabrina and South Lake
  - Document presence and/or absence of Owens Sucker in Lake Sabrina and South Lake
  - Assess distribution of other fish species in Project reservoirs
- Evaluate select, localized water quality parameters that may affect the growth and distribution of fish species
- Ensure that future Project facilities and operations are not inconsistent with the Desired Conditions described in the "Land Management Plan for the Inyo National Forest" (USDA 2018) as they relate to ecological sustainability and diversity of plant and animal communities

4.0 PERTINENT LIFE HISTORY INFORMATION

Although Project waters were originally fishless, the California Department of Fish and Wildlife (CDFW) currently manages waters in the Project area as a popular stocked reservoir rainbow trout fishery, and wild brown trout and brook trout fishery in stream segments. The Project reservoir lakes provide a heavily stocked put-and-take rainbow trout fishery. The abundance of rainbow trout in the reservoirs is a function of stocking intervention and angler exploitation rates; residency time for stocked rainbow trout in the reservoirs is believed to be very short lived (N. Buckmaster, CDFW, *personal communication*). In addition, Owens sucker, a California species of special concern, has been known to be illegally introduced into Lake Sabrina. Wild brown trout and brook trout from tributary headwater creeks upstream of the reservoirs may drop into the reservoirs and occupy these reservoirs.

Owens Sucker. Owens sucker have been introduced to the Bishop Creek watershed, and specifically are known to occupy Lake Sabrina. It is not known if they have colonized other portions of the watershed. The species occupies waters specifically in the Owens River Valley but has also escaped via the Owens Aqueduct to the Santa Clara River drainage.

The species prefers soft-bottomed runs in cool-water streams and the bottoms of lakes and reservoirs. Owens suckers feed at night on aquatic insects, algae, detritus and organic matter and spawn from early May through early July. Larval suckers become juveniles at a total length of 19 millimeters (mm) to 22 mm and hide under cover along stream margins and in backwaters. According to CDFW (*https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=104359*):

> *Owens suckers, in the Owens River … are most common in stream reaches with long runs and few riffles (Deinstadt et al. 1986). Habitat in these reaches is characterized by fine substrate…with lesser amounts of gravel and cobble, water temperatures of 7-13°C, and pH of 7.9-8.0. In lakes and reservoirs, … adults are abundant near the bottom, regardless of depth. Adult suckers (> 15 cm) were also commonly found at the bottom of pools in a 10-mile reach of the Owens River Gorge (CDFW snorkel surveys 2008; S. Parmenter, CDFW, pers. comm. 2009). Recent surveys in the lower Owens River found suckers predominantly in off-channel habitats, such as backwaters (M. Hill, pers. comm. 2009).*

5.0 REVIEW OF EXISTING INFORMATION

Owens sucker is a state of California species of special concern. It has no federal classification; therefore, there is no formal species management plan.

Project facilities (13 dams and diversions, and 5 powerhouses and associated intakes) are sited along Bishop Creek and its tributaries as well as Birch and McGee creeks. Bishop Creek has a total drainage area of approximately 70-square-miles from its headwaters to the confluence with the Owens River. South Lake and Lake Sabrina are the major storage reservoirs in the watershed. SCE manages the releases from the storage reservoirs, for purposes of hydrogeneration and meeting water allocation requirements in accordance with the 1922 Chandler Decree. Water from McGee and Birch creeks (combined drainage area of approximately 25-square-miles) is also diverted to Bishop Creek through the hydroelectric facilities.

This network of creeks and reservoirs supports both stocked and self-sustaining trout fisheries, including brown trout, brook trout and rainbow trout managed by CDFW. All three species are nonindigenous, and stocking is required to support heavy angling exploitation for the put and take fishery. The CDFW introduced these trout, which are managed to support an angling harvest. Segments of the lower reaches of Bishop Creek support self-sustaining brown trout populations, and McGee and Birch creeks maintain scattered populations of brook trout. Owens sucker are believed to have been informally introduced (N. Buckmaster, CDFW, personal communication), and during an early June 2018 field visit to Lake Sabrina, adult Owens sucker were observed spawning in a shallow arm near the eastern end of the Lake Sabrina dam. EA (1987) netted unidentified sucker from Lake Sabrina, which the authors speculated were Owens sucker. Edison monitored the Bishop Creek brown trout population at intervals from 1988 through 2010 (Sada, 2010). Sada (2010) found that population parameters such as growth, age and abundance remained similar to that of other regional Sierra creeks throughout most of the study period; however, abundance declined by 2010, the last year of monitoring.

6.0 STUDY AREA

Figure 6-1 below shows the proposed study area for the Bishop Creek Reservoirs Fish Distribution Study Plan. The study would be conducted in South Lake and Lake Sabrina, and in Longley Reservoir.

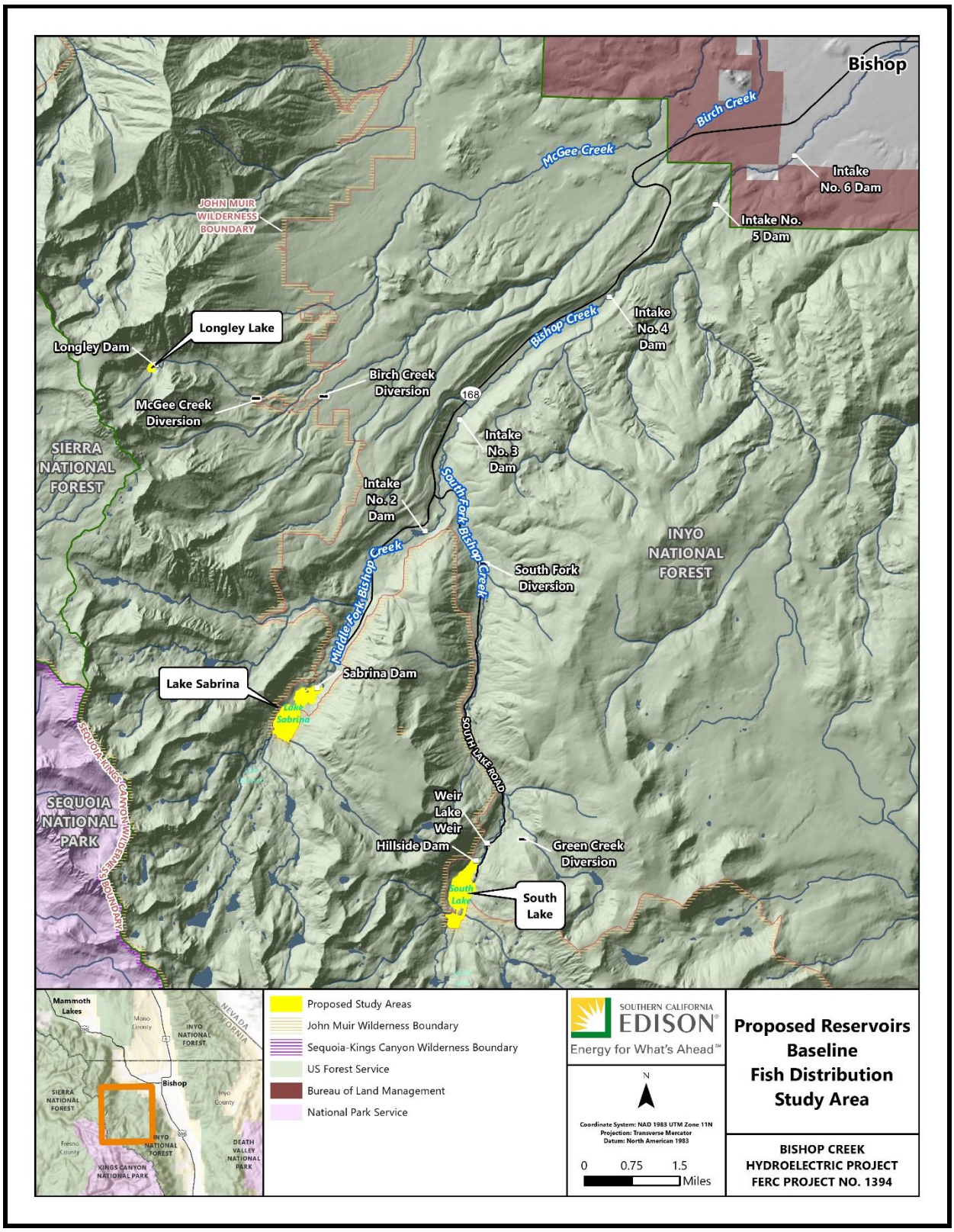

FIGURE 6-1 PROPOSED BASELINE FISH DISTRIBUTION STUDY AREA

7.0 METHODS

1. *Characterize populations of Owens sucker in Lake Sabrina and South Lake*

   The Owens sucker (*Catostomus fumeiventris*) is native to the Owens River but has been introduced into other water bodies, including parts of Bishop Creek. CDFW and U.S. Forest Service (USFS) biologist speculated that the species may have been introduced into South Lake and Lake Sabrina (March 2018 stakeholder meeting, *personal communication*). A group of spawning adults was subsequently observed during the June 2018 site visit to Lake Sabrina, and CDFW reports obtaining DNA samples from this population in the past during the spawning run (Steve Parmenter, CDFW, *personal communication*, August 14, 2018). SCE proposes the following study methods to further characterize the population of this species in both lakes.

   a. Review literature to determine habitat requirements and ecology of Owens sucker

   SCE will obtain and review applicable literature describing the life history, ecology and habitat requirements of the Owens sucker. This information will be used to inform and refine field sampling efforts and better understand the interaction between the species and study area waters.

   b. Conduct field survey

   Any potential populations of Owens sucker in the study area lakes are likely relatively small, and therefore individuals scattered and difficult to detect using conventional sampling methods such as electrofishing or nets. However, adults normally aggregate in the springtime in spawning areas and may be readily observed, captured and enumerated during this period. Further evidence of spawning activities may confirm that such populations are potentially self-sustaining.

   c. Identify known or likely spawning areas

   Based on review of the literature (*Task A*) and geographic information system (GIS) mapping of the study area lakes, SCE will target likely spawning habitat and establish provisional monitoring stations. In general Owens suckers prefer spawning in shallows

with flowing or well-aerated water, and therefore inlets, outlets and windswept shorelines will be prioritized. Such areas should be relatively finite, confined and readily accessible shoreline and shoal areas.

d. Visit spawning areas during late spring spawning season

Based on review of the literature (*Task A*), and habitat mapping, SCE will target a spring spawning season monitoring period, and conduct a methodical site visit to each monitoring station at least once per week during the spawning season.

i Observe spawning activity and estimate number of adults

During each monitoring event, SCE will record the date and time, and use calibrated meters to measure in *situ* ambient temperature, dissolved oxygen, water clarity and climatic conditions (air temperature, wind speed and cloud cover/precipitation). SCE will estimate the number of Owens suckers, if any, observed spawning at each monitoring location. If none are directly observed, SCE will search for evidence of spawning such as redd formations or spent adult fish and enumerate such findings.

ii Sample adults for length, weight and age data

To the extent possible, SCE will collect a representative subsample of adults to document basic biometric information, such as length (total length [TL] or fork length [FL]), weight, gender and spawning condition. Operculum bony material will be obtained from up to 30 adults and made available to CDFW for age determination, however this will require sacrificing each of these fish. The method of collection will be determined in consultation with CDFW but is anticipated to include methods such as boat electrofishing or trap netting. All specimens not needed for age determination will be returned alive to the source water immediately following processing.

2. Collect additional Owens sucker population and fish assemblage data

SCE will boat electrofish littoral habitat along each reservoir. Sampling will occur once in late spring to coincide with the *Task D,* Owens sucker spawning investigation and again, between late August and mid-September. This will be late enough for spring-

hatched young of year (YOY) life stage fish to have grown sufficiently to be detectable yet be early enough to not to interfere with any fall spawning salmonids. Each sampling site will be georeferenced and shown on maps. Stations will be selected that provide relatively diverse habitat structure and substrates to optimize the potential to collect suckers as well as other resident species.

As part of this effort, each reservoir will be bathymetrically mapped, using a boat-mounted fathometer coupled to an RTK or other similar georeferencing instrument. The boat will transect each reservoir at approximately 100-meter intervals at a slow enough rate of speed to be able to record variations in substrate depth. The bathymetry will be scheduled to occur during a period of relatively high reservoir level and water and bed elevations will be benchmarked to project datum. These data will then be imported into GIS to create a bathymetric map of each impoundment. Isodepths will be color coded on maps to ease interpretation, and identify potential over-wintering habitat.

At this time SCE anticipates that up to four electrofishing stations approximately 1,600-feet-long would be fished longitudinally along the reservoir shoreline. The beginning and endpoint of each electrofishing station will be recorded with a handheld GPS unit. Water quality (temperature, dissolved oxygen, pH, and conductivity) will be measured *in situ* at 3-feet in depth prior to each sampling run with a Yellow Spring Instruments (YSI) or equivalent electronic meter. The meter will be calibrated prior to each day's effort. In addition, a vertical temperature and dissolved oxygen profile will be obtained with a probe and meter (YSI or equivalent) deployed to a depth at least as deep as the hypolimnion boundary in offshore in water deeper than the epilimnion.

Electrofishing will be conducted at night. The start time and end time of each sample will be recorded. Stunned fish will be netted and immediately placed into an aerated live well filled with ambient water. At the end of each sample, all fish collected will be identified to species, enumerated, weighed and measured for length. If more than 50 individuals of a single species are collected, 50 fish will be randomly selected for measurements, and the remainder will be counted and batch-weighed. All fish will be released alive other than those saved as voucher specimens should that be necessary.

Scale samples of brown trout and brook trout will be obtained and provided to CDFW for age analysis if desired. This survey will also identify and enumerate aquatic amphibians following methods described in the Wildlife Study Plan, while executing this fish survey.

3. *Conduct Presence/absence survey of Longley Reservoir*

   Longley Reservoir is characteristically cold and oligotrophic and believed to have a naturally-reproducing brook trout population. CDFW has requested that SCE conduct a one-time qualitative fish sampling survey of Longley Reservoir. This reservoir's remote location and limited access limits the survey to hand-carried sampling gear. Based on discussions with the TWG, SCE anticipates deploying horizontal gill nets during a period of summer sampling to target obtaining a sample of up to 50 trout specimens. All fish will be identified to species; each fish will be measured, weighed and a scale sample obtained for purposes of aging. A minimum of two nets will be set for two 12-hour periods. Date, time, duration and prevailing weather conditions for each net set period will be recorded. Each net will be approximately 100 ft long and comprised of two or three panels of varying mesh sizes (to be determined in consultation with CDFW). Depth and location for fishing the nets will be determined in the field based on professional judgement but will be based on habitat, bathymetry and deployment feasibility. Ambient water temperature and dissolved oxygen will be gathered at the beginning and conclusion of each net set.

4. *Evaluate select, localized water quality parameters that may affect the growth and distribution of fish species*

   a. The study will gather concurrent *in situ* water quality parameters during all sampling events. This will provide localized data describing water quality at stations where quantitative fish sampling occurs as discussed above under objectives 1 and 2 and will include temperature, dissolved oxygen, pH and conductivity. These data will supplement and compliment the water quality data gathered under the Water Quality Study Plan, which will gather data on the same parameters as well as others as described under that plan.

8.0 SCHEDULE AND REPORTING

TABLE 8-1 ANTICIPATED POST PAD/NOI STUDY PLAN DEVELOPMENT MILESTONES AND FERC PROCESS THROUGH STUDY PLAN DETERMINATION

TASK	RESPONSIBLE ENTITY	SCHEDULE MILESTONES
File NOI/PAD with FERC along with Final Study Plans	SCE	03/29/19
FERC Holds Scoping and Site Visit	FERC	05/30/19 – 06/29/19
FERC Director's Study Plan Determination	FERC	01/10/20 - 02/09/20
First Field Season	SCE	2020
Initial Study Report (adjust as necessary in consultation with TWGs)	SCE	01/10/21 - 02/09/21
Second Field Season (as necessary)	SCE	2021
Final Study Report	SCE	2022
License Application	SCE	June, 2022

9.0 REFERENCES

Sada, D.W. and C. Rosamond. 2010. 2009 and 2010 fish population surveys Bishop and McGee Creeks, Inyo County, California. Submitted to Southern California Edison, Rosemead, CA. 26 pp.

EA Engineering. 1987. Eastside Sierra Hydroelectric Relicensing Studies: Impacts of Reservoir Drawdown on Fish Populations. Prepared for Southern California Edison. March 1987.

Federal Energy Regulatory Commission (FERC). 1991. Environmental Assessment for Hydropower License: Bishop Creek Project (FERC No 1394-000).

United States Department of Agriculture (USDA), 2018. Land Management Plan for the Inyo National Forest. https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd589652.pdf.

APPENDIX A: Study Plan Consultation Record

Appendix A

Study Plan Consultation Record

The Bishop Creek Reservoir Fish Distribution Study Plan (Study Plan) was developed in consultation with the Bishop Creek Aquatic Resources Technical Working Group (TWG). The intent of the consultation process is to achieve consensus, to the degree possible, on the need for specific studies, the key resource questions to be addressed by the studies, and the appropriate methodology and level of effort for the study.

This appendix summarizes the key consultation milestones for each Study Plan (Table A- 1), and how Southern California Edison Company (SCE) addressed comments received through the consultation process. Table A-**2** is a Response to Comments Table for comments received from stakeholders, and how comments have been addressed in the final Study Plan. Where stakeholder comments requests have not been incorporated, Table A-**2** provides a rationale based on Project specific information and Federal Energy Regulatory Commission's (FERC) Study Plan criteria (18 Code of Federal Regulation [CFR] § 5.9).

TABLE A- 1 KEY STUDY PLAN DEVELOPMENT MILESTONES AND TECHNICAL WORKING GROUP PLANNING SCHEDULE

DELIVERABLE	MATERIAL DISTRIBUTED	MEETING TYPE	TWG MEETING DATES	PROPOSED DATES FOR COMMENTS
Project Description	5/25/2018	TWG	6/4/2018, 6/5/2018, and 6/7/2018	7/9/2018
Annotated Study Plans, Goals, Objectives	7/26/2018	TWG	8/14/2018 and 8/15/2018	8/31/2018
Draft Study Plans	9/17/2018	TWG	10/9/2018 to 10/11/2018	10/26/2018
Final Study Plans	11/15/2018	TWG	12/4/2018 to 12/6/2018	1/7/2019

TABLE A-2 SCE RESPONSES TO COMMENTS RECEIVED ON STUDY PLANS

COMMENT NO.	DATE OF COMMENT	ENTITY	COMMENT	SCE RESPONSE
1	8/31/2018	Tristan Leong, US Forest Service	Propose objectives to document presence/absence of Owens sucker in Lake Sabrina and South Lake; measure recruitment and develop potential population estimate.	SCE proposes to characterize fish populations in the Project reservoirs, however the level of effort needed to develop population and recruitment estimates do not have a clear nexus. Sucker spawning, relative abundance, and size/age ranges of juveniles and adults will be documented but the overall population size will not be estimated
2	8/14/2018	Nick Buckmaster, CDFW	Separate reservoir sampling study scope independently from Creek survey scope	SCE concurs; see also fish baseline study scope for complementary creek study scope
3	10/10/2018[1]	Nick Buckmaster, Steve Parmenter CDFW	Include bathymetric mapping of South Lake and Lake Sabrina to identify shoal and overwintering habitat potential	SCE concurs and will add this to the study scope and study area
4	10/10/2018	CDFW	Determine trout age classes from scale samples rather than inferring from length; identify aquatic amphibian species encountered during sampling	SCE concurs and will add this to the study scope

[1] October 10, 2018 comments were received verbally at TWG meeting, Bishop, CA

COMMENT NO.	DATE OF COMMENT	ENTITY	COMMENT	SCE RESPONSE
5	10/10/2018	CDFW	Sample two seasons (spring and early fall)	SCE concurs and will add this to the study scope
6	10/10/2018	CDFW	Add Longley Reservoir, but limit to a single survey effort using gill nets	SCE concurs and will add this to the study scope