SOUTHERN CALIFORNIA EDISON

Lee Vining Hydroelectric Project

(FERC Project No. 1388)

VOLUME I

PRELIMINARY APPLICATION DOCUMENT

SOUTHERN CALIFORNIA EDISON®
Energy for What's Ahead℠

August 2021

SOUTHERN CALIFORNIA EDISON

Lee Vining Hydroelectric Project
(FERC Project No. 1388)

Preliminary Application Document

Southern California Edison
1515 Walnut Grove Ave
Rosemead, CA 91770

August 2021

Support from:

ERM Kleinschmidt

Page Intentionally Left Blank

TABLE OF CONTENTS

VOLUME I CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

LIST OF PHOTOS

VOLUME II CONTENTS

LIST OF APPENDICES

LIST OF ACRONYMS AND ABBREVIATIONS

°C	degree Celsius
°F	degree Fahrenheit
AAA	Aquatic Assessment Area
ABL	Aquatic Bioassessment Lab
AF	acre-foot
AGOL	ArcGIS Online
AICMC	American Indian Council of Mariposa County
amsl	above mean sea level
APE	Area of Potential Effects
APP	Avian Protection Plan
AVM	acoustic velocity meter
Basin Plan	Lahontan Region Water Quality Control Plan
BCC	Birds of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMI	benthic macroinvertebrate
BMP	best management practice
BP	Before Present
cal	calendar years
Cal-IPC	California Invasive Plant Council
CAL FIRE	California Department of Forestry and Fire Protection
CALVEG	Classification and Assessment with Landsat of Visible Ecological Groupings
CDFW	California Department of Fish and Wildlife
CEII	Critical Energy Infrastructure Information
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGS	California Geological Survey
CHRIS	California Historical Resources Information System
CNDDB	California Natural Diversity Data Base
CNPS	California Native Plant Society
COLD	cold freshwater fish

COVID-19	Coronavirus-2019
CRPR	California Rare Plant Rank
CSCI	California Stream Condition Index
DO	dissolved oxygen
DWR	California Department of Water Resources
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FLA	Final License Application
fps	foot per second
g/m^2	gram per meter square
GAA	Geomorphic Assessment Area
GIS	geographic information system
HAPP	Historic and Archaeological Preservation Plan
HUC	Hydraulic Unit Code
ILP	Integrated Licensing Process
IPaC	Information for Planning and Consultation
JAM	Joint Agency Meeting
ka	thousand years ago
kV	kilovolt
LADWP	Los Angeles Department of Water and Power
LRWQCB	Lahontan Region Water Quality Control Board
LWCF	Land and Water Conservation Fund
m^2	square meter
mg/L	milligrams per liter
MRLC	Multi-Resolution Land Characteristics
MRZ	Mineral Resource Zone
MUN	municipal and domestic water supply
MW	megawatt
MWh	megawatt-hour
mya	million years ago
NAHC	Native American Heritage Commission
NGO	non-governmental organization
NH_3	ammonia

NH_4	ammonium
NLCD	National Land Cover Database
NNIP	Non-Native Invasive Plant
NO_3	nitrate
NOI	Notice of Intent
NRHP	National Register of Historic Places
NRM	Natural Resource Manager
NTR	National Toxics Rule
NVUM	National Visitor Use Monitoring Program
NWI	National Wetlands Inventory
O&M	operations and maintenance
OHP	California Office of Historic Preservation
PAD	Preliminary Application Document
PCT	Pacific Crest Trail
pH	indicates acidity or alkalinity of a solution
PO_4	orthophosphate
ppt	parts per thousand
Project	Lee Vining Hydroelectric Project (FERC Project No. 1388)
RCA	Riparian Conservation Area
RTE	rare, threatened, and endangered
SAT	seven affiliated Tribes
SCC	Species of Conservation Concern
SCE	Southern California Edison Company
SCT	Candidate for listing as California Threatened
SHPO	State Historic Preservation Office
SNARL	Sierra Nevada Aquatic Research Laboratory
SPAWN	spawning, reproduction and/or early development
SSC	Species of Special Concern
Study Plan	Technical Study Plan
SWAMP	Surface Water Ambient Monitoring Program
SWRCM	State Water Resources Control Board
TAA	Terrestrial Assessment Area
TCP	Traditional Cultural Property

THPO	Tribal Historic Preservation Officer
TLP	Traditional Licensing Process
TWG	Technical Working Group
U.S.	United States
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
YOY	young-of-year

1.0 INTRODUCTION

1.1. BACKGROUND

Southern California Edison (SCE) Company is the licensee, owner, and operator of the Lee Vining Hydroelectric Project (Project), licensed under the Federal Energy Regulatory Commission (FERC) Project Number 1388. The Project is located on the eastern slope of the Sierra Nevada along the eastern boundary of Yosemite National Park, and approximately 9 miles upstream from Mono Lake and the town of Lee Vining in Mono County, California (Figure 1.1-1). A more detailed map set of the Project is included as Appendix A. The 11.25 megawatt (MW) Project is situated on Lee Vining Creek, largely within the Inyo National Forest managed by the U.S. Forest Service (USFS); the remaining Project lands are privately owned.

The Project consists of three dams and reservoirs, an auxiliary dam, a flowline consisting of a pipeline and penstock, and a powerhouse. SCE currently operates the Project under a 30-year license issued by FERC on February 4, 1997. The license will expire January 31, 2027. SCE is seeking a license renewal to continue operation and maintenance (O&M) of the Project.

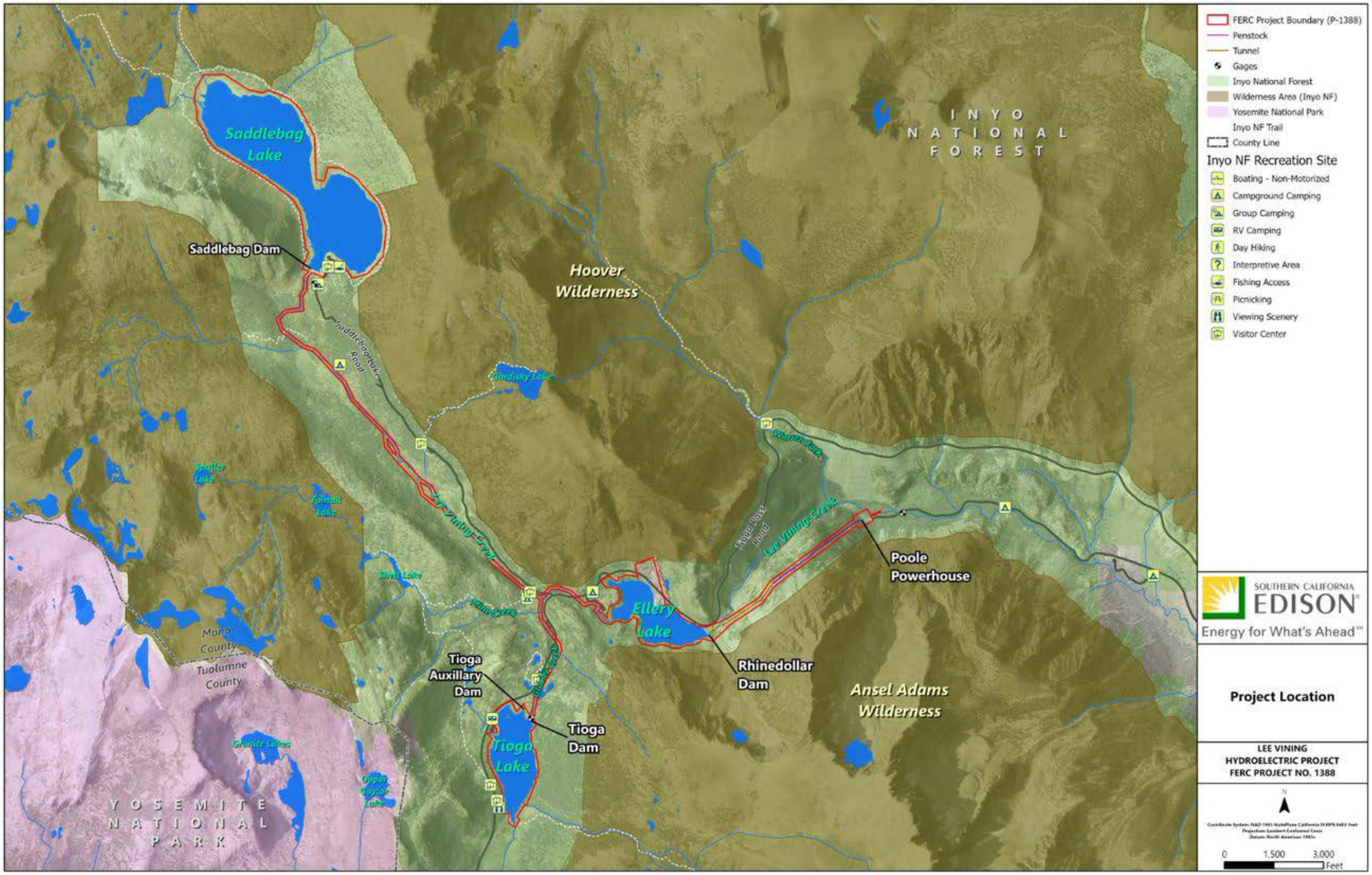


Figure 1.1-1. Project Location Map

1.2. DOCUMENT PURPOSE

This Preliminary Application Document (PAD) has been prepared in compliance with Title 18 Code of Federal Regulations (CFR) Part 5, which defines the form and content requirements of the document. The purpose of the PAD is to provide FERC, federal and state agencies, and other interested stakeholders with background information related to Project facilities and engineering, as well as operational, economic, and environmental aspects of the Project. The PAD defines pertinent Project issues and potential study needs. In accordance with the regulations, the PAD and associated Notice of Intent (NOI) have been filed with FERC and distributed to interested stakeholders.

1.3. PRELIMINARY APPLICATION DOCUMENT CONTENT

As stated above, the information contained in this document was assembled based on the requirements set forth in 18 CFR § 5.6 (c) and (d) and for distribution to federal and state resource agencies, local governments, relevant Native American Tribes, members of the public, non-governmental organizations (NGOs), and others likely to be interested in the relicensing proceeding. This PAD is organized as follows:

- Main PAD Content (**Volume I**)
  - Front Matter: Table of Contents; List of Tables; List of Figures; List of Appendices; List of Acronyms and Abbreviations
  - Section 1: Introduction
  - Section 2: Plans, Schedules, and Protocols, per 18 CFR § 5.6(d)(1) and § 4.35
  - Section 3: General Description of the River Basin, per 18 CFR § 5.6(d)(3)(xiii)
  - Section 4: Project Location, Facilities, and Operations, per 18 CFR § 5.6(d)(2)
  - Section 5: Description of the Existing Environment (by resource area), per 18 CFR § 5.6(d)(3)(ii)–(xii)
  - Section 6: Preliminary Issues, Proposed Studies, and Plans
  - Section 7: Literature and Sources Cited
- PAD Appendices (**Volume II**)
  - Appendix A: Exhibit G Map of the Project
  - Appendix B: Consultation Record
  - Appendix C: Proposed Technical Study Plans
  - Appendix D: Single-Line Diagram (CEII)

- Appendix E: FERC License Conditions Summary Table
- Appendix F: Flow Duration Curves
- Appendix G: National Wetlands Inventory Maps
- Appendix H: Cultural Resources (Confidential)

1.4. APPLICANT'S AGENTS

Wayne P. Allen Principal Manager, Hydro Licensing and Implementation Southern California Edison Company 1515 Walnut Grove Avenue Rosemead, California 91770 626-302-9741 wayne.allen@sce.com	**Matthew Woodhall** Lee Vining Relicensing Project Manager Southern California Edison Company 1515 Walnut Grove Avenue Rosemead, California 91770 626-302-9596 matthew.woodhall@sce.com

2.0 PLANS, SCHEDULES, AND PROTOCOLS

2.1. Process Plan and Schedule through Filing of License Application

In accordance with FERC's regulations (18 CFR § 5.3), SCE is requesting to use the Traditional Licensing Process (TLP) for the relicensing of the Project. This request, along with the rationale for why SCE chose this as the most appropriate process for the Lee Vining Project, is outlined in the cover letter submitted with this PAD.

The TLP includes three stages, as described in 18 CFR § 16.8 and identified in Table 2.1-1 below. The first stage involves coordination among SCE, resource agencies, affected Native American tribes, and the public. This stage includes sharing Project information; notifying interested parties; and planning and developing studies using the PAD as a guide. The second stage includes implementing studies (to the extent that pre-filing studies are necessary) to gather additional data, developing a Draft License Application, and submitting the Draft License Application for review by resource agencies and FERC. The third stage begins with the filing of the Final License Application (FLA). During this stage, FERC conducts a review of the FLA and any public comments received during the process, completes an environmental analysis under the National Environmental Policy Act, and makes a final decision regarding issuing a license for the Project.

The process plan and schedule shown in Table 2.1-1 uses timeframes set forth by FERC for the TLP process and is based upon an NOI and PAD filing date of approximately August 12, 2021, ahead of the statutory deadline of January 31, 2022; all subsequent dates in the table are derived from the PAD and NOI filing. Over the course of the relicensing process and as necessary, SCE will revise the process plan and schedule for the Project, and ensure the revised schedule is available to participants.

In advance of initiating relicensing, SCE formed Technical Working Groups (TWGs) to assist in identification of issues and necessary studies (please see Appendix B, Consultation Record). SCE has planned additional consultation opportunities for participants in the to provide input on the development of study plans. Table 2.1-1 describes these steps intended to ensure that a comprehensive study program is implemented to inform the environmental analysis of the FLA.

Should FERC deny the request to use the TLP, and instead require the use of the Integrated Licensing Process (ILP), the process plan and schedule will be adjusted and distributed accordingly.

Table 2.1-1. Lee Vining Process Plan and Schedule

Regulation	Activity	Responsible Party	Activity Timeframe	Dates[a]
Stage 1				
18 CFR § 5.3, 16.8	File NOI and PAD	SCE	At least 5 years but no more than 5.5 years prior to license expiration	8/12/2021
18 CFR § 5.3	Publish Notice in Newspaper of NOI/PAD Filing, TLP Request, and Site Visit	SCE	Concurrent with NOI	8/12/2021
18 CFR § 5.7	Meeting Between FERC Staff and Native American Tribes	FERC/Stakeholders	Within 30 days of NOI	9/13/2021
18 CFR § 5.3	Comments on Use of TLP	FERC/ Stakeholders	Within 30 days of NOI	9/13/2021
18 CFR § 5.8	FERC Notice of Site Visit	FERC	Approximately 30 days before site visit	8/27/2021
18 CFR § 16.8	Conduct Site Visit[b]	SCE	30 to 60 days after FERC Notice of Commencement and TLP Approval	9/28/2021
18 CFR § 5.8	FERC Notice of NOI/PAD Filing, Commencement of Proceeding, and Decision on TLP Request	FERC	Within 60 days of NOI	10/8/2021
18 CFR § 16.8	JAM Notification and Agenda to FERC and Stakeholders	SCE	At least 15 days prior to the JAM	10/31/2021
18 CFR § 16.8	Publish Public Notice of JAM in Newspaper	SCE	At least 14 days prior to the JAM	11/1/2021
18 CFR § 16.8	Conduct JAM[b]	SCE	30 to 60 days after FERC Notice of Commencement and TLP Approval	11/16/2021
18 CFR § 16.8	File Comments on PAD, and Study Requests	Stakeholders	Within 60 days of JAM	1/15/2022
Not Required	Provide Study Plans TWG Review	SCE	Within 30 days of Receipt of Study Requests	2/14/2022
Not Required	Comments on Study Plans	Stakeholders	Within 30 days of Receipt of Study Plans	3/16/2022
Not Required	Study Plan Meetings	SCE/Stakeholders	If needed, within 15 days of receipt of comments on Study Plans	3/31//2022

Regulation	Activity	Responsible Party	Activity Timeframe	Dates[a]
	Final Study Plans	SCE	Within 30 Days of Receipt of Study Plan Comments	4/15/2022
Stage 2				
18 CFR § 16.8	Conduct First Season of Studies	SCE		2022
Not Required	Interim Study Report Meeting	SCE/Stakeholders	Following first year of study implementation	January, 2023
18 CFR § 16.8	Conduct Second Season of Studies (if necessary)	SCE		2023
18 CFR § 16.8	File DLA with Stakeholders and FERC	SCE	No later than 150 days prior to deadline for filing FLA	9/3/2024
18 CFR § 16.8	File Comments on Applicant’s DLA	Stakeholders	Within 90 days of filing DLA	12/2/2024
Stage 3				
18 CFR § 5.17	File FLA	SCE	No later than 24 months before existing license expires	1/31/2025

CFR = Code of Federal Regulations; DLA = Draft License Application; FERC = Federal Energy Regulatory Commission; FLA = Final License Application; JAM = Joint Agency Meeting; NOI = Notice of Intent; PAD = Pre-Application Document; SCE = Southern California Edison; TLP = Traditional Licensing Process; TWG = Technical Working Group

Notes:

[a] If the due date falls on a weekend or holiday, the deadline has been adjusted to show the preceding business day.

[b] SCE is proposing to separate the site visit and the JAM to avoid a potential early snow.

2.2. EARLY RELICENSING ACTIVITIES

SCE initiated early outreach activities for relicensing the Project in 2020. Early outreach activities involved holding one-on-one conference calls with state and federal resource agencies and NGOs as well as sending out Project-related postcards to resource agencies and Stakeholders including members of the public, and NGOs, and brochures to Native American tribes. A publicly accessible website (refer to Section 2.3.1) was also established. The intent of these early outreach activities was to identify potential Stakeholders and understand their resource interests, explain the relicensing process, describe Project facilities and operations, and solicit existing resource information.

SCE also hosted a virtual Public Open House on October 6, 2020, to familiarize interested parties with the Project, SCE's relicensing plans, and the relicensing process. Materials presented at the workshop are available on the relicensing website as described in Section 2.3.1. Following this workshop, smaller TWGs were established to begin communications surrounding resource concerns and existing information, and to help guide the identification of information gaps and potential study needs. Appendix B, *Consultation Record*, provides a summary of contacts made by SCE in preparing this PAD as part of early relicensing activities, including the public meeting.

As listed below, four TWGs were established with Stakeholders, each meeting held virtually through the Spring of 2021, prior to the filing of this PAD.

- Fish and Aquatic Resources (including Operations)
- Terrestrial and Botanical Resources
- Recreation and Land Use Resources
- Cultural and Tribal Resources

During these meetings, SCE collaborated with Stakeholders to obtain existing resource information, identify resource areas where there is little or no information, and to discuss the need for technical studies. Stakeholders were given the opportunity to submit Study Plan requests to address issues identified in advance of the PAD, which were then discussed with SCE during the TWG meetings. From this process, SCE has preliminarily proposed 15 Study Plans, which are described in Section 6.0, *Preliminary Issues, Proposed Studies, and Plans*, and included as Appendix C. The plans included with this PAD are preliminary and will not be considered final until Stakeholders have had an opportunity to comment on them following the Joint Agency Meeting (JAM) and as provided for under the TLP procedures of 18 CFR § 16.8.

2.3. PROPOSED COMMUNICATIONS PROTOCOLS

Effective communication is essential for a timely and effective relicensing process. SCE's goal is to maintain open communication during the licensing process and to provide public access to relevant Project licensing information. SCE anticipates that the primary means of communication will be meetings, documents, email, a public website, and telephone. The communication protocols outlined below will provide guidelines for participation in the relicensing process by SCE and interested parties, including governmental agencies, NGOs, Native American tribes, and members of the public. SCE will maintain documentation of all electronic correspondence as part of formal agency consultation proceedings.

2.3.1. Public Relicensing Website

In January 2020, SCE established a publicly accessible website to make relicensing information readily available to all relicensing participants. SCE anticipates that all public FERC filings, beginning with the NOI and PAD, will be available through the website. In addition, SCE will post meeting notices/agendas, meeting summaries, public documents sent and received, reference materials, and other relevant information on this website as they continue to maintain it throughout the relicensing process.

The Project relicensing website can be accessed at: www.sce.com/leevining.

2.3.2. List of Interested Parties

To facilitate communication with relicensing participants during the relicensing process, SCE will continue to develop and maintain a list of Stakeholders interested in the relicensing and parties who formally intervene in the relicensing proceeding.[1] Cumulatively, these three lists make up the "FERC Project No. 1388 Distribution List":

- FERC Project No. 1388 Mailing List: A mailing list of interested parties prepared and maintained by FERC throughout the Project relicensing proceeding.
- FERC Project No. 1388 Service List: A list of parties that have formally intervened in the relicensing proceeding, to be prepared and maintained by FERC after it issues public notice of SCE's filing of the FLA and invites formal intervention in FERC's proceeding by licensing participants.
- SCE's Project No. 1388 Relicensing Stakeholder List: A list of interested parties compiled by SCE and the Relicensing Team in anticipation of the Project's relicensing proceeding. SCE will update and maintain the list throughout the duration of the relicensing process.

2.3.3. Meetings

FERC regulations require specific meetings as part of the TLP process (18 CFR § 16.8), as identified in the process plan and schedule above. SCE anticipates other meetings, in addition to those required by FERC, particularly during development of the Study Plans and potential Protection, Mitigation, and Enhancement measures.

SCE will provide public notice for FERC-required meetings in accordance with the regulations, which may include distribution to mailing lists, publishing in local papers, and posting on the Project website. Following each meeting, a summary memorandum will be developed to include the meeting purpose, location, time, attendees, decisions, follow-up actions, and schedule. SCE will provide meeting notices and summaries to the FERC

[1] Communication with interested parties may be completed via U.S. mail or email.

Project No. 1388 Distribution List via email and will file meeting notices and summaries so that they are available in the FERC eLibrary.

For those meetings conducted by SCE not specifically required by FERC regulations, SCE will provide electronic notice to the appropriate distribution lists via email. These meetings will be led by SCE and the Relicensing Team and may include an independent facilitator. A meeting summary will be distributed following each meeting via email to all those in attendance. SCE may elect to post all meeting notices and summaries on the relicensing website, as appropriate.

SCE will work with all interested parties to develop meeting schedules that include practical locations in or near the Project or in a virtual setting, in an effort to accommodate as many participants as practicable. In general, meetings will be scheduled between the hours of 8:00 a.m. and 5:00 p.m. For those meetings specifically designed for public involvement, an evening time will also be scheduled. SCE will make every effort to begin and end meetings on time. SCE or their designee will lead such meetings, but may also use an independent facilitator, as needed.

When timing allows, SCE will make a good faith effort to notify all interested parties at least 2 weeks prior to the next planned public meeting. At that time, SCE will provide a meeting agenda via email, as it is the preferred method of contact for this Project. SCE will also post on its website or distribute as requested any documents or other information that will be the subject of meeting discussions, as well as meeting minutes and summaries as appropriate.

2.3.4. Telephone

SCE will document oral communications for significant consultation activities (i.e., teleconferences) and formal information requests. Oral communications about significant consultation activities will be documented in a telephone record and saved to the Project files and relicensing website.

2.4. Proposed Location and Date for Joint Agency Meeting and Site Visit

TLP guidelines require that SCE host a JAM and site visit within 30 days and no later than 60 days after TLP approval, should FERC approve this request. SCE invites FERC to the JAM to secure for itself and all other attendees and participants FERC's perspective on the initial scoping of issues. The purpose of the JAM will be to provide Stakeholders the opportunity to view the Project, to discuss the information presented in the PAD, and to identify issues related to the Project. For this Project, issue identification workshops have already occurred and have included many interested Stakeholders. The JAM will provide another formal opportunity for stakeholders and FERC to become involved. The timing of the PAD/NOI filing Schedule prevents SCE from offering a site visit in conjunction with the JAM because of likely weather-related limitations on access. Therefore, SCE proposes to hold the JAM and the site visit separately. Logistics for both the site visit and JAM are as follows:

- The site visit is currently planned September 28, 2021, which is before FERC's statutory review time for the TLP request has been completed. The site visit will begin at 9:00AM, Pacific Daylight Time. Logistics and details about attending the site visit may be found at www.sce.com/leevining

- The JAM will be virtual meeting, held on November 16, 2021 at 9:00AM, Pacific Standard Time. Information about the meeting, including a hyperlink to join the virtual meeting can be found at www.sce.com/leevining.

The date and location of the site visit and meeting may be altered after consultation with jurisdictional agencies and other licensing participants and pending FERC's decision regarding SCE's request to utilize the TLP. If the request is denied and SCE begins the ILP, FERC will hold a scoping meeting in accordance with CFR § 5.8 within a similar timeframe.

2.5. Document Management

FERC regulations identify a number of formal documents as part of the TLP, some of which are the responsibility of FERC and some of which are the responsibility of the Licensee.

All documents issued or received by FERC are maintained on FERC's eLibrary. Each participant in the relicensing proceeding can register to receive a notice each time FERC posts a document regarding Project 1388. To register, go to FERC's homepage at http://www.ferc.gov, click on "Documents and Filings," and then click on "eSubscription." The FERC website provides further instructions. The eLibrary can be accessed through the same FERC homepage above or directly at https://elibrary.ferc.gov/idmws/search/fercgensearch.asp.

SCE will use electronic filing whenever possible for documents filed with FERC, and will use email (SCE's Project No. 1388 Distribution List) to electronically distribute such documents and inform participants of their availability. Additionally, SCE will post all public documents on the relicensing website that it sends or receives regarding the relicensing.

2.5.1. Restricted Documents

Certain Project-related documents known as Critical Energy Infrastructure Information (CEII) are restricted from public viewing in accordance with FERC regulation 18 CFR § 388.113. CEII documents related to the design and safety of dams and appurtenant facilities as well as information that is necessary to protect national security and public safety are restricted. Anyone seeking FERC CEII information must file a CEII request. FERC's website at https://www.ferc.gov/ceii contains additional details related to CEII.

Information related to protecting sensitive archaeological or other culturally important information is also restricted under Section 106 of the National Historic Preservation Act.

In addition, information related to threatened and endangered species are protected under Section 7 of the federal Endangered Species Act (ESA). Anyone seeking this information from FERC must file a Freedom of Information Act request. Instructions for filing a Freedom of Information Act request are available on FERC's website at https://www.ferc.gov/enforcement-legal/foia/overview/file-foia-privacy-act-request.

3.0 GENERAL DESCRIPTION OF THE RIVER BASIN

This section provides a general description of the river basin containing SCE's Project located on Lee Vining Creek in Mono County, California. The FERC requirements for this section are specified in 18 CFR § 5.6(d)(3)(xiii). The following information is included: descriptions of the river subbasins and watersheds containing the Project facilities, including lengths of major stream reaches and tributary rivers and streams; affected streams; non-Project dams and diversion structures; and major land and water uses surrounding the Project.

In hierarchical order, the overview discusses the hydrologic region for the Project, drainage basins within the hydrologic region, and watersheds associated with each drainage basin. Hydrologic region, drainage basin, and watershed as used below all refer to the geographic area drained by a river or stream.

3.1. INFORMATION SOURCES

This section was prepared utilizing the following primary information sources:

- Los Angeles Department of Water and Power's (LADWP) *Mono Basin Geology and Hydrology* report (LADWP, 1987)
- Mono Lake Committee's description of Mono Basin (MLC, 2020)
- The SCE Rhinedollar Dam Supporting Technical Information Document (SCE, 2019)
- *Draft Revised Land Management Plan for the Inyo National Forest* (USFS, 2016)

3.2. LEE VINING CREEK WATERSHED

The Project facilities are located in the Inyo National Forest in Mono County, California. The Project is within the "Northern Mojave-Mono Lake" Subregion (Hydrologic Unit Code [HUC] 1809), which is further subdivided into the Accounting Unit or Basin "Mono-Owens Lake" (HUC 180901), and then the Cataloging Unit or Subbasin "Mono Lake" (HUC 18090101). The HUC10 classification for the Project is the "Lee Vining Creek-Frontal Mono Lake" Watershed (HUC 1809010104), which encompasses 135.1 square miles (see Figure 3.2-1). The watershed is then further divided into HUC12 subwatersheds, the Project is located in the "Lee Vining Creek-Frontal Mono Lake" HUC12 subwatershed, which covers 46.9 square miles.

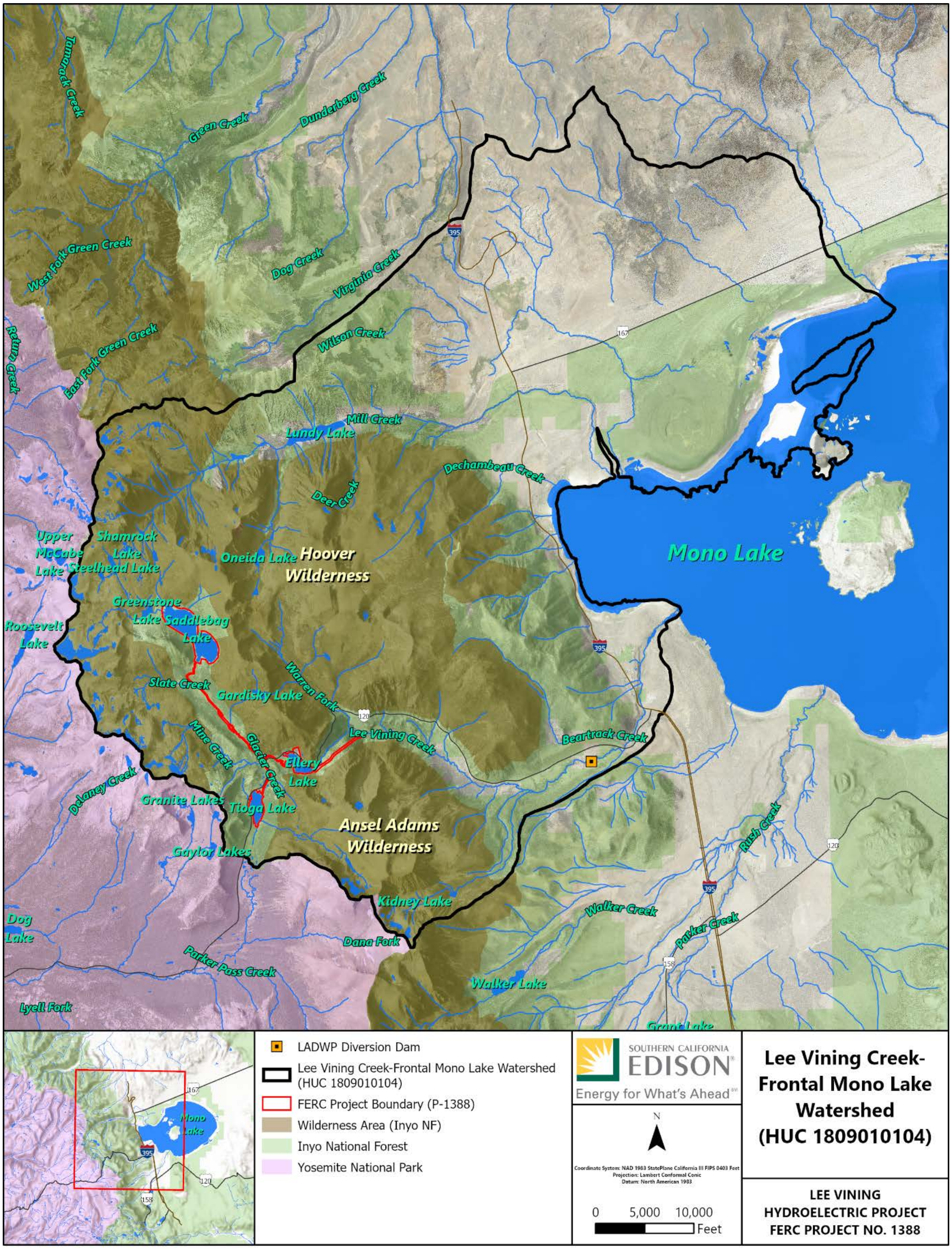


Figure 3.2-1. Lee Vining Creek-Frontal Mono Lake (HUC 1809010104)

Lee Vining Creek-Frontal Mono Lake (HUC12) subwatershed has a total drainage area of approximately 47 square miles. The elevations in the watershed range from approximately 6,400 feet above mean sea level (amsl) to over 13,000 feet amsl. The Project Area is mountainous with steep exposed bedrock and talus slopes with little tree cover or vegetation; along the Lee Vining Creek, the area is flatter and vegetated with meadows and pine trees.

The key Project facilities include Saddlebag Dam and Lake, Tioga Dam and Lake, the Rhinedollar Dam, Ellery Lake, a flowline consisting of pipeline and penstock, and the Poole Powerhouse. Both Saddlebag Lake and Tioga Lake drain into Ellery Lake, which is the intake and regulating reservoir for Poole Powerhouse. The two lakes have historically been drawn down in the winter to provide storage capacity for spring runoff. Ellery Lake is the forebay for the powerhouse, and its storage level is not as varied as the two upper reservoirs. Water is conveyed from Ellery Lake to the powerhouse via the flowline and penstock.

The Project is located on Lee Vining and Glacier Creeks, which flow directly into Mono Lake. Glacier Creek is a major tributary to Lee Vining Creek. Lee Vining Creek flows southeastward approximately 15 miles from its headwaters at Saddlebag Lake to Mono Lake east of the town of Lee Vining (SCE, 2019). Glacier Creek flows northward for approximately 1.83 miles from its headwaters to its confluence with Lee Vining Creek (estimated using GoogleEarth imagery). Both Lee Vining Creek and Glacier Creek originate in snowpack from glacially carved terrain in the Sierra Nevada (SCE 2018, 2019).

Tioga Lake receives its waters from Glacier Creek, which flows northwest from Dana Lake and Mount Dana. Glacier Creek joins Lee Vining Creek, which then flows east into Ellery Lake.

Ellery Lake receives its waters from Lee Vining and Glacier Creeks. Lee Vining Creek continues from the outlet of the Rhinedollar Dam and flows generally east and north to the town of Lee Vining and on to Mono Lake. The drainage area of the Project at Rhinedollar Dam is approximately 17 square miles (SCE, 2019).

Below the Project, several other tributaries contribute to Lee Vining Creek as it flows to Mono Lake; such as Warren Fork, Gibbs Lake/Creek, Mine Creek, and Beartrack Creek.

3.3. MONO BASIN WATERSHED

The Lee Vining Creek is within the Mono Lake watershed and all flows in the Project Vicinity historically flowed into Mono Lake. The Mono Lake watershed (Figure 3.2-1 has a total drainage area of approximately 750 square miles (LADWP, 1987). Roughly half of the Mono Lake watershed is hills and mountains (365 square miles), and the other half is valley fill areas and Mono Lake itself (385 square miles) (LADWP, 1987). Elevations in the watershed range from 6,400 feet amsl to over 13,000 feet amsl (LADWP, 1987).

The surface of Mono Lake is approximately 70 square miles (MLC, 2020). During the Pleistocene (Ice Age), Mono Lake was more than 315 square miles (LADWP, 1987). The

Lake is a popular recreation destination due to the lake's unique history, geology, and salinity. The Mono Lake Committee describes the watershed as:

> Embracing 14 different ecological zones, over 1,000 plant species, and roughly 400 recorded vertebrate species within its watershed, Mono Lake and its surrounding basin encompass one of California's richest natural areas. (MLC, 2020)

Mono Lake is a popular destination for sightseeing and on-water recreation.

3.4. AFFECTED STREAMS

The Project primarily affects streams by temporarily retaining water in its reservoirs on Lee Vining and Glacier Creeks. Minimum flows are returned to the creeks through the outlets of Saddlebag Dam, Tioga Dam, and below Poole Powerhouse as required by the current FERC license. This Project does not divert water away from the creeks.

3.5. NON-PROJECT DAMS AND DIVERSIONS

There are no impoundments on Lee Vining or Glacier Creeks upstream of the Project.

There is a diversion dam owned and managed by Los Angeles Department of Water and Power (LADWP) approximately 5 miles downstream of the Poole Powerhouse. There, the water is diverted to the Los Angeles Aqueduct System via the Mono Basin Extension (LADWP, 1987). LADWP has been diverting water from Lee Vining Creek at this location since 1941 (LADWP, 1987).

Much like SCE's minimum flow requirements out of each Project reservoir, LADWP must maintain minimum flows in Lee Vining Creek (SWRCB, 1994). In 1994, LADWP's allowed diversion from the Mono Basin was decreased by the State Water Resources Control Board (SWRCB) to increase stream flows and raise the level of Mono Lake (SWRBC, 1994). LADWP's water rights and minimum flow requirements were altered again in 2013 with the SWRCB settlement agreement (SWRCB, 2013). LADWP's history with Lee Vining Creek and their minimum flow requirements are discussed later in this PAD in Section 5.2, *Water Resources*.

3.6. MAJOR LAND USES IN THE PROJECT VICINITY

A more detailed discussion of land use can be found in PAD Section 5.9, *Land Use*.

The Project is located primarily on federal land within the Inyo National Forest. The nearest community is the rural town of Lee Vining, approximately 5.25 miles east of the Poole Powerhouse.

The surrounding area has almost no development, aside from the roads in the Project Vicinity. The predominant land cover types in the Lee Vining Creek-Frontal Mono Lake subwatershed based on 2016 USA National Land Cover Database (NLCD) Land Cover are evergreen forest, shrub/scrub, barren, grassland/herbaceous, open water, perennial ice/snow, emergent herbaceous wetlands, woody wetlands, and developed open/low/medium/high intensity (MRLC Consortium, 2016) (see Figure 5.9-2 and Table 5.9-2 in Section 5.9).

The Inyo National Forest Land Management Plan (LMP) manages the forest for a variety of land uses, including recreation, wilderness use, maintenance and improvement of habitat, rangeland, timber production, and the exploration and development of mineral resources, particularly energy resources (USFS, 2019). Land use in the immediate area otherwise consists of recreational uses such as hiking, camping, fishing, and sightseeing.

The LMP identifies the Lee Vining Project Area as being included in the plan's Conservation Watershed management area, specifically under the Mono Lake Headwaters designation. Conservation Watershed management areas are a network of watersheds that: (1) have been determined to have a functioning or functioning-at-risk rating based on the Watershed Condition Framework; (2) provide for connectivity of species of conservation concern; and (3) provide high quality water for beneficial uses downstream. The management emphasis for conservation watersheds is to maintain or improve, where possible, the functional rating of these systems for the long-term and to provide for the persistence of species of conservation concern by maintaining connectivity and refugia for these species.

The existing FERC license requires SCE to maintain Ellery Lake at full level (within 2 feet of its spillway elevation) during recreation season (from the Friday preceding Memorial Day through the end of September).

3.7. MAJOR WATER USES IN THE PROJECT VICINITY

The primary uses of water within the Lee Vining Creek watershed are power generation by SCE and recreation such as fishing and boating. Downstream of the Project, much of the flow is diverted by LADWP (FERC, 1992). As described in Section 5.2, *Water Resources*, the allocation of water between LADWP and Mono Lake is now governed by minimum flow requirements in Lee Vining Creek regulated by the SWRCB.

Water resources are discussed in Section 5.2; recreation is discussed in Section 5.8.

3.8. CLIMATE

Precipitation amounts vary greatly in the Mono Lake watershed. The CA Department of Water Resources gage at Ellery Lake (maintained by SCE) has an average annual precipitation of 24.5 inches (CDEC, 2021). Since 2010, the average annual precipitation has been 18.5 inches. There are arctic-like winters in the high mountains and dry warm summer conditions in Mono Basin (LADWP, 1987). Average air temperature at Ellery Lake is 36 degrees Fahrenheit (°F), and 34 °F at Dana Meadows (CDEC, 2021).

The town of Lee Vining has an average annual high temperature of 61 °F, an average annual low temperature of 35 °F, and receives an average of 15.67 inches of precipitation annually (U.S. Climate Data, 2020).

Page Intentionally Left Blank

4.0 PROJECT LOCATION, FACILITIES, AND OPERATIONS

4.1. Introduction

With this PAD, SCE is formally initiating the FERC relicensing process for the 11.25 MW Lee Vining Hydroelectric Project (FERC No. 1388). The Project consists of three dams and reservoirs, an auxiliary dam, a flowline consisting of a pipeline and penstock, and a powerhouse, as well as the other lands and waters necessary to operate the Project, all located on Lee Vining Creek in Mono County, California.

4.2. Authorized Agent

The exact name, business address, and telephone number of each person authorized to act as agent for the applicant is identified below.

Wayne P. Allen
Principal Manager, Hydro Licensing and Implementation
Southern California Edison Company
1515 Walnut Grove Avenue
Rosemead, California 91770
Phone: 626-302-9741
Email: wayne.allen@sce.com

4.3. Project Location

The Project is located on the east slope of the Sierra Nevada along the eastern boundary of Yosemite National Park. The Project is approximately 9 miles upstream from Mono Lake and the town of Lee Vining in Mono County, California. Most of the Project occupies public lands within the Inyo National Forest managed by the USFS. The Project is located on Lee Vining Creek and a tributary to the creek, Glacier Creek. The Project location overview is shown on Figure 1.1-1.

4.4. Project History and Overview

Between 1917 and 1922, preliminary work had begun on plans developed by Nevada-California Power Company for the Lee Vining Hydroelectric Project. The original plans included three dams, one at each existing lake (Saddlebag, Tioga and Ellery) as well as a generating plant at each dam (Diamond and Hicks, 1988). Saddlebag Lake Dam was completed in 1922, with construction of Rhinedollar and Tioga reservoirs underway.

After 1922, control of the Lee Vining Creek development was acquired by Southern Sierras Power Company, an operating subsidiary of the California-Nevada Electric Corporation. The Southern Sierras Power Company had completed most of the construction of the Project in 1924, including bringing proposed Plants No. 1 and No. 3 into operation (Diamond and Hicks, 1988). Lee Vining Plant No. 1 became Poole Powerhouse in 1925 after chief engineer Charles Oscar Poole who had worked tirelessly on the plant designs.

In 1936, Southern Sierras Power Company was dissolved. Its operating properties were transferred to its parent company, Nevada-California Electric Corporation. Plant No. 3 would eventually cease to operate in 1940 due to ongoing disagreement with the City of Los Angeles over water rights in the region, (Diamond and Hicks, 1988). In 1941, the corporation changed its name to California Electric Power Company, which operated the Lee Vining Creek system until they merged with Southern California Edison on January 1, 1964. The current FERC license is a 30-year license, issued February 4, 1997, and expires on January 31, 2027.

Today, the key Project facilities include Saddlebag Dam and Lake, Tioga Dam and Lake, the Rhinedollar Dam, Ellery Lake, a flowline consisting of pipeline and penstock, and the Poole Powerhouse. Releases and spill from both Saddlebag Lake and Tioga Lake flow into Ellery Lake, which is the intake and regulating reservoir for Poole Powerhouse. The two lakes have historically been drawn down in the winter to provide storage capacity for spring runoff. Ellery Lake is the forebay for the powerhouse, and its storage level is not as varied as the two upper reservoirs. Water is conveyed from Ellery Lake to the powerhouse via the flowline and penstock. Minimum flows are provided into Lee Vining Creek below Poole Powerhouse.

Several repairs and modifications have occurred at the four dams over the lifetime of the Project, as summarized in Table 4.4-1.

Table 4.4-1. Repairs and Modifications Summary at Project Dams

Location	Repairs and Modifications
Saddlebag Dam	• Geomembrane liner installation • Sinkhole repairs • Spillway planking replaced with reinforced concrete • Extension of outlet pipe • New concrete cutoffs upstream and downstream • Dam crest gravel addition • Timber facing removed and replaced with redwood timber • Downstream face rock filled out • Intake box repaired and installation of new trash racks • V-notch weirs added • Lake level recorder installation • Sinkhole repair with bentonite, sand, and concrete • Additional concrete and timber extensions on abutments • Spillway concrete apron extension, riprap added • Pedestrian bridge addition
Tioga Dam and Auxiliary Dam	• Leak repairs • Redwood shiplap facing installed • Valve house addition • Hand railing addition • Concrete crack repairs

	• Repair erosion on dam crest • Repairs to redwood facing and sealing annually • Spillway concrete repairs • French drain construction • Geomembrane liner installation
Rhinedollar Dam	• Dam crest raised • New trash rack installations • New Parshall measuring flume below spillway • Rock training wall for channeling high flows installed • Blasting of projecting rocks below spillway • Remote-controlled mechanism for center spillgate • Generator rebuilt, increasing nameplate capacity to 11.25 MW • Radial gate and spillway pier removal • Parapet wall addition • Installation of new steel beam to support footbridge and a steel access platform

Source: SCE 2018a, 2018b, 2019

MW = megawatt

On October 1, 1983, the elevation datum was changed to U.S. Geological Survey (USGS) NGVD29. Prior to 1983, Project elevations were based on mean sea level. All Project feature elevations presented in this PAD are accurate to SCE's knowledge and are confirmed in the NGVD29 datum.

4.5. EXISTING PROJECT FACILITIES[1]

4.5.1. SADDLEBAG LAKE AND DAM

Saddlebag Lake is in the headwaters of Lee Vining Creek. It is the lake farthest north of the Project and highest in elevation. The drainage area is approximately 4.5 square miles. Saddlebag Lake is generally drawn down in the winter to allow storage capacity for spring runoff. The dam is 45 feet high and 600 feet long, geomembrane-lined, redwood-faced, and composed of rockfill. The dam impounds the 297-acre Saddlebag Lake, which has a net storage capacity of 9,765 acre-feet (AF) (SCE, 2018a). Saddlebag Lake previously had a storage capacity of 9,789 AF at normal maximum reservoir level (elevation 10,090.4 feet); however, in 2013, the spillway crest elevation was lowered to 10,089.4 feet, resulting in the current reservoir net storage capacity of 9,765 AF (SCE, 2018a). The spillway is centrally located on the dam and is a 54-foot-long and 5-foot-deep concrete flume. Saddlebag Lake and Dam facilities are shown on Figure 4.5-1.

[1] The values presented in this document represent the best available information, including the Supporting Technical Information Documents, and may differ slightly from the 1997 FERC License Project Description. Updated values will be reflected in the new license application.

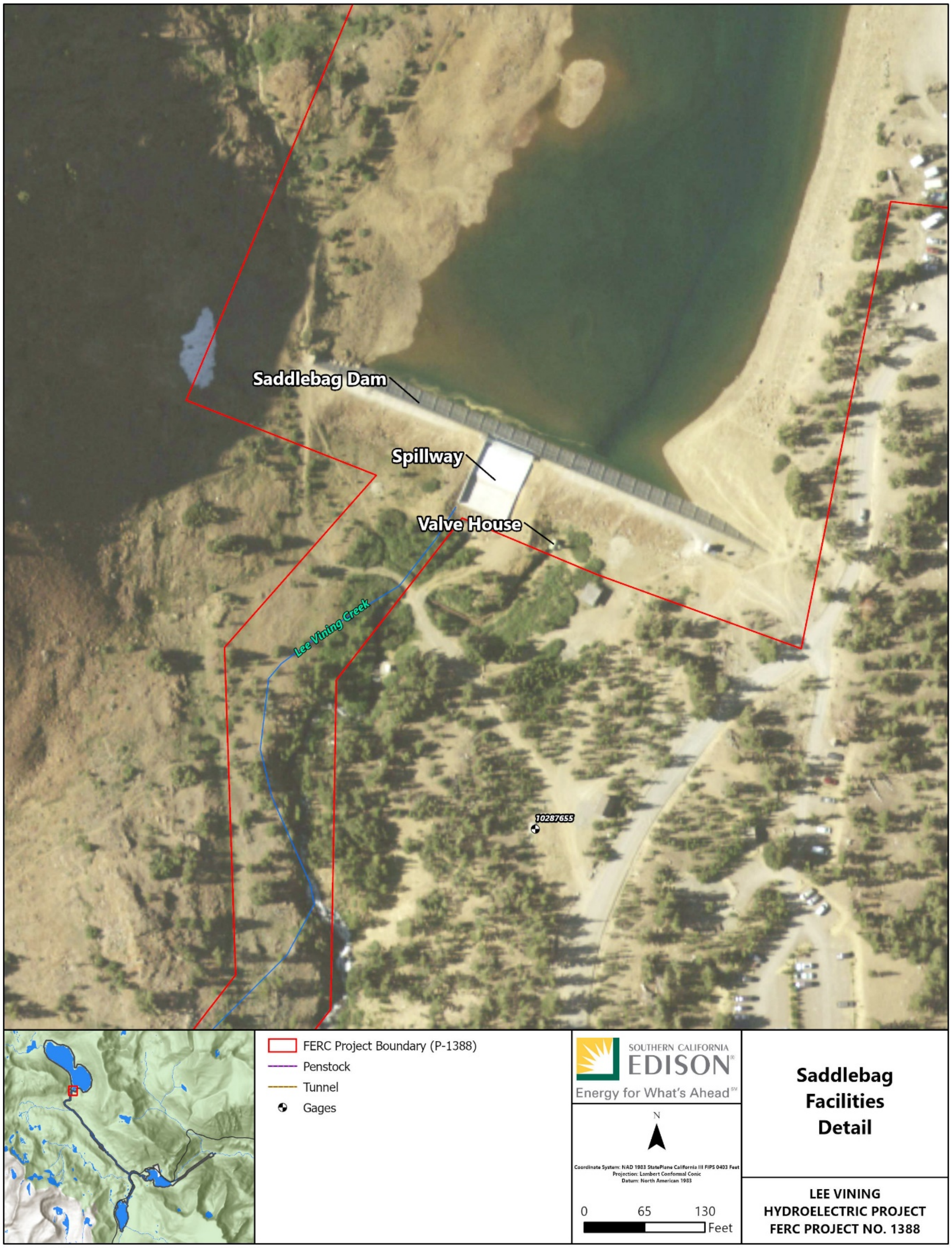


Figure 4.5-1. Saddlebag Lake and Dam Facilities Detail.

4.5.2. Tioga Lake, Tioga Dam, and Tioga Auxiliary and Dam

Tioga Lake is in the headwaters of Glacier Creek, which then drains into Lee Vining Creek. It is the lake farthest south of the Project. The drainage area is approximately 4.03 square miles (SCE, 2018b). Tioga Lake is generally drawn down in the winter to allow storage capacity for spring runoff. Tioga Lake has two dams: the main Tioga Dam and the Tioga Auxiliary Dam. Tioga Dam is a 27-foot-high, 270-foot-long, redwood-faced, rockfill dam (Photo 4.5-1). Tioga Auxiliary Dam is a 9-foot-high, 50-foot-long, constant radius concrete-arch dam. These dams together impound the 73-acre Tioga Lake, which has a gross storage capacity of 2,175 AF. The net storage capacity is 1,250 AF (SCE, 2018b). The Tioga Dam spillway is a 57-foot-long, 4-foot-deep, rockfill concrete weir at the southeast end of the dam. Tioga Lake and Dam facilities are shown on Figure 4.5-2.

Photo 4.5-1. Tioga Dam and Spillway 2020

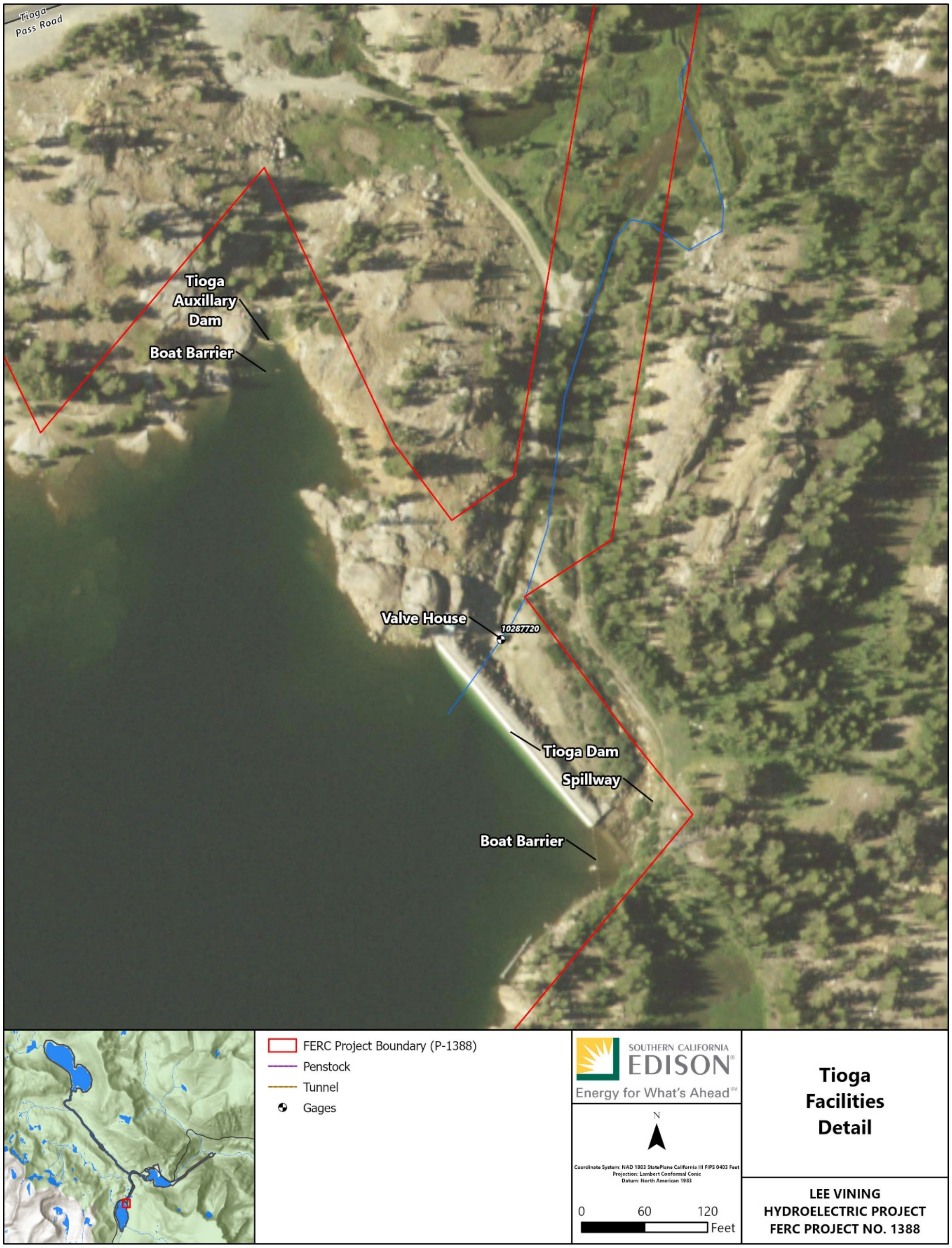


Figure 4.5-2. Tioga Lake and Dam Facilities Detail.

4.5.3. Ellery Lake and Rhinedollar Dam

Ellery Lake is on Lee Vining Creek, downstream of the confluence with Glacier Creek; both Saddlebag and Tioga Lakes drain to Ellery Lake. Ellery Lake is the smallest and farthest east of the three Project lakes (Photo 4.5-2). However, the drainage area is the largest, at 16.7 square miles (USGS, 2020). Ellery Lake is basically the forebay for the Poole Powerhouse and its storage level is not varied as much as either Saddlebag or Tioga Lakes. The Rhinedollar Dam is an 18.5-foot-high (17 feet with a 1.5-foot concrete parapet), 437-foot-long, rockfill dam that impounds the 61-acre Ellery Lake, which has a gross storage capacity of 493 AF (SCE, 2019). The Rhinedollar Dam spillway is a concrete side channel and is 36 feet long and 5 feet deep. Ellery Lake and Rhinedollar Dam facilities are shown on Figure 4.5-3.

Photo 4.5-2. Ellery Lake 2020

Figure 4.5-3. Ellery Lake and Rhinedollar Dam Facilities Detail Intake and Water Conveyance System.

The Project's reinforced concrete intake structure is located at Rhinedollar Dam. It has a single set of trashracks. Water flows under the dam through a 48-inch steel pipe encased in 8 inches of concrete.

The Project's flowline consists of a pipeline and a penstock. The flowline is 2,530 feet long and 48 inches in diameter (SCE, 2019). It is composed of double riveted lap joint steel pipe. The Project's penstock is 3,741 feet long and 28 to 44 inches in diameter (SCE, 2019). It is composed of lap welded steel. It has a maximum flow of 110 cubic feet per second (cfs). The pipeline/flowline and penstock features are below ground in a tunnel.

4.5.4. Powerhouse and Switchyard

The Poole Powerhouse is a reinforced concrete building constructed in the 1920s (Photo 4.5-3). It is located on Lee Vining Creek east (downstream) of Ellery Lake. The building is 68 feet long, 38 feet wide, 43 feet high, and has a substructure that is 18 feet deep.

The powerhouse contains one General Electric generating unit with a nameplate capacity of 11.25 MW. The Project has one Pelton single overhung, horizontal-impulse turbine with a design capacity of 17,910 horsepower with a hydraulic capacity of 105 cfs.

The Poole Powerhouse facilities are shown on Figure 4.5-4.

Photo 4.5-3. Poole Powerhouse and Residence

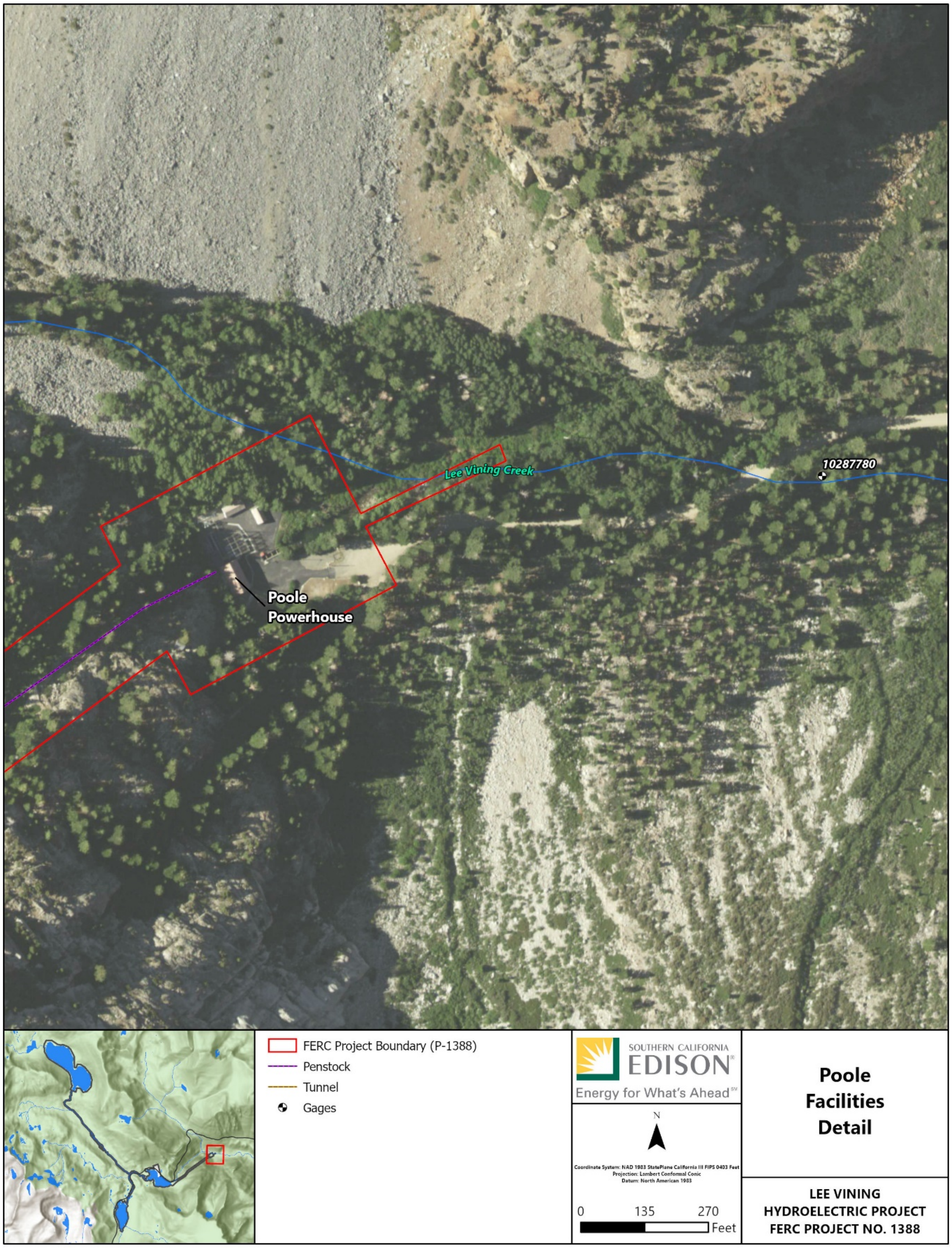


Figure 4.5-4. Poole Powerhouse and Flowline Facilities Detail Other Project Appurtenances

4.5.5. Gaging Stations

Gage locations in the Project vicinity are shown on Figure 4.5-5. There is one Project-associated stream gage immediately downstream of each Project dam: Saddlebag, Tioga, and Rhinedollar. These gages continuously collect streamflow data, which is monitored and recorded at the Bishop Control Center.

There are seven stream gages located in the Project Area that are actively recording data. The gages are published by the USGS, but are owned by SCE. The USGS maintains a contract with SCE to review streamflow records at these SCE gages to satisfy the Project's FERC license requirements. The seven gages in the Project Area are shown in Table 4.5-1.

Table 4.5-1. SCE Gaging Stations

SCE Gage No.	USGS Gage No.	Location
353	10287770	In stream, Lee Vining Creek below Ellery Lake
354	10287655	In stream, Lee Vining Creek below Saddlebag Lake
356	10287760	In reservoir, Ellery Lake (Rhinedollar Reservoir)
360	10287650	In reservoir, Saddlebag Lake
361	10287700	In reservoir, Tioga Lake
363	10287762	In stream, Poole Plant Use (acoustic velocity meter [AVM])
368	10287720	In stream, Glacier Creek below Tioga Lake

Additionally, LADWP has a flume above stream of their Lee Vining Creek diversion that is a valuable resource for measuring flow. This flume is approximately 5 miles downstream of the Project boundary, which terminates at the Poole Powerhouse.

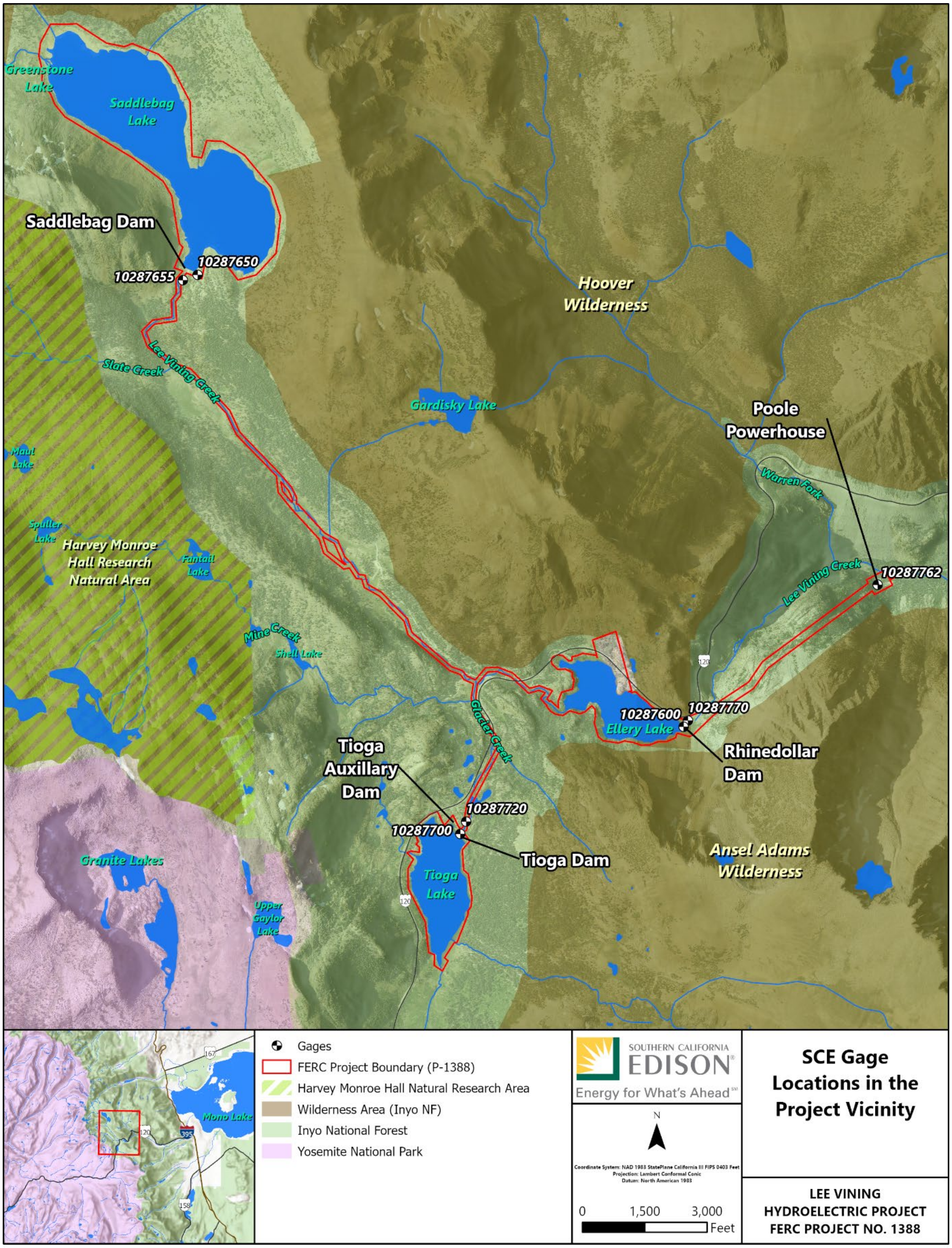


Figure 4.5-5. SCE Gage Locations in the Project Vicinity.

4.5.6. Access Roads and Trails

The current Project license does not identify any roads or access trails as Project features to be included in the Project boundary. However, SCE does utilize portions of certain public roads (e.g., State Route 120, Saddlebag Lake Road, and Poole Power Plant Road) for access to Project facilities. Portions of these roads are also used by the public to access certain Inyo National Forest recreation sites. Other minor access roads and foot trails, largely within the current Project boundary, are used by SCE staff to access the upper and lower portions of each Project dam and related facilities.

A review of Project lands and roads is currently being proposed for the 2022 to 2023 study season to determine which of these roads and foot trails are used exclusively for Project purposes and thus may warrant future inclusion in the Project boundary.

4.5.7. Ancillary and Support Facilities

The Lee Vining powerhouse facility includes three detached ancillary buildings. One adjacent structure was historically a construction and operators housing apartment complex. Two smaller buildings are a garage for storing equipment and materials and a shop/storage garage that has parts and other materials.

4.5.8. Project Recreation Sites

Recreation is discussed more thoroughly in Section 5.8, *Recreation Resources*. Much of the recreational use in the Project vicinity is an indirect result of people traveling to nearby recreation areas; Tioga Pass connects the eastern Sierras and Mono Lake to the western Sierras and provides access to the adjacent Yosemite National Park. Recreation in upper Lee Vining Canyon is managed by Inyo National Forest. The Hoover Wilderness and Ansel Adams Wilderness surround the Project. The Project reservoirs and Lee Vining Creek are stocked by California Department of Fish and Wildlife (CDFW) for fishing. There are several campgrounds, trails, and trailheads adjacent to Project and many more within the Project vicinity. Boating, sightseeing, and picnicking are also popular in this area.

4.5.9. Non-Project Transmission Facilities

There are no transmission lines or facilities associated with the proposed Project. The transmission line was removed from the Project's license in 2001.

As required by 18 CFR § 5.6(d), a single-line diagram showing the transfer of electricity from the Project to the transmission grid is included as Appendix D of this filing. SCE considers this information CEII and has therefore restricted its availability.

4.6. Project Operations

The Project is operated in compliance with existing regulatory requirements, agreements, and water rights to generate power. The following subsections describe operational constraints (regulatory requirements and operating agreements) associated with the Project, followed by a description of water rights associated with the Project.

4.6.1. Water Management

SCE stores water from the drainage area in the Project's reservoirs and releases the water for power generation, which is the primary, non-consumptive use of water within the Lee Vining Creek watershed. Project operations must be consistent with the 1933 Sales Agreement between the Southern Sierras Power Company (predecessor to SCE) and LADWP. The Project also conforms to the minimum flow release requirements outlined in the FERC license. As described below, once water has left the Project Boundary, SCE has no control over downstream diversions.

While meeting the LADWP Sales Agreement targets and the required FERC minimum flows, SCE also optimizes plant generation to respond to load requests from the California Independent System Operator (CAISO). SCE's delivery of intra-day load to meet demands is referred to as "Hydro-Resource Optimization" and has increased since 2016. These operations are in response to grid demand and pricing. The Plant is usually called into operations during the evening hours. These events have resulted in periodic releases of flow into Lee Vining Creek below Poole Powerhouse. Data is not available to easily describe the frequency and magnitude of these, but they generally last less than 8 hours. Using available data from the downstream LADWP diversion, SCE has estimated that these events are influenced by time of year with higher frequency of events occurring in the winter and spring. SCE is proposing to continue Hydro-Resource Optimization in the new license term, and will be characterizing the frequency, magnitude, and duration of these events for the new license along with reviewing potential Project effects.

Minimum flow requirements are different below each dam (USFS Condition No. 4 of current license, 78 FERC ¶ 61,110). Under the current license, minimum flow requirements are based on whether the water year is wet, normal, or dry, and the water inflow into each reservoir. A water year is considered "wet" when the annual precipitation was in the highest 30 percent of the previous years, back to 1966. A water year is "dry" when the precipitation is in the lowest 30 percent of the previous years, back to 1966. A "normal" water year is when it is neither wet nor dry. Under any new license, the methodology for determining a wet, normal, and/or dry year will be reviewed and modified as necessary.

4.6.1.1. Saddlebag Dam

Below Saddlebag Dam, the flow requirements are determined annually in consultation with USFS, no later than May 1 of each calendar year. If SCE and USFS do not agree on flows, these minimums apply year-round:

- 14 cfs for wet years
- 9 cfs for normal years
- 6 cfs for dry years

4.6.1.2. Tioga Dam

Below Tioga Dam, the flow requirements are different depending on the month, the water year, and the amount of inflow. The reservoir is kept low in the winter in preparation for spring runoff.

- May through September:
  - In a wet or normal water year, if the inflow is less than 2 cfs the flow requirement is equal to the inflow and cannot exceed 2 cfs. If the inflow is greater than 2 cfs, the flow requirement is 2 cfs until the lake water surface elevation is within 2 feet of the main spillway crest; once this level has been achieved, then the flow changes to greater than 60 percent of the inflow.
  - In a dry water year, if the inflow is less than 2 cfs the flow requirement is equal to the inflow and cannot exceed 2 cfs. If the inflow is greater than 2 cfs, the flow requirement is 2 cfs until the lake water surface elevation is within 2 feet of the main spillway crest; once this level has been achieved, then the flow changes to the natural inflow.
- In October and November, the minimum flow is 2 cfs or the natural inflow.
- December through April: the minimum flow is equal to the natural flow.

4.6.1.3. Below Poole Powerhouse

Below Poole Powerhouse, the minimum flow requirement is 27 cfs or the natural flow, whichever is less, between August and May. In June and July, the minimum flow is 89 cfs or the natural flow, whichever is less. Flows here are measured by acoustic velocity meter (AVM).

During the operation of the facilities authorized by the license, SCE maintains each year a continuous, minimum flow as follows: August to May, 27 cfs or the natural flow, whichever is less; June to July, 89 cfs or the natural flow, whichever is less, as measured by a continuously recording gauging device to be installed in the Poole Powerhouse. During those periods when short-term repair and testing of the Poole Power plant facilities may be needed (i.e., Poole Powerhouse is offline), minimum flows in Lee Vining Creek will be measured downstream of Ellery Lake, below Rhinedollar Dam. SCE is authorized under the license to temporarily modify minimum flows if required by operating emergencies beyond its control. SCE may also modify minimum flows for short periods upon written consent of the USFS.

4.6.2. Regulatory Requirements

4.6.2.1. FERC License

Most non-federal hydroelectric projects in the United States operate under licenses issued by FERC. FERC issued a 30-year license to SCE in February 1997, and that license expires on January 31, 2027. For SCE to continue operating the Project after this date, SCE must obtain a new operating license from FERC. This process requires SCE to complete a multi-year application process and file a license application with FERC by January 31, 2025. The process of relicensing formally commences with the filing of this PAD and NOI.

FERC issued the current Project license to SCE on February 4, 1997 (78 FERC ¶ 61,110). Since then, FERC has issued various administrative orders approving management and monitoring plans and design drawings that were required as part of the current license. Appendix E, Table E-1 provides a summary of the status of each license article and reference to subsequent FERC Orders. The license has subsequently been amended by FERC at various times to include revisions to license articles and deletions of license articles. Where applicable, Table E-1 indicates where a license article has been modified or deleted.

Although not described herein, the Project is also subject to rules set forth in Form L-1, (October 1975) entitled Terms and Conditions of License for Constructed Major Project Affecting the Lands of the United States (54 F.P.C. 1792, 1799).

4.6.2.2. Water Rights

In 1989, SCE worked with FERC to obtain archive records showing that they possessed sufficient pre-1914 water rights for Lee Vining. SCE's pre-1914 water right on Lee Vining Creek is based on two court cases: Mono County v. Adam Farrington, et al.; and Cain Irrigation v. J.S. Cain. The Hancock (presiding judge) decision awarded water and storage rights on Lee Vining Creek to Mono County Irrigation Company.

SCE filed an application on June 3, 1915, with the SWRCB to divert 40 cfs of water from Lee Vining Creek at the outlet of Ellery Lake. The permit (Permit No. 81; License No. 622) was issued March 24, 1916. SCE filed a second application on June 22, 1926, to divert 30 cfs on a year-round basis from Lee Vining Creek for power purposes. The permit (Permit No. 2620; License No. 623) was issued September 21, 1926. This permit brought the total water allotted to SCE to 70 cfs.

SCE received Permit No. 20893 on January 22, 1997, from the SWRCB to divert Lee Vining Creek water, not to exceed 935 gallons per day, and not to exceed 0.9 AF per year.

4.6.3. Existing Environmental Programs and Measures

SCE maintains several environmental Project-specific programs, plans, and measures. Where applicable, the License Article and condition number is provided for reference.

- Emergency Action Plan
- Riparian and Aquatic Resources Monitoring Plan (Section 4(e) Condition 7)
- Hazardous Substances Plan (Section 4(e) Condition 8)

- Erosion Control Plan (Section 4(e) Condition 9)
- Soil Disposal Plan (Section 4(e) Condition 10)
- Visual Resource Protection Plan (Section 4(e) Condition 11)
- Sensitive, Threatened, and Endangered Species Protection Plan (Section 4(e) Condition 12)
- Cultural Resources Management Plan (Section 4(e) Condition 13)

Routine Project O&M include numerous activities to ensure the safe operation of the Project. SCE entered into a long-term agreement with the State of California Department of Fish and Game[2] to streamline the permitting process for its facilities. The long-term agreement provides for the following routine activities.

- Material Removal: When required, SCE removes material that obstructs the water diversions and operations of hydroelectric generation.
- Vegetation Control: SCE controls vegetation growth at or adjacent to its facilities to prevent overgrowth of vegetation that interferes with the flow of water and the measurement of flow through the gaging stations. Methods proposed for vegetation control include selective thinning, selective removal, or mowing.
- Facilities Repair: When required, SCE routinely makes repairs to structures and facilities and conducts maintenance to retain the functional and structural integrity of facilities. These include:
  - Measuring Stations and Flumes—SCE uses measuring stations and flumes to measure water in the waterways. Maintenance work related to measuring stations and flumes include mowing of vegetation to provide access along channel banks and the removal of stream deposit within an area of measuring stations to allow for unobstructed water flow and the accurate reading of water flow in waterways.
  - Intake and Diversion Structures—SCE uses intake and diversion structures to divert water from a stream, canal, or intermittent manmade waterway into a canal or intermittent manmade waterway. Stream deposits are removed above and or below intake structures.
  - Gate Inspection and Maintenance—These routine operations are mandated by the Department of Safety of Dams and do not result in the draining of any ponds, which minimizes impacts to the stream. SCE is required to inspect penstocks, which does involve lowering the ponds to expose the entry point to the penstock.

Stream Deposit Management: Because of the nature of the facilities, stream deposits may accumulate behind diversions and other structures and these deposits may require

[2] They have since changed their name to California Department of Fish and Wildlife (CDFW).

regular removal or control. Should SCE determine that water releases are necessary to remove stream deposits for a facility, the water releases will be performed in the spring, so as to mimic naturally occurring heavy flows. Included in these protection measures are as-needed nesting bird surveys, raptor surveys, other sensitive species surveys, fish protection, restoration for impacts, implementation of best management practices (BMPs) for work in and around stream and lakes, and monitoring, and reporting to SCE, CDFW, USFS, and other resource agencies, as appropriate. These activities and associated BMPs are described in the following resource management plans for use by Project personnel:

- Avian Protection Plan and Bird Nesting Guidelines (includes provisions for reporting wildlife and avian interactions with the Project)
- Historic Properties Management Plan
- Vegetation Management Operations Manual
- Invasive Mussel Prevention Plan
- Fire Suppression Plan (part of the Project's Emergency Action Plan)

SCE resource specialists are consulted during the preparation of non-routine projects that potentially expand or modify the Project from the original licensed configuration. In these instances, SCE utilizes an internal Environmental Screening Form through its EHSync database to initiate the appropriate environmental or cultural review. In the event of a potential impact on a cultural resource, the Project's Senior Archaeologist will implement procedures and measures identified in the Historic Properties Management Plan. As appropriate, consultation with U.S. Fish and Wildlife Service (USFWS), Bureau of Land Management (BLM), CDFW, USFS, and the appropriate tribes is included in the review and permitting process.

4.6.4. Project Facility Maintenance

This section describes routine inspection and maintenance activities conducted at the Project. A description of each activity is provided in Table 4.6-1 and includes detailed information on the location and frequency of these activities.

Table 4.6-1. Routine Project Inspection and Maintenance Activities

Maintenance Activity	Relevant Project Area	Frequency	Description
Maintenance of dirt/native roads and parking areas, including ditch and culvert maintenance	• All native Project roads and parking areas (e.g., Poole Power Plant Road) • Parking areas at boater put-in/take-outs	• Annually, and as needed	Minor Project road maintenance: • Grading approximately within the road prism • Debris removal and basic repairs including filing of pothole • Maintenance of erosion control features such as drains, ditches, and water bars • Repair, replacement, or installation of access control structures such as posts, cables, and barrier rock • Cleaning and clearing debris and sediment from culverts with a backhoe or hand shovel • Repair and replacement of signage • Vegetation management may be conducted concurrently with road maintenance on an as-needed basis Major Project road maintenance: • Placement or replacement of culverts and other drainage features
Repaving/patching asphalt roads	• Paved Project roads and parking areas (e.g., pavement around Poole Powerhouse) • Paved Project roads around powerhouse, machine shop, and warehouse buildings	• As needed (approximately every 2–3 years)	Minor Project road maintenance: • Cleaning and clearing debris and sediment from culverts and ditches with a backhoe or hand shovel • Hand tools are used for filling of blacktop and potholes Major Project road maintenance: • Use of pick-up truck, dump truck, loaders and backhoes, and graders for resurfacing larger/longer parking areas or roads
Vegetation trimming and removal/clearing	• All Project roads • Project facilities: powerhouse, dams, water conveyance system, penstock, and stream gage sites	• Every other year	• Brush mow along roadway to maintain road as necessary for safe line of sight and passage • Trimming performed both manually and with tools/equipment (i.e., weed whacker or chainsaw)

Maintenance Activity	Relevant Project Area	Frequency	Description
Hazard tree inspection and removal	• All Project roads • Project facilities: powerhouse, dams, water conveyance system, penstock, and stream gage sites	• Weekly and monthly inspections • Removal as needed	• Remove hazard brush and trees that are deemed a threat to road or vehicles traveling over them or near Project infrastructure • Removal performed both manually and with tools/equipment
Slide debris removal	• All Project roads	• As needed, typically following winter rains	• Remove slide debris with grader, loader, and dump truck • Spread material on road near debris slide as road base
Herbicide spraying	• Project facilities: powerhouse, dams, water conveyance system, penstock, and stream gage sites	• Annually	• Pre-emergent herbicide spraying followed by post-emergent, as necessary • If necessary, weed-whack within flat areas prior to spraying
Structural inspection and maintenance	• Powerhouse • Saddlebag Dam • Tioga Main Dam • Tioga Auxiliary Dam • Rhinedollar Dam • Penstock • Water conveyance system	• Weekly and monthly inspections • Daily during spring/summer in peak runoff conditions • Maintenance work as needed	• Rake trash rack grids to ensure they are clean and free of debris • Fix minor concrete repairs/spalling
Material/slash burning	• Varies, depending upon source material location	• Annually, or as needed	• Obtain permit from Inyo National Forest when needed • Burn brush, slash, or other vegetation accumulated from various Project operations
Manage access gates and security fencing	• Vicinity of powerhouse, including machine shop and warehouse • Gates at Tioga, Saddlebag, and Rhinedollar Dams	• Inspect weekly and monthly during other facility inspections	• Repair as needed

Maintenance Activity	Relevant Project Area	Frequency	Description
	• Selected locations around access points at open flumes		
Sediment management (physical removal)	• Intake areas	• As needed	• Hand shovels used to remove sediment, if needed
Facility painting	• Powerhouse, handrails, maintenance buildings • Penstock • Parking lots	• Annually maintain, as needed (facilities on a rotation of every 10–20 years)	• Follow general aesthetic guidelines (e.g., painting in earth tones, landscaping with vegetation similar to surrounding areas)

Routine inspections are conducted at Project facilities to verify the structural and/or functional integrity of the facilities, and to identify conditions that might disrupt operation or threaten public safety. Routine inspections are conducted by an operator 4 to 5 days a week. Monthly Spill Prevention, Control, and Countermeasure and switchyard inspections also occur.

Routine maintenance activities are conducted to maintain Project facilities in operational conditions. An annual generator outage takes place to support minor maintenance and repair any wear and tear. Other normal maintenance includes snow removal and emergency repairs to the generator and associated equipment, as needed.

Hydrographers perform weekly dam inspections of Saddlebag Dam in summer months. Monthly inspections occur at all dams, year-round; however, there is limited visibility in winter months.

Specific repair and modification items are listed above in Table 4.6-1.

4.7. Other Project Information

4.7.1. Project Compliance History

The current license requirements and their status can be found in Appendix E, FERC License Conditions Summary Table.

4.7.1.1. FERC Inspections

The FERC Regional Office conducts an annual dam safety inspection and an environmental and public use inspection approximately every 5 years. The most recent inspections that occurred at the Project are as follows:

- FERC dam safety inspections from September 16 to 19, 2019
- FERC environmental inspections from August 20 to 22, 2018
- FERC public use inspections from August 6 to 8, 2012[3]

Additionally, independent consultant's Part 12D inspections are conducted every 5 years; the most recent of these inspections occurred in 2018.

SCE has completed all necessary corrective actions to address comments and recommendations arising from FERC inspections.

4.7.1.2. FERC License Deviations

SCE has reviewed the Project compliance history and found no instances of reoccurring non-compliance. Over the term of the current license, the Project has had several deviations to Condition Nos. 4, 5, and 6 regarding flow releases and reservoir levels. A

[3] A public use inspection was included in the 2018 environmental inspection.

summary of these deviations is provided in Table 4.7-1. Additionally, Table E-1 in Appendix E to this PAD contains more information on compliance with original license conditions.

Table 4.7-1. SCE Deviations over the Current License Term

Date of Report of Deviation	Relevant License Article	Description
March 23- April 22, 1998	Condition No. 4	The allowable range during the 1997/1998 water year based on an average of the average daily flows for the first part of October 1997 was 0 to 19.2 cfs (+/- 10 cfs from 9.2 cfs). This flow was not met from March 23, 1998, through April 22, 1998.
May 22-24, 1998	Condition No. 4	The 1998/99 water year was defined as a wet year. An April 20, 1998 statement established a target minimum flow for the water year beginning on May 1, 1998. Average daily flows were less than 8.4 cfs (the allowed 60 percent below 14 cfs) on 3 days: May 22, 23, and 24, 1998.
August 12, 1998	Condition No. 5 and 6	Ellery reservoir levels on August 12, 1998, dropped to 9,478.82 feet.
August 17, 1998	Condition No. 5 and 6	Ellery reservoir levels on August 17, 1998, dropped to 9,484.82 feet.
August 18, 1998	Condition No. 5 and 6	Ellery reservoir levels on August 18, 1998, dropped to 9,484.50 feet.
July 17-27, 1999	Condition No. 4	During periods when the net storage in your 3 reservoirs upstream of the powerhouse was increasing, minimum flows of 89 cfs were not met on July 17, 1999 through July 27, 1999.
August 9, 1999	Condition No. 4	During periods when the net storage in your 3 reservoirs upstream of the powerhouse was increasing, minimum flows of 27 cfs were not met on August 9, 1999.
September 18, 1999	Condition No. 4	During periods when the net storage in your 3 reservoirs upstream of the powerhouse was increasing minimum flows of 27 cfs were not met on September 18, 1999.
July 13, 2003	Condition No. 5 and 6	The lake level fell to elevation 9,490.03 feet, 2.5 feet below the elevation of the spillway, for about 10 hours on July 13, 2003. A sudden, unexpected increase in air temperatures caused a rapid decrease in inflow to Rhinedollar [Ellery] Lake from Slate Creek, a significant (and uncontrolled) contributor to the reservoir. Monitoring equipment at the dam was not capable of providing real-time information about minor lake level fluctuations; the lake level was restored when field personnel noted the deviation.

cfs = cubic feet per second

4.7.2. Current Net Investment

As of December 31, 2020, SCE has incurred an original cost investment of $32,088,497, accumulated depreciation of $12,288,103, with a net book value of $19,800,394 for the Project.

4.7.3. Project Generation and Outflow Records

Outflow data and average annual monthly energy production for current operations of the Project (2010 to 2020) are summarized in Table 4.7-2. During this period, annual generation ranged from 7,873 megawatt-hours (MWh) to 39,173 MWh (SCE, 2020).

Per FERC requirements, a summary of Project generation and outflow records for operations (annually and quarterly) for the 5 years preceding filing the PAD (2016 to 2020) is included in Table 4.7-3.

4.7.4. Average Annual Energy and Dependable Capacity

SCE defines Maximum Dependable Capacity to be the maximum load-carrying capacity of each generating unit, based upon single unit load tests during unrestricted conditions of maximum reservoir and/or forebay head and maximum manufacturer-rated capabilities of the turbines, generators, and other power plant components. Based on this approach, Lee Vining has a Dependable Capacity of 10.9 MW.

Table 4.7-2. Average Annual and Monthly MWh Generation (2010–2020)

Year	Jan	Feb	Mar	April	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual Total
2010	1,119	751	1,046	1,463	3,380	5,737	7,793	2,371	1,820	2,632	2,909	1,312	32,334
2011	1,350	1,178	1,178	4,132	1,267	7,478	8,347	6,442	1,691	2,999	1,061	186	37,310
2012	-55	0	-39	69	2,262	3,206	1,089	0	0	156	605	580	7,873
2013	365	413	706	2,807	2,278	0	0	0	0	0	0	1,582	8,150
2014	2,784	899	1,217	2,128	4,806	4,347	1,745	1,006	1,610	307	1,163	-786	21,226
2015	920	888	1,387	1,521	3,491	3,096	1,614	634	547	847	1,437	1,254	17,637
2016	830	939	1,273	2,979	5,585	7,518	3,589	2,961	92	1,604	1,920	1,069	30,359
2017	1,335	1,166	2,260	2,594	7,618	7,875	8,151	6,677	1,560	-17	-20	-27	39,173
2018	-22	-20	-24	685	1,163	4,794	7,052	4,211	3,109	1,042	420	577	22,986
2019	671	1,028	440	596	167	7,699	7,728	4,500	2,039	236	-24	957	26,036
2020	1,481	634	750	2,284	3,517	1,773	1,389	417	0	0	0	0	12,245
2010-2020 Average (MWh)	980	716	927	1,933	3,230	4,866	4,409	2,656	1,134	891	861	609	23,212

Source: SCE, 2020

MWh = megawatt-hour
Note:
A negative value indicates that the market conditions were in “negative pricing” and therefore the Project is consuming rather than producing power.

Table 4.7-3. Summary of Project Generation and Outflows (2016–2020)

Year	Quarter	Flow (cfs)	Generation (MWh)
2016	1	1,459	3,043
	2	6,510	16,082
	3	2,662	6,641
	4	1,995	4,593
2016 Annual Total		12,626	30,359
2017	1	2,034	4,761
	2	7,180	18,087
	3	6,447	16,388
	4	0	-63
2017 Annual Total		15,660	39,173
2018	1	0	-67
	2	3,872	6,641
	3	5,358	14,373
	4	1,052	2,039
2018 Annual Total		10,282	22,986
2019	1	1,115	2,139
	2	4,001	8,461
	3	5,864	14,267
	4	792	1,169
2019 Annual Total		11,773	26,036
2020	1	1,874	2,865
	2*	--	7,574
	3*	--	--
	4*	--	--
2020 Annual Total*		--	--

Source: SCE, 2020

cfs = cubic feet per second; MWh = megawatt-hour
Note:
*At the time the Draft PAD was developed, flow data was not available after May 2020 and generation data was not available after August 2020.Proposed Project Modifications

No modifications to Project facilities or operations are proposed at this time. As described in Section 4.6.1.3, SCE has been operating the Project to optimize the hydro-resource in response to load demands since 2016 and anticipates continuing to operate in this manner in the new license.

5.0 DESCRIPTION OF EXISTING ENVIRONMENT

5.1. GEOLOGY AND SOILS

5.1.1. INTRODUCTION

This section describes the geologic setting within the vicinity of SCE's Lee Vining Project (FERC Project No. 1388) and geomorphology of the Geomorphic Assessment Area (GAA) located within the Lee Vining Creek watershed (47 square miles) of Mono Basin. The GAA includes Project dams and reservoirs (Saddlebag Dam and Lake, Tioga Dam and Lake, and Rhinedollar Dam, which impounds Ellery Lake), as well as Project-affected stream reaches including Lee Vining Creek between Saddlebag Dam and Ellery Lake; Lee Vining Creek downstream of Rhinedollar Dam to Poole Powerhouse; Poole Powerhouse to the LADWP Lee Vining Creek Diversion Dam impoundment; and Glacier Creek between Tioga Dam and its confluence with Lee Vining Creek. The upstream extent of the GAA is the maximum design water level of Saddlebag Lake.

The Project Vicinity is within the Cascade-Sierra Mountains physiographic province. Mono Lake, east of the GAA, is situated in the Basin and Range physiographic province (Figure 5.1-1). The region has a rich tectonic, volcanic, and glacial history. The Project Vicinity was sculpted by glaciers and is characterized by rounded granite outcrops, U-shaped valleys, glacial lakes within glacial till deposits, and talus slopes (FERC, 1992). Within Mono Basin, elevations range from over 13,000 feet amsl along the Sierra Nevada peaks to approximately 6,400 feet at the shoreline of Mono Lake (Millar and Woolfenden, 1999), with the basin floor generally below 7,000 feet (Vorster, 1985). The uppermost reservoir, Saddlebag Lake, lies within a glacially carved U-shaped valley. Steep, 1,200-foot ridges bound the lake on the east and west sides, and talus slopes form most of the rock shoreline. Saddlebag Dam is in a narrow channel between rock outcrops (FERC, 1992). Tioga Lake lies in a valley on glacial till with a scattering of rounded rock outcrops. Tioga Dam, comprising a small concrete arch dam and a main dam, lies within the rock outcrops (FERC, 1992). Ellery Lake, impounded by Rhinedollar Dam, has a rocky shoreline with several areas of talus slopes entering the lake from the steep terrain along the southern margin. Rhinedollar Dam is anchored in rock at the left abutment, whereas the right abutment is within a talus slope (FERC, 1992).

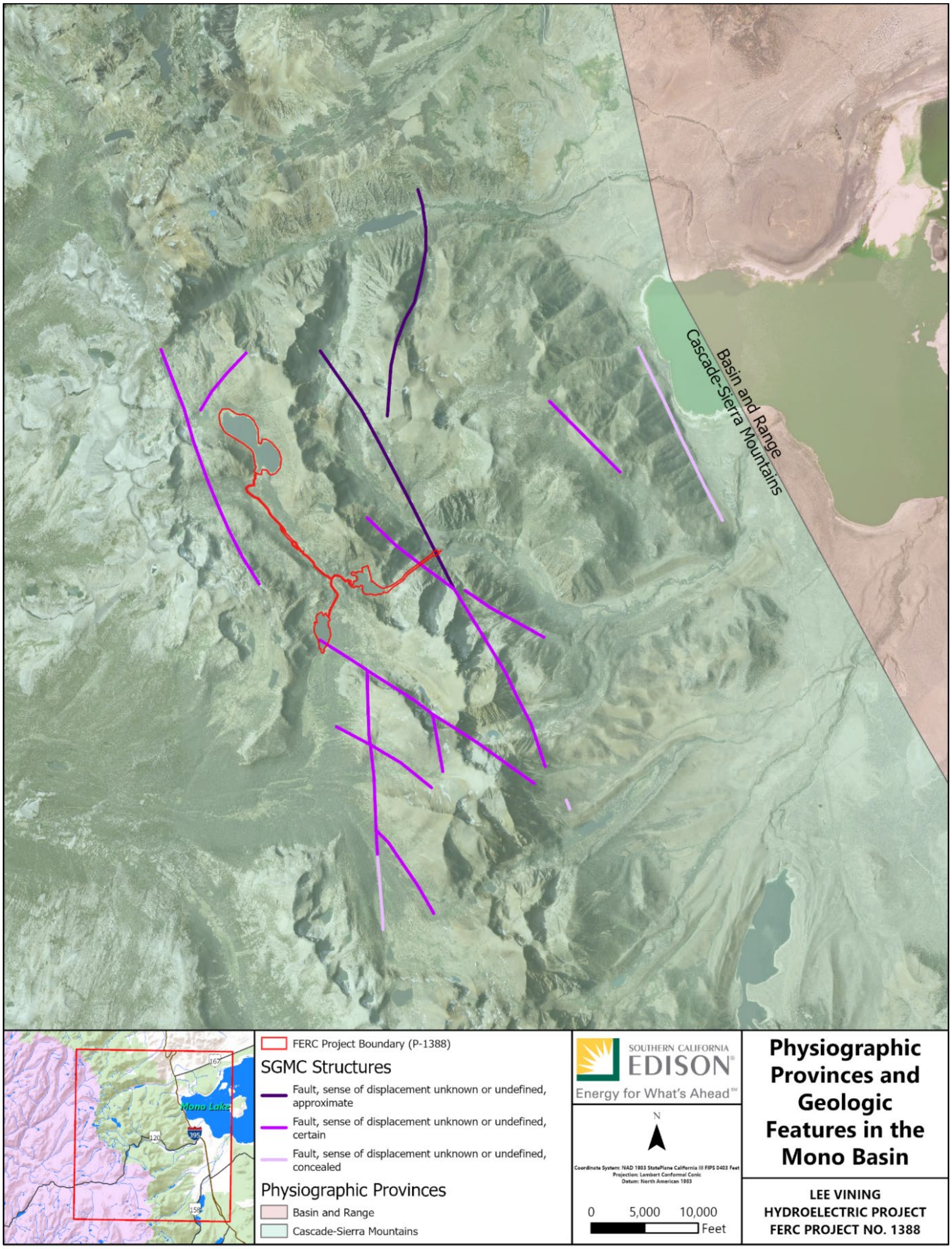


Figure 5.1-1. Physiographic Provinces and Geologic Features in the Mono Basin.

5.1.2. Information Sources

- *Final Environmental Assessment for Hydropower License* (FERC, 1992)
- *Plan for Control of Erosion, Stream Sedimentation, Soil Mass Movement, and Dust* (SCE, 1997a)
- *Plan for Storage and/or Disposal of Excess Construction/ Tunnel Spoils and Slide Materials* (SCE, 1997b)
- *Mono Basin Geology and Hydrology* (LADWP, 1987)
- *Birth of the Sierra Nevada Magmatic Arc* (Barth et al., 2011)
- *A Water Balance Forecast Model for Mono Lake, California* (Vorster, 1985)
- Fault and Thrust information summaries (Lidke, 2000; Sawyer, 1995; Sawyer and Bryant, 1995; Sawyer and Bryant, 2002)

5.1.3. Geologic Setting

Vorster (1985) describes the Mono Basin as

> …a sediment-filled structural depression – created by faulting and tectonic downwarping – that is surrounded by massive Mesozoic granite and Paleozoic metamorphic rocks of the Sierra Nevada escarpment on the west, and highly fractured Tertiary volcanic rocks of the Bodie Hills, Anchorite Hills, and Cowtrack Mountain on the north and east, and the Quaternary volcanic rocks of the Mono Craters and Glass Mountains on the south.

The geologic map units are shown on Figure 5.1-2, and further details of Project Vicinity geology are provided in the following sections.

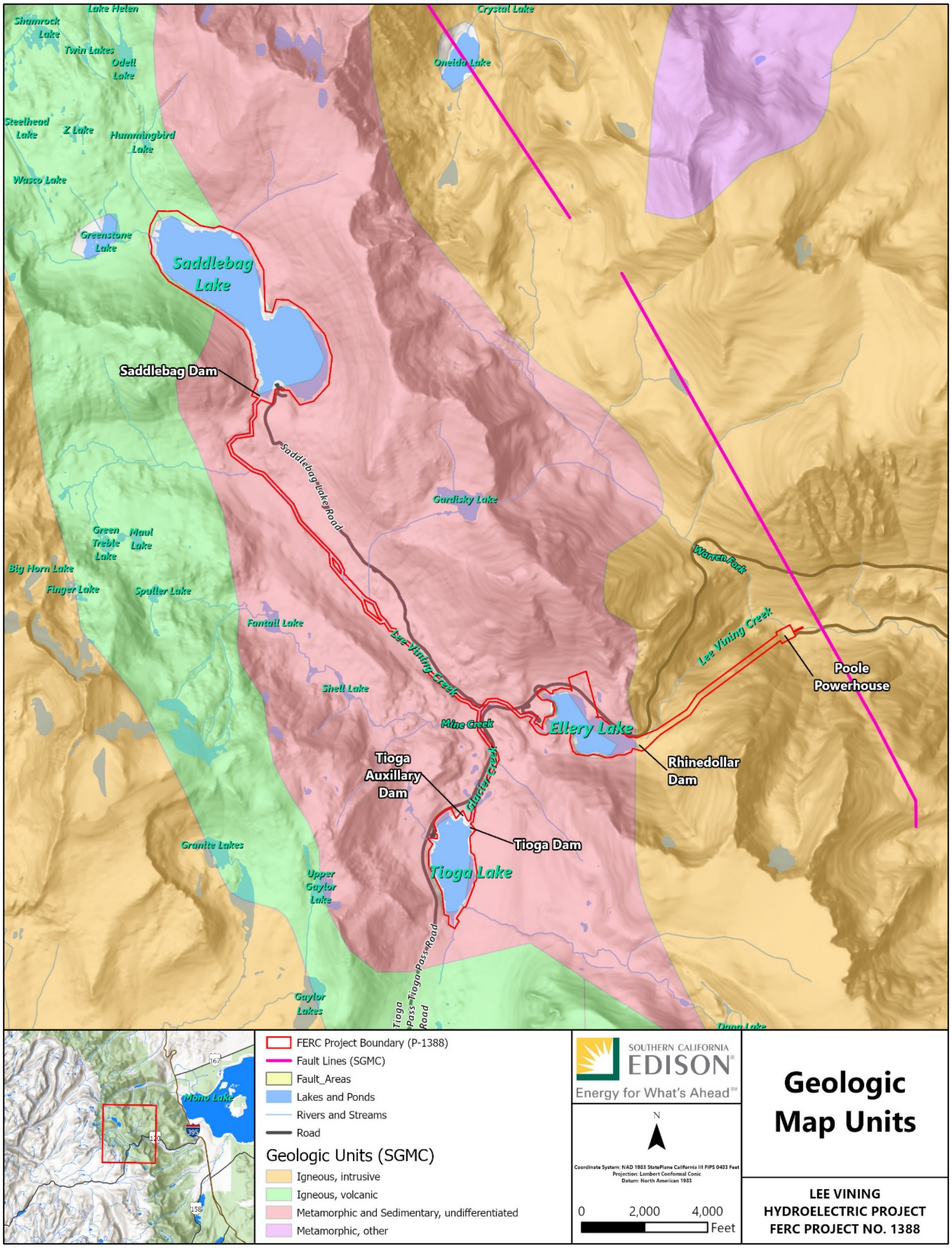


Figure 5.1-1. Geologic Map Units in the Project Vicinity.

5.1.3.1. Bedrock Lithology and Stratigraphy

The Sierra Nevada batholith is a key component of the Mesozoic Cordilleran orogenic belt formed along the continental margin of the western United States by subduction (Barth et al., 2011). Following emplacement of the batholith, a regional system of northwest striking and steeply northeast dipping joints developed in the granitic rocks. These joint patterns influence hillslope stability and water movement (ESE, 1975).

The Project is primarily in the Western Metamorphic Rocks group, including metasedimentary rock (Late Paleozoic) and metavolcanic rock (Triassic, Jurassic, Cretaceous), with surficial deposits including Holocene talus and alluvium (Huber et al., 1989; Figure 5.1-2). The Scheelite Intrusive Suite, one of the largest Mesozoic intrusive suites in the Sierra Nevada, also lies within the GAA and includes the granite of Lee Vining Canyon (Bateman, 1992; Barth et al., 2011). Within the GAA, metamorphosed volcanic rocks unconformably overlie Paleozoic metasediments (Barth et al., 2011), which include volcanic sandstone, thinly bedded calc-silicate rock, and thin interbeds of ash-flow tuff. The Saddlebag Lake Pendant includes all rocks that stratigraphically overlie the Scheelite Intrusive Suite. The pendant exposes rocks of both the Sonoma and Antler orogenic belts from west-central Nevada, which date to the Paleozoic Era (Schweickert and Lahren, 1987). Rocks within the Antler orogenic belt typically include chert, shale, siltstone, and argillite with minor lenses of quartzite, calcarenite, and basalt. Rocks of the Sonoma orogenic belt typically include metagabbro and other ultramafic rocks, chert-argillite breccia, siltstone, sandstone, and conglomerate (Lahren, 1989).

5.1.3.2. Tectonic History

The Sierra Nevada frontal fault zone extends approximately 373 miles (600 kilometers) along the eastern escarpment of the Sierra Nevada from near the Garlock fault to the Oregon Cascade Range and defines the western boundary of the Eastern California Shear Zone and Basin and Range physiographic province. In the Project Vicinity, the Sierra Nevada frontal fault zone occurs as a series of left-stepping, north-north-west striking, and east-facing escarpments formed in Quaternary alluvial deposits (alluvial fan and glacial deposits) and rockslides (Le et al., 2007). The Sierra Nevada frontal fault zone has remained tectonically active throughout the Quaternary. Since 1978, earthquakes have been concentrated in a portion of the Eastern California Shear Zone referred to as the Walker Lane Belt.

Volcanism

Widespread volcanism occurred during the Permian Period (about 250 million years ago [mya]) and again during the following Triassic and Jurassic periods (about 130 to 230 mya) when the Sierran batholith was emplaced (LADWP, 1987). During the late Pliocene Period (2 to 12 mya), there was widespread volcanic activity in Mono Basin, which is thought to have occurred after the major faulting that shaped the basin (LADWP, 1987). In the Quaternary, two major volcanic events in the surrounding area included eruption of the rhyolites of Glass Mountain (0.9 to 1.9 mya) east of Mono Lake, and a major eruption in Long Valley about 700 thousand years ago (ka), which collapsed the

Long Valley caldera and deposited the Bishop Tuff. In the following period (680 to 630 ka), upward moving magma caused a bulging of the central part of the caldera and formed a resurgent dome—at the same time as rhyolitic eruptions occurred from nearby vents. Rhyolite eruptions have subsequently occurred (500, 300, and 100 ka) in the ring-shaped valley surrounding the dome (LADWP, 1987). Rim eruptions of rhyodacite (180 to 50 ka) produced Mammoth Mountain. Eruptions of basalt in the Devil's Postpile area and the west moat area date from 200,000 to 60 ka (Bailey, 1982 as cited in LADWP, 1987), while younger basalts eruptions occurred near June Lake (Lajoie, 1968; Curry, 1971 as cited in LADWP, 1987). The Mono Craters southeast of the GAA started erupting about 40 ka with the most recent volcanic activity occurring on the islands in Mono Lake in the period from 220 to 2,000 years ago (Stine, 1984 as cited in LADWP, 1987).

5.1.3.3. Structural Features

Displaced moraines at the mouth of Lundy Canyon, fissures near the top of Black Point, and scarps and folds in uplifted lake sediments on Paoha Island provide evidence of post-glacial faulting (Putnam, 1949 as cited in LADWP, 1987). The major faults and thrusts in the Project Vicinity are listed below:

- Mono Lake Fault [23 kilometers long]—Holocene active (less than 15,000 years), down-to-the-east, range-bounding normal fault (Sawyer and Bryant, 2002).
- Quaternary Silver Lake Fault (also known as the Park Lake Fault) [33 kilometers long] —high-angle, down-to-east normal fault, comprised of two sub-parallel fault traces along the prominent eastern front of the central Sierra Nevada (Sawyer and Bryant, 1995).
- Tinemaha Fault (also known as the Birch Creek Fault)—part of the Southern Sierra Nevada fault zone, which is a zone of high-angle normal faults that bound the eastern front of the southern Sierra Nevada (Sawyer 1995).
- Mojave-Snow Lake Fault and related dextral strike-slip faults—displacing Mesozoic rocks over about a 400-kilometer length.
- Nevahbe Thrust—places Convict Lake and Mount Aggie formations on the west against highly altered Bright Dot Formation and Mount Baldwin Marble on the east.
- Roberts Mountain Thrust—a major continuous, northeast-striking range-front fault that trends northeast along the northern flank of the Roberts Mountains (Lidke, 2000).

5.1.3.4. Mineral Resources

The California Department of Conservation's Division of Mine Reclamation compiles data on the current status of mines and the commodities produced, and the California Geological Survey produces Mineral Land Classification studies that identify areas with potentially important mineral resources that should be considered in local and regional planning (California Department of Conservation, 2018). No Mineral Land Classification studies have been undertaken in the Project Vicinity (CGS, 2015). Therefore, there is no current information to determine Mineral Resource Zones (MRZs) within the Project Vicinity or whether there are any "regionally significant" mineral resources (MRZ-2) as defined in Sections 2761(a) and (b) and 2790 of the California Surface Mining and Reclamation Act of 1975 (California Department of Conservation, 2020). There is history of gold, silver, and tungsten mining in Lee Vining Creek watershed (Bateman, 1965); however, the USGS Mineral Resources Data System (MRDS) does not provide detailed information about the current status of these historical mines (USGS, 2018).

5.1.3.5. Soils

Soils are generally thin within the Project Vicinity. At high elevations, soil development has been limited by the harsh climate and recent glaciations that left behind steep bedrock and colluvium-covered slopes (Vorster, 1985). Soils in the Project Vicinity are generally described as coarse-textured, well-drained, and low in organic matter (Vaughn, 1983). Within the GAA, a sparse, thin soil stabilized by grasses has formed along the northern portion of Saddlebag Lake. At Tioga Lake, thin soils have developed over the bedrock and till. Soils are undeveloped along a portion of the perimeter of Ellery Lake (FERC, 1992). Downstream at Mono Lake outside of the GAA, saline-alkaline soils with high water tables and salt crusts occur (Vorster, 1985).

The soil units in the Project Vicinity are shown on Figure 5.1-3 and include the following U.S. Department of Agriculture (USDA) National Cooperative Soil Survey data units mapped by the University of California Davis and University of California Agriculture and National Resources (2020):

- "*Rock outcrop-Rubble land complex"* [117], which comprises 60 percent rock outcrop and 20 percent rubble land. This unit extends around most of the perimeter of Saddlebag Lake and along the northeastern slope above Lee Vining Creek to the outlet of Ellery Lake and between Ellery and Tioga Lakes and west of Tioga Lake.
- *"Rock outcrop-Rubble land-Canisrocks association, 0 to 80 percent slopes"*, cirqued mountainflanks, cryic [219yp], which comprises 40 percent rock outcrop, 25 percent rubble land, 15 percent Canisrocks, 10 percent lithic Cryorthents, 7 percent Humic Lithic Dystrocryepts, 2 percent water, and 1 percent Histosols. Canisrocks are of the Entisols order. This unit extends along the western and southern slopes above Saddlebag Lake and Lee Vining Creek.
- *"Stecum-Charcol families-Rock outcrop complex, 30 to 70 percent slopes"* [158]. This unit comprises 35 percent Stecum family, 25 percent Charcol family, 15 percent rock outcrop, 10 percent Lithic Cryorthents, 10 percent Aquic Cryoborolls, and 5 percent unnamed. The Stecum family is of the Entisols order and the Charcol family is of the Mollisols order. This unit encompasses Lee Vining Creek and its margins from Saddlebag Lake to Ellery Lake.
- *"Stecum-Guiser families-Rock outcrop complex, 15 to 60 percent slopes"* [157]. This unit comprises 40 percent Stecum family, 20 percent Guiser family, 15 percent rock outcrop, 10 percent Lithic Cryorthents, 5 percent Aquic Cryoborolls, 5 percent Charcol family, 5 percent Cowood family. The Guiser family is of the Alfisols order. This unit extends around the eastern and southern margins of Tioga Lake.

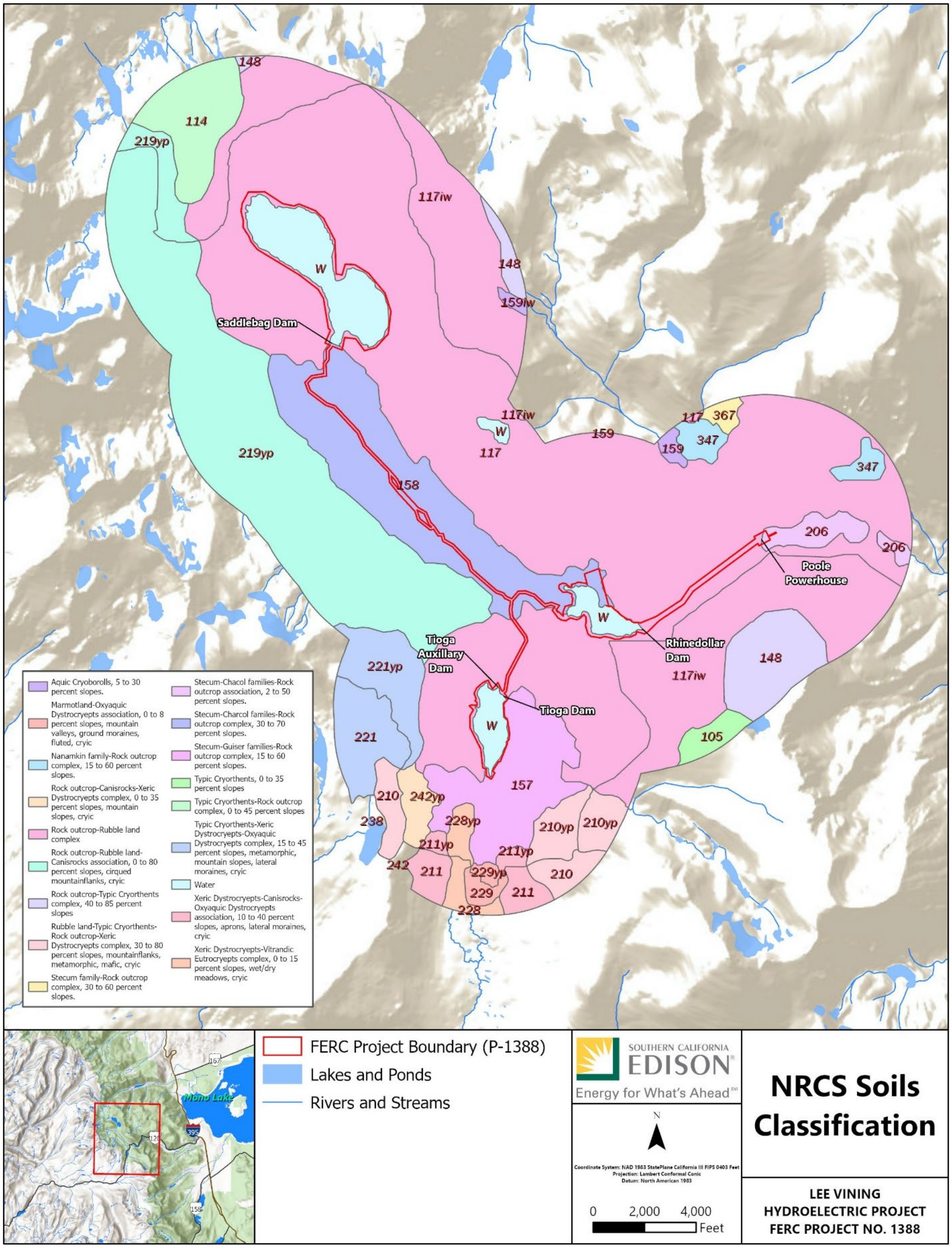


Figure 5.1-3. NRCS Soil Classifications

5.1.4. Glacial History and Landforms

The Sierra Nevada eastern escarpment is characterized by steep, granitic mountain slopes. Most sedimentary rocks in Mono Basin are not older than the Quaternary (i.e., 2.6 mya to present; LADWP, 1987). The Quaternary glacial record on the eastern side of the Sierra Nevada range includes eight named Pleistocene glaciations and stadials, in order of decreasing age: McGee (Pliocene-Pleistocene), Sherwin (800 ka), Casa Diablo, Mono Basin, Tahoe (150 ka), Tenaya, Tioga (Late Wisconsin to Last Glacial Maximum), and Recess Peak (14 to 12.5 ka), as well as the Neoglacial Matthes (Little Ice Age) advance; although there is evidence of several more (unnamed) advances and retreats (Gillespie and Zehfuss, 2004; Gillespie and Clark, 2011). During the Last Glacial Maximum (21 to 18 ka maximum), the Sierra Nevada in California was covered by a 20,000-square-kilometer glacier/ ice cap complex (Phillips, 2017). Glacial debris from multiple Pleistocene glaciations formed many moraines, ridges, and coarse-grained alluvial deposits that cover a broad piedmont slope of glacial till at the base of the Sierra Nevada, as well as sculpting depressions that are now alpine lakes (Jones & Stokes Associates, 1993). Several terminal and lateral glacial moraines are present along the Sierra Nevada escarpment between Bishop and Lee Vining (Vaughn, 1983). Aeolian erosion and redeposition, rockfalls, small debris flows, and slides shape the slopes of the moraines; the Mono Basin moraines are covered with grus (angular, coarse grained fragments of crystalline rock), which suggests that as these processes become less active; in addition, creep is the primary means of moraine degradation (Bursik, 1991).

The three reservoirs within the GAA (Saddlebag, Tioga, Ellery) were glacially scoured natural lakes prior to dam construction for hydropower storage in the 1920s (Jones & Stokes Associates, 1993). Today, there are two extant glaciers in the Lee Vining Creek watershed—the Conness Glacier and the Dana Glacier—as well as several rock glaciers. The extent to which natural ice processes currently contribute to erosion in the GAA is unknown.

5.1.5. Physiography and Geomorphology

5.1.5.1. Hillslope Processes

The surficial geology of the Project Vicinity is shown on Figure 5.1-4. California Geological Survey (CSG, 2015) has not mapped landslides or other mass movements within the GAA. Nearby studies (e.g., Wieczorek and Jäger, 1996), along with the need for remediation management of slope failures in the GAA (SCE, 1997a), provide some indication of potential for mass wasting; however, there is no information to reasonably determine the extent that mass wasting or hillslope erosion occur in the Project Vicinity.

The FERC-approved Erosion Control Plan (SCE, 1997a) states that rupture of flowlines or failure of slopes along the flowline, or failure cut slopes for roadways or other facilities, may result in land movements requiring remediation within the GAA. The SCE (1997a) document indicates that slope failures would generally be repaired through remedial grading and slope stabilization, using retaining walls, riprap, or other structures where necessary, as well as revegetation.

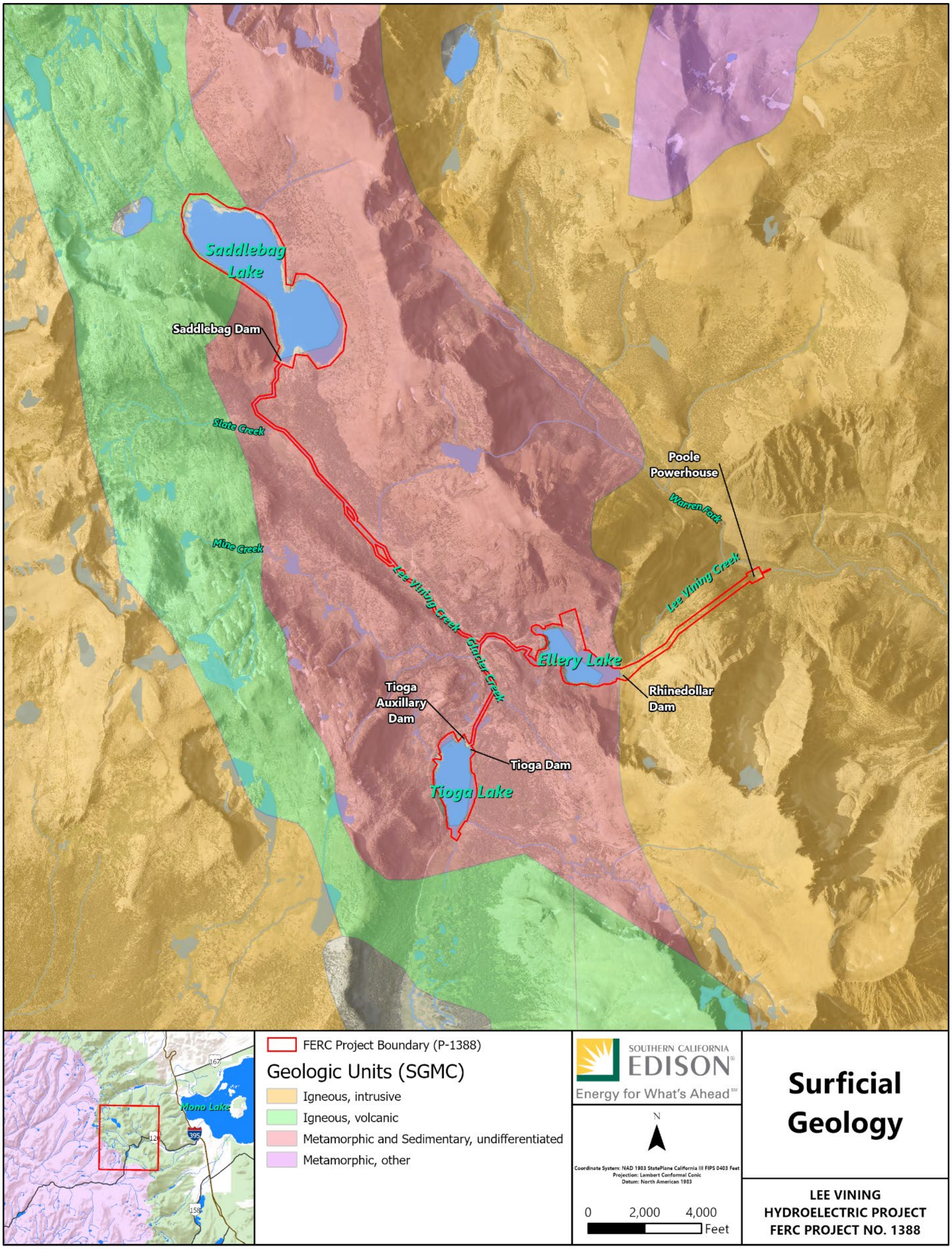


Figure 5.1-4. Surficial Geology.

Condition 10 of the current license (FERC, 1997) requires a Spoil Disposal Plan (SCE, 1997b). The Spoil Disposal Plan states that when material is removed from behind impoundments, within waterbodies, or from mass wasting events, the material is used as fill on SCE property or on other properties with the owner's permission. If excess construction/tunnel spoils and slide material are to be disposed of on National Forest System land, or major construction activities such as intake dredging are planned, the Spoil Disposal Plan (SCE, 1997b) requires a separate plan for the disposal activity be prepared and submitted to the USFS. This separate plan would address contouring and compacting of storage piles and fill sites to conform to adjacent landforms and slopes, stabilization and rehabilitation of all spoil sites and borrow pits, and prevention of water contamination by leachate and runoff (SCE, 1997b).

5.1.5.2. Sediment Supply, Erosion, and Transport

Because glaciers are effective weathering and erosion agents, watersheds with receding glaciers or postglacial features often carry high sediment loads until fine sediment suitable for fluvial transport in the proglacial area is exhausted. No studies have been undertaken to assess postglacial sediment sources in the watershed, nor the relative contribution of postglacial and non-glacial sediments to the fluvial system.

SCE currently operates three streamflow gages in the GAA: No. 10287655 [Lee Vining Creek at Saddlebag Dam], No. 10287720 [Glacier Creek at Tioga Dam], and No. 10287770 [Lee Vining Creek at Rhinedollar Dam]. SCE also historically operated Gage No. 10287780 [Lee Vining Creek at Poole Powerhouse] and No. 10287900 [Lee Vining Creek downstream of the Project], which are now inactive (Figure 4.5-5).

Information available downstream of the GAA suggests average annual sediment yield at the LADWP diversion structure was approximately 28,000 tons per year in 2000 (R2, 2002). At that time, Lee Vining Creek above the diversion structure was a cobble bed stream with a gradient of 1.6 percent and a bankfull top-width of approximately 35 feet (R2, 2002). R2 (2002) conceptualized that (1) during flood/rising flows, fine sediment is transported over the armor layer from upstream sources; (2) when flows are high enough to break up the armor layer, large quantities of sands and fine gravels become available for transport; and (3) supply of the fine fraction is depleted if flows remain high over an extended period, resulting in higher sediment transport on the rising limb of the hydrograph. The initial breakup of the armor layer in Lee Vining Creek has been estimated to occur at approximately 250 cfs (R2, 2000 as cited in R2, 2002). R2 (2002) suggests that the LADWP diversion structure traps the majority of the coarse sediment fraction (coarse sands, gravels, and cobbles), but passes the majority of the fine sediment fraction (clays, silts, and very fine sands). The diversion structure was estimated by R2 (2002) to trap 320 tons per year of sediment—primarily sand—on an annual basis.

5.1.5.3. Fluvial Geomorphology

Lee Vining Creek drains the eastern Sierra Nevada crest and Glacier Creek is a tributary that flows from Tioga Lake. Mount Dana (13,053 feet amsl), the highest peak in Mono Basin, and several other peaks above 12,000 feet rim the watershed boundary (Jones &

Stokes Associates, 1993). Lee Vining Creek drops precipitously down the eastern Sierra escarpment from Ellery Lake at elevation 9,500 feet amsl to Poole Powerhouse at elevation 7,825 feet amsl (Jones & Stokes Associates, 1993). A channel profile of Lee Vining Creek is shown on Figure 5.1-5, and the bathymetry of each lake is shown on Figure 5.1-6, Figure 5.1-7, and Figure 5.1-8. There is no information describing the contemporary fluvial geomorphology of Lee Vining Creek or Glacier Creek or how it has changed since the 1990s.

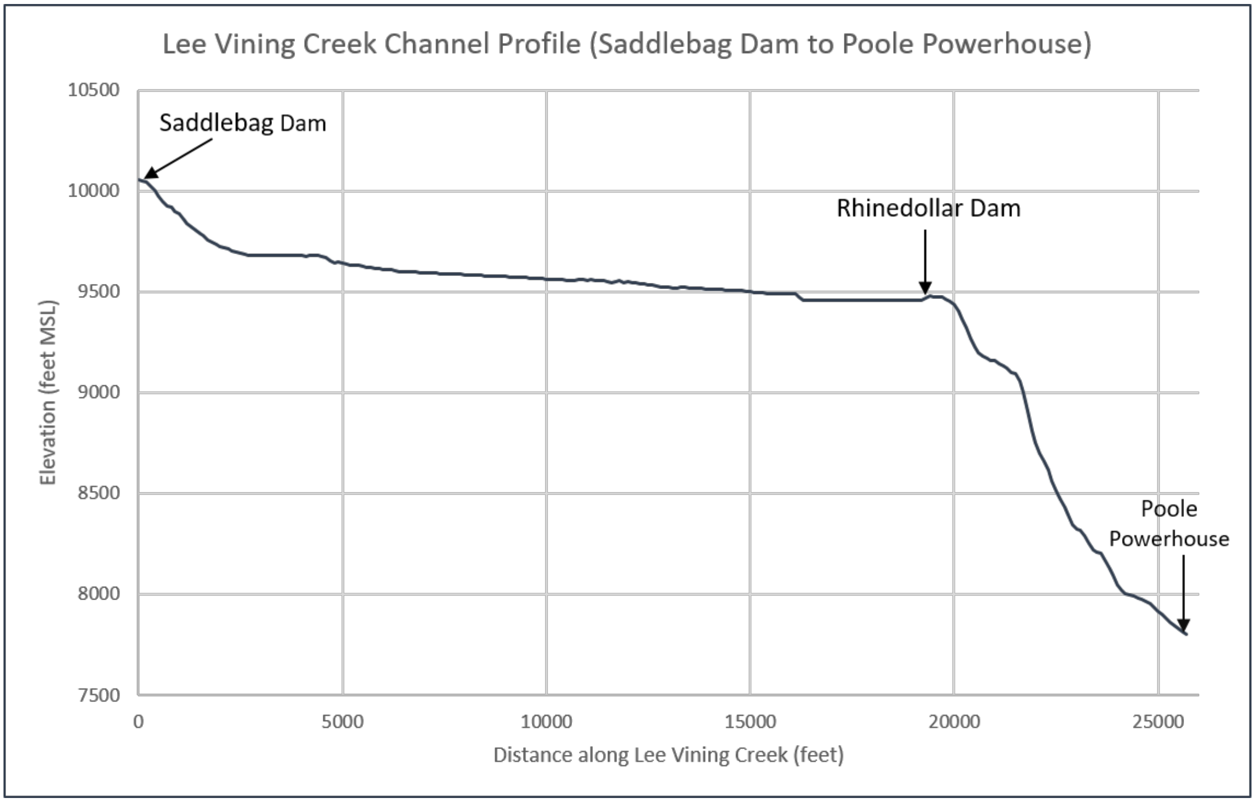


Figure 5.1-5. Channel Profile of Lee Vining Creek.

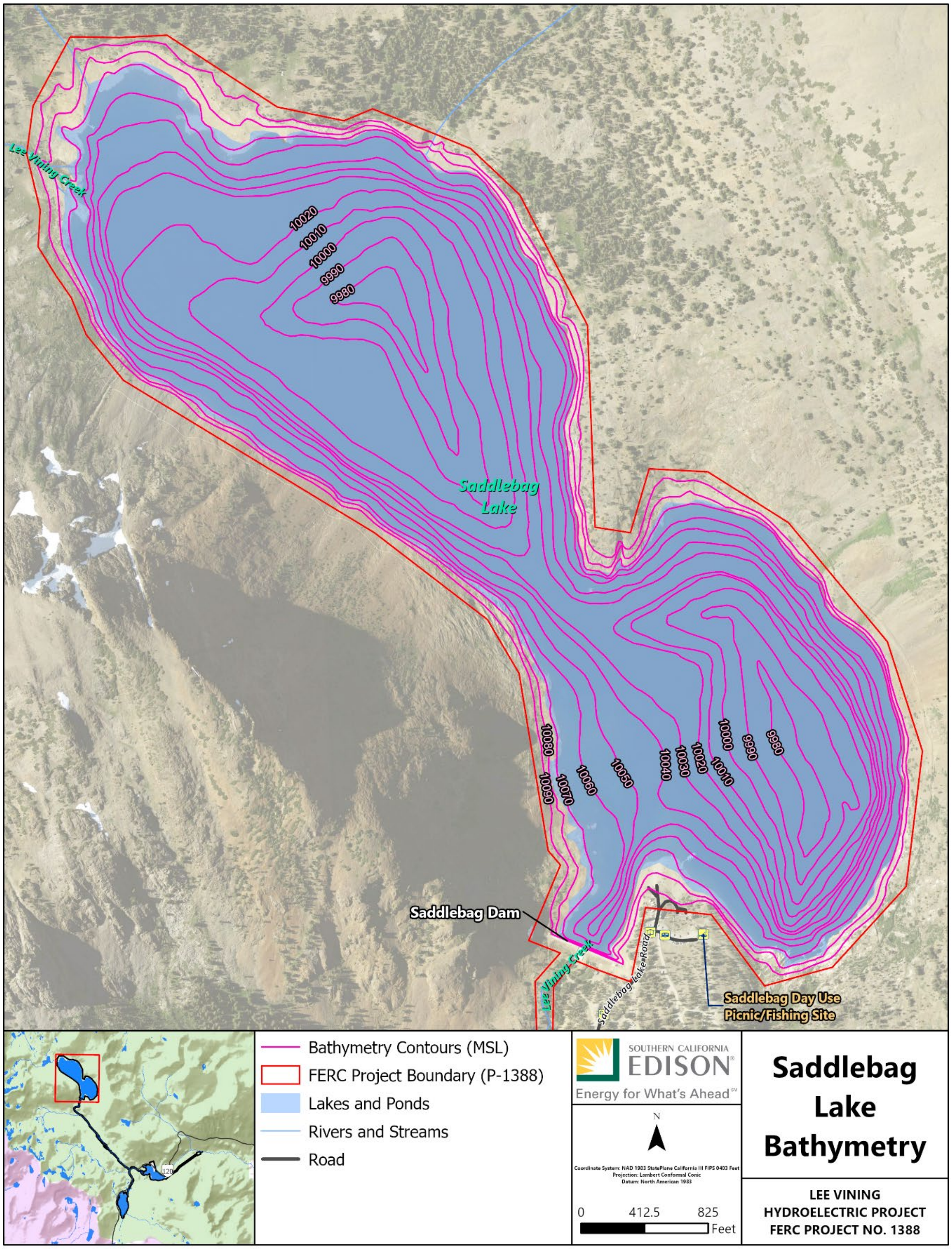


Figure 5.1-6. Bathymetry of Saddlebag Lake.

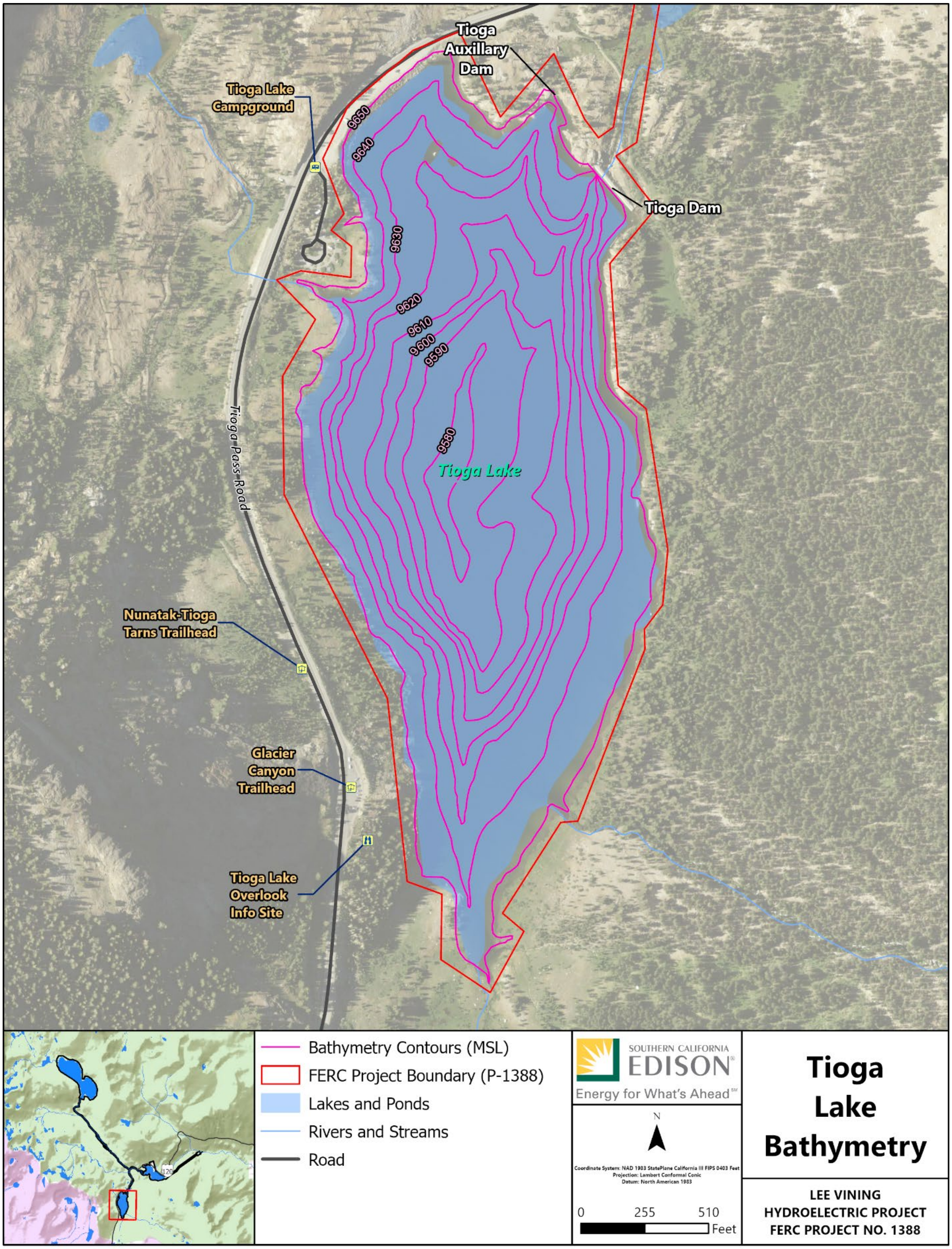


Figure 5.1-7. Bathymetry of Tioga Lake.

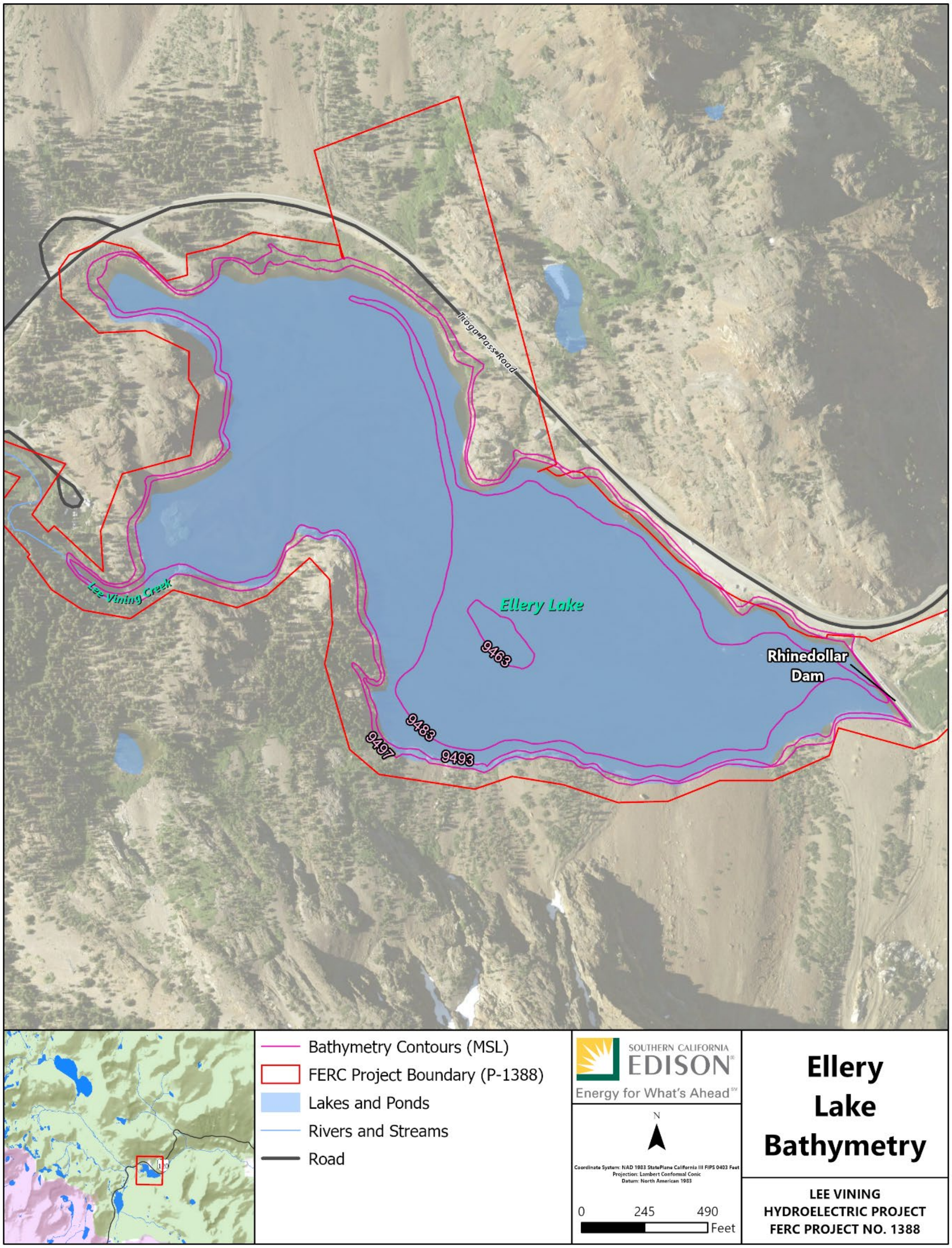


Figure 5.1-8. Bathymetry of Ellery Lake.

The 1992 Final Environmental Assessment (FERC, 1992) for the Project describes Lee Vining Creek as having three distinct stream reaches differentiated by habitat and channel morphology between Saddlebag Dam and Ellery Lake:

- Lee Vining Creek from Saddlebag Dam to the confluence of Slate Creek (an unimpaired tributary to Lee Vining Creek). This reach is 1,258 feet long and as of 1992 reportedly comprised moderate gradient riffles of various widths and a small amount of cascade habitat (~85% riffle, ~10% cascade).

- Lee Vining Creek from the confluence of Slate Creek to the confluence of Glacier Creek. This reach is 10,750 feet long and as of 1992 reportedly comprised two low-gradient meadow sections, totaling 7,880 feet in stream length, separated by a steeper gradient canyon of 2,870 feet stream length.

- Lee Vining Creek from the confluence of Glacier Creek to Ellery Lake. This reach is 2,406 feet long, is wide and relatively shallow, and as of 1992 reportedly comprised riffle, run, and cascade habitat with cobble and gravel substrate.

There is no information available on geomorphic conditions between Ellery Lake and Poole Powerhouse. Below Poole Powerhouse, Lee Vining Creek alternates between areas of shallow pools and short sections of steeper gradients containing riffles. Substrate downstream of Poole Powerhouse is primarily cobble with sand prevalent in areas of reduced gradient (FERC, 1992).

The Project regulates stream flows in Lee Vining and Glacier creeks below Project reservoirs which can potentially affect channel morphology. There is no information available to reasonably determine how Project-related stream flows are affecting fluvial morphology.

5.1.5.4. Erosion and Sedimentation Associated with Project Facilities

The Project proposed as part of the 1992 Environmental Assessment did not involve ground-disturbing activities outside of enhancement measures, such as historic activities to install flow gages and bury a portion of the Project telephone line. As part of the 1992 Environmental Assessment (FERC, 1992) and Condition 9 of current license (FERC 1997), an Erosion Control Plan based on site geological, soil, and groundwater conditions was required. The FERC-approved Erosion Control Plan (SCE, 1997a) states that because there were no major changes to Project facilities or maintenance, soil erosion would be related to minor construction activities associated with access road repairs, bridge repairs, maintenance of dams and diversion structures, repair of flowlines, replacements and repairs of buildings and facilities, repairs of transmission facilities, and other channel maintenance and facility modifications as required by FERC as a result of periodic inspections. The Erosion Control Plan (SCE, 1997a) requires consultation with the USFS in relation to specific erosion control measures, as well as with the Lahontan Regional Water Quality Control Board and CDFW when appropriate.

The following measures required in the Erosion Control Plan (SCE, 1997a) to reduce erosion and sedimentation are currently part of ongoing Project O&M.

- Grading and contouring—after ground-disturbing activities and retaining original drainage patterns.
- Construction of erosion control structures—in areas prone to significant flows and/or erosion, structures such as riprap, rock gabions, or small concrete retaining structures may be necessary. Temporary sedimentation basins may be utilized for work within or adjacent to streams, followed by revegetation.
- Water bars, sediment fences etc.—where needed, water bars (earth, concrete, or sandbags) placed at 30 degrees will be used on slopes to dissipate energy of flowing water and reduce soil erosion. Where needed, sediment fences may be used near streams and in areas of high runoff to trap sediments. Straw bales may also be used to reduce sedimentation in and adjacent to streams.
- Slope stabilization—straw and/or jute matting may be used in the stabilization of slopes prior to revegetation and plants establishing.
- Revegetation—revegetation methods and plant palettes are site-specific and would require a revegetation plan and where feasible a revegetation monitoring program. Areas of disturbance were required to be periodically monitor, and noxious weeds will be eradicated as appropriate.
- Wind erosion—wind erosion may be reduced through revegetation, intermittent use of dust palliative chemicals, lath fences, or earthen berms. Water trucks were required to be used to control dust during construction.
- Monitoring—the effectiveness of erosion and sedimentation control measures were required to be monitored during and after storm events. Erosion control structures would be repaired, and erosion damage remediated.

SCE (1997a) describes the potential need for sediment removal and measures to reduce associated sedimentation. Impoundments may require removal of sediments on a periodic basis, resulting in sedimentation or siltation. Methods may include ramping of flow releases to reduce the amount of sediments released, sediment removal (sluicing, dredging, or removal by clamshell), and material disposal. Sediment removal has not been necessary on a regular basis within the license term.

5.1.5.5. Reservoir Shorelines and Streambanks

The occurrence and potential for shoreline erosion around the perimeter of Saddlebag Lake, Tioga Lake, and Ellery Lake was assessed using Unmanned Aircraft Systems imagery (CASC Engineering and Consulting, 2020) and aerial photography available on Google Earth. Shoreline conditions at each lake are described below.

Variable water levels within Saddlebag Lake create a ring of predominantly unvegetated rock and soil surrounding the reservoir. Reservoir shorelines are typically underlain by bedrock and other resistant materials associated with coarse-grained talus and rockfall. Less frequently occurring areas underlain by finer-grained materials show some terracing from wind wave erosion, particularly along the north shore where slopes are more gradual. Soil has been removed from these areas, but otherwise there is little evidence of active surface erosion, mass wasting, or erosion due to the tractive force of wind waves.

Tioga Lake maintains a more stable water level with highly vegetated shorelines occupied by stable large woody debris. There were no signs of shoreline retreat in vegetated areas due to wind wave erosion. Shorelines at the southern end of the reservoir near the tributary inlet are underlain by finer-grained materials, but shoreline erosion was not apparent in this area. Surface erosion (e.g., rilling) was observed on the shoulders of Tioga Road along shorelines at the northern end of the Lake.

Much like Tioga Lake, Ellery Lake maintains a relatively stable water level that limits wind wave erosion within the zone of fluctuation. Much of the shoreline is underlain by resistant material (e.g., talus, rockfall, coarse-grained alluvial fans, and bedrock). Shorelines are typically highly vegetated at and above the waterline and do not show evidence of wind wave erosion. Highly vegetated islands within the reservoir also show little to no evidence of erosion.

5.2. WATER RESOURCES

5.2.1. INTRODUCTION

This section describes water resources in the vicinity of SCE’s Lee Vining Project (FERC Project No. 1388).

5.2.2. WATER USE AND HYDROLOGY

There are seven stream gages located in the Project Area that are actively recording data. The gages are published by the USGS, but are owned by SCE. The USGS maintains a contract with SCE to review streamflow records at these gages to satisfy the Project’s FERC license requirements. The seven gages in the Project Area are shown in Table 5.2-1.

Table 5.2-1. SCE Gaging Stations

SCE Gage No.	USGS Gage No.	Location
353	10287770	In stream, Lee Vining Creek below Ellery Lake
354	10287655	In stream, Lee Vining Creek below Saddlebag Lake
356	10287760	In reservoir, Ellery Lake (Rhinedollar Reservoir)
360	10287650	In reservoir, Saddlebag Lake
361	10287700	In reservoir, Tioga Lake
363	10287762	In stream, Poole Plant Use (AVM)
368	10287720	In stream, Glacier Creek below Tioga Lake

5.2.2.1. Drainage Area

The Project is located in the Lee Vining Creek–Frontal Mono Lake watershed (HUC 1809010104), which has a total drainage area of approximately 47 square miles (SCE, 2019) (see Figure 5.2-1). The drainage area of the Project at Rhinedollar Dam is approximately 17 square miles. The Project Area is mountainous with steep exposed bedrock and talus slopes with little tree cover or vegetation; along the Lee Vining Creek, the area is flatter and vegetated with meadows and pine trees. The elevations in the watershed range from approximately 6,400 feet amsl to over 13,000 feet amsl. Lee Vining Creek flows toward the southeast approximately 15 miles from its headwaters at Saddlebag Lake to Mono Lake east of the town of Lee Vining (SCE, 2019). Glacier Creek is a major tributary to Lee Vining Creek, and is impounded by Tioga Dam. Both Lee Vining Creek and Glacier Creek originate in snowpack from glacially carved terrain in the Sierra Nevada (SCE, 2018b; SCE, 2019). Saddlebag Lake, Tioga Lake, and Ellery Lake (impounded by Rhinedollar Dam) are the three major storage reservoirs on Lee Vining Creek and Glacier Creek.

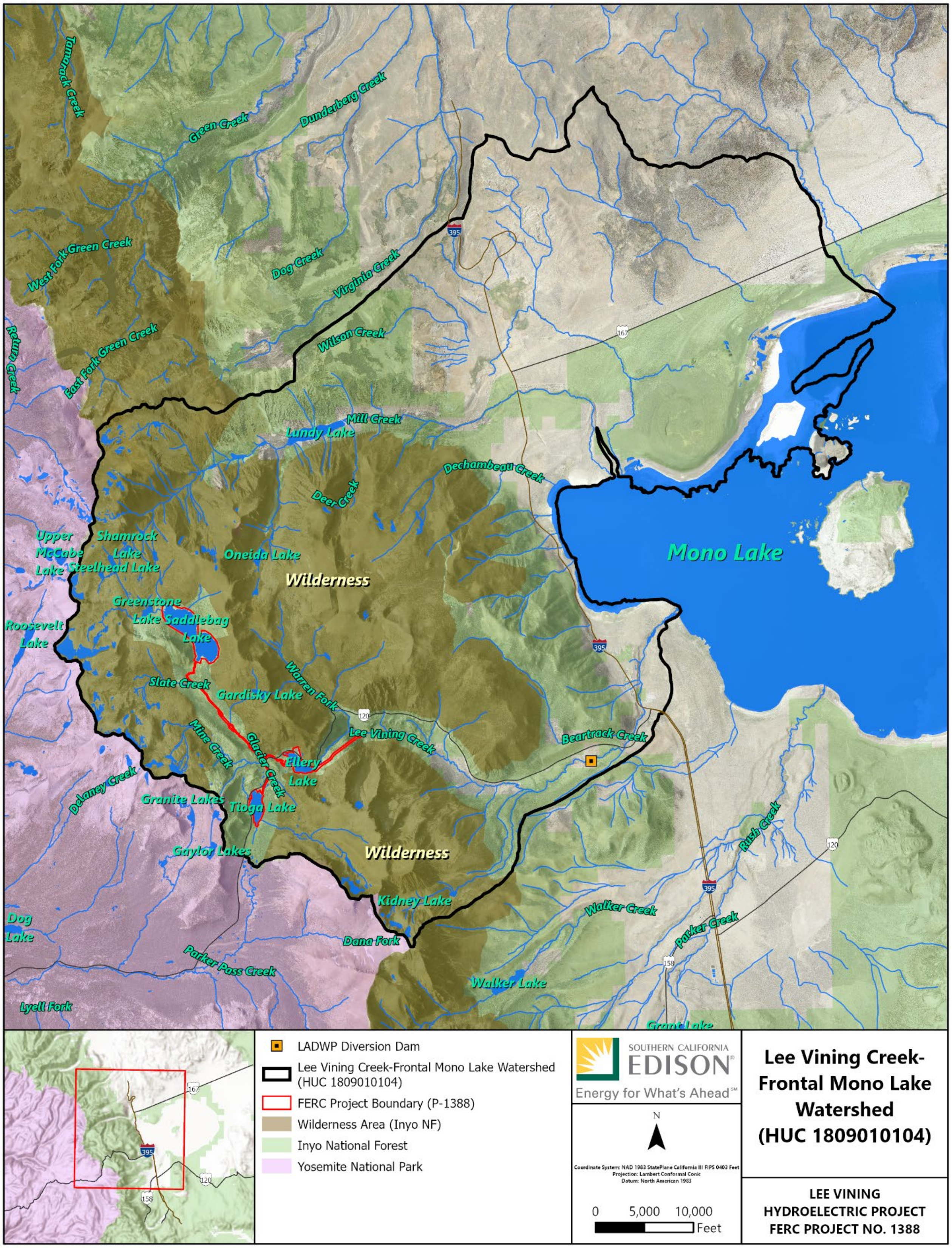


Figure 5.2-1. Lee Vining Creek—Frontal Mono Lake Watershed

5.2.2.2. Precipitation Data

Precipitation data was obtained at Ellery Lake from a SCE gage for the period 2010 to 2019. The daily precipitation totals were summarized to monthly total precipitation, shown in Table 5.2-2. Data for the last 10 years (2010–2019) and the last 5 years (2015–2019) are aggregated. Average annual precipitation at Lee Vining was 19.2 inches over the last 10 years.

5.2.2.3. Flow Statistics

To estimate flow statistics at pertinent locations within the Lee Vining watershed, the existing USGS gage data were prorated based on drainage areas. The drainage areas of Lee Vining Creek and Glacier Creek at their confluence and the drainage area of Lee Vining Creek below Rhinedollar Dam were determined using the U.S. Environmental Protection Agency Waters Watershed Delineation tool from the Google Earth application (USEPA, 2020), specifically:

1. USGS No. 10287655 (Lee Vining Creek below Saddlebag Lake) was adjusted by a factor of 2.14 to obtain the flows of Lee Vining Creek at the confluence with Glacier Creek.

2. USGS No. 10287720 (Glacier Creek below Tioga Lake) was adjusted by a factor of 1.69 to obtain the flows of Glacier Creek at the confluence with Lee Vining Creek.

3. The two prorated datasets at the confluence with Lee Vining Creek were summed and adjusted by a factor of 1.05 to obtain the flows of Lee Vining Creek below Rhinedollar Dam.

The mean annual flow at Lee Vining Creek below Rhinedollar Dam is approximately 47.7 cfs, and monthly mean flows range between 26.6 and 78.9 cfs. Annual results are shown in Table 5.2-3. Months where data was not available from USGS gages are labeled with “N/A”.

Table 5.2-2. Monthly Precipitation Totals at Ellery Lake Station

Monthly Total Precipitation (inches)													
	Jan.	**Feb.**	**March**	**April**	**May**	**June**	**July**	**Aug.**	**Sept.**	**Oct.**	**Nov.**	**Dec.**	**Annual**
2009	3.51	3.27	1.14	2.56	0.79	0.04	0.63	0	0	6.16	1.78	6.77	26.65
2010	2.93	2.17	4.78	1.31	3.9	0.86	0.87	0	0.39	1.38	0.51	0	19.1
2011	2.92	0.92	3.07	1.23	0.04	0.28	0.04	3.12	0.08	1.25	2.5	5.1	20.55
2012	0.44	0.16	1.1	0.36	0.8	0.24	0.04	0.2	0.4	0.6	0.56	1.28	6.18
2013	1.32	4.02	2.52	1.2	0.8	0.52	0.88	1.68	0.36	0	0.6	1.92	15.82
2014	0.28	2.12	0.52	1.24	3.12	1.16	2.92	0.48	0.36	1.68	2.16	3.42	19.46
2015	4.88	0.72	2.4	1.28	1.4	0.8	0.24	0.04	0.2	5.84	0.88	4.24	22.92
2016	11.34	7.98	1.56	2.6	0.56	0.16	0	0.76	0.8	0.2	3.02	0.12	29.1
2017	1.44	0.68	5.02	3.76	1.76	0	3.33	0	0	0.36	3	0.87	20.22
2018	3.42	6.16	3.4	0.84	1.4	0.2	0.68	0.16	0	0	0	3.86	20.12
2019	0.8	0.36	1.92	2.4	0.48	0.16	0.12	1	0.16	0.00	0.00	3.86	11.26
2010–2019													
Maximum	11.34	7.98	5.02	3.76	3.90	1.16	3.33	3.12	0.80	6.16	3.02	6.77	29.10
Average	3.03	2.60	2.49	1.71	1.37	0.40	0.89	0.68	0.25	1.59	1.36	2.86	19.22
Minimum	0.28	0.16	0.52	0.36	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.18
2015–2019													
Maximum	11.34	7.98	5.02	3.76	1.76	0.80	3.33	1.00	0.80	5.84	3.02	4.24	29.10
Average	4.38	3.18	2.86	2.18	1.12	0.26	0.87	0.39	0.23	1.28	1.38	2.59	20.72
Minimum	0.80	0.36	1.56	0.84	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.12	11.26

Table 5.2-3. Monthly Mean, Minimum, and Maximum Flows for Lee Vining Creek Below Rhinedollar Dam

Water Year	Monthly Mean Flow for Lee Vining Creek Prorated Below Rhinedollar Dam (cfs)											
	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.
1997–1998	52.6	43.9	25.2	43.6	37.0	76.3	68.4	30.3	131.2	137.0	86.7	49.3
1998–1999	65.9	82.7	40.4	34.2	N/A	N/A	26.1	55.5	102.7	47.5	34.7	36.9
1999–2000	59.9	58.1	41.2	N/A	N/A	N/A	39.2	56.9	60.9	53.3	31.7	46.6
2000–2001	38.6	58.3	46.6	N/A	N/A	N/A	15.1	56.2	23.2	31.0	15.8	44.1
2001–2002	64.6	59.0	80.0	N/A	N/A	N/A	20.9	42.0	72.7	32.2	27.5	21.6
2002–2003	38.9	78.2	N/A	N/A	N/A	N/A	N/A	66.0	87.0	24.0	22.2	29.1
2003–2004	43.9	49.0	N/A	N/A	N/A	N/A	N/A	20.4	38.2	25.6	23.4	19.6
2004–2005	25.8	49.6	46.6	N/A	N/A	N/A	N/A	97.3	112.5	90.8	46.0	43.7
2005–2006	61.8	72.2	40.3	N/A	N/A	N/A	51.7	85.0	145.2	98.7	74.3	63.1
2006–2007	61.1	73.7	67.5	57.4	N/A	N/A	28.2	30.8	23.1	20.2	20.6	13.3
2007–2008	42.4	40.6	N/A	N/A	N/A	N/A	N/A	43.7	31.2	25.8	18.8	31.2
2008–2009	40.6	36.4	36.2	16.1	N/A	N/A	N/A	44.6	44.4	29.3	31.5	48.6
2009–2010	46.1	36.5	N/A	N/A	N/A	N/A	N/A	36.3	100.6	112.7	55.5	63.1
2010–2011	67.4	78.5	26.8	N/A	N/A	N/A	N/A	N/A	171.6	212.8	156.6	136.5
2011–2012	105.5	28.2	22.1	N/A	N/A	N/A	53.3	44.7	13.2	49.5	31.5	23.1
2012–2013	39.6	39.1	12.3	11.6	10.4	11.2	42.2	44.0	11.9	11.8	12.3	11.6
2013–2014	11.8	40.6	40.5	37.0	35.2	36.0	16.5	19.7	19.3	19.3	26.1	105.3
2014–2015	N/A	N/A	N/A	N/A	N/A	N/A	18.6	25.0	15.0	15.7	38.1	19.0
2015–2016	55.2	39.3	46.2	25.9	24.4	20.5	55.0	63.0	95.7	34.0	71.9	N/A
2016–2017	N/A	N/A	N/A	N/A	N/A	N/A	N/A	116.8	196.5	170.2	143.8	68.0
2017–2018	61.9	49.0	23.1	24.7	24.0	25.1	67.1	177.3	161.3	135.6	104.3	89.9
2018–2019	54.0	16.2	16.9	21.4	28.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mean	51.9	51.5	38.2	30.2	26.6	33.8	38.6	57.8	78.9	65.6	51.1	48.2
Maximum	105.5	82.7	80.0	57.4	37.0	76.3	68.4	177.3	196.5	212.8	156.6	136.5
Minimum	11.8	16.2	12.3	11.6	10.4	11.2	15.1	19.7	11.9	11.8	12.3	11.6

cfs = cubic feet per second; N/A = data not available
Note:
Gaps in prorated combined data are due to months with missing data from USGS No. 10287720 (Glacier Creek below Tioga Lake).

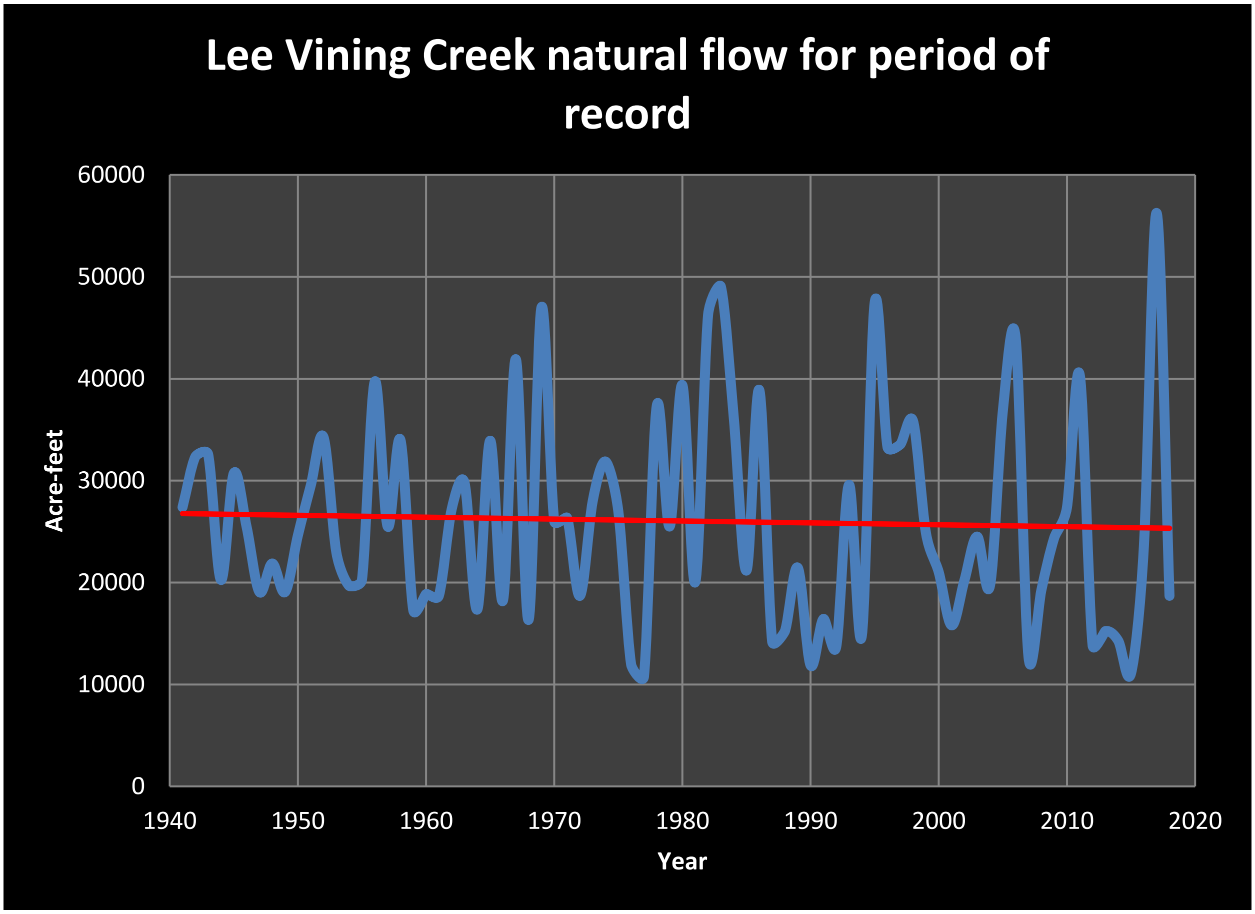
Additional data provided by SCE at Rhinedollar Dam provides similar monthly total flows to the USGS data provided in Table 5.2-3 above. Note that data from USGS gages was based on daily average flow measurements, while the data provided in Table 5.2-4 is based on single monthly measurements of water volume (converted here to flow). As daily data was not obtained from SCE, the flow duration curves (see Section 5.2.2.4) analysis is based on the USGS data. SCE data is summarized in Table 5.2-4 below, with an annual mean of 24.3 cfs. Months with missing data from SCE are labeled as "N/A" in Table 5.2-4.

Table 5.2-4. Monthly Mean, Minimum, and Maximum Flows at Rhinedollar Dam (SCE Data)

Water Year	Monthly Mean Natural Flows for Rhinedollar Dam (SCE Data)											
	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.
2009-2010	5.8	4.2	3.2	4.4	4.3	6.3	11.2	31.1	133.5	77.1	12.8	2.8
2010-2011	12.0	12.6	3.2	17.1	6.5	6.6	17.9	37.2	131.6	139.6	52.7	16.0
2011-2012	9.3	4.2	0.8	0.6	1.3	3.1	22.1	56.8	34.1	15.2	7.9	2.2
2012-2013	2.0	2.8	5.6	3.7	3.4	7.6	27.4	53.7	48.3	16.7	2.7	1.8
2013-2014	1.2	1.6	3.2	2.4	3.1	5.6	22.2	53.3	45.6	14.0	4.5	0.4
2014-2015	1.0	2.9	2.4	2.3	3.3	7.5	11.4	37.2	32.9	16.7	2.4	1.2
2015-2016	4.7	5.7	5.0	4.8	6.5	11.2	27.7	64.1	99.7	34.4	7.8	3.0
2016-2017	12.2	10.5	6.4	8.7	6.1	10.0	17.9	91.1	209.4	160.8	57.7	19.7
2017-2018	N/A	N/A	N/A	N/A	N/A	N/A	44.4	73.2	68.4	34.9	11.6	4.3
Mean	6.0	5.6	3.7	5.5	4.3	7.2	22.5	55.3	89.3	56.6	17.8	5.7
Maximum	12.2	12.6	6.4	17.1	6.5	11.2	44.4	91.1	209.4	160.8	57.7	19.7
Minimum	1.0	1.6	0.8	0.6	1.3	3.1	11.2	31.1	32.9	14.0	2.4	0.4

N/A = data not available

Figure 5.2-2 below illustrates the historic trend for natural inflows into Lee Vining Creek for the period of record.



Source: SCE, 2020

Figure 5.2-2. Historic Trend for Inflows—Lee Vining Creek (1941–2018)

5.2.2.4. Flow Duration Curves

Flow duration curves were developed using HEC-DSSVue Version 2.6 software with the prorated data discussed in Section 5.2.2.3, *Flow Statistics*. See flow duration curves in Appendix F.

5.2.2.5. Existing and Proposed Water Uses

SCE stores water from the drainage area in the Project reservoirs and releases the water for power generation, which is the primary, non-consumptive use of water within the Lee Vining Creek watershed. The reservoirs are described in detail in Section 4.0, *Project Location, Facilities, and Operations*. SCE's storage and use of the water is prescribed by the existing FERC license, consistent with the 1933 Sales Agreement between the Southern Sierra Power Company (predecessor to SCE) and the LADWP. As described below, once water has left the Project Area, SCE has no control over downstream diversions. No changes to operation or water usage are proposed in the new license term. The LADWP diversion dam location is shown on Figure 5.2-1.

The Poole Powerhouse is operated at a flow consistent with the available water supply. During periods of high streamflow, the Project is operated at capacity (110 cfs); during periods of low flow, water is diverted conservatively to assure a continuous water supply through the season.

Recreation is a secondary use of water within the Lee Vining Creek watershed. Much of the upper Lee Vining Canyon is a part of the Inyo National Forest, and the watershed is adjacent to Yosemite National Park. Project reservoirs are stocked for fish by the CDFW. Three campgrounds are adjacent to the Lee Vining Creek, and several more are downstream of Rhinedollar Dam. Hiking trails are prevalent in the area, accompanied by boating, sightseeing, and picnicking. For more information, see Section 5.8, *Recreation Resources*.

Downstream of the Project, some of the flow is diverted into the Los Angeles Aqueduct System by the LADWP (FERC, 1992; SWRCB, 1994; Figure 5.2-1). LADWP overseas water management and ensures minimum flows into Mono Lake to support the ecosystem.

5.2.2.6. Instream Uses of Water

Three storage reservoirs are in the Lee Vining Creek watershed: Saddlebag Lake, Tioga Lake, and Ellery Lake. Saddlebag Lake and Tioga Lake drain into Ellery Lake. Saddlebag Dam, in the headwaters of Lee Vining Creek, impounds Saddlebag Lake. Minimum flow requirements are determined annually for Saddlebag Dam. Minimum flow requirements below Tioga Dam depend on water year, inflow, and month. During December to April, the minimum flow is equal to the natural inflow. In October and November, the minimum flow is the minimum of 2 cfs or the natural inflow. In May to September, the minimum flow depends on water year and inflow.

Ellery Lake, impounded by Rhinedollar Dam, serves as the regulating reservoir for the Poole Powerhouse, and is fed by flows from both Saddlebag Dam and Tioga Dam. Minimum flow requirements below Poole Powerhouse are 27 cfs or the natural flow, whichever is less, between August and May. In June and July, the minimum flow is 89 cfs or natural flow, whichever is less. See Section 4.6.1, *Water Management*, for additional details.

5.2.2.7. Water Rights

There has been very little development within the Lee Vining Creek drainage area. Most of the area falls within the Inyo National Forest, with minimal recreation use, except along Lee Vining Creek. SCE has inherited water rights from previous owners starting from 1915 for diversion and storage (Diamond and Hicks, 1988). There are no existing or proposed consumptive uses of the water upstream of the Project, but LADWP uses water downstream of the Project for public water supply (SWRCB, 1989). Although water is stored in upstream reservoirs for power generation at Poole Powerhouse, there is no long-term net loss of water to downstream areas. Many water rights have been filed with the state; Table 5.2-5 provides a summary of the known water rights upstream of the Project.

Table 5.2-5. Summary of Existing Water Rights in the Lee Vining Creek Watershed Upstream of the Lee Vining Creek Project

POD ID	Applicant ID	Name	Diversion Value	Map ID
8222	S007775	Southern California Edison Company	110 cfs	8222
11270	A026539A	Southern California Edison Company	935 gpd	11270
11791	A005068	Southern California Edison Company	30 cfs	11791
20017	A000051	Southern California Edison Company	40 cfs	20017
21926	S007777	Southern California Edison Company	0 gpd	21926
22483	A026539B	Southern California Edison Company	50 cfs	22483
33298	F010218S	U.S. Inyo National Forest	6,240 gpd	33298
44976	F007808S	U.S. Inyo National Forest	325 gpd	44976
7298	A026537	Southern California Edison Company	30 cfs	7298

Source: SWRCB, 2018

cfs = cubic feet per second; gpd = gallons per day; ID = Identification Number; POD = Point of Diversion

Water rights below the Project on Lee Vining Creek belong to LADWP (Water Right Licenses 10191 and 10192) (SWRCB, 1994). LADWP diverts water into the Los Angeles Aqueduct System via the Mono Basin Extension at an impoundment approximately 5 miles downstream of the Poole Powerhouse (LADWP, 1987). The LADWP diversion dam location is shown on Figure 5.2-1. The Mono Basin Extension of the aqueduct was completed in 1940 and started diverting water in 1941 (LADWP, 1987). From 1941 to 1970, water diversion from the Mono Basin was limited by the aqueduct capacity; the aqueduct was upgraded in 1970 and the capacity increased (SWRCB, 1994). After the upgrade, during periods of average flows, LADWP commonly diverted all of Lee Vining Creek's flows (SWRCB, 1994). LADWP was diverting water from other creeks in Mono Basin at this time as well (i.e., Walker, Parker, and Rush Creeks) resulting in a significant drop in the water level of Mono Lake as well as a multitude of ecological impacts (SWRCB, 1994).

In 1994, LADWP's allowed diversion from the Mono Basin was decreased by the SWRCB to increase streamflows, thereby restoring fish habitat and raising the level of Mono Lake (SWRCB, 1994).

After several years of litigation regarding water rights in the Mono Basin, SWRCB memorialized a settlement agreement in 2013 with LADWP, which again modified the minimum flow requirements (SWRCB, 2013). The main purposes of the settlement agreement were to resolve water right and flow disputes and allow flows sufficient to complete stream restoration and fish protection (SWRCB, 2013) in the Mono Basin. The revised release schedule allocates environmental flows according to an algorithm that takes into account the type of hydrologic year, the inflow, and the time of year. The algorithm is intended to ensure continuous flows while providing opportunity for channel maintenance flows when flows are in excess of 250 cfs.

5.2.2.8. Morphometric Data for Existing Impoundments

Saddlebag Lake Dam retains 9,765 AF of water with a normal reservoir maximum elevation of 10,093.9 feet amsl (SCE, 2018a). Tioga Lake is impounded by two dams: Tioga Dam and Tioga Auxiliary Dam; together, the two dams impound the 1,250 AF reservoir with a normal maximum reservoir level of 9,650.28 feet amsl (SCE, 2018b). Rhinedollar Dam impounds Ellery (Rhinedollar) Lake, with a storage capacity of 493 AF at normal full reservoir level (9.452.53 feet) (SCE, 2019).

5.2.2.9. Gradient of Lee Vining Creek

As exact stream gradients were not provided in previous reports, the stream gradients were estimated using a combination of USGS StreamStats (USGS, 2020) data and Google Earth elevation data (Google Earth, 2020). The upstream sections of Lee Vining and Glacier Creeks are very steep, with mean gradients of 13.4 percent to 21 percent, respectively. From the confluence of the two streams to Rhinedollar Dam, the stream approaches a very mild slope, with a mean gradient of less than 1 percent. The gradients are summarized in Table 5.2-6.

Table 5.2-6. Approximate Stream Lengths and Gradients for Lee Vining Creek and Glacier Creek

Drainage Name	Reach	Reach Length		Reach Elevation			Stream Gradient	
		(feet)	(miles)	Top of Reach (feet amsl)	Bottom of Reach (feet amsl)	Elevation Change (feet)	(feet/mile)	(%)
Lee Vining Creek	Headwaters to confluence with Glacier Creek	22,214.50	4.21	12,541	9,565	2,976	707	13.40
	Confluence to Ellery Lake	22,696.78	4.30	9,535	9,462	73	17	0.32
	Penstock from Ellery Lake to Poole Powerhouse	3,740.15	0.71	9,521	7,823	1,698	2,397	45.40
	Bypass reach from Ellery Lake to Poole Powerhouse	7,283.44	1.38	9,496	7,844	1,652	1,197	22.68
Glacier Creek	Headwaters to confluence with Lee Vining Creek	16,702.71	3.16	13,043	9,526	3,517	1,112	21.06

amsl = above mean sea level

5.2.3. Water Quality

The Lee Vining Creek Project Water Quality Assessment Area (Water Quality Assessment Area) includes the following waterbodies:

- Project reservoirs (Saddlebag Lake, Tioga Lake, and Ellery Lake)
- Project-affected stream reaches including:
  - Lee Vining Creek between Saddlebag Dam and Ellery Lake (upper Lee Vining Creek)
  - Lee Vining Creek downstream of Rhinedollar Dam to the LADWP Lee Vining Creek Diversion Dam (lower Lee Vining Creek)
- Glacier Creek between Tioga Dam and its confluence with Lee Vining Creek

5.2.3.1. Information Sources

The primary data sources referenced in this section are the following:

- *Water Quality Control Plan for the Lahontan Region* (California Regional Water Quality Control Board, Lahontan Region [LRWQCB], 2019, as amended)
- *Final Environmental Assessment for Hydropower License, Lee Vining FERC Project No. 1398* (FERC, 1992)
- California Environmental Data Exchange Network (CEDEN, 2020)
- *Comparative Limnology of High-elevation Lakes and Reservoirs and their Downstream Effects* (Cohen, 2019)
- *Water Quality of Bishop Creek and Selected Eastern Sierra Nevada Lakes* (Lund, 1988)

5.2.3.2. Water Quality Objectives from the Lahontan Region Water Quality Control Plan

Federal water quality standards required by the Clean Water Act of 1970 are implemented under the authority of the SWRCB and the LRWQCB. The Lahontan Region Water Quality Control Plan (Basin Plan) was revised in 2019 and sets forth water quality standards for waterbodies in the region including Lee Vining Creek as well as Ellery, Saddlebag, and Tioga Lakes (LRWQCB, 2019). No site-specific water quality standards are listed in the Basin Plan for Glacier Creek. Basin Plan water quality standards are composed of existing and potential beneficial uses and water quality objectives. Beneficial uses established by the Basin Plan for Project waters relevant to water quality include municipal and domestic supply (MUN); water contact recreation (REC-1); hydropower generation (POW); navigation (NAV); water non-contact recreation (REC-2); cold freshwater habitat (COLD); commercial sportfishing (COMM); wildlife habitat (WILD); and spawning, reproduction and/or early development (SPWN). Additional beneficial uses listed in the Basin Plan include agricultural supply (AGR), groundwater recharge (GWR) and freshwater replenishment (FRSH).

In addition to beneficial uses, the Basin Plan includes narrative and numeric surface water quality objectives that aim to preserve and protect the beneficial uses listed above. Basin Plan objectives are listed in Table 5.2-7. Additionally, under the State of California Antidegradation Policy, whenever the existing water quality is better than the water quality established in the Basin Plan (both narrative and numerical), such existing quality must be maintained unless appropriate findings are made under the policy. Some increase in pollutant level may be appropriate, if (1) a reduction in water quality would not seriously harm any species found in the water; (2) lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located, and existing beneficial uses are protected; and (3) long-term or permanent water quality in Outstanding Natural Resource Waters (including Mono Lake) is not reduced.

Table 5.2-7. Basin Plan Water Quality Objectives

Objective	Criteria
Ammonia	One-hour and 4-day unionized ammonia criteria are temperature- and pH-dependent.
Coliform bacteria	Shall not exceed a log mean of 20/100 mL in a 30-day mean, nor shall more than 10 percent of all samples collected during any 30-day period exceed 40/100 mL.
Biostimulatory substances	Shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect the water for beneficial uses.
Chemical constituents	Waters designated as MUN shall not contain concentrations of chemical constituents in excess of MCL or SMCL based upon the California Code of Regulations, Title 22; and shall not contain concentrations of chemical constituents in amounts that adversely affect beneficial uses.
Chlorine	Shall not exceed either a median of 0.002 mg/L or maximum of 0.003 mg/L.
Color	Shall be free of coloration that causes nuisance or adversely affects the water for beneficial uses.
Dissolved oxygen	Concentration as percent saturation shall not be depressed by more than 10 percent, nor shall the minimum DO concentration be less than 80 percent of saturation; DO concentrations in waters with the beneficial uses COLD and SPWN shall not be less than 9.5 mg/L over a 7-day mean, nor less than 8.0 mg/L in 1 day.
Floating materials	For natural high-quality waters, concentrations of floating material shall not be altered to the extent that such alterations are discernable at the 10% significance level.
Oil and grease	For natural high-quality waters, the concentration of oils, greases, or other film- or coat-generating substances shall not be altered.
Nondegradation of aquatic communities and populations	All wetlands shall be free from substances attributable to wastewater or other discharges that produce adverse physiological responses in humans, animals, or plants, or that lead to the presence of undesirable or nuisance aquatic life.
pH	In freshwaters with designated beneficial uses of COLD or WARM, changes in normal ambient pH levels shall not exceed 0.5 pH units.
Radioactivity	Radionuclides shall not be present in concentrations that are deleterious to human, plant, animal, or aquatic life, or that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life. Waters designated as MUN shall not contain concentrations of radionuclides in excess of the limits specified in Table 4 of the California Code of Regulations, Title 22, Section 64443 (Radioactivity).
Sediment	The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect the water for beneficial uses.
Settleable materials	For natural high-quality waters, the concentration of settleable materials shall not be raised by more than 0.1 mL per liter.

Objective	Criteria
Suspended materials	For natural high quality waters, the concentration of total suspended materials shall not be altered to the extent that such alterations are discernible at the 10% significance level.
Taste and odor	For naturally high quality waters, the taste and odor shall not be altered.
Temperature	For waters designated COLD, the temperature shall not be altered.
Toxicity	All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in, human, plant, animal, or aquatic life.
Turbidity	Waters shall be free of changes in turbidity that cause nuisance or adversely affect the water for beneficial uses. Increases in turbidity shall not exceed natural levels by more than 10%.

Source: LRWQCB, 2019

COLD = cold freshwater habitat; DO = dissolved oxygen; MCL = Maximum Contaminant Level; mg/L = milligrams per liter; mL = milliliter; MUN = municipal and domestic supply; pH = indicates acidity or alkalinity of a solution; SMCL = Secondary Maximum Contaminant Level; SPWN = spawning, reproduction, and/or early development; WARM = warm freshwater habitat

5.2.3.3. Existing Water Quality Data

Water quality within the Water Quality Assessment Area is expected to be good; information on water quality within the Water Quality Assessment Area is limited, but alpine Sierra lake water quality is typically excellent due to their primarily granitic basins (Melack et al., 1985), snowpack runoff (Williams and Melack, 1991), and land cover characteristics (Sadro et al., 2012). In its Final Environmental Assessment, prior to issuance of the 1997 license, FERC stated that water quality in upper Lee Vining Creek is “believed to be good,” because the watershed is alpine and largely undeveloped (FERC, 1992). SWRCB waived water quality certification prior to issuance of the 1997 license (FERC, 1997). No water quality monitoring was required by the 1997 license. A Water Quality Certification was later issued by SWRCB in 2017 to address ongoing O&M of the Project, which identifies 1- to 2-day increases in turbidity as a potential source of water quality impairment, and requires turbidity monitoring during O&M activities (SWRCB, 2017). Within the Water Quality Assessment Area, limited data were available regarding ammonia (NH_3), biostimulatory substances, coliform bacteria, some chemical constituents, dissolved oxygen (DO), pH (indicates acidity or alkalinity of a solution), turbidity, and water temperature. Although there is a history of mining in the Lee Vining Creek watershed (see Section 5.1.3.4, *Mineral Resources*), no historical information regarding trace metals or other mining-related water quality issues were identified. No data were available at the time of publication regarding the remaining Basin Plan objectives.

BIOSTIMULATORY SUBSTANCES

Nutrient (ammonium [NH_4], nitrate [NO_3], and orthophosphate [PO_4]) and DO concentrations were measured in all Project reservoirs and their outlet streams between 2015 and 2017; sampling occurred at least once per season including when reservoir surfaces were frozen (Table 5.2-8; Cohen, 2019). Nutrient concentrations were near or below detection although hypolimnetic and outlet stream NH_4 and PO_4 were occasionally elevated in late summer and spring, which correlated with prolonged stratification and reduced DO. NO_3 concentrations were more seasonally variable than NH_4 and PO_4, but relatively higher values prior to peak snowmelt in late spring were likely due to snowmelt ionic pulses (Williams and Melack, 1991).

Table 5.2-8. Nutrient and Dissolved Oxygen Concentrations of Project Reservoir Surfaces, Hypolimnia, and Their Outlet Streams, 2015–2017

Lake	Layer	Date	NH_4	NO_3	PO_4	DO
Ellery	surface	8/9/2015	< 0.002	0.02	< 0.009	6.75
		11/1/2015	< 0.002	< 0.01	< 0.009	8.4
		5/17/2016	0.006	0.22	< 0.009	10.3
		6/29/2016	0.009	0.18	0.038	9.6
		6/29/2016	< 0.002	1.41	0.046	9.49
		7/22/2016	0.016	< 0.01	< 0.009	9.23
		9/18/2016	0.010	0.03	< 0.009	8.6
		7/3/2017	0.003	0.16	< 0.009	9.6
		8/17/2017	0.036	0.06	0.030	8.1
		9/20/2017	0.006	0.04	0.019	8.16
	hypolimnion	5/17/2016	0.013	0.13	< 0.009	9.3
		7/22/2016	0.032	< 0.01	< 0.009	8.66
		8/19/2017	0.005	0.03	< 0.009	8.73
	outlet stream	5/17/2016	< 0.002	0.26	< 0.009	10.2
		7/3/2017	0.005	0.18	< 0.009	8.8
		8/19/2017	< 0.002	0.27	0.027	8.2
Saddlebag	surface	6/29/2016	< 0.002	0.11	< 0.009	9.4
		7/22/2016	< 0.002	0.08	< 0.009	8.74
		9/16/2016	0.005	0.02	< 0.009	7.3
		7/7/2017	0.005	0.25	< 0.009	9.2
		8/19/2017	0.003	0.13	< 0.009	9.2
		9/21/2017	< 0.002	0.02	< 0.009	10.42

Lake	Layer	Date	NH_4	NO_3	PO_4	DO
	hypolimnion	6/29/2016	0.014	0.14	0.029	11.75
		9/16/2016	0.098	0.07	0.031	8.6
		8/20/2017	0.014	0.08	< 0.009	8.7
	outlet stream	6/29/2016	< 0.002	0.17	< 0.009	9.8
		9/16/2016	0.003	0.04	< 0.009	8.8
		10/23/2016	< 0.002	0.08	< 0.009	7.7
		7/7/2017	0.009	0.25	< 0.009	9.8
		7/18/2017	0.005	0.19	0.023	10.45
		9/21/2017	0.022	0.03	< 0.009	10.39
Tioga	surface	8/9/2015	< 0.002	0.25	< 0.009	6.9
		9/29/2015	0.008	0.09	< 0.009	7.05
		5/17/2016	0.025	0.24	< 0.009	10.1
		6/29/2016	0.010	0.15	0.023	9.4
		7/14/2016	< 0.002	0.07	0.023	7.62
		9/18/2016	0.021	0.21	0.016	8.5
		6/4/2017	0.012	0.05	< 0.009	10.3
		7/3/2017	< 0.002	0.21	< 0.009	7.1
		8/24/2017	0.009	0.14	< 0.009	8.18
		9/20/2017	0.004	0.11	0.020	7.62
	hypolimnion	8/9/2015	0.004	0.28	< 0.009	7.6
		9/29/2015	0.007	0.15	< 0.009	6.14
		5/17/2016	0.043	0.82	< 0.009	0.9
		6/29/2016	0.005	0.35	< 0.009	9.8
		7/14/2016	< 0.002	0.08	< 0.009	9.7
		9/18/2016	0.181	0.19	0.408	3.2
		6/4/2017	< 0.002	0.19	< 0.009	10.29
		8/24/2017	0.009	0.18	< 0.009	6.7
	outlet stream	8/9/2015	< 0.002	0.30	< 0.009	7.8
		11/1/2015	0.042	0.22	< 0.009	8.5
		5/17/2016	0.011	0.29	< 0.009	3.2
		6/29/2016	< 0.002	0.33	< 0.009	9.92
		7/28/2016	< 0.002	0.01	< 0.009	9.9
		9/18/2016	0.166	0.20	0.043	6.1

Lake	Layer	Date	NH_4	NO_3	PO_4	DO
		7/3/2017	< 0.002	0.26	< 0.009	8.7
		8/9/2017	< 0.002	0.22	< 0.009	8.6
		9/20/2017	0.010	0.09	< 0.009	7.63

Source: Cohen, 2019

DO = dissolved oxygen; hypolimnion = region in reservoir below thermocline while stratified; mg/L = milligrams per liter; NH_4 = ammonium; NO_3 = nitrate; PO_4 = orthophosphate

Additional data were collected in Lee Vining Creek downstream of Poole Powerhouse as part of Surface Water Ambient Monitoring Program (SWAMP) and Statewide Perennial Streams Assessment stream surveys (Table 5.2-9; CEDEN, 2020), and in Project reservoirs in support of the prior license application (Lund, 1988). Samples were collected 0.7 mile, 3.5 miles, and 4.8 miles downstream of Poole Powerhouse in 2011, 2000, and 2019, respectively. Nutrient concentrations were low in lower Lee Vining Creek but reflect only two sample collection dates, thus seasonal and interannual variations could not be determined. Nitrate concentrations did not exceed the Basin Plan objective of 10 milligrams per liter (mg/L) for water designated as MUN (California Code of Regulations, Title 22, Section 64431). Based on reported ammonium concentrations, temperature, and typical Sierra lake pH, unionized ammonia concentrations did not exceed the Basin Plan objective. Sierra lakes generally have a pH near 7 (Melack et al., 1985) and are slightly acidified during peak snowmelt (Stoddard, 1987), thus as an example where temperature is 10 degrees Celsius (°C) and pH is 7, the 4-day total ammonia objective for waters designated COLD is 2.8 mg/L as NH_3. Under those conditions, 0.125 percent of total ammonia (NH_4^+ + NH_3) present occurs as unionized ammonia (NH_3), thus the highest ammonia concentration calculated from ammonium measured by Cohen (2019) is 0.0002 mg/L. Nitrate concentrations were measured in Project reservoirs on several dates in 1986 and 1987 and ranged from below detection to 0.29 mg/L (Lund, 1988), which are similar to values reported by Cohen (2019).

5.3. Fish and Aquatic Resources

5.3.1. Introduction

This section describes the fish and aquatic resources that have the potential to occur in the vicinity of SCE's Lee Vining Project (FERC Project No. 1388). The Project Aquatic Assessment Area (AAA) for Fish and Aquatic Resources includes Project reservoirs (Saddlebag Lake, Tioga Lake, and Ellery Lake), and Project-affected stream reaches including Lee Vining Creek between Saddlebag Dam and Ellery Lake, between Rhinedollar Dam and Poole Powerhouse, and between Poole Powerhouse and the LADWP Lee Vining Creek Diversion Dam impoundment. It also includes the Glacier Creek reach between Tioga Dam and its confluence with Lee Vining Creek.

Fish and aquatic species not listed as threatened or endangered by either the state of California under the California ESA or by the USFWS under the federal ESA that have the potential to occur in the AAA are described below. Fish and aquatic species listed as threatened or endangered under the California ESA or federal ESA are described in Section 5.7, *Rare, Threatened, and Endangered Species*.

5.3.2. Information Sources

The following information sources were reviewed to identify fish and aquatic species known to occur or to potentially occur in the AAA.

- CDFW's California Natural Diversity Database (CNDDB; CDFW, 2020) for USGS' Tioga Pass, Mount Dana, Lee Vining, Falls Ridge, Lundy, Dunderberg Peak, Vogelsang Peak, Koip Peak, Matterhorn Peak, and Tenaya Lake 7.5-minute topographic quadrangles
- Final Environmental Assessment for Hydropower License (FERC, 1992)
- Fish Population Surveys in Upper Lee Vining Creek from 1999 to 2001, 2006, 2011, and 2016 (Sada, 2007a; Salamunovich, 2017a)
- Aquatic Habitat Surveys in Upper Lee Vining Creek, Mono County, California (Sada, 2007b; Salamunovich, 2017b)
- Instream Flow and Fisheries Studies for the Upper Lee Vining Creek Hydroelectric Project (EA, 1986)
- Fish Populations in Upper Lee Vining Hydroelectric Project (EA, 1987a)
- Impacts of Reservoir Drawdown on Fish Populations (EA, 1987b)
- Rainbow trout species and conservation assessment (Adams et al., 2008)
- Ice cover alters the behavior and stress level of brown trout *Salmo trutta* (Watz et al., 2015)
- Winter habitats of Atlantic salmon, brook trout, brown trout, and rainbow trout (Calkins, 1989)
- The California Environmental Data Exchange Network operated by the State Water Resources Control Board (SWRCB, 2020a)
- Bioassessment Scores Map Network operated by the State Water Resources Control Board: an interactive compilation of data collected from 1999 through 2015 as part of the Perennial Streams Assessment, Reference Condition Management Program, Southern Stormwater Monitoring Coalition, USFS, and Regional Board Bioassessment Monitoring Programs (SWRCB, 2020b)
- Report on South Lake and Saddlebag Lake Invertebrate Inventories (Herbst and Medhurst, 2010)
- Comparative limnology of high-elevation lakes and reservoirs and their downstream effects (Doctoral dissertation, University of California Santa Barbara; Cohen, 2019)

5.3.3. Fish Resources

Fish resources in the AAA are dominated by naturally reproducing populations of non-native, introduced brown (*Salmo trutta*) and brook trout (*Salvelinus fontinalis)* and a stocked population of rainbow trout (*Oncorhynchus mykiss*). A query of CNDDB indicated the potential for two state Species of Special Concern to occur in the AAA: mountain whitefish (*Prosopium williamsoni*) and mountain sucker (*Catostomus platyrhynchus*; CDFW, 2020). However, mountain whitefish and mountain sucker are unlikely to occur in the AAA (see Section 5.3.1.1, *Fish Species Temporal/Life History Information*).

Fish species potentially occurring in the AAA are identified in Table 5.3-1.

Table 5.3-1. Fish Species Potentially Occurring in the Aquatic Assessment Area for the Lee Vining Project

Common Name	Scientific Name	Status
Mountain whitefish	*Prosopium williamsoni*	SSC
Mountain sucker	*Catostomus platyrhynchus*	SSC
Rainbow trout	*Oncorhynchus mykiss*	I
Brown trout	*Salmo trutta*	I
Brook trout	*Salvelinus fontinalis*	I

Sources: CDFW, 2020; Salamunovich, 2017a

I = Introduced; SSC = California State Species of Concern

Lee Vining Creek fish population studies conducted in 1984 and 1986 in support of the previous relicensing documented self-reproducing populations of brown and brook trout throughout Lee Vining Creek. Hatchery rainbow trout were captured in Lee Vining Creek upstream of the confluence of Slate Creek, as well as downstream of the confluence of Glacier Creek, in 1984 but not in 1986 (EA, 1987a). These studies indicated trout biomass was highest in the reach between Saddlebag Dam and the confluence of Slate Creek (8.3 grams per square meter [g/m^2]), followed by the reach between the confluence of Slate Creek and Ellery Lake (7.2 g/m^2). Below Poole Powerhouse, trout biomass was estimated to be 6.7 g/m^2 (FERC, 1992). Brown and brook trout occurred in approximately equal numbers in the reach between the confluence of Slate Creek and the confluence of Glacier Creek (795 brown trout and 957 brook trout per mile); however, brown trout were generally larger in size than brook trout (128 versus 39 pounds per mile, respectively). Between the confluence of Glacier Creek and Lake Ellery, 6 of the 74 trout captured were brook trout and the remainder were brown trout. The density of brown trout in this reach was estimated to be 1,210 trout per mile, and biomass was estimated to be 108 pounds per mile (EA, 1987a). Adult brown trout were most abundant between the Slate Creek confluence and the Glacier Creek confluence, juveniles were most abundant from the Glacier Creek confluence to Ellery Lake, and fry were equally distributed downstream of the Slate Creek confluence to Ellery Lake. Adult brook trout were most abundant between Saddlebag Dam and the Glacier Creek confluence, juveniles were most abundant above the Slate Creek confluence, and fry were most abundant from the Slate Creek confluence to the Glacier Creek confluence (EA, 1987a). Brown trout were in good condition based on Fulton-type condition factors, with a mean condition factor (k) of 1.06; brook trout had a condition factor of 0.80 (EA, 1986).

SCE conducted fish population monitoring surveys in Lee Vining Creek between Saddlebag Dam and the confluence of Slate Creek since 1999 (Figure 5.3-1). These surveys were not specified in the 1997 FERC License, but were conducted in conjunction with riparian and aquatic habitat monitoring efforts stipulated in Condition 7 of the License. Fish surveys were conducted in spring, summer, and fall from 1999 to 2001, and in the fall of every fifth year thereafter, 2006, 2011, and 2016 (Sada, 2007a; Sada and Hogle, 2011; Salamunovich, 2017a). The surveys documented brown trout, brook trout, and a small number of hatchery-raised rainbow trout in the reach between Saddlebag Dam and the confluence of Slate Creek. Fish abundance and biomass for both brown and brook trout ranged from approximately 48 to 483 fish per mile and 0.3 to 8.2 g/m^2 (2.7 to 73.2 pounds per acre) for brown trout and approximately 290 to 703 fish per mile and 0.8 to 3.9 g/m^2 (7.1 to 34.8 pounds per acre) for brook trout (Sada, 2007a). Young-of-year (YOY) brook trout were present during each summer and autumn sample, indicating annual spawning in Lee Vining Creek within this reach. Between 1999 through 2006, YOY brown trout were only abundant during the summer of 2001 and evidence of successful spawning within the reach was rare (Sada, 2007a).

More recent fish population surveys conducted on Lee Vining Creek between Saddlebag Dam and the confluence of Slate Creek in 2016 documented naturally produced brown and brook trout populations in good physical condition, with multiple age classes present, satisfactory condition factors, an abundance of recently-hatched YOY, and actively spawning adults (Salamunovich, 2017a). Both brown and brook trout had length-frequency and age-class distributions typical of the species, with the highest number of fish belonging to the YOY age class and lower numbers in each subsequent age class; data suggested the presence of six to seven age classes of brown trout and at least six age classes of brook trout (Salamunovich, 2017a). The average abundance, density, and biomass of brook and brown trout within this reach were all significantly greater in 2016 compared to previous survey years (Table 5.3-2; Salamunovich, 2017a). Brown trout were the numerically dominant trout species in the reach in 2016, however, biomass was split more evenly between the two species (Salamunovich, 2017a). Brown trout density in 2016 greatly exceeded that of brook trout, which was opposite from previous years of the study. Only one hatchery-reared rainbow trout was captured in 2016 (Salamunovich, 2017a).

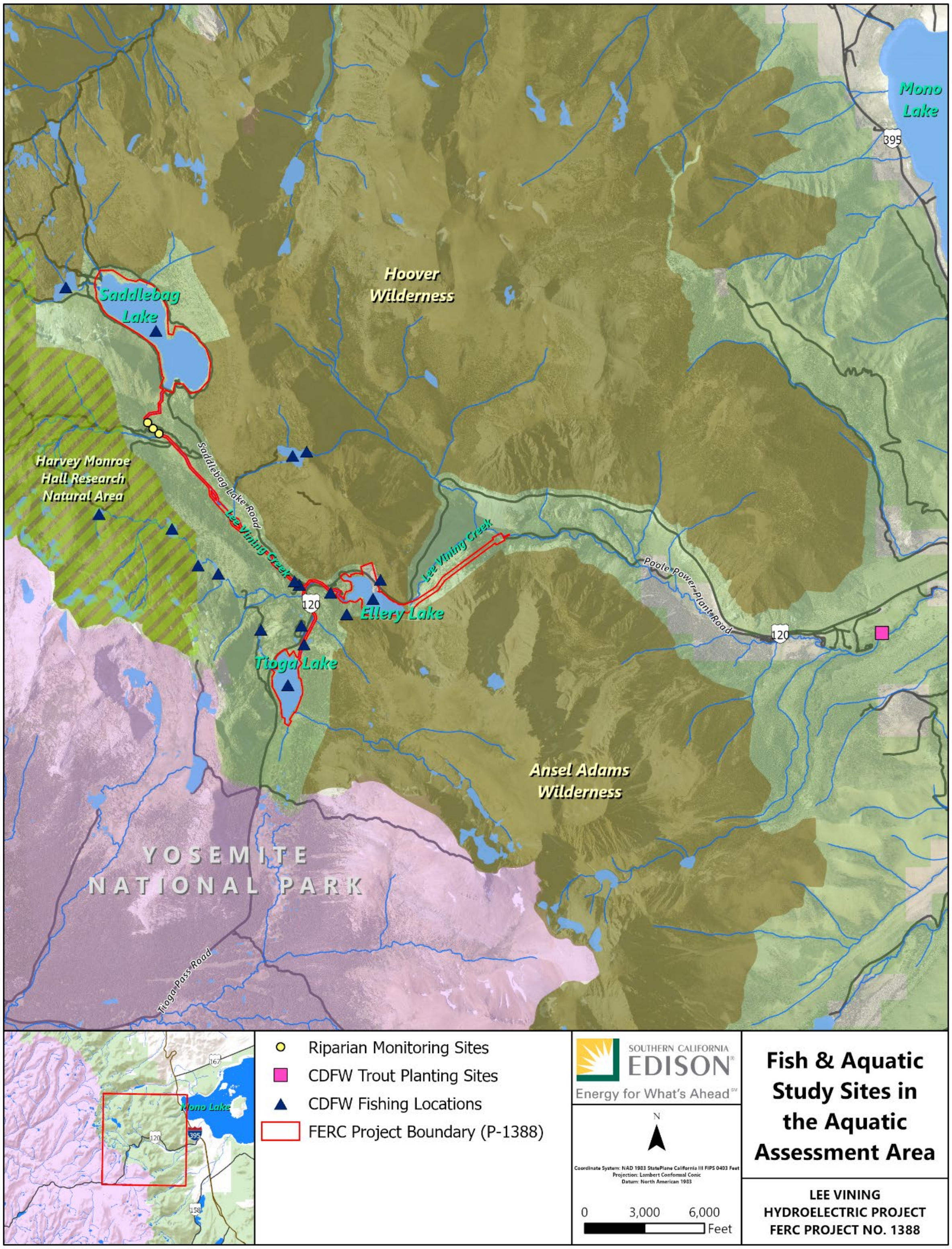


Figure 5.3-1. SCE Fish and Aquatic Habitat Monitoring Locations, CDFW Trout Planting Locations, FERC Project Boundary, and Project Features

Table 5.3-2. Average Abundance, Density, and Biomass Estimates for Naturally Reproducing Trout (Brown and Brook) in Lee Vining Creek Between Saddlebag Dam and the Confluence of Slate Creek, 1999–2016

Survey Year [a]	Abundance (trout/mile)	Density (trout/m^2)	Biomass (g/m^2)
1999	998	0.14	6.8
2000	601	0.12	4.1
2001	735	0.11	4.2
2006	1,159	0.16	8.9
2011	880	0.02	1.1
2016	3,525	0.43	13.4

Sources: Sada, 2007a; Sada and Hogle, 2011; Salamunovich, 2017a

g/m^2 = grams per square meter
Note:
[a] Fish surveys were conducted in spring, summer, and fall from 1999 to 2001, and in the fall of every fifth year thereafter (2006, 2011, and 2016)

The fish assemblage in Project reservoirs is similarly dominated by non-native introduced trout species. Brook trout and hatchery rainbow trout are found in every Project reservoir, and brown trout are found in Ellery Lake (EA, 1987b). Gillnetting during 1986 documented rainbow trout in slightly greater relative abundance than brook trout in Saddlebag Lake and brook trout in greater relative abundance than rainbow trout in Tioga Lake (EA, 1987b). In Lake Ellery, rainbow trout were slightly more abundant than brook trout and much more abundant than brown trout (Table 5.3-3). In all three reservoirs, YOY brook trout were observed, and all trout were in good condition with Fulton-condition factors ranging from 1.04 to 1.26 (EA, 1987b).

Table 5.3-3. Percent Composition, Maximum Size, Average Condition Factor (k), and Percent Young-of-the-Year Trout in Project Reservoirs in the Fall of 1986

Lake	Total Catch (No. trout)	Brook Trout			Brown Trout			Rainbow Trout		
		% Total (% YOY)	Max. FL	k	% Total (% YOY)	Max. FL	k	% Total (% YOY)	Max. FL	k
Saddlebag	110	45 (4)	249	1.18	0	--	--	55 (0)	300	1.26
Tioga	111	74 (4)	247	1.13	0	--	--	26 (0)	280	1.23
Ellery	118	36 (7)	255	1.04	22 (12)	275	1.04	42 (0)	282	1.22

Sources: EA, 1987b

FL = fork length; k = Fulton-condition factor; YOY = young-of-year

The 1986 reservoir drawdown study found that reservoir drawdown likely had minimal effect on trout populations within Project reservoirs. Brook trout were documented congregating at the mouths of inlet streams in all reservoirs and extensive brook trout spawning activity was observed in the shallows of the inlets to Tioga Lake and the outlet to Glacier Creek (EA, 1987b). No spawning was observed in reservoir shoreline habitats. Upstream spawning migrations are possible at Ellery and Saddlebag lakes; however, they are not possible at Tioga Lake because the inlet streams are too steep to permit upstream migration (EA, 1987b). Tributary inlets remained hydrologically connected after reservoir drawdown in all Project reservoirs (EA, 1987b). Six springs were exposed in Tioga Lake after drawdown that contained mud and silt substrate unsuitable for brook trout spawning and no eggs were observed. No springs were exposed in Saddlebag or Ellery lakes. Small numbers of trout fry (20 to 40) were observed swimming in small schools in shallow areas in each reservoir near submerged vegetation or woody debris; however, such habitat was scarce (EA, 1987b). Low numbers of YOY suggest trout recruitment in Project reservoirs may be limited by the lack of cover rather than by reservoir drawdown (EA, 1987b). Decreased reservoir pool was correlated to increased plankton and brook and brown trout condition (EA, 1987b).

5.3.3.1. Fish Species Temporal/Life History Information

Fish assemblages throughout the AAA are dominated by non-native introduced trout species. No native fish species, including mountain whitefish or mountain sucker, have been reported and are not likely to occur in the AAA (see additional discussion below). The timing of major life history events for fish species likely to occur within the AAA is included in Table 5.3-4.

Table 5.3-4. Life History Timing of Fish Species Likely to Occur in the Aquatic Assessment Area for the Lee Vining Project

Species/Stage	OCT		NOV		DEC		JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP	
Brown Trout																								
Spawning	Peak	Peak	Peak	Peak	Potential	Potential																	Potential	Potential
Egg Incubation	Peak	Peak	Peak	Peak	Peak	Peak	Potential	Potential																
Fry/YOY	Peak	Peak															Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
Juvenile	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
Adult	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
Brook Trout																								
Spawning	Peak	Peak	Peak	Peak	Peak	Potential	Potential	Potential																Potential
Egg Incubation			Peak	Peak	Peak	Peak	Peak	Peak	Potential	Potential														
Fry/YOY	Peak	Peak															Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
Juvenile	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
Adult	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
Rainbow Trout																								
Spawning									Potential	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Potential					
Fry/YOY	Peak	Peak																Potential	Peak	Peak	Peak	Peak	Peak	Peak
Juvenile	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
Adult	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak

Peak period Potential Use

Source: SCE, 2007

YOY = young-of-year

BROWN TROUT

Brown trout are native to Europe, North Africa, and western Asia and were introduced to North America in the late 19th century for planting in coastal streams. They have been reared in hatcheries since and have been planted throughout the state of California (Moyle, 2002).

Optimal habitats for brown trout are medium to large, slightly alkaline, clear streams with riffles and large, deep pools. Adults tend to occupy the bottoms of pools, and younger trout can be found in pools and riffles (Moyle, 2002). Water temperatures limit brown trout distribution, with preferred temperatures ranging from 12 to 20°C and optimal temperatures of 17 to 18°C. Brown trout have a variable diet that changes with size and season; smaller trout prey upon drift organisms, while larger trout selectively feed on benthic aquatic invertebrates. Brown trout over 25 centimeters (cm) total length pursue large prey, such as fish, crayfish, and dragonfly larvae. Brown trout over 40 cm total length almost exclusively feed on fish. Feeding is most intense at dawn and dusk; however, active feeding can occur at any time (Moyle, 2002). During the winter, ice cover provides shelter from terrestrial predators and reduces the amount of light reaching the water, which has been found to reduce stress responses and increase swimming activity in brown trout (Watz et al., 2015). Brown trout fry, juveniles, and adults have been observed in streams with winter water temperatures of 0.1 to 1.5°C (Calkins, 1989).

Brown trout reach sexual maturity in their second to third year. Spawning takes place in the fall and winter, most commonly in November and December in California (Moyle, 2002). Streams containing riffles with gravel size between 1 cm and 4 cm diameter are preferred for spawning, and the most suitable spawning locations within a stream are pool tails with deeper water, less turbulent current, and nearby cover. Spawning sites are selected by the female, and site selection occurs once water temperatures drop to 6 to 10°C (Moyle, 2002). Eggs are fertilized and buried in redds and incubate through the winter months. Fry emergence is in the early spring. Egg survival is not greatly influenced by redd temperature; egg survival has been observed at redd temperatures of zero to 8°C, with survival slightly higher at temperatures of zero to 1°C than at warmer temperatures (Calkins, 1989).

BROOK TROUT

Brook trout are native to the northeastern United States, west to eastern Minnesota and northeastern Iowa, and to eastern Canada. They were first introduced to California in 1871, and by 1872 they were being distributed throughout the state by the California Fish Commission (Moyle, 2002). Within the West Coast states, they have become established in mountain streams and lakes ranging from the San Bernardino Mountains to the Oregon border, but are most abundant in the Sierra Nevada.

Brook trout in California are primarily found in isolated mountain lakes and headwater streams. Preferred temperatures range from 14 to 19°C; however, brook trout can feed at temperatures as low as 1°C and can acclimate to temperatures as high as 26°C (Moyle, 2002). Brook trout tend to feed on whichever organisms are most abundant, and prey items typically include terrestrial insects, aquatic insect larvae, and zooplankton, but occasionally include benthic organisms and other fish. Feeding is most intensive in the evening and early morning; however, feeding will occur whenever there is sufficient light to see prey.

Maturity occurs at an early age. Some brook trout males are able to spawn as soon as the end of their first summer and females at the end of their second summer; however, it is more common for males to mature in their second or third year and females in their third or fourth year (Moyle, 2002). Spawning occurs in the fall, but is dependent on water temperature (4 to 11°C). Spawning sites are selected by females, and site characteristics include depths greater than 40 cm, water temperatures colder than the surrounding waters, gravel size between 1 cm and 4 cm diameter, nearby cover, and upwelling flow through substrate (Moyle, 2002). Eggs are fertilized and buried in redds and incubate through the winter months. Fry emerge in the early spring. Brook trout are adapted to spawn in lakes and females prefer sites with gravel-bottomed springs close to undercut banks or logs for redd conduction. This ability to spawn in lakes has allowed brook trout to maintain populations in mountain lakes without accessible inlets or outlets, something most other salmonids require (Moyle, 2002).

RAINBOW TROUT

Rainbow trout found in the AAA are sterile, hatchery-reared trout planted for recreation. Although they occur in Project reservoirs, they are non-migratory (FERC, 1992).

Rainbow trout typically occupy highly oxygenated coldwater habitats, including lakes, reservoirs, streams, and rivers. Optimal growth occurs in waters of 15 to 18°C with near-saturation levels of dissolved oxygen (Moyle, 2002). Stream-resident rainbow trout typically remain within a few hundred meters of a stream throughout their entire lives, although some individuals will stray more than others (Moyle, 2002). For their first few years, naturally produced rainbow trout occupy cool, clear, permanent streams of fast-flowing waters with ample riffle habitat, cover provided by undercut banks and riparian vegetation, and abundant invertebrate life. Older trout will occupy a variety of deeper habitats including pockets behind rocks, runs, and pools, and will stay in close proximity to areas where fast water will deliver drifting invertebrates, such as at pool inlets (Moyle, 2002). They are highly successful competitors who will aggressively defend feeding territories in streams, both from other species and from other rainbow trout. Prey items include drifting aquatic organisms, terrestrial insects, benthic invertebrates, and an occasional small fish (Moyle, 2002). During the winter, juvenile stream-resident rainbow trout will utilize log jams, upturned roots, and debris piles as important sources of cover, whereas adults will seek out boulders. Rainbow trout adults are less active in the winter and may remain in one place during this period (Calkins, 1989).

Resident rainbow trout will typically mature in their second or third year, reaching sizes greater than 13 cm. They typically spawn from February to June; however, low temperatures may extend spawning to July or August. Spawning occurs in redds that females dig out in coarse gravel at the tail of a pool or in a riffle. Spawning may occur on annual or biennial intervals. The number of eggs laid per female can range from 200 to 12,000, with trout under 30 cm typically laying fewer than 1,000 eggs (Moyle, 2002). During the winter, eggs have remained viable at temperatures as low as 0.3 to 2.0°C (Calkins, 1989).

MOUNTAIN WHITEFISH

Mountain whitefish (*Prosopium williamsoni*) is a state Species of Special Concern and was identified in the CNDDB query (CDFW, 2020). This species is associated with cold, clear streams, as well as in mountain lakes, at elevations from 4,600 to 7,545 feet (Moyle, 2002). Project streams and reservoirs are located at about 9,500 to 10,000 feet elevation, which is above the species elevation range. The closest known occurrence of this species to the Project is from 1984 in Green Creek, which is located about 12 miles from the Project and in a neighboring watershed (CDFW, 2020a). Surveys conducted in Lee Vining Creek in 1986, 1987, 1999–2001, 2006, 2011, and 2016 did not document this species between Saddlebag Dam and the confluence with Slate Creek (FERC, 1992; Sada, 2007a; Sada and Hogle, 2011; Salamunovich, 2017a). As a result, mountain whitefish are not likely to occur in the AAA, and there are no status reports or recovery plans that are pertinent to the AAA.

MOUNTAIN SUCKER

The mountain sucker (*Catostomus platyrhynchus*) is a state Species of Special Concern and was identified in the CNDDB query (CDFW, 2020a). Mountain suckers prefer streams characterized by low turbidity, moderate gradients, depths of less than 6 feet, and substrate comprised of rubble, sand, or bolder; however, they can be found in a variety of habitats (Moyle, 2002). The closest known occurrence of this species to the Project is from 1934 in Virginia Creek, which is approximately 12 miles from the Project and in a neighboring watershed (CDFW, 2020a). Surveys conducted in Lee Vining Creek within the AAA in 1986, 1987, 1999–2001, 2006, 2011, and 2016 did not document this species (as reported in FERC, 1992; Sada, 2007a; Sada and Hogle, 2011; Salamunovich, 2017a). As a result, mountain suckers are not likely to occur in the AAA, and there are no status reports or recovery plans that are pertinent to the AAA.

5.3.3.2. Fishery Management

Trout may have been first introduced to Lee Vining Creek around 1880 simultaneously with introductions made to Rush Creek, a nearby watershed. Brown trout were introduced to the Mono Lake basin in 1919, with plantings continuing until 1942, and eastern brook trout were introduced in 1931. After 1942, brown trout plants were replaced by annual plants of unmarked catchable rainbow trout (Salamunovich, 2017a).

Catchable rainbow trout are planted in each of the three Project reservoirs to support a put-and-take fishery management strategy. In 1980, approximately 35,000 pounds were planted in Saddlebag Lake, 20,000 in Tioga Lake, and 14,500 in Ellery Lake (SCE, 1981 as cited in FERC, 1992).

Historical information of fish plantings in Lee Vining Creek is limited. In 1992 approximately 9,000 and 53,000 pounds of catchable trout were planted above and below Poole Powerhouse, respectively (personal communication, Chris Boone, Fish Hatchery Manager, California Department of Fish and Game, March 18, 1992, as cited in FERC, 1992). Recently, CDFW Fish Springs Hatchery releases catchable rainbow trout in the AAA every 10 days from June through September (Salamunovich, 2017a; Figure 5.3-1). Triploid (sterile) rainbow trout were added to the releases in 2011, and since 2013 all planted rainbow trout have been sterile (Salamunovich, 2017a). CDFW planted over 47,300 catchable rainbow trout in 2016, including over 18,000 in Saddlebag Lake; 13,375 in Ellery Lake; 9,995 in Tioga Lake; 3,980 in Glacier Creek; and 1,590 in Lee Vining Creek between Saddlebag Dam and Ellery Lake (Salamunovich, 2017a). Stocking information for 2015 and 2016 is provided in Table 5.3-5.

Table 5.3-5. Rainbow Trout Stocking Information for the Lee Vining Project Aquatic Assessment Area in 2015 and 2016

Year	Waterbody	Number	Pounds	Average weight/fish (pounds)
2015	Saddlebag Lake	11,680	6,100	0.52
2015	Lee Vining Creek	730	375	0.51
2015	Tioga Lake	4,275	2,220	0.51
2015	Glacier Creek	1,380	700	0.51
2015	Ellery Lake	7,390	3,983	0.54
2015	**Average**	**5,091**	**2,672**	**0.52**
2016	Saddlebag Lake	18,455	9,365	0.51
2016	Lee Vining Creek	1,590	800	0.50
2016	Tioga Lake	9,955	5,165	0.52
2016	Glacier Creek	3,980	2,000	0.50
2016	Ellery Lake	13,375	6,895	0.52
2016	**Average**	**9,471**	**4,845**	**0.51**
2015-2016	**Average**	**7,281**	**3,758**	**0.51**

Source: CDFW as cited in Salamunovich, 2017a

5.3.4. Aquatic Habitat

The Project regulates stream flows in Lee Vining and Glacier Creeks below Project reservoirs, which can affect aquatic habitat and channel morphology. Consistent with Condition 4 of the 1992 License, SCE provides minimum flow releases to protect the recreational fishery in the AAA. Monthly flows for Lee Vining Creek are determined annually with the USFS, no later than May 1. If SCE and the USFS do not agree on flows, the minimum instream flows from the current license apply year-round: 14 cfs for wet years, 9 cfs for normal years, and 6 cfs for dry years. Minimum flow requirements below Tioga Dam depend on water year, inflow, and month. From December to April, the minimum flow is equal to the natural inflow. In October and November, the minimum flow is 2 cfs or natural inflow. From May to September, the minimum flow depends on water year and inflow. Between August and May, minimum flow requirements below Rhinedollar Dam are 27 cfs or the natural flow, whichever is less. In June and July, the minimum flow is 89 cfs or natural flow, whichever is less (see Section 5.2, *Water Resources*, for additional detail).

An instream flow analysis conducted by SCE to inform minimum instream flows for the 1992 License indicated that habitat for adult and juvenile brown and brook trout in Lee Vining Creek between Saddlebag Dam and the confluence of Slate Creek is maximized at flows between 15 and 25 cfs, and declines most significantly at flows below 10 cfs (EA, 1986 as cited in FERC, 1992); between the confluence of Slate Creek and Ellery Lake, habitat for juvenile and adult brown and brook trout is maximized between 20 and 40 cfs, and declines most significantly below 10 cfs (EA, 1986, as cited in FERC, 1992); and downstream of Poole Powerhouse, habitat for juvenile, adult, and spawning life stages of brown and brook trout is maximized at flows between 30 and 40 cfs, and declines most significantly for spawning adults at flows below 20 cfs (Groves Energy, 1984, as cited in FERC, 1992). No instream flow studies have been conducted in Lee Vining Creek between Ellery Dam and Poole Powerhouse due to the steepness of the canyon, or in Glacier Creek downstream of the Tioga Dam.

Lee Vining Creek within the AAA is comprised of mostly run and riffle habitat, with few pools. Aquatic habitat surveys conducted in 1986 indicate that the upper reach of Lee Vining between Saddlebag Dam and the confluence of Slate Creek is dominated by moderate-gradient riffles (approximately 85 percent) of various widths, some of which are braided channel, and a small amount of cascade habitat (approximately 10 percent); the middle reach from the confluence of Slate Creek to the confluence of Glacier Creek is comprised of two low-gradient meadow sections, separated by a steeper gradient canyon, and a section of broad riffles and runs as the creek approaches Tioga Pass Road; and the reach between the confluence of Glacier Creek and Ellery Lake is wide and relatively shallow, with a mixture of riffle and run habitat and low-gradient cascades that flow over cobble and gravel (EA, 1986).

Adequate cover for fish has been documented in Lee Vining Creek between Saddlebag Dam and the confluence of Slate Creek. Aquatic habitat monitoring conducted in accordance with Condition 7 of the license from 1999 to 2001, and then again in 2006, 2011, and 2016 indicated that cover in this reach occurs primarily in the form of overhanging vegetation (e.g., willow bushes and conifers), boulder pockets, turbulence, and occasional but infrequent accumulations of large woody debris and submerged vegetation. Initial results from 1999 to 2006 indicated that between 13 and 59 percent of the reach was shaded (Sada, 2007b; Sada and Rosamond, 2011, as cited in Salamunovich, 2017b). Surveys conducted in 2016 reported a slight increase in canopy cover (approximately 25 to 63 percent); however, differences are likely attributed to reduced sampling effort in 2016 compared to previous surveys (Salamunovich, 2017). No aquatic habitat surveys have been conducted in downstream reaches of Lee Vining Creek or in Glacier Creek.

5.3.4.1. Spawning Gravel

High percentages of spawning gravels, loosely compacted sediments, and relatively low gradients have been documented in Lee Vining Creek between Saddlebag Dam and Slate Creek. Aquatic habitat monitoring conducted from 1999 to 2011 indicated that substrates in this reach were dominated by gravel (34 to 73 percent) and cobble (41 to 57 percent) with very little fines (0 to 6 percent), sand (0 to 6 percent), or boulder (1 to 16 percent) substrate occurring (Sada, 2007b; Sada and Rosamond, 2011, as cited in Salamunovich, 2017b). Surveys conducted in 2016 found substrates continued to be dominated by gravel (approximately 23 to 44 percent) and cobble (35 to 41 percent) with very little fines (1 to 2 percent), sand (approximately 1 percent), and boulder (18 to 35 percent) substrate occurring in the reach (Salamunovich, 2017b). Gravels in this reach were found to be moderately loose (i.e., not embedded) and sufficient for spawning

(Salamunovich, 2017b). Additionally, the relatively low gradient (approximately 3 to 6 percent) reported for this reach likely results in slow sediment transport through the system (Sada, 2007b; Sada and Rosamond, 2011, as cited in Salamunovich, 2017b). Fish monitoring surveys conducted within these reaches in 2016 (Salamunovich, 2017a) documented the presence of recently-hatched trout fry and the actively spawning adults, confirming that this section of Lee Vining Creek (and the gravels therein) is utilized for spawning.

No additional detail was reported regarding the volume or precise location of spawning gravel within Lee Vining Creek downstream of Slate Creek.

5.3.4.2. Fish Passage Barriers

No migratory fishery resources requiring fish passage exist in the AAA.

5.3.5. Large Woody Debris

In 2016, aquatic habitat monitoring surveys conducted in Lee Vining Creek between Saddlebag Dam and the confluence of Slate Creek documented occasional but infrequent accumulations of large woody debris (Salamunovich, 2017b).

5.3.6. Entrainment

The Project has an unscreened intake structure to Poole Powerhouse at the base of Rhinedollar Dam. Although a fish screen was requested by CDFW in 1992, FERC did not consider potential entrainment losses to be significant enough to recommend the installation of a fish screen on the Poole Powerhouse intake (FERC, 1992). While unscreened intakes can cause involuntary entrainment and turbine mortality for fish, entrainment risk primarily occurs at higher approach velocities (i.e., 2 feet per second [fps]; FERC, 1992). The intake to Poole Powerhouse has an approach velocity of approximately 0.5 fps (FERC, 1992), which is lower than the cruising speeds of both juvenile (approximately 2 fps) and adult (approximately 3 fps) trout (Bell, 1991). Therefore, it is likely that juvenile and adult trout can easily escape the intake flow field. Additionally, the introduced brown and hatchery rainbow trout residing in Ellery Lake are nonmigratory species that may make random movements in the vicinity of the intake, but do not make population-scale migrations and therefore are not likely to become entrained in large numbers.

5.3.7. Benthic Macroinvertebrates

There are several sources of benthic macroinvertebrate (BMI) data for sites in the AAA, including samples collected from Lee Vining Creek, Glacier Creek, and leakage zones below Saddlebag Lake. BMI samples within the AAA have been collected by the CDFW Aquatic Bioassessment Lab (ABL), Sierra Nevada Aquatic Research Laboratory (SNARL), and other researchers (i.e., Cohen, 2019; Herbst and Medhurst, 2010; Rost and Fritsen, 2014). Additional BMI data are available at unimpaired sites near the Project (SWRCB, 2020a; Cohen, 2019). Sample sites within the AAA and unimpaired sites near the AAA are shown on Figure 5.3-1 and additional detail is presented in Table 5.3-6.

Sample collection (e.g., targeted-riffle, reach-wide benthic, triplicate sample methods, D-frame kicknet) and analytical methodologies varied across studies and while taxonomic data of subsampled BMI is available for sites LVMC, LVWF, LVSR, LVEL, GCTL (see Table 5.3-6), individual metrics (e.g., taxonomic richness, composition, tolerance, and functional feeding groups) and/or multi-metric index scores (e.g., the California Stream Condition Index [CSCI]) commonly used to characterize BMI samples may not have been calculated or are not readily obtainable. For example, data from the California Environmental Data Exchange Network (CEDEN; SWRCB, 2020a) only includes identified taxa; whereas, data available from Herbst and Medhurst (2010), Rost and Fritsen (2014), and Cohen (2019) include descriptive metrics. Data available from samples collected as part of the Perennial Streams Assessment (SWRCB, 2020b) include CSCI scores, which are derived via a multi-part evaluation that uses a statewide reference database to integrate observed-to-expected ratios of BMI taxonomic completeness and multi-metric indices into a composite score indicative of stream condition (Rehn et al., 2015).

CSCI scores available for two sites on Lee Vining Creek, Site LVMC (CSCI=1.09) and Site LVWF (CSCI=1.17), exceed the threshold for the highest condition category of the score (Rehn et al., 2015; SWRCB, 2020b). This suggests that stream conditions and quality of aquatic habitat in the AAA downstream of Poole Powerhouse is generally suitable for BMIs and comparable with unimpaired reference conditions. This is supported by studies that compare stream reaches below reservoirs, including sites within the AAA (Figure 5.3-1 and Table 5.3-6), and streams not affected by hydroelectric operations. Cohen (2019) found that BMI community structure (i.e., richness, evenness, density, and composition) in outlet streams of reservoirs and high-elevation natural lakes were similar despite differences in flow and nutrient (e.g., ammonium) concentrations. Rost and Fritsen (2014) found that BMI assemblages in Lee Vining Creek were generally unimpaired, but noted higher densities of BMIs at Site LVSR compared to Site LVSC and Slate Creek (Figure 5.3-1 and Table 5.3-6), which was attributed to higher periphyton biomass caused by the invasive diatom *Didymosphenia geminate*. Samples collected from leakage zones below Saddlebag Lake (Herbst and Medhurst, 2010) determined that these areas support lower BMI diversity and are not high-quality habitat compared to regional unimpaired streams.

Additional historical BMI data are available in the Project Vicinity. These samples were collected from nearby, unimpaired waterways that are not affected by Project operations. Historical BMI collection sites in the AAA vicinity include a site on Warren Fork approximately 1 mile upstream of Lee Vining Creek, a site at Gardisky Lake approximately 0.8 mile from the AAA (SWRCB, 2020a, 2020b), a site immediately downstream of Spuller Lake approximately 0.9 mile from the AAA, and a site immediately downstream of Middle Gaylor Lake approximately 0.95 mile from the AAA within Yosemite National Park (Cohen, 2019).

Table 5.3-6. Benthic Macroinvertebrate Sample Sites in the Lee Vining Project Aquatic Assessment Area

Waterbody Name	Site Location Description	Site Code	Coordinates [a]		Sampling Year(s)	Collection Agency or Institution	Data Source(s)
			Latitude	Longitude			
Lee Vining Creek	Approximately 3.1 miles below Poole Powerhouse at Moraine Camp (SWRCB Station Code 601LVC001)	LVMC	37.9300	-119.1640	2000	SNARL	SWRCB, 2020a, 2020b
	Approximately 0.9 mile below Warren Fork (SWRCB Station Code 601PS0065)	LVWF	37.9451	-119.2040	2011	CDFW ABL	SWRCB, 2020a, 2020b
	Below Saddlebag Lake outlet [b]	LVSR	37.9649	-119.2738	2016, 2017	UCSB	Cohen, 2019
					2010	SNARL	Herbst and Medhurst, 2010
					2005, 2006	SNC and DRI	Rost and Fritsen, 2014
	Below the confluence of Slate Creek [b]	LVSC	37.9586	-119.2729	2005, 2006	SNC and DRI	Rost and Fritsen, 2014
	Lee Vining Creek below Ellery Lake outlet	LVEL	37.9353	-119.2316	2016, 2017	UCSB	Cohen, 2019
Slate Creek	Upstream of the confluence of Lee Vining Creek	Unimpaired	37.9592	-119.2786	2005, 2006	SNC and DRI	Rost and Fritsen, 2014
Glacier Creek	Glacier Creek 50 meters below Tioga Dam	GCTL	37.9285	-119.2508	2015, 2016, 2017	UCSB	Cohen, 2019
Leakage zones below Saddlebag Dam	Reservoir leakage sites below Saddlebag Lake outlet [b]	SRRL	37.9653	-119.2731	2010	SNARL	Herbst and Medhurst, 2010
Middle Gaylor Lake	Below the outlet of Middle Gaylor Lake	Unimpaired	37.9136	-119.2702	2015, 2016, 2017	UCSB	Cohen, 2019
Spuller Lake	Below the outlet of Spuller Lake	Unimpaired	37.9489	-119.2838	2016, 2017	UCSB	Cohen, 2019

Waterbody Name	Site Location Description	Site Code	Coordinates [a]		Sampling Year(s)	Collection Agency or Institution	Data Source(s)
			Latitude	Longitude			
Warren Fork of Lee Vining Creek	Warren Fork upstream of Highway 120	Unimpaired	37.9552	-119.229	2006, 2010, 2018	SNARL	SWRCB, 2020a, 2020b

CDFW ABL= California Department of Fish and Wildlife Aquatic Bioassessment Lab; DRI = Desert Research Institute; SNARL= Sierra Nevada Aquatic Research Laboratory; SNC = Sierra Nevada College; UCSB = University of California Santa Barbara

Notes:

[a] Datum = NAD83

[b] Approximate location based on description of reach (coordinates were not included in associated publication).

Table 5.2-9. Selected Water Quality Parameters Collected in Lee Vining Creek at Three Sites Downstream of Poole Powerhouse

CEDEN Source	Sample Location	Sample Date	Analyte	Unit	Result
SWAMP Perennial Stream Surveys	Lee Vining Creek ~0.7 miles below Poole Powerhouse	9/01/2011	**Nutrients**		
			Total ammonia, as N	mg/L	< 0.01
			Nitrate + nitrite, as N	mg/L	< 0.018
			Total nitrogen	mg/L	0.17
			Orthophosphate, as P	mg/L	< 0.014
			Total phosphorus, as P	mg/L	0.009
			Dissolved organic carbon	mg/L	1.14
			Biological		
			Benthic AFDM	g/m^2	2.42
			Benthic chlorophyll-a	mg/m^2	5.25
			Physical		
			Dissolved oxygen	mg/L	7.35
			pH		7.86
			Specific conductivity	µS/cm	21.6
			Suspended sediment concentration	mg/L	< 2
			Total suspended solids	mg/L	0.6
			Temperature	°C	12.1
			Turbidity	NTU	0.41
			Total hardness, as $CaCO_3$	mg/L	9.29
			Minerals		
			Chloride	mg/L	0.17
			Silica as SiO_2	mg/L	4.1
			Sulfate	mg/L	2.77
SWAMP RWB6 Monitoring	Lee Vining Creek ~3.5 miles below Poole Powerhouse	8/3/2000	**Nutrients**		
			Nitrate + nitrite, as N	mg/L	< 0.05
			Phosphorus as P	mg/L	< 0.01
			Biological		
			Benthic chlorophyll-a	mg/m^2	1.75
			Benthic CPOM	g/m^2 ww	40

CEDEN Source	Sample Location	Sample Date	Analyte	Unit	Result
			Benthic FPOM	g/m^2 dw	0.216
			Physical		
			Dissolved oxygen	mg/L	8
			pH		6.36
			Specific conductivity	µS/cm	33.8
			Temperature	°C	13.3
			Turbidity	NTU	0.72
			Hardness, as $CaCO_3$	mg/L	77
			Minerals		
			Calcium	mg/L	16
			Magnesium	mg/L	8.9
			Silica, as SiO_2	mg/L	4.6
			Sulfate	mg/L	1,500[a]
Statewide Perennial Streams Assessment 2019	Lee Vining Creek ~4.8 miles below Poole Powerhouse	8/27/2019	**Physical**		
			Dissolved oxygen	mg/L	8.05
			Specific conductivity	µS/cm	24.2
			Temperature	°C	14.65
			Turbidity	NTU	0.42
			pH	none	7.1
			Alkalinity, as $CaCO_3$	mg/L	12

Source: CEDEN, 2020

°C = degrees Celsius; µS/cm = microSiemens per centimeter; AFDM = ash-free dry mass; $CaCO_3$ = calcium carbonate; CPOM = coarse particulate organic matter; dw = dry weight; FPOM = fine particulate organic matter; g/m^2 = grams per square meter; mg/L = milligrams per liter; mg/m^2 = milligrams per square meter; N = nitrogen; NTU = nephelometric turbidity unit; P = phosphorus; pH = indicates acidity or alkalinity of a solution; RWB6 = Surface Water Ambient Monitoring Program Bioassessment Monitoring; SiO_2 = silicon dioxide; SWAMP = Surface Water Ambient Monitoring Program; ww = wet weight

Note:

[a] Potential data quality issue as it is several orders of magnitude higher than the concentration measured upstream as noted in this table, or in high elevation Sierra lakes (e.g., Melack, 1985). Elevated sulfate concentrations are not accompanied by either high magnesium or by higher conductivity readings resulting from elevated sodium concentrations.

DISSOLVED OXYGEN

DO concentrations were measured in Project reservoirs and their outlet streams from 2015 to 2017 (Table 5.2-8; Cohen, 2019) in upper Lee Vining Creek just downstream of Saddlebag Lake as part of fish monitoring efforts (Salamunovich, 2017), in lower Lee Vining Creek on single dates in 2000, 2011, and 2019 (Table 5.2-9; CEDEN, 2020), and in all Project reservoirs on seven dates in 1986 and 1987 (Lund, 1988). DO concentrations within Project reservoirs fluctuated seasonally and occasionally did not achieve Basin Plan objectives for COLD and SPWN but were infrequently below 95 percent saturation. Hypoxia was recorded at depth in Tioga Lake while stratified in late summer (Cohen, 2019), as well as at depth in Tioga, Saddlebag, and Ellery Lakes under ice (Cohen, 2019; Lund, 1988). DO in Lee Vining Creek downstream of Saddlebag Lake from September 20 to 25, 2016, ranged from 7.24 mg/L to 9.55 mg/L, varying with temperature between 9.2 and 13.8°C. Within Lower Lee Vining Creek, DO concentrations ranged from 7.35 to 8 mg/L, below or meeting Basin Plan objectives for COLD and SPWN (1-day average of 8 mg/L; 7-day average of 9.5 mg/L). Reduced DO typically reflected decreased solubility of oxygen in water at high elevation (low pressure) and summer temperatures.

WATER TEMPERATURE

Water temperature was measured in Lee Vining Creek downstream of Poole Powerhouse on single dates in 2000, 2011, and 2019 (Table 5.2-9; CEDEN, 2020), in upper Lee Vining Creek immediately downstream of Saddlebag Lake as part of fish monitoring efforts (Salamunovich, 2017), and in Project reservoirs on seven dates in 1986 and 1987 (Lund, 1988). In upper Lee Vining Creek downstream of Saddlebag Lake, temperature recorded from September 20 to 25, 2016, ranged from 9.2 to 13.8°C, likely resulting from cooling air temperatures typical of early fall. Water temperature ranged from 12.10 to 14.65°C in Lee Vining Creek downstream of Poole Powerhouse, possibly reflecting typical summer stream temperatures. All Project reservoirs were stratified under ice and on summer sampling dates, with temperatures ranging from 0.01°C under ice in Tioga Lake in March 1987, up to 14.7 °C in Ellery Lake in August 1986 (Lund, 1988). No specific temperature objectives are given in the Basin Plan.

COLIFORM BACTERIA

Samples for fecal coliform were collected immediately downstream of Poole Powerhouse from 2012 to 2013, and upstream of the LADWP diversion from 2011 to 2015 (Table 5.2-10; CEDEN, 2020). All sample measurements were below Basin Plan objectives for coliform counts and are therefore in compliance with the Basin Plan. No corresponding data were collected within the FERC Project Boundary, but Project facilities and operations do not introduce coliform bacteria into Project waters.

Table 5.2-10. Fecal Coliform Counts from Water Samples Collected in Lee Vining Creek

CEDEN Source	Location	Sample Date	Fecal Coliform cfu/100 mL
Eastern Sierra Ambient Monitoring	Lee Vining Creek below Poole Plant	7/26/2012	< 1
		8/13/2012	< 1
		3/12/2013	< 1
		4/24/2013	< 1
		5/31/2013	< 1
		7/7/2013	1
		7/30/2013	2
		9/17/2013	2
		10/17/2013	2
RWB6 Lahontan Bacteria Sampling	Lee Vining Creek above LADWP Diversion	7/14/2011	10
		7/27/2011	1
		8/10/2011	2
		8/16/2011	6
		7/24/2012	18
		8/21/2012	2
		5/17/2014	1
		5/17/2014	1
		4/19/2015	< 1

Source: CEDEN, 2020

CEDEN = California Environmental Data Exchange Network; cfu/100 mL = colony forming unit per 100 milliliters; LADWP = Los Angeles Department of Water and Power; RWB6 = Surface Water Ambient Monitoring Program Bioassessment Monitoring

MINERALS AND PH

Profiles of pH were collected in all three Project reservoirs on seven dates between 1986 and 1987. pH was near circumneutral on most sampling dates and depths, ranging from a minimum of 6.33 in June 1986 in Tioga Lake up to a maximum of 8.07 under ice in March of 1987 in Ellery Lake (Lund, 1988).

To determine vulnerability of Project reservoir waters to invasion by invasive mussel species such as quagga (*Dreissena rostriformis bugensis*) or zebra mussels (*Dreissena polymorpha*), three additional water quality samples were collected in Project reservoirs at unspecified dates in 2009 and 2010. Calcium concentrations were between 2.24 and 3.95 mg/L, and pH was between 6.85 and 6.91, which indicated Project reservoirs could not support invasive mussels (SCE, 2017), as a pH greater than 7.3 and calcium concentration greater than 12 mg/L is necessary to potentially allow invasion.

Low concentrations of several additional minerals were measured in Lee Vining Creek 0.7 and 3.5 miles downstream of Poole Powerhouse (Table 5.2-9), with the exception of sulfate, which may represent a data quality issue. Sulfate was measured in all three Project reservoirs in on six dates between 1986 and 1987, and was low in all samples (less than 3.2 mg/L)

Measurements of pH were taken in Lee Vining Creek 0.7 mile, 3.5 miles, and 4.8 miles downstream of Poole Powerhouse (Table 5.2-9). These measurements ranged from pH 6.36 to 7.86, which is typical of high elevation Sierra streams.

MERCURY

Information regarding concentrations of mercury within Project waters is minimal. Fish tissue data available from CEDEN collected in 2008 includes concentrations of total mercury in two composite samples of five rainbow trout from each Ellery, Tioga, and Saddlebag Lakes (CEDEN, 2020). Total mercury in composite fish samples collected from all three reservoirs ranged from 18 to 26 parts per billion, which is within the Food and Drug Administration’s “best choices” category for fish consumption (FDA, 2019). Low values of mercury found in fish tissue indicate that legacy impacts of mining in Lee Vining Creek watershed (see Section 5.1.3.4, *Mineral Resources*) are likely not adversely impacting water quality.

5.4. BOTANICAL RESOURCES

5.4.1. INTRODUCTION

This section describes the terrestrial botanical resources including vegetation communities and common plants, non-native invasive plants, and special status plants on and in the vicinity of SCE’s Lee Vining Project (FERC Project No. 1388). Plant species listed under the federal and state ESAs are discussed in detail in Section 5.7, *Rare, Threatened, and Endangered Species*. Aquatic botanical, wildlife, and associated resources are discussed in Section 5.3, *Fish and Aquatic Resources*.

The area assessed for botanical resources includes the FERC Project Boundary plus a 200-foot buffer, hereafter referred to as the Terrestrial Assessment Area (TAA). The TAA extends from the reservoir behind Saddlebag Dam to the Poole Powerhouse tailrace.

5.4.2. Information Sources

A literature review identified common and special status plant species and vegetation communities known to occur (or that historically occurred) in the vicinity of the TAA.

Vegetation alliances described herein are based on the following sources:

- Direct observation from previously conducted field surveys and license-required monitoring studies
- Information on vegetation communities data provided by the USFS (USFS, 2020a)
- Keys and descriptions from the USFS using the CALVEG (Classification and Assessment with Landsat of Visible Ecological Groupings) classification system. This is the preferred key by the Inyo National Forest and is used in this document for consistency with the Inyo National Forest Plan (USFS, 2019). In this system, differences between vegetation alliance types (also referred to as communities) are based on canopy cover as determined from aerial photography and satellite imagery.
- Psomas biological survey reports (two reports prepared for SCE):
  - *Summary of Biological Resources Determination of No Effect on Listed Species for Southern California Edison Company's Tioga Lake Dams Geomembrane Liner Installation Project, Mono County, California* (Psomas, 2013)
  - *Biological Resources Evaluation Technical Report for the Southern California Edison South Lake Dam, Agnew Lake Dam, Saddlebag Lake Dam, and Tioga Lake Dam, and Auxiliary Dam Maintenance and Geo-Membrane Lining Projects* (Psomas, 2010)
- E. Read and Associates riparian monitoring reports:
  - *Lee Vining Creek (FERC No. 1388) Riparian, Aquatic Habitat, and Fish Population Monitoring: Phase 2 (Year 2) Compared to Baseline and 2006* (Read, 2012)
  - *Lee Vining Creek (FERC No. 1388) Riparian Monitoring Phase 2 Year 3 (2016) Compared to Previous Years* (Read, 2017)
- *Environmental Assessment of Potential Cumulative Impacts Associated with Hydropower Development in the Mono Lake Basin, California (FERC Nos. 1388, 1389, 1390, 3259, and 3272)* (FERC, 1990)

A list of special status plant species was compiled from several sources by searching the following USGS 7.5-minute topographic quadrangles: Tioga Pass, Mount Dana, Lee

Vining, Falls Ridge, Lundy, Dunderberg Peak, Vogelsang Peak, Koip Peak, Matterhorn Peak, and Tenaya Lake. The sources queried included:

- California Natural Diversity Database (CNDDB; CDFW, 2020)
- California Native Plant Society's Inventory of Rare and Endangered Plants (CNPS, 2020)
- Persistence Analysis for Species of Conservation Concern (SCC) Inyo National Forest (INF, 2019). Species known to be present in the Mono Ranger District are included
- USFS records of botany at risk species (NRM – TESP/IS, 2018)
- Whitebark pine range geospatial data (USFS, 2020b)

Information on non-native invasive plants (NNIPs) potentially occurring in the TAA was obtained from the following sources:

- California Invasive Plant Inventory (Cal-IPC; Cal-IPC, 2020)
- USFS invasive species inventory database (NRM – TESP/IS, 2018)

5.4.3. Vegetation Alliances

The TAA generally occurs between 7,800 and 10,200 feet amsl on the eastern side of the Sierra Nevada. Vegetation alliances and habitats determined to occur in the TAA are listed in Table 5.4-1 and discussed in detail below. CALVEG USFS vegetation data can be accessed at the USFS *Vegetation Classification & Mapping* website.[1]

[1] https://www.fs.usda.gov/detail/r5/landmanagement/resourcemanagement/?cid=stelprdb5347192

Table 5.4-1. Vegetation Alliances and Habitats

Herbs
Alpine Grasses and Forbs *
Annual Grasses and Forbs
Wet Meadows *
Scrub
Alpine Mixed Scrub
Great Basin Mixed Scrub
Low Sagebrush
Upper Montane Mixed Chaparral
Willow (Shrub) *
Forest
Lodgepole Pine
Subalpine Conifers
Mixed Conifer–Fir
White Fir
Quaking Aspen *
Whitebark Pine
Other
Water *
Barren
Urban-related Bare Soil
Urban/Developed (General)

Source: USFS n.d.

"*" Denotes riparian habitats. Alpine grasses and forbs occur in both riparian and upland areas.

Riparian habitats are noted with an asterisk in the sub-headings of Table 5.4-1.

5.4.3.1. Alpine Grasses and Forbs

Many alpine regions close to or above treeline are dominated by grasses and herbaceous species, some of which take on a cushion plant form that is adapted to protect plants under these severe climatic conditions. Minor amounts of alpine shrubs may be included. Slopes are variable and elevations are generally in the 9,000- to 13,000-foot range. Species that may be found in this alliance include a mixture that appear to be limited by substrate, such as cushion buckwheat (*Eriogonum ovalifolium*), the fern ally Watson's spikemoss (*Selaginella watsonii*), pussypaws (*Calyptridium umbellatum*), pygmy-flower rock-jasmine (*Androsace septentrionalis*), squirreltail (*Elymus elymoides*), pinewoods needle grass (*Stipa pinetorum*) and granite gilia (*Linanthus pungens*), tufted hair grass (*Deschampsia cespitosa*), spiked woodrush (*Luzula spicata*), low cryptantha (*Cryptantha humilis*), and Merten's rush (*Juncus mertensianus*). At these elevations, subalpine conifers such as whitebark pine (*Pinus albicaulis*) and limber pine (*Pinus flexilis*) are often found in association with this alliance.

5.4.3.2. Alpine Mixed Scrub

The Alpine Mixed Scrub alliance is often low graminoid and forb species within a mixture of dwarf shrubs, which often include some cushion plants. This type has been mapped abundantly in the White Mountains and more sparsely in the Mono Basin at elevations generally above 9,200 feet. In this area, the Mixed Alpine Scrub alliance is identified in scattered locations of bedrock outcrops, which provide more mesic sites for shrubs. The mixture may include fern bush (*Chamaebatiaria millefolium*), mountain snowberry (*Symphoricarpos rotundifolius*), and spineless horsebrush (*Tetradymia canescen*s). Herbaceous species common in these high elevation sites are dwarf lupine (*Lupinus lepidus*), mountain dandelion (*Agoseris glauca*), Jacob's ladder (*Polemonium* spp.), oval-leaved buckwheat (*Eriogonom ovalifolium*), Coville's phlox (*Phlox condensata*) and graminoids such as tufted hair grass, June grass (*Koeleria macrantha*), and sedges (*Carex* spp.).

5.4.3.3. Annual Grasses and Forbs

This alliance is found predominantly on flat and generally non-alkaline alluvial areas at elevations from about 4,000 to 10,800 feet. It is identified by annual grasses such as bromes (*Bromus* spp.), many of which are not native to California, native annual grasses such as Mexican love grass (*Eragrostis mexicana*), witchgrass (*Panicum capillare*) and sixweeks grass (*Festuca octoflora*), and non-native grasses such as wall barley (*Hordeum murinum*), rattail sixweeks grass (*Festuca myuros*), and oats (*Avena* spp.). Non-native annual forbs such as spotted knapweed (*Centaurea stoebe* ssp. *micranthos*), bindweed (*Convolvulus arvensis*), butter-and-eggs (*Linaria vulgaris*), sheep sorrel (*Rumex acetosella*), common dandelion (*Taraxacum offinale*), storksbill (*Erodium* spp.), and tumble mustard (*Sisymbrium altissimum*), may invade these areas to displace native forbs such as shortflowered owl's clover (*Orthocarpus cuspidatus* ssp. *cryptanthus*) and freckled milkvetch (*Astragalus lentiginosus*).

5.4.3.4. Barren

Landscapes generally devoid of vegetation as seen from a high-altitude image source such as aerial photography, are labeled as Barren. This category includes areas in which surface lithology is dominant, such as exposed bedrock, cliffs, and granitic or volcanic outcroppings. It does not include areas considered as modified or developed, as in urban areas.

5.4.3.5. Great Basin Mixed Scrub

A mixture of common Great Basin shrubs defines the Great Basin Mixed Scrub alliance. Slopes are mainly steep with shallow rocky soils. Geologic substrates are diverse and elevations are generally above about 4,600 feet. The species mixture includes big sagebrush (*Artemisia tridentata*), bitterbrush (*Purshia tridentata*), curl-leaf mountain-mahogany (*Cercocarpus ledifolius*), and species of currant (*Ribes* spp.), snowberry (*Symphoricarpos* spp.), or interior rose (*Rosa woodsii*). Jeffrey pine (*Pinus jeffreyi*) is a conifer associate of this alliance.

5.4.3.6. Water

Areas mapped as Water are comprised of perennial surface water including Saddlebag Lake, Tioga Lake, and Ellery Lake, Lee Vining Creek, and Glacier Creek. These areas have a minimum of vegetation components, except along the edges, which may be mapped as Wet Meadows.

5.4.3.7. Lodgepole Pine

The lodgepole pine (*Pinus contorta* ssp. *murrayana*) dominates this alliance. Sites tend to be on flat or low-gradient slopes having volcanic and pyroclastic deposits at elevations mainly between 6,800 and 10,600 feet. Quaking aspen (*Populus tremuloides*) occasionally forms a hardwood understory at elevations below about 9,400 feet. Whitebark pine is found in this alliance along Lee Vining Creek. The Eastside Pine alliance is often found adjacent to this alliance.

5.4.3.8. Low Sagebrush

Low sagebrush (*Artemisia arbuscula*), a short evergreen shrub, is dominant in this alliance. Elevations are in the range of about 5,000 to 12,500 feet. These sites often occur in rocky or sterile areas such as basins with clay or saline-to-alkaline soils that are intermittently flooded and terraces with hardpans or heavy clay substrata that restrict root growth of competing species. Typical sites are higher or have more available moisture than those occupied by black sagebrush (*Artemisia nova*), but often with more bedrock than those dominated by big sagebrush. Jeffrey pine is a conifer often associated with this alliance as well as a variety of associated desert and semiarid shrubs such as curl-leaf mountain-mahogany and bitterbrush.

5.4.3.9. Mixed Conifer–Fir

At least three conifers are included in the Mixed Conifer–Fir alliance, typically white fir (*Abies concolor*), California red fir (*Abies magnifica*), lodgepole pine, and Jeffrey pine. These species, in addition to quaking aspen, are also commonly found as dominants in their own alliances adjacent to this type. Great Basin species such as bitterbrush, sagebrushes (*Artemisia* spp.), and curl-leaf mountain-mahogany often occur as understory shrubs in this type. It is chiefly found within the elevation range of about 4,600 to 9,400 feet on north- to east-facing slopes.

5.4.3.10. Quaking Aspen

Quaking aspen occurs as an indicator of moist conditions in high elevation meadows and other moist areas. It is generally dominant on more productive sites, often forming dense, long-lived clonal patches on the landscape. It has been mapped chiefly at elevations above 6,000 feet on a variety of geologic substrates. Quaking aspen has been identified as the principal hardwood understory species in Jeffrey pine, lodgepole pine, and limber pine sites. Shrub associates on moist sites include interior rose, western prickly gooseberry (*Ribes montigenum*), and silver sagebrush (*Artemisia cana ssp. bolanderi*), and on drier sites, big sagebrush and bitterbrush. Other associated taxa are herbaceous species in dry and seasonally moist grasslands and meadows, and riparian hardwoods such as willows (*Salix* spp.) and water birch (*Betula occidentalis*).

5.4.3.11. Subalpine Conifers

Elevations of the Subalpine Conifers alliance are chiefly within the range of 7,600 to 10,800 feet. The conifer mixture occurs chiefly on volcanic substrates and consists of mountain hemlock (*Tsuga mertensiana*), lodgepole pine, limber pine, whitebark pine, and California red fir. Quaking aspen is an associated hardwood of this alliance on sites where soils are richer. More open or exposed areas may be dominated by herbaceous components such as those in the Alpine Grasses and Forbs alliance.

5.4.3.12. Upper Montane Mixed Chaparral

The Upper Montane Mixed Chaparral alliance is a mid- to high-elevation shrub type in which no single species is dominant. Characteristic, non-dominant species in this area generally include only greenleaf manzanita (*Arctostaphylos patula*), mountain whitethorn (*Ceanothus cordulatus*), and snowbrush (*Ceanothus velutinus*). Slopes tend to be south and west facing within the general elevation mapped, at about 4,400 to 10,400 feet.

5.4.3.13. Urban-related Bare Soil

Urban development in California occurs in phases. When land is cleared before paving, this category represents the occurrence of non-vegetated barren ground that is caused by urbanization projects. This land-use type also represents other mechanically-caused barren ground, such as open quarries or mined areas, barren ground along highways, and other areas cleared of vegetation prior to construction. This type is often adjacent to agricultural areas, already established urbanized centers, or paved areas of the landscape.

5.4.3.14. Urban/Developed (General)

This category applies to landscapes that are dominated by urban structures, residential units, or other developed land use elements such as highways, city parks, cemeteries, and the like. In those cases, in which the managed landscapes may have a considerable vegetation component, other land use categories may be more appropriate, such as Ornamental Conifer and Hardwood mixtures within city parks.

5.4.3.15. Wet Meadows

Despite the general aridity of this zone, surface and near-surface waters are plentiful in some areas. These seasonally or permanently wet herbaceous sites have been mapped in widely scattered areas. The Wet Meadows alliance has been chiefly identified on saturated alluvium and coarse substrates within a wide elevation range from below 4,000 feet to about 12,000 feet. Indicator forbs and graminoids of this area include Hartweg iris (*Iris hartwegii*) and western blue flag (*Iris missouriensi*s), various rushes (*Juncus* spp.), false hellebore (*Veratrum californicum*), buttercup (*Ranunculus* spp.), stinging nettle (*Urtica dioica*), water sedge (*Carex aquatilis*) and various other sedges (*Carex* spp.), mat muhly (*Muhlenbergia richardsonis*), streamside bluebells (*Mertensia ciliata* var. *stomatechoides*), scented shootingstar (*Primula fragrans*), dwarf larkspur (Delphinium *depauperatum*), fringed willowherb (*Epilobium ciliatum*), and Sierra woodrush (*Luzula orestera*). At Lee Vining Creek, showy sedge (*Carex spectabilis*) is the most common herb.

5.4.3.16. White Fir

White fir occurs in pure stands in this alliance, which is found at elevations typically higher than the Mixed Conifer-Fir alliance. It is commonly mapped at elevations within the general range of 6,400 to 9600 feet. Quaking aspen and tree-sized curl-leaf mountain-mahogany are the only consistent hardwood associates occurring on or adjacent to white fir stands in this zone.

5.4.3.17. Whitebark Pine

This alliance, dominated by whitebark pine, occurs on open, windswept ridges at treeline. In these areas, a krummholzed (i.e., stunted, windblown) form is common. It also grows in areas of glacial scouring where soil development is poor, where it is often found adjacent to barren areas or sites mapped as the Alpine Grasses and Forbs alliance. It has been mapped sparsely within the elevation range of about 8,800 to 11,200 feet. Lodgepole pine may be associated with it on occasion.

5.4.3.18. Willow (Shrub)

Shrub forms of willow (*Salix* spp.) are mapped as this alliance where they dominate the shrub layer in a riparian, seep, or meadow site. In this region, they have been identified at low to high elevations, often on gravel bars adjacent to or in permanent water sources, and chiefly in middle to upper montane locations. Willows in this alliance may include any combination of narrow-leaved willow (*Salix exigua*), Geyer's willow (*Salix geyeriana*), Lemmon's willow (*Salix lemmonii*), shining willow (*Salix lasiandra*), yellow willow (*Salix lutea*), and gray-leafed Sierra willow (*Salix orestera*). Grasses and grass-like plants such as water sedge (*Carex aquatilis*), meadow barley (*Hordeum brachyantherum*), Nebraska sedge (*Carex nebrascensis*), and woolly sedge (*Carex pellita*) may be common in this alliance. Associated trees and shrubs in this wide-ranging type may include quaking aspen, interior rose, blue elderberry (*Sambucus nigra* ssp. *caerulea*), current (*Ribes* spp.), and moist site sagebrush species (*Artemisia* spp.).

5.4.4. Noxious Weeds/Non-Native Invasive Plants

The list of NNIPs with potential to occur in the TAA was developed from a query of the Cal-IPC (Cal-IPC, 2020) and a list provided by the USFS of NNIPs currently known in the Inyo National Forest (NRM – TESP/IS, 2018).

Cal-IPC was queried to obtain a list of NNIPs based on two parameters:

- Jepson region: The inventory uses geographic floristic provinces and subdivisions within California as described by the Jepson Flora Project (2020); Sierra Nevada East was used.
- Habitat types: Five vegetation communities were known to be in or near the TAA and were selected: scrub and chaparral, grasslands, riparian, woodland, and forest.

Cal-IPC defines NNIPs as plants that (1) are not native to, yet can spread into, wildland ecosystems, and that also (2) displace native species, hybridize with native species, alter biological communities, or alter ecosystem processes (Cal-IPC, 2020).

Cal-IPC categorizes plants as High, Moderate, or Limited, according to the degree of ecological impact in California (Cal-IPC, 2020):

- High: Severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.
- Moderate: Substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.
- Limited: Invasive, but ecological impacts are minor on a statewide level (or not enough information to justify a higher score). Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

The USFS has categorized NNIPs into various treatment strategies (1) eradicate, (2) control, (3) contain, and (4) limited or no treatment.

The Cal-IPC query combined with the list of NNIPs known to occur in the Inyo National Forest yielded a total of 84 species that have the potential to occur in the TAA as shown in Table 5.4-2.

Table 5.4-2. Non-Native Invasive Plants Potentially Occurring in the Terrestrial Assessment Area

Scientific Name	Common Name	USFS Treatment Strategy	Cal-IPC Rank
Agrostis stolonifera	creeping bent		Limited
Ailanthus altissima	tree of heaven	1 – Eradicate	Moderate
Alhagi maurorum	camel thorn		Moderate
Arundo donax	giant reed		High
Asparagus asparagoides	bridal creeper		Moderate
Avena barbata	slender wild oat		Moderate
Avena fatua	wild oat		Moderate
Bassia hyssopifolia	five-hook bassia	3 – Contain	Limited
Brassica nigra	black mustard		Moderate
Brassica rapa	field mustard		Limited
Brassica tournefortii	Sahara mustard		High
Bromus diandrus	ripgut grass		Moderate
Bromus hordeaceus	soft chess	4 – Limited or None	Limited
Bromus japonicus	Japanese brome	4 – Limited or None	Limited
Bromus rubens	red brome	3 – Contain	High
Bromus tectorum	cheat grass	3 – Contain	High
Centaurea diffusa	diffuse knapweed	1 – Eradicate	Moderate
Centaurea melitensis	tocalote		Moderate
Centaurea solstitialis	yellow star-thistle	1 – Eradicate	High
Centaurea stoebe ssp. *micranthos*	spotted knapweed	1 – Eradicate	High
Chorizpora tenella	crossflower	4 – Limited or None	
Cirsium arvense	Canada thistle	1 – Eradicate	Moderate
Cirsium vulgare	bull thistle	3 – Contain	Moderate
Conium maculatum	poison-hemlock		Moderate
Convolvulus arvensis	bindweed	3 – Contain	
Cortaderia selloana	pampas grass		High
Cynodon dactylon	Bermuda grass		Moderate
Dactylis glomerata	orchard grass		Limited
Descurainia sophia	tansy mustard	4 – Limited or None	Limited
Dipsacus fullonum	wild teasel	2 - Control	Moderate

Scientific Name	**Common Name**	**USFS Treatment Strategy**	**Cal-IPC Rank**
Dipsacus sativus	Fuller's teasel		Moderate
Elaeagnus angustifolia	Russian olive	2 - Control	Moderate
Elymus caput-medusae	medusa head		High
Erodium cicutarium	redstem filaree	4 – Limited or None	Limited
Fallopia sachalinensis	giant knotweed		Moderate
Festuca arundinacea	tall fescue		Moderate
Festuca myuros	rattail sixweeks grass	4 – Limited or None	Moderate
Festuca perennis	rye grass		Moderate
Foeniculum vulgare	fennel		Moderate
Geranium purpureum	little robin		Limited
Grindelia squarrosa var. serrulate	curlycup gumweed	4 – Limited or None	
Halogeton glomeratus	saltlover	2 - Control	Moderate
Helminthotheca echioides	bristly ox-tongue		Limited
Hirschfeldia incana	short-pod mustard	3 – Contain	Moderate
Holcus lanatus	common velvet grass	3 – Contain	Moderate
Hordeum marinum	Mediterranean barley	4 – Limited or None	Moderate
Hordeum murinum	wall barley		Moderate
Lactuca serriola	prickly lettuce	4 – Limited or None	
Lathyrus latifolius	perennial sweet pea		Watch
Lepidium appelianum	white-top	1 – Eradicate	Limited
Lepidium chalepense	lens-podded hoary cress	1 – Eradicate	Moderate
Lepidium draba	heart-podded hoary cress	1 – Eradicate	Moderate
Lepidium latifolium	perennial pepperweed	1 – Eradicate	High
Leucanthemum vulgare	ox-eye daisy		Moderate
Linaria dalmatica ssp. *dalmatica*	dalmatian toadflax	1 – Eradicate	Moderate
Linaria vulgaris	butter-and-eggs	1 – Eradicate	Moderate
Lotus corniculatus	bird's-foot trefoil	3 – Contain	
Malva neglecta	common mallow	4 – Limited or None	
Marrubium vulgare	horehound	3 – Contain	Limited
Melilotus spp.	sweetclover	3 – Contain	
Penstemon subglaber	smooth penstemon	3 – Contain	
Poa bulbosa	bulbous bluegrass	4 – Limited or None	

Scientific Name	Common Name	USFS Treatment Strategy	Cal-IPC Rank
Polygonum aviculare	knotweed	4 – Limited or None	
Polygonum aviculare ssp. *depressum*	oval-leaf knotweed	4 – Limited or None	
Polypogon monspeliensis	rabbitfoot grass	4 – Limited or None	Limited
Ranunculus testiculata	curveseed butterwort	4 – Limited or None	
Rhaponticum repens	Russian knapweed	1 – Eradicate	Moderate
Robinia pseudoacacia	black locust	3 – Contain	Limited
Rubus armeniacus	Himalayan blackberry	2 - Control	High
Rumex crispus	curly dock	4 – Limited or None	Limited
Salsola tragus	Russian thistle	3 – Contain	Limited
Saponaria officinalis	bouncingbet	2 - Control	Limited
Schismus arabicus	Arabian schismus	4 – Limited or None	Limited
Sisymbrium altissimum	tumble mustard	4 – Limited or None	
Sonchus oleraceus	common sow thistle	3 – Contain	
Spartium junceum	Spanish broom	1 – Eradicate	High
Spergularia rubra	red sand-spurry	4 – Limited or None	
Tamarix ramosissima	saltcedar	2 - Control	High
Taraxacum officinale	common dandelion	4 – Limited or None	
Tragopogon dubius	yellow salsify	4 – Limited or None	
Tribulus terrestris	puncturevine	2 - Control	Limited
Trifolium repens	white clover	4 – Limited or None	
Ulmus pumila	Siberian elm	2 - Control	
Verbascum thapsus	woolly mullein	4 – Limited or None	Limited

Cal-IPC = California Invasive Plant Council; USFS = U.S. Forest Service

5.4.5. Special-Status Plant Species

This section describes special status plants that are known to occur or may potentially occur in the TAA. Federally or state rare, threatened and endangered (RTE) plants are discussed in detail in Section 5.7, *Rare, Threatened, and Endangered Species*. The list of special status species reported from the vicinity of the TAA was developed based on the literature described in Section 5.4.2.

For the purposes of this document, a special status plant is defined as a plant species considered by the U.S. Department of Agriculture—Forest Service (Inyo National Forest) or by the State of California to merit regulatory consideration in association with prosecution of a project. The State of California classifies such plant species as Species of Special Concern and will also employ the California Native Plant Society's (CNPS) California Rare Plant Rank (CRPR), a ranking system for rare, threatened, or endangered plants in California. The California Environmental Quality Act requires consideration of plant species with the following CRPR rankings:

- 1A—presumed extirpated in California and either rare or extinct elsewhere
- 1B—rare endangered in California and elsewhere
- 2A—presumed extirpated in California, but more common elsewhere
- 2B—rare or endangered in California, but common elsewhere

Species with a CRPR of 3 are part of a review list, which requires more information; species with a CRPR of 4 are part of a watch list, which are of limited distribution. Consideration of these species is not typically required by the California Environmental Quality Act.

The CRPR also employs a Threat Rank extension that further clarifies the level of endangerment of a plant species. An extension of .1 is assigned to plants that are considered to be "seriously threatened" in California (i.e., over 80 percent of occurrences are threatened or have a high degree and immediacy of threat). Extension .2 indicates the plant is "moderately threatened" in California (i.e., between 20 and 80 percent of the occurrences are threatened or have a moderate degree and immediacy of threat). Extension .3 is assigned to plants that are considered "not very threatened" in California (i.e., less than 20 percent of occurrences are threatened or have a low degree and immediacy of threat or no current threats are known). The absence of a threat code extension indicates that this information is lacking for the plant(s) in question.

This resulting list was then evaluated to determine which plant species have the potential to occur or are known to occur in the TAA based on habitat descriptions and known occurrences.

Plant species on the list were then categorized as follows:

- Known to occur: The species was recorded as occurring in the immediate TAA, as determined by SCE reporting or as shown in CNDDB records.
- May occur: The species has potential to occur in the TAA based on the geographic location, elevation, and vegetation alliances and other habitat features present.
- Unlikely to occur: The species is unlikely to occur because the TAA is outside the known species range or it does not support any habitat suitable for the species.

Table 5.4-3 provides a list of special status plant species evaluated for their potential to occur in the TAA. This includes all USFS SCC and species with a CRPR of 1 or 2. Species listed in the table are categorized as known to occur, may occur, or unlikely to occur. Table 5.4-3 also summarizes pertinent information for each species, including listing status, blooming period, and preferred habitat, with information on the location of occurrences recorded within the TAA. Figure 5.4-1 depicts the CNDDB records of all plant species documented in the greater Project Vicinity.

Table 5.4-3. Potential for Special Status Plant Species to Occur

Scientific/Common Name[a]	Federal Status[b]	State Status and CRPR Rank[c]	Blooming Period	Habitat	Likelihood for Occurrence Within TAA[d,e] and Occurrence Notes
Known to Occur					
Agrostis humilis mountain bent grass	SCC	2B.3	Jul–Sep	Perennial herb found in sometimes carbonate soil in alpine boulder and rock field, meadows and seeps, and subalpine coniferous forest; 3,200–10,500 feet	Known to occur. This species has numerous records in the local watershed and two 1999 records within the TAA: (1) 820 feet southeast from the Saddlebag Lake parking lot (YOSE.99S148) and (2) 1,640 feet up Lee Vining Creek from Gardisky Lake Trailhead, on east side of the creek (YOSE.99S145).
Boechera tiehmii Tiehm's rockcress	SCC	1B.3	Jul–Aug	Perennial herb found in alpine boulder and rock field (granitic); 3,590–11,780 feet	Known to occur. This species has three records since 1990 within the TAA in a cirque at east base of Tioga Peak uphill from State Route 120 between Warren Fork and Ellery Lake (RSA565042).
Botrychium crenulatum scalloped moonwort	SCC	2B.2	Jun–Sep	Perennial rhizomatous herb found in bogs and fens, lower montane coniferous forest, meadows and seeps, marshes and swamps (freshwater), and upper montane coniferous forest; 3,280–10,760 feet	Known to occur. This species has been recorded in the TAA area in 1998 on the Nunatak Trail downstream of Tioga Lake (UCR123116).
Carex vallicola western valley sedge	SCC	2B.3	Jul–Aug	Perennial rhizomatous herb found in mesic soil in Great Basin scrub and meadows and seeps; 2,805–9,205 feet	Known to occur. This species has been recorded in the TAA in 2006 in a meadow across State Route 120 and upstream by 0.1 mile (CHSC99395).

Scientific/Common Name[a]	Federal Status[b]	State Status and CRPR Rank[c]	Blooming Period	Habitat	Likelihood for Occurrence Within TAA[d,e] and Occurrence Notes
Eriogonum alexanderae Alexander's buckwheat	SCC	1B.1	May–Jul	Perennial herb found in shale or gravelly soil in Great Basin scrub, and pinyon and juniper woodland; 4,265–5,577 feet	Known to occur. This species has been recorded in the TAA in 2002 at the south end of Saddleback Lake (SEINET 523071).
Pinus albicaulis whitebark pine	Candidate; SCC		NA	Tree found in subalpine forest; 10,000–12,100 feet	Known to occur. This species has been recorded in the TAA and in the local watershed numerous times in the last 100 years.
May Occur					
Boechera bodiensis Bodie Hills rockcress	SCC	1B.3	Jun–Jul (Aug)	Perennial herb found in alpine boulder and rock field, Great Basin scrub, pinyon and juniper woodland, and subalpine coniferous forest; 3,530–11,580 feet	May occur. This species was recorded in 1999, 3.2 miles from the TAA but outside the local watershed. Suitable habitat is present.
Boechera shockleyi Shockley's rockcress	SCC	2B.2	May-Jun	Perennial herb found in carbonate or quartzite, rocky or gravelly soils in pinyon and juniper woodland; 2,625–6,930 feet	May occur. This species was recorded in 1984 in the local watershed 0.7 mile from the TAA. Suitable habitat is present.
Boechera tularensis Tulare rockcress	SCC	1B.3	(May) Jun–Jul (Aug)	Perennial herb found in rocky slopes, sometimes roadsides, subalpine coniferous forest, and upper montane coniferous forest; 3,350–10,990 feet	May occur. This species was recorded in 1942, 3.6 miles from the TAA but outside the local watershed. Suitable habitat is present.
Botrychium ascendens upswept moonwort	SCC	2B.3	(Jun) Jul–Aug	Perennial rhizomatous herb found in mesic soil in lower montane coniferous forest, and meadows and seeps; 3,045–9,990 feet	May occur. This species was recorded in 2007, 7.3 miles from the TAA but outside the local watershed. Suitable habitat is present.

Scientific/Common Name[a]	Federal Status[b]	State Status and CRPR Rank[c]	Blooming Period	Habitat	Likelihood for Occurrence Within TAA[d,e] and Occurrence Notes
Botrychium lineare slender moonwort	SCC	1B.1	Unknown	Perennial herb found in meadows and seeps, subalpine coniferous forest, and upper montane coniferous forest (often disturbed areas); 2,600–8,530 feet	May occur. This species was recorded in 2013, 4.6 miles from the TAA but outside the local watershed. Suitable habitat is present.
Botrychium lunaria common moonwort		2B.3	Aug	Perennial rhizomatous herb found in meadows and seeps, subalpine coniferous forest, and upper montane coniferous forest; 3,400–11,155 feet	May occur. This species was recorded in 1981, 5.7 miles from the TAA but outside the local watershed. Suitable habitat is present.
Botrychium minganense Mingan moonwort	SCC	2B.2	Jul–Sep	Perennial rhizomatous herb found in mesic soil in bogs and fens, lower montane coniferous forest, meadows and seeps (edges), and upper montane coniferous forest; 2,180–7,150 feet	May occur. This species was recorded in 1961, 1.0 mile from the TAA but outside the local watershed. Suitable habitat is present.
Botrychium paradoxum paradox moonwort		2B.1	Aug	Perennial rhizomatous herb found in alpine boulder and rock field (limestone and marble), and upper montane coniferous forest (moist); 4,200–13,780 feet	May occur. This species was recorded in 2008, 5.7 miles from the TAA but outside the local watershed. Suitable habitat is present.
Botrychium yaaxudakeit giant moonwort		2B.1	Aug	Perennial rhizomatous herb found in limestone and marble soil in alpine boulder and rock field (meadows); 3,200–10,500 feet	May occur. This species was recorded in 2007, 6.9 miles from the TAA but outside the local watershed. Suitable habitat is present.
Bruchia bolanderi Bolander's bruchia	SCC	4.2	NA	Moss found in damp soil in lower montane coniferous forest, meadows and seeps, upper montane coniferous forest; 2,800–9,185 feet	May occur. This species was recorded in 2000, 4.1 miles from the TAA but outside the local watershed. Suitable habitat is present.

Scientific/Common Name[a]	Federal Status[b]	State Status and CRPR Rank[c]	Blooming Period	Habitat	Likelihood for Occurrence Within TAA[d,e] and Occurrence Notes
Carex davyi Davy's sedge	SCC	1B.3	May–Aug	Perennial herb found in subalpine coniferous forest and upper montane coniferous forest; 3,200–10,500 feet	May occur. This species was recorded in 1944, 4.8 miles from the TAA but outside the local watershed. Suitable habitat is present.
Carex praticola northern meadow sedge	SCC	2B.2	May–Jul	Perennial herb found in mesic soil in meadows and seeps; 3,200–10,500 feet	May occur. This species was recorded in 2003 in the local watershed 0.3 mile from the TAA. Suitable habitat is present.
Carex scirpoidea ssp. *pseudoscirpoidea* western single-spiked sedge	SCC	2B.2	Jul, Sep	Perennial rhizomatous herb found in mesic, often carbonate soil in alpine boulder and rock field, meadows and seeps, and subalpine coniferous forest (rocky); 3,700–12,140 feet	May occur. This species was recorded in 2009 in the local watershed 1.1 miles from the TAA. Suitable habitat is present.
Carex tiogana Tioga Pass sedge	SCC	1B.3	Jul–Aug	Perennial herb found in meadows and seeps (mesic, lake margins); 3,300–10,825 feet	May occur. This species was recorded in 2010, 1.6 miles from the TAA but outside the local watershed. Suitable habitat is present.
Claytonia megarhiza fell-fields claytonia	SCC	2B.3	Jul–Sep	Perennial herb found in crevices between rocks in alpine boulder and rock field, and subalpine coniferous forest (rocky or gravelly); 3,532–11,590 feet	May occur. This species was recorded in 2007, 7.4 miles from the TAA but outside the local watershed. Suitable habitat is present.
Draba cana canescent draba		2B.3	Jul	Perennial herb found in carbonate soil in alpine boulder and rock field, meadows and seeps, and subalpine coniferous forest; 3,505–11,500 feet	May occur. This species was recorded in 1990 in the local watershed 0.5 mile from the TAA. Suitable habitat is present.

Scientific/Common Name[a]	Federal Status[b]	State Status and CRPR Rank[c]	Blooming Period	Habitat	Likelihood for Occurrence Within TAA[d,e] and Occurrence Notes
Draba monoensis White Mountains draba	SCC	1B.2	Aug	Perennial herb found in alpine boulder and rock fields and meadows and seeps; 9,000–11,880 feet	May occur. This species was recorded in 1949, 7 miles from the TAA but outside the local watershed. Suitable habitat is present.
Draba praealta tall draba		2B.3	Jul–Aug	Perennial herb found in mesic soil in meadows and seeps; 3,415–11,205 feet	May occur. This species was recorded in 1990 in the local watershed 0.4 mile from the TAA. Suitable habitat is present.
Festuca minutiflora small-flowered fescue		2B.3	Jul	Perennial herb found in alpine boulder and rock field; 4,050–13,285 feet	May occur. This species was recorded in 2009 in the local watershed 2 miles from the TAA. Suitable habitat is present.
Helodium blandowii Blandow’s bog moss	SCC	2B.3		Moss found in meadows, seeps, and subalpine coniferous forest on damp soil, especially under willows among leaf litter. 6,109–8,858 feet	May occur. Detailed location information is not available for this species but it was reported approximately 30 miles from the TAA outside the local watershed. Suitable habitat is present.
Horkelia hispidula White Mountains horkelia	SCC	1B.3	Jun–Aug	Perennial herb found in Great Basin scrub, subalpine coniferous forest, alpine dwarf scrub, and dry flats, mostly in bristlecone forest. 9,843–11,155 feet	May occur. Outside current known geographic range but reported from Saddlebag Lake in 1940. Suitable habitat is present.
Jamesia americana var. *rosea* rosy-petalled cliffbush	SCC	4.3	Jul–Aug	Perennial deciduous shrub found on rocky slopes and cliffs in subalpine and alpine areas; 6,791–12,139 feet	May occur. Outside current known geographic range but reported 8.8 miles from the TAA in 1949. Suitable habitat is present.

Scientific/Common Name[a]	**Federal Status[b]**	**State Status and CRPR Rank[c]**	**Blooming Period**	**Habitat**	**Likelihood for Occurrence Within TAA[d,e] and Occurrence Notes**
Kobresia myosuroides seep kobresia	SCC	2B.2	(Jun) Aug	Perennial rhizomatous herb found in alpine boulder and rock field (mesic), meadows and seeps (carbonate), and subalpine coniferous forest; 3,245–10,645 feet	May occur. This species was recorded in 2010, 1.6 miles from the TAA but outside the local watershed. Suitable habitat is present.
Lupinus gracilentus slender lupine		1B.3	Jul–Aug	Perennial herb found in subalpine coniferous forest; 3,500–11,485 feet	May occur. This species was recorded in 1997, 0.2 mile from the TAA but outside the local watershed. Suitable habitat is present.
Meesia longiseta long seta hump moss		2B.3	NA	Moss found in carbonate, on soil in bogs and fens, meadows and seeps, and upper montane coniferous forest; 5,741–9,900 feet	May occur. This species was recorded in 2000, 4.1 miles from the TAA but outside the local watershed. Suitable habitat is present.
Pohlia tundrae tundra thread moss		2B.3	NA	Moss found in gravelly, damp soil in alpine boulder and rock field; 3,000–9,845 feet	May occur. This species was recorded in 2009, 1.7 miles from the TAA but outside the local watershed. Suitable habitat is present.
Potamogeton epihydrus Nuttall's ribbon-leaved pondweed		2B.2	(Jun) Jul–Sep	Perennial rhizomatous herb found in marshes and swamps (assorted shallow freshwater); 2,172–9,182 feet	May occur. This species was recorded in 2008, 8.1 miles from the TAA but outside the local watershed. Suitable habitat is present.
Potamogeton praelongus white-stemmed pondweed		2B.3	Jul–Aug	Perennial rhizomatous herb (aquatic) found in marshes and swamps (deep water, lakes); 5,905–9,842 feet	May occur. Outside current known geographic range but reported 4.9 miles from the TAA in 1934. Suitable habitat is present.

Scientific/Common Name[a]	Federal Status[b]	State Status and CRPR Rank[c]	Blooming Period	Habitat	Likelihood for Occurrence Within TAA[d,e] and Occurrence Notes
Potamogeton robbinsii Robbins' pondweed		2B.3	Jul–Aug	Perennial rhizomatous herb (aquatic) found in marshes and swamps (deep water, lakes); 3,300–10,825 feet	May occur. This species was recorded in 2008, 5.5 miles from the TAA but outside the local watershed. Suitable habitat is present.
Sabulina stricta bog sandwort		2B.3	Jul–Sep	Perennial herb (aquatic) found in alpine boulder and rock field, alpine dwarf scrub, and meadows and seeps; 3,960–12,990 feet	May occur. This species was recorded in 1990 in the local watershed 0.2 mile from the TAA. Suitable habitat is present.
Salix brachycarpa var. brachycarpa short-fruited willow		2B.3	Jun–Jul	Perennial herb found in carbonate soil in alpine dwarf scrub, meadows and seeps, and subalpine coniferous forest; 3,500–11,485 feet	May occur. This species was recorded in 1993, 0.5 mile from the TAA but outside the local watershed. Suitable habitat is present.
Salix nivalis snow willow		2B.3	Jul–Aug	Perennial deciduous shrub found in alpine dwarf scrub; 3,500–11,485 feet	May occur. This species has been recorded numerous times in the last 90 years on the ridgelines surrounding the TAA. Suitable habitat is present.
Silene oregana Oregon campion		2B.2	Jul–Sep	Perennial deciduous shrub found in Great Basin scrub and subalpine coniferous forest; 2,500–8,200 feet	May occur. This species was recorded in 1995, 1.5 miles from the TAA but outside the local watershed. Suitable habitat is present.
Triglochin palustris marsh arrow-grass		2B.3	Jul–Aug	Perennial rhizomatous herb found in mesic soil in meadows and seeps, marshes and swamps (freshwater), and subalpine coniferous forest; 3,700–12,140 feet	May occur. This species was recorded in 2012, 3.0 miles from the TAA but outside the local watershed. Suitable habitat is present.

Scientific/Common Name[a]	Federal Status[b]	State Status and CRPR Rank[c]	Blooming Period	Habitat	Likelihood for Occurrence Within TAA[d,e] and Occurrence Notes
Viola purpurea ssp. *aurea* golden violet		2B.2	Apr–Jun	Perennial herb found in sandy soil in Great Basin scrub, and pinyon and juniper woodland; 2,500–8,200 feet	May occur. This species was recorded in 1980, 5.5 miles from the TAA but outside the local watershed. Suitable habitat is present.
Unlikely to Occur					
Abronia alpina Ramshaw Meadows abronia	SCC	1B.1	Jul–Aug	Perennial herb found in granitic, gravelly margins of meadows in gravel and sand with *Hulsea* spp. and *Lupinus* spp.; 7,874–8,858 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Allium atrorubens var. *atrorubens* Great Basin onion	SCC	2B.3	May–Jun	Perennial bulbiferous herb found in rocky or sandy soil in Great Basin scrub and pinyon and juniper woodland; 2,315–7,595 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range.
Astragalus cimae var. *sufflatus* inflated Cima milk-vetch	SCC	1B.3	Apr–Jun	Perennial herb found in Great Basin scrub, sagebrush, pinyon and juniper woodland in rocky, linestone sites with carbontate/calcareous substrates; 4,987–6,759 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range.
Astragalus inyoensis Inyo milk-vetch	SCC	4.2	May–Jun	Perennial herb found in mostly volcanic, sometimes carbonate soils in Great Basin scrub and pinyon and juniper woodland;4,500–9,150 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Astragalus johannis-howellii Long Valley milk-vetch	SCC	1B.2	(May) Jun–Aug	Perennial herb found in Great Basin scrub (sandy loam); 6,692–8,300 feet	Unlikely to occur. The TAA lies outside this species known geographic range.
Astragalus kentrophyta var. *elatus* spiny-leaved milk-vetch	SCC	2B.2	Jun–Sep	Perennial herb found in subalpine coniferous forest (rocky, sometimes carbonate soil); 9,842–11,450 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.

Scientific/Common Name[a]	Federal Status[b]	State Status and CRPR Rank[c]	Blooming Period	Habitat	Likelihood for Occurrence Within TAA[d,e] and Occurrence Notes
Astragalus lemmonii Lemmon's milk-vetch	SCC	1B.2	May–Aug (Sep)	Perennial herb found in Great Basin scrub, meadows and seeps, marshes, and swamps (lake shores); 3,303–7,244 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Astragalus lentiginosus var. kernensis Kern Plateau milk-vetch	SCC	1B.2	Jun–Jul	Perennial herb found in meadows, seeps, and subalpine coniferous forest in dry, gravelly or sandy slopes or flats, primarily in and around large meadows; 6,791–9,006 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Astragalus monoensis Mono milk-vetch	SCC	1B.2	Jun–Aug	Perennial herb found in pumice, gravelly or sandy soil in Great Basin scrub and upper montane coniferous forest; 3,35511,005 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Astragalus ravenii Raven's milk-vetch	SCC	1B.3	Jul–Sept	Perennial herb found in alpine boulder and rock fields and upper montane coniferous forests on gravelly flats and slopes of metamorphosed sedimentary and volcanic bedrock, often near large nurse rocks; 10,892–12,106 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range.
Astragalus serenoi var. *shockleyi* Shockley's milk-vetch	SCC	2B.2	May–Jun	Open, dry alkaline gravelly clay, generally in sagebrush or pinyon pine; 3,773–7,546 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range.
Astragalus subvestitus Kern County milk-vetch	SCC	4.3	(May) Jun–Jul	Gravel and sand in sagebrush; 4,921–8,694 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Boechera cobrensis Masonic rockcress		2B.3	Jun–Jul	Perennial herb found in sandy soil in Great Basin scrub, and pinyon and juniper woodland; 3,105–10,185 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.

Scientific/Common Name[a]	**Federal Status**[b]	**State Status and CRPR Rank**[c]	**Blooming Period**	**Habitat**	**Likelihood for Occurrence Within TAA**[d,e] **and Occurrence Notes**
Boechera pendulina rabbit-ear rockcress	SCC	2B.3	Jun–Jul	Perennial herb found in sandy, gravelly, or rocky (sometimes carbonate) soil in Great Basin scrub and pinyon and juniper woodland; 9,150–9,600 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Boechera pinzliae Pinzl's rockcress	SCC	1B.3	Jul	Perennial herb found in alpine boulder and rock field, and subalpine coniferous forest (scree or sandy); 9,842–10,990 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Botrychium tunux moosewort		2B.1	Aug–Sep	Perennial rhizomatous herb in calcareous alpine boulder and rock field; 10,000 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Calochortus excavatus Inyo County star-tulip	SCC	1B.1	Apr–Jul	Perennial bulbiferous herb found in alkaline, mesic soil in Chenopod scrub, and meadows and seeps; 3,772–6,561 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Camissonia sierrae ssp. *alticola* Mono Hot Springs evening-primrose		1B.2	May–Aug	Annual herb found in granitic, gravel and sand pans in lower montane coniferous forest and upper montane coniferous forest; 2,410–7,905 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Calyptridium pygmaeum pygmy pussypaws	SCC	1B.2	Jun–Aug	Annual herb found in sandy or gravelly soils in subalpine coniferous forest and upper montane coniferous forest; 5,814–9,330 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Carex duriuscula spikerush sedge	SCC	2B.3	Jul-Aug	Perennial rhizomatous herb found in Great Basin scrub and subalpine coniferous forest; 10,500–12,300 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range.
Carex idahoa Idaho sedge	SCC	2B.3	July	Perennial rhizomatous herb found in meadows and seeps and subalpine coniferous forest; 8,550– 9,600 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.

Scientific/Common Name[a]	Federal Status[b]	State Status and CRPR Rank[c]	Blooming Period	Habitat	Likelihood for Occurrence Within TAA[d,e] and Occurrence Notes
Carex petasata Liddon's sedge	SCC	2B.3	May–Jul	Perennial herb found in broadleaf upland forest, lower montane coniferous forest, meadows and seeps, and pinyon and juniper woodland; 1,963–10,892 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Carex stevenii Steven's sedge	SCC	2B.2	Aug	Perennial rhizomatous herb found along creeks, sometimes dry meadows and alpine boulder and rock fields; 8,550–10,155 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Chaetadelpha wheeleri Wheeler's dune-broom	SCC	2B.2	Apr–Sep	Perennial rhizomatous herb found in sandy soil in desert dunes, Great Basin scrub, and Mojavean desert scrub; 2,608–6,234 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range.
Cinna bolanderi Bolander's woodreed		1B.2	Jul–Sep	Perennial herb found in mesic streamsides of meadows, seeps, and upper montane coniferous forests; 5,479–8,005 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Cordylanthus eremicus ssp. kernensis Kern Plateau bird's-beak	SCC	1B.3	(May)Jul–Sep	Annual, hemiparasitic herb found in Great Basin scrub, Joshua tree woodland, pinyon and juniper woodland, and upper montane coniferous forest; 5,025–9,000 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Crepis runcinata ssp. *hallii* Hall's meadow hawksbeard	SCC	2B.2	May–Aug	Perennial herb found in mesic, alkaline soil in Mojavean desert scrub, and pinyon and juniper woodland; 1,591–7,125 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range.
Cuniculotinus gramineus Panamint rock-goldenrod	SCC	2B.3	Jun–Aug	Perennial herb found in carbonate, rocky soils in pinyon and juniper woodland and subalpine coniferous forest; 6,120–8,700 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.

Scientific/Common Name[a]	Federal Status[b]	State Status and CRPR Rank[c]	Blooming Period	Habitat	Likelihood for Occurrence Within TAA[d,e] and Occurrence Notes
Cusickiella quadricostata Bodie Hills cusickiella		1B.2	May–Jul	Perennial herb found in clay or rocky soil in Great Basin scrub, and pinyon and juniper woodland; 2,800–9,185 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Cymopterus globosus globose cymopterus	SCC	2B.2	Mar–Jun	Perennial herb found in sandy, open flats in Great Basin scrub; 3,937–7,004 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Dedeckera eurekensis July gold	SCC	SR, 1B.3	May–Aug	Perennial deciduous shrub found in Mojavean desert scrub on carbonate soils; 3,645–6,600 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range.
Draba asterophora var. *asterophora* Tahoe draba		1B.2	Jul–Aug (Sep)	Perennial herb found in alpine boulder and rock field, and subalpine coniferous forest; 3,505–11,500 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Draba californica California draba	SCC	4.2	Jul–Aug	Perennial herb found in alpine boulder and rock field and meadows and seeps; 9,000–12,750 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Draba sharsmithii Mt. Whitney draba	SCC	1B.2	Jul–Aug	Perennial herb found in protected rock crevices of alpine boulder and rock fields and subalpine coniferous forest; 7,382–13,009 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Dryopteris filix-mas male fern	SCC	2B.3	Jul–Sep	Crevices of granitic cliffs; 7,874–10,170 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Eremothera boothii ssp. *boothii* Booth's evening-primrose		2B.3	Apr–Sep	Annual herb found in Joshua tree woodland, and pinyon and juniper woodland; 2,400–7,875 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range.

Scientific/Common Name[a]	Federal Status[b]	State Status and CRPR Rank[c]	Blooming Period	Habitat	Likelihood for Occurrence Within TAA[d,e] and Occurrence Notes
Eremothera boothii ssp. *intermedia* Booth's hairy evening-primrose		2B.3	(May) Jun	Perennial herb found in Great Basin scrub (sandy), and pinyon and juniper woodland; 2,150–7,055 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range.
Ericameria gilmanii Gilman's goldenbush	SCC	1B.3	Aug–Sep	Perennial shrub found at the interface of pinyon and juniper woodland and subalpine forests and on rocky (generally limestone but also granite) sites in open coniferous forests; 6,890–11,155 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Erigeron compactus compact daisy	SCC	2B.3	May–Jul	Perennial herb found on rocky slopes in sagebrush, pinyon and juniper woodland, and alkali flats with carbonate soils; 5,906–7,546 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Erigeron uncialis var. *uncialis* limestone daisy	SCC	1B.2	May–Jul	Perennial herb found in crevices of limestone cliffs in Great Basin scrub, subalpine coniferous forest, and pinyon and juniper woodland; 6,234–9,514 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Eriogonum mensicola Pinyon Mesa buckwheat	SCC	1B.3	Jul–Oct	Perennial herb found on rocky slopes in sagebrush and pinyon and juniper woodland; 5,906–8,858 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Eriogonum wrightii var. *olanchense* Olancha Peak buckwheat	SCC	1B.3	Jul–Sep	Perennial herb found on dry, gravelly to rocky places and open areas at the base of bounders in subalpine coniferous forest and alpine bounder and rock fields; 10,696–11,598 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range.
Eriophyllum nubigenum Yosemite woolly sunflower		1B.3	May–Aug	Annual herb found in gravelly and granitic soils of chaparral, lower montane coniferous forest, and upper montane coniferous forest; 5,003–9,022 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.

Scientific/Common Name[a]	Federal Status[b]	State Status and CRPR Rank[c]	Blooming Period	Habitat	Likelihood for Occurrence Within TAA[d,e] and Occurrence Notes
Erythranthe utahensis Utah monkeyflower		2B.1	Apr	Perennial rhizomatous herb found in meadows and seeps, pinyon and juniper woodland; 2,000–6,560 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range.
Goodmania luteola golden goodmania	SCC	4.2	Apr–Aug	Annual herb found in alkaline or clay soil in Mojavean desert scrub, meadows and seeps, playas, and valley and foothill grassland; 65–7,217 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range.
Greeneocharis circumscissa var. *rosulata* rosette cushion cryptantha	SCC	1B.2	Jul–Aug	Annual herb found in gravelly (coarse), granitic soil in alpine boulder and rock field and subalpine coniferous forest; 9,678–12,008 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Grusonia pulchella beautiful cholla	SCC	2B.2	May (Jun)	Perennial stem succulent found on the borders of dry lakes and sandy flats; 4,921–5,577 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range.
Hackelia brevicula Poison Canyon stickseed	SCC	3.3	Jul	Perennial herb found on open slopes, dry streambeds, and rocky slopes of open aspen stands and sagebrush and alpine habitats; 8,858–10,335 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Hackelia sharsmithii Sharsmith's stickseed	SCC	2B.3	Jul–Aug	Perennial herb found in crevices in cliffs, talus slopes, and the shade of large boulders. 10,335–12,139 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range.
Hesperidanthus jaegeri Jaeger's hesperidanthus	SCC	1B.2	May–Jul	Perennial herb found in shady, rocky, limestone crevices in Great Basin scrub, pinyon and juniper woodland, and subalpine coniferous forest; 7,005–9,186 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.

Scientific/Common Name[a]	Federal Status[b]	State Status and CRPR Rank[c]	Blooming Period	Habitat	Likelihood for Occurrence Within TAA[d,e] and Occurrence Notes
Hulsea brevifolia short-leaved hulsea	SCC	1B.2	May–Aug	Perennial herb in granitic or volcanic, gravelly or sandy soils, in upper and lower montane coniferous forest; 4,921–10,499 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Hulsea vestita ssp. *inyoensis* Inyo hulsea	SCC	2B.2	Apr–Jun	Perennial herb found in rocky soil in Chenopod scrub, Great Basin scrub, and pinyon and juniper woodland; 5,393–9,842 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Ivesia campestris field ivesia	SCC	1B.2	Jul–Sep	Perennial herb found on meadow edges; 7,218–10,171 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Ivesia kingii var. *kingii* alkali ivesia	SCC	2B.2	May–Aug	Perennial herb found in mesic, alkaline, and clay soils in Great Basin scrub, meadows and seeps, and playas; 3,937–6,988 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range.
Ladeania lanceolata lance-leaved scurf-pea	SCC	2B.3	Apr–Aug	Perennial rhizomatous herb found in sandy soil in Great Basin scrub; 4,000–8,200 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Lewisia disepala Yosemite lewisia		1B.2	Mar–Jun	Perennial herb found in granitic or sandy soil in upper and lower montane coniferous forest, pinyon and juniper woodland; 3396–11,483 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Lomatium foeniculaceum ssp. *inyoense* Inyo lomatium	SCC	4.3	Jun–Jul	Perennial herb found on open summits and subalpine scrub; 7,201–10,499 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Lupinus duranii Mono Lake lupine		1B.2	May–Aug	Perennial herb found in volcanic pumice, gravelly soil in Great Basin scrub, subalpine coniferous forest, and upper montane coniferous forest; 3,000–9,845 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.

Scientific/Common Name[a]	Federal Status[b]	State Status and CRPR Rank[c]	Blooming Period	Habitat	Likelihood for Occurrence Within TAA[d,e] and Occurrence Notes
Lupinus padre-crowleyi Father Crowley's lupine	SCC	SR, 1B.2	Jul–Aug	Perennial herb found on decomposed granite in Great Basin scrub, riparian scrub, riparian forest, and upper montane coniferous forest scattered on steep avalanche chutes, in sunny sites in drainages, and in valley bottoms; 8,990–10,909 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Mentzelia inyoensis Inyo blazing star	SCC	1B.3	Apr–Oct	Annual herb found in rocky sites, washes, calcareous pumice sand, and clayey hillsides of Great Basin scrub, pinyon and juniper woodland; 3,789–6,496 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range.
Mentzelia torreyi Torrey's blazing star	SCC	2B.2	Jun–Aug	Perennial herb found in sandy or rocky, alkaline, usually volcanic soil in Great Basin scrub, Mojavean desert scrub, and pinyon and juniper woodland; 2,835–9,300 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Monardella beneolens sweet-smelling monardella	SCC	1B.3	Jun–Sep	Perennial rhizomatous herb found in granitic soils of alpine boulder and rock fields, subalpine coniferous forest, upper montane coniferous forest, and open conifer forests; 8,202–11,598 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Oreocarya roosiorum bristlecone cryptantha	SCC	SR, 1B.2	Jun–Jul	Perennial herb found on carbonate substrates (gentle slopes or flats of dolomite or limestone formations) of subalpine coniferous forest (bristlecone pine/limber pine); 9,547–10,597 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Oxytropis deflexa var. *sericea* blue pendant-pod oxytrope	SCC	2B.1	Jun–Aug	Perennial herb found in moist meadows, seeps, and forest openings; 9,186–10,499 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.

Scientific/Common Name[a]	Federal Status[b]	State Status and CRPR Rank[c]	Blooming Period	Habitat	Likelihood for Occurrence Within TAA[d,e] and Occurrence Notes
Parnassia parviflora small-flowered grass-of-Parnassus		2B.2	Aug–Sep	Perennial herb found in meadows and seeps; 6,562–9,367 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Penstemon calcareus limestone beardtongue	SCC	1B.3	Apr–May	Perennial herb found on carbonate soil in xeric shrub/blackbrush, limestone crevices, rocky slopes in pinyon and juniper woodland, and Joshua tree scrub; 3,937–5,249 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range and it contains no suitable habitat for this species.
Petrophytum caespitosum ssp. *acuminatum* marble rockmat	SCC	1B.3	Jun–Sep	Perennial evergreen shrub found on rocky sites (limestone cliffs) in lower montane coniferous forest and upper montane coniferous forest; 3,035–7,513 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Phacelia inyoensis Inyo phacelia	SCC	1B.2	Apr–Aug	Annual herb found in meadows and seeps (alkaline); 3,000–10,498 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Phacelia monoensis Mono County phacelia	SCC	1B.1	May–Jul	Annual herb found in clay soil, often on roadsides in Great Basin scrub, and pinyon and juniper woodland; 6,233–9,514 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Phacelia nashiana Charlotte's phacelia	SCC	1B.2	Feb–Jun	Annual herb found on sandy to rocky east-facing slopes, generally in Joshua tree woodland, pinyon and juniper woodland, or xeric shrub/blackbrush; less than 7,874 feet	Unlikely to occur. The TAA lies outside this species' known geographic range and it contains no suitable habitat for this species.
Physaria ludoviciana silver bladderpod	SCC	2B.2	May–Jun	Perennial herb found in Great Basin scrub; 7,053 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.

Scientific/Common Name[a]	Federal Status[b]	State Status and CRPR Rank[c]	Blooming Period	Habitat	Likelihood for Occurrence Within TAA[d,e] and Occurrence Notes
Physocarpus alternans Nevada ninebark	SCC	2B.3	Jun–Jul	Perennial deciduous shrub found on limestone outcrops, rocky calcareous canyon walls, and dry rocky pinyon and juniper woodland; 5,905–10,170 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Plagiobothrys parishii Parish's popcornflower	SCC	1B.1	Mar–Jun (Nov)	Annual herb found in alkaline, mesic soil in Great Basin scrub and Joshua tree woodland; 2,460–4,593 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Polemonium chartaceum Mason's sky pilot	SCC	1B.3	Jun–Aug	Perennial herb found on gravelly slopes and rocky ledges on granitic or volcanic soils in alpine boulder and rock fields, and subalpine coniferous forest; 10,794–14,009 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range.
Polyctenium williamsiae Williams' combleaf	SCC	1B.2	Mar–Jun	Perennial herb found in saline soils of alkali playas, marshes, swamps, vernal pool edges, lake margins, meadows, swales, mud flats, dry streambeds, and gravel bars of sagebrush scrub and pinyon and juniper woodland; 3,281–8,202 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Populus angustifolia narrow-leaved cottonwood	SCC	2B.2	Mar–Apr	Perennial deciduous tree that occurs on streamsides; 3,937–5,906 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range.
Potentilla morefieldii Morefield's cinquefoil	SCC	1B.3	Jul–Aug	Perennial herb found in limestone soils of alpine boulder and rock fields; 10,712–13,123 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range.
Potentilla pulcherrima beautiful cinquefoil	SCC	2B.2	Jul–Aug	Perennial herb found on dry edges of meadows and streams; 9,843–10,171 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.

Scientific/Common Name[a]	Federal Status[b]	State Status and CRPR Rank[c]	Blooming Period	Habitat	Likelihood for Occurrence Within TAA[d,e] and Occurrence Notes
Ranunculus hydrocharoides frog's-bit buttercup	SCC	2B.1	Jun–Aug	Perennial herb (aquatic) found in wet ground, shallow water, creek edges, and lakes; 3,937–9,186 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Sclerocactus polyancistrus Mojave fish-hook cactus	SCC	4.2	Apr–Jun	Perennial stem succulent found in limestone areas, hills and canyons, alluvial slopes of sagebrush, xeric shrub/blackbrush, creosote bush scrub, and Joshua tree woodland; 2,461–6,890 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range.
Solorina spongiosa fringed chocolate chip lichen	SCC	2B.2	NA	Crustose lichen (terricolous) found in moist calcareous habitats, meadows and seeps, and subalpine coniferous forest; 9,500 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Sphaeromeria potentilloides var. *nitrophila* alkali tansy-sage	SCC	2B.2	Jun–Jul	Perennial herb found in usually alkaline soil in meadows and seeps, and playas; 6,889–7,874 feet	Unlikely to occur. The TAA contains no suitable habitat for this species.
Sphenopholis obtusata prairie wedge grass	SCC	2B.2	Apr–Jul	Perennial herb found in mesic soil in cismontane woodland, and meadows and seeps; 984–6,561 feet	Unlikely to occur. The TAA lies outside the species known geographic range and contains no suitable habitat for this species.
Stipa divaricata small-flowered ricegrass	SCC	2B.3	Jun–Sep	Perennial herb found on gravel benches, rocky slopes, and creek banks; 2,625–10,171 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Streptanthus gracilis alpine jewelflower	SCC	1B.3	Jul–Sep	Annual herb found in gravel pockets among granitic outcrops and talus boulders of subalpine coniferous forest and upper montane coniferous forest; 9,186–11,483 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.

Scientific/Common Name[a]	**Federal Status**[b]	**State Status and CRPR Rank**[c]	**Blooming Period**	**Habitat**	**Likelihood for Occurrence Within TAA**[d,e] **and Occurrence Notes**
Streptanthus oliganthus Masonic Mountain jewelflower	SCC	1B.2	Jun–Jul	Perennial herb found in volcanic or granitic, rocky soil in pinyon and juniper woodland; 3,050–10,005 feet	Unlikely to occur. The TAA lies outside the species' known geographic range and contains no suitable habitat for this species.
Taraxacum ceratophorum horned dandelion	SCC	2B.1	Jun–Aug	Annual herb found in moist alpine meadows; 9,514–10,171 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Tetradymia tetrameres dune horsebrush	SCC	2B.2	(Jul) Aug	Perennial herb found in sandy soil in Great Basin scrub; 3,937–7,004 feet	Unlikely to occur. The TAA contains no suitable habitat for this species.
Thelypodium integrifolium ssp. *complanatum* foxtail thelypodium	SCC	2B.2	Jun–Oct	Perennial herb found in alkaline or subalkaline, mesic soils in Great Basin scrub, and meadows and seeps; 2,500–8,200 feet	Unlikely to occur. The TAA lies outside the species' known elevation range and it contains no suitable habitat for this species.
Thelypodium milleflorum many-flowered thelypodium	SCC	2B.2	Apr–Jun	Perennial herb found in Chenopod scrub and Great Basin scrub (sandy); 4,002–8,202 feet	Unlikely to occur. The TAA contains no suitable habitat for this species.
Townsendia leptotes slender townsendia	SCC	2B.3	Jun–Jul	Perennial herb found on alpine rocky or sandy slopes; 11,483–12,467 feet	Unlikely to occur. The TAA lies outside this species' elevation range and known geographic range.
Transberingia bursifolia ssp. *virgata* virgate halimolobos	SCC	2B.3	May–Jul	Perennial herb found in meadows, near alpine groves, and in pinyon and juniper woodland; 6,562–12,139 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.
Trichophorum pumilum little bulrush	SCC	2B.2	Aug	Perennial rhizomatous herb found in riverbanks, carbonate soil in bogs and fens, marshes and swamps, and riparian scrub; 9,383–10,662 feet	Unlikely to occur. The TAA contains no suitable habitat for this species.

Scientific/Common Name[a]	Federal Status[b]	State Status and CRPR Rank[c]	Blooming Period	Habitat	Likelihood for Occurrence Within TAA[d,e] and Occurrence Notes
Trifolium dedeckerae Dedecker's clover	SCC	1B.3	May–Jul	Perennial herb found in gravelly canyons and slopes, cracks in granite rock outcrops, and understory of pinyon pines in pinyon and juniper woodland, subalpine coniferous forest, upper montane coniferous forest, and lower montane coniferous forest; 6,890–11,483 feet	Unlikely to occur. The TAA lies outside this species' known geographic range.

NA = not applicable; TAA = Terrestrial Assessment Area

Notes:

[a] The following USGS 7.5-minute topographic quadrangles were queried for special status plant species: Tioga Pass, Mount Dana, Lee Vining, Falls Ridge, Lundy, Dunderberg Peak, Vogelsang Peak, Koip Peak, Matterhorn Peak, and Tenaya Lake.

[b] The source of the Inyo National Forest status is the *list of Botany At Risk Species* (NRM – TES/IS, 2018).

[c] The source for the State Status and CRPR rank is the *Special Vascular Plants, Bryophytes, and Lichens List* (CDFW, 2021).

[d] Occurrence information provided by the Consortium of California Herbaria (CCH, 2021).

[e] The TAA includes the FERC Project Boundary plus a 200-foot buffer extending from the reservoir behind Saddlebag Dam to the Poole Powerhouse tailrace.

Inyo National Forest

SCC = Species of Conservation Concern

California Rare Plant Rank (CRPR)

1B = Plants Rare, Threatened, or Endangered in California and elsewhere

2B = Plants Rare, Threatened, or Endangered in California but more common elsewhere

3 = Plants for which we need more information–Review List

4 = Plants of limited distribution–A Watch List

CRPR Threat Code Extensions

.1 = Seriously threatened in California (over 80% of occurrences threatened; high degree and immediacy of threat)

.2 = Fairly threatened in California (20–80% of occurrences threatened; moderate degree and immediacy of threat)

.3 = Not very threatened in California (<20% of occurrences threatened; low degree and immediacy of threat or no current threats known)

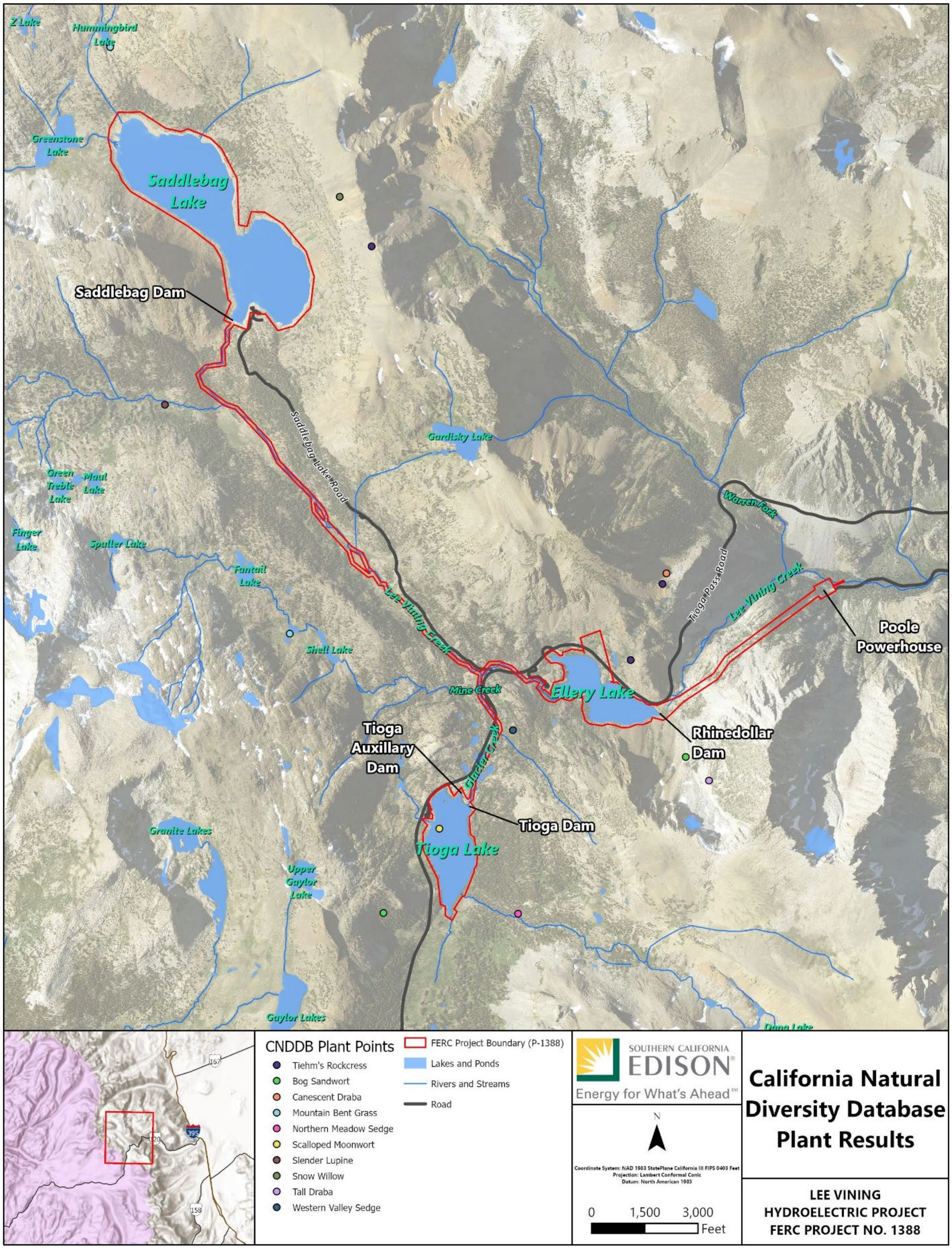


Figure 5.4-1. CNDDB Records of All Plant Species Documented in the Greater Project Vicinity

5.4.6. Mitigation

SCE anticipates continuing with the protection, mitigation, and enhancement measures identified in the new license, although the frequency and extent of ongoing monitoring may be modified. No new additional mitigation or enhancement measures relating to botanical resources are planned at this time. SCE plans to evaluate any pending issues as part of the relicensing Study Plan, and in consultation with stakeholders. Should any major structural changes be planned for the Project, appropriate BMPs to minimize effects on resources associated with wetlands, riparian areas, shorelines, and littoral zones would be implemented; however, no structural changes are proposed at this time.

5.5. Wildlife Resources

5.5.1. Introduction

This section describes terrestrial wildlife and the associated resources on and in the vicinity of SCE's Lee Vining Project (FERC Project No. 1388). Terrestrial wildlife species listed under the federal ESA and the California ESA are discussed in detail in Section 5.7, *Rare, Threatened, and Endangered Species*. Aquatic wildlife and associated resources are discussed in Section 5.3, *Fish and Aquatic Resources*.

The area assessed for terrestrial wildlife resources includes the FERC Project Boundary plus a 200-foot buffer, hereafter referred to as the TAA. The TAA extends from the reservoir behind Saddlebag Dam to the Poole Powerhouse tailrace (see Figure 5.5-1).

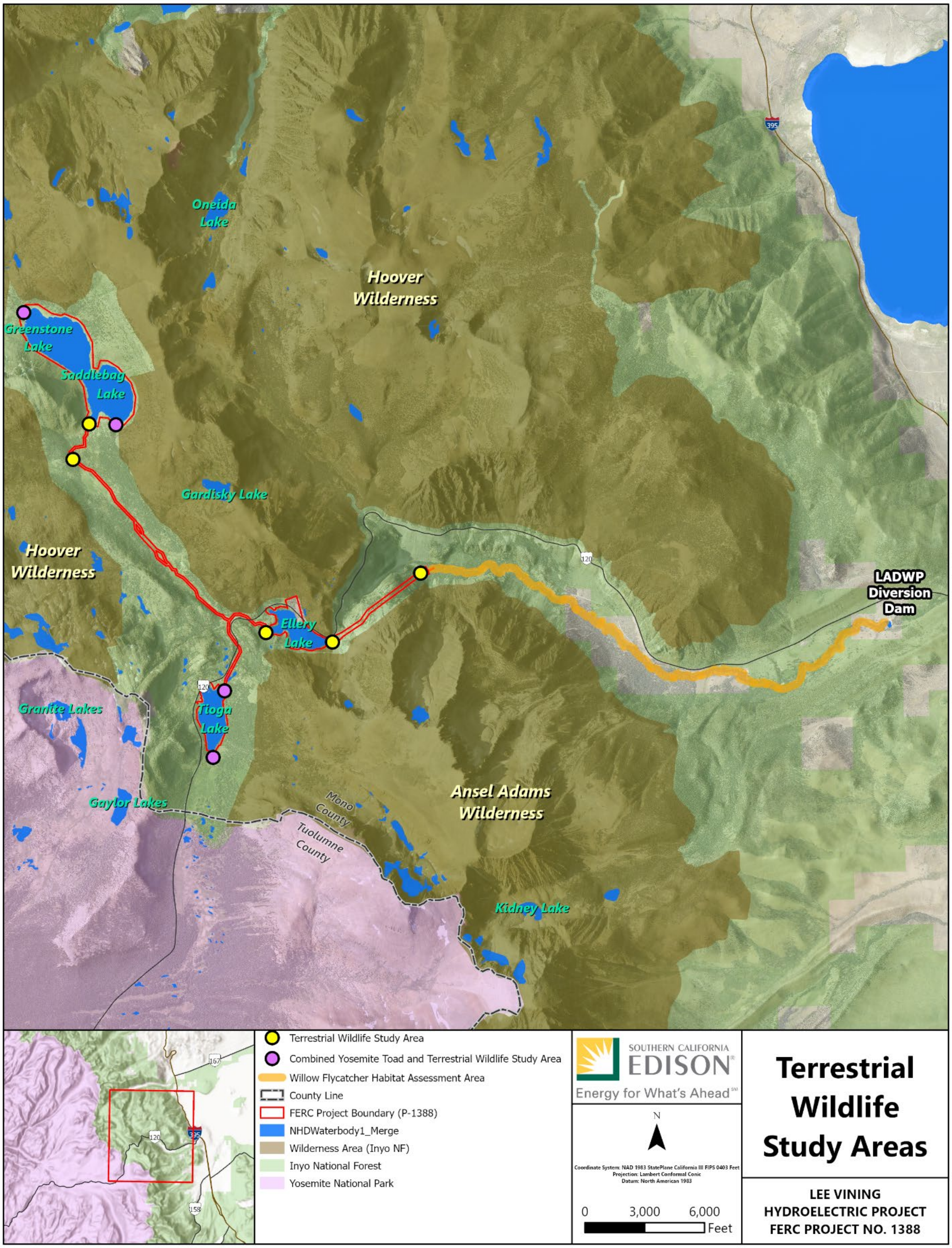


Figure 5.5-1. Terrestrial Assessment Area

5.5.2. Information Sources

A literature review was performed to identify common and special status wildlife known to occur (or that historically occurred) in equivalent habitat in the greater vicinity of the TAA. The greater vicinity is generally the TAA and the adjacent USGS 7.5'-minute quadrangles, but also includes results from the literature reviews described herein. The literature review included a search of the CDFW CNDDB (CDFW, 2020a) for USGS' 7.5-minute quadrangles for Tioga Pass, Mount Dana, Lee Vining, Falls Ridge, Lundy, Dunderberg Peak, Vogelsang Peak, Koip Peak, Matterhorn Peak, and Tenaya Lake. Results from the USFWS Information for Planning and Consultation (IPaC) System (USFWS, 2020a) and the unpublished *At-Risk Aquatic and Terrestrial Species on Inyo National Forest* (INF, 2020) further expanded the list of special status species with the potential to occur in the greater vicinity of the TAA. Common terrestrial wildlife species anticipated to occur in the TAA were compiled following review of previous survey reporting by SCE and their consulting biologists including:

- *Rodent Control Report and Plan for Hydroelectric Projects at Bishop Creek, Inyo County, and Lee Vining Creek, Mono County* (Psomas, 2018)
- Copies of Focused Survey Field Notes for Tioga Lake Geomembrane Project (Psomas, 2014)
- *Summary of Biological Resources Determination of No Effect on Listed Species for SCE's Tioga Lake Dams Geomembrane Liner Installation Project* (Psomas, 2013)
- Determination of No Effect on Listed Species for the Biological Resources Evaluation Technical Report for the South Lake Dam, Agnew Lake Dam, Saddlebag Lake Dam, Tioga Lake Dam, and Auxiliary Dam Maintenance and Geomembrane Lining Projects (Psomas, 2010)
- Determination of No Effect on Listed Species for Maintenance Activities to Rhinedollar Dam, SCE's Lee Vining Creek Hydro Project (Psomas, 2006)

Additional resources identifying common species include *Mammals of Southern California* (Blood, 2018) and California Herps (CaliforniaHerps.com, 2020a, 2020b).

The habitats identified as occurring within the TAA are derived from the vegetation discussion in Section 5.4, *Botanical Resources*, and Section 5.6, *Wetland, Riparian, and Littoral Habitat*.

This section includes tables of special status species and the habitat elements the species are known to occupy. The sources used to determine these habitats are primarily derived from three sources: species accounts in the California Wildlife Habitat Relationship System (CDFW, 2020b), species accounts in CNDDB (CDFW, 2020a), and species accounts in the *Persistence Analysis for Species of Conservation Concern* (INF, 2019). The species' habitat information is further supplemented by scientific literature or other resource agency information where referenced.

5.5.3. Wildlife Habitats and Associated Common Species

The TAA generally occurs between 7,800 and 10,200 feet amsl on the eastern side of the Sierra Nevada. As detailed in Section 5.4, *Botanical Resources*, multiple vegetation alliances are identified as occurring within the TAA. Descriptions of the characteristic plant species for each alliance can be found in Section 5.4. The vegetation alliances can be grouped into four categories: herbs, scrub, forest, and other. These four categories are listed below in Table 5.5-1 with their respective vegetation alliances.

Table 5.5-1. Vegetation Alliances and Habitats

Herbs
Alpine Grasses and Forbs *
Annual Grasses and Forbs
Wet Meadows *
Scrub
Alpine Mixed Scrub
Great Basin Mixed Scrub
Low Sagebrush
Upper Montane Mixed Chaparral
Willow (Shrub) *
Forest
Lodgepole Pine
Subalpine Conifers
Mixed Conifer–Fir
White Fir
Quaking Aspen *
Whitebark Pine
Other
Water *
Barren
Urban-related Bare Soil
Urban/Developed (General)

"*" Denotes riparian habitats

The four broad categories intergrade and mix with each other throughout the TAA. Consequently, other than those wildlife species with very specific habitat requirements, most common wildlife species would be expected to occur within each of the four broad categories. Common wildlife species expected to occur in the TAA and the common wildlife species observed on-site during previous surveys conducted by SCE contractors are discussed below.

Herpetofauna species (reptiles and amphibians) previously observed in the TAA include Sierran chorus tree frog (*Pseudacris sierra*) and mountain garter snake (*Thamnophis elegans elegans*). Other species expected to occur include great basin rattlesnake (*Crotalus oreganus lutosus*), northern rubber boa (*Charina bottae*), western sagebrush lizard (*Sceloporus graciosus gracilis*), western fence lizard (*Sceloporus occidentalis*), and Sierra alligator lizard (*Elgaria coerulea palmeri*).

Bird species previously observed in the TAA include California gull (*Larus californicus*), western wood pewee (*Contopus sordidulus*), dusky flycatcher (*Empidonax oberholseri*), western scrub jay (*Aphelocoma californica*), American dipper (*Cinclus mexicanus*), dark-eyed junco (*Junco hyemalis*), mountain chickadee (*Poecile gambelii*), Clark's nutcracker (*Nucifraga columbiana*), osprey (*Pandion haliaetus*), red-tailed hawk (*Buteo jamaicensis*), ruby-crowned kinglet (*Regulus calendula*), yellow-rumped warbler (*Dendroica coronate*), orange-crowned warbler (*Vermivora celata*), pine siskin (*Spinus pinus*), common raven (*Corvus corax*), white-breasted nuthatch (*Sitta carolinensis*), and song sparrow (*Melospiza melodia*).

Mammal species previously observed in the TAA include coyote (*Canis latrans*), North American pika (*Ochotona princeps*), yellow-bellied marmot (*Marmota flaviventris*), Belding's ground squirrel (*Urocitellus beldingi*), golden-mantled ground squirrel (*Callospermophilus lateralis*), yellow-pine chipmunk (*Neotamias amoenus*), least chipmunk (*Neotamias minimus)*, alpine chipmunk (*Neotamias alpinus*), and Douglas' squirrel (*Tamiasciurus douglasii*). Other species expected to occur include Great Basin pocket mouse (*Perognathus mollipilosus*), long-tailed vole (*Microtus longicaudus*), North American deermouse (*Peromyscus maniculatus*), bobcat (*Lynx rufus*), long-tailed weasel (*Mustela frenata)*, vagrant shrew (*Sorex vagrans*), big brown bat (*Eptesicus fuscus*), and mule deer (*Odocoileus hemionus*).

5.5.4. Special Status Wildlife

This section addresses special status biological resources reported as occurring in the greater vicinity of the TAA. These resources include wildlife species that have been afforded special status and/or are recognized by federal and state resource agencies and the Inyo National Forest. In general, the principal reason an individual taxon (i.e., species, subspecies, or variety) is given such recognition is the documented or perceived decline or limitations of its population size, geographic range, and/or distribution resulting in most cases from habitat loss. This list includes species listed under the federal ESA or the California ESA, species designated as California Species of Special Concern (SSC) or Fully Protected by the CDFW, and species identified as SCC by the Inyo National Forest.

5.5.4.1. Federal Special Status

Special status species include species listed as Endangered, Threatened, or Candidate under the federal ESA. It also includes bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*), which are protected under the federal Bald and Golden Eagle Protection Act (BGEPA). Details and definitions associated with the federal ESA and BGEPA are discussed in Section 5.7, *Rare, Threatened, and Endangered Species*.

Under the 2012 Planning Rule (36 CFR § 219.7(c)(3)), the Regional Forester determined the terrestrial wildlife, aquatic wildlife, and plant species that meet the criteria for SCC for the Inyo National Forest's *Land Management Plan*. The definition of SCC is found at 36 CFR 219.9(c), and criteria for identifying them are outlined in the Forest Service Handbook FSH 1909.12 Chapter 10, Section 12.52c. An SCC is a species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the regional forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area (36 CFR 219.9) (USFS, 2019).

The 1988 amendment to the Fish and Wildlife Conservation Act, United States Code, Title 16, Sections 2901-2911 (16 USC § 2901-2911), mandates the USFWS to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973." The overall goal of the Birds of Conservation Concern (BCC) is to accurately identify the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent our highest conservation priorities. Bird species considered for inclusion as a BCC include nongame birds, gamebirds without hunting seasons, subsistence-hunted nongame birds in Alaska; and federal ESA candidate, proposed endangered or threatened, and recently delisted species (USFWS, 2015).

5.5.4.2. State of California Special Status

Special status species include species listed as Endangered, Threatened, or Candidate under the California ESA. It also includes species listed as Fully Protected by the State Legislation. Details and definitions associated with the California ESA and Fully Protected species are discussed in Section 5.7, *Rare, Threatened, and Endangered Species*.

The California SSC is a designation used by the CDFW for some wildlife species with declining populations that are not State Candidates for listing under the California ESA. This designation does not provide the level of protection that the California ESA provides, but signifies that these species require analysis of potential impacts from projects.

5.5.5. Special Status Wildlife Species Potential

A list of special status wildlife species known to occur in the greater vicinity of the TAA was compiled, and each species was assessed for its potential to occur in the TAA. The potential for a special status species to occur is categorized as follows:

- Known to Occur: The species was recorded as occurring in the TAA, as determined by SCE reporting or as shown in CNDDB records, from within the last 30 years.
- May Occur: The species has potential to occur in the within the TAA because the species' habitat is present, the TAA is within the elevation range appropriate for the species, and the species has been previously recorded in the greater vicinity.
- Unlikely to Occur: The species is unlikely to occur because the Project is outside the known species range or the TAA doesn't support any habitat suitable for the species.

Table 5.5-2 lists the special status terrestrial wildlife species identified during the literature search for the Project and provides an evaluation of their potential to occur in the TAA. The table also includes the status of each species and a summary of pertinent habitat information. Wildlife species listed as Threatened or Endangered are analyzed in more detail in Section 5.7, *Rare, Threatened, and Endangered Species*. Figure 5.5-2 depicts the CNDDB records of all wildlife species recorded documented in the greater vicinity of the Project.

Table 5.5-2. Potential for Special Status Terrestrial Wildlife Species to Occur

Scientific Name	Common Name	Federal Status	State Status	Habitat [a]	Potential To Occur/Notes [b]
Known to Occur					
Anaxyrus canorus	Yosemite toad	FT	SSC	Primarily montane wet meadows; also, in seasonal ponds associated with lodgepole pine and subalpine conifer forest within meadow and seep, subalpine coniferous forest, and wetland habitat, from 6,400 to 11,300 feet.	Known to occur; previously recorded onsite in 2014 (Psomas, 2014)
Euderma maculatum	spotted bat	None	SSC	Feeds over water and along washes. Feeds almost entirely on moths. Needs rock crevices in cliffs or caves for roosting within wide variety of habitats from arid deserts and grasslands through mixed conifer forests from mostly 900 to 2,700 feet but up to 9,700 feet amsl.	Known to occur; previously recorded onsite in 1999 (CDFW, 2020a)
Eumops perotis californicus	western mastiff bat	None	SSC	Many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, grasslands, chaparral, etc. Roosts in	Known to occur; previously recorded onsite in 1999

Scientific Name	Common Name	Federal Status	State Status	Habitat [a]	Potential To Occur/Notes [b]
				crevices in cliff faces, high buildings, trees, and tunnels.	(CDFW, 2020a)
Aplodontia rufa californica	Sierra Nevada mountain beaver	None	SSC	Dense growth of small deciduous trees and shrubs, wet soil, and abundance of forbs in the Sierra Nevada and east slope. Needs dense understory for food and cover. Burrows into soft soil. Needs abundant supply of water.	Known to occur; previously recorded onsite in 2002 (CDFW, 2020a)
May Occur					
Pyrgulopsis wongi	Wong's springsnail	SCC	None	Occurs within unaltered spring habitat with cool, clean water along the Sierra Nevada and White Mountains escarpment. (INF, 2020)	May occur; previously recorded within 10 miles in 1988 (CDFW, 2020a)
Pyrgulopsis owensensis	Owens Valley springsnail	SCC	None	Occurs within un-altered spring habitat with cool, clean water along the Sierra Nevada and White Mountains escarpment (INF, 2020).	May occur; limited distribution information
Euphydryas editha monoensis	Mono Lake checkerspot butterfly	SCC	None	Found in wet meadows and pine forests on the east slope of the Sierra Nevada in Alpine and Mono Counties, may have been extirpated from Mono Lake Ranger District. They occur in scattered colonies on the east side of the Sierra Nevada in Great Basin Scrub habitat, from east below Sonora Pass to Big Pine Creek Canyon and the food plants are *Penstemon rydbergii*, *Collinsia parviflora*, possibly some *Castilleja* species (INF, 2020).	May occur; limited distribution information
Speyeria nokomis apacheana	Apache silverspot butterfly [Apache fritillary]	SCC	None	A subspecies of western *Speyeria nokomis* limited mainly to spring-fed meadows in Nevada and California. Found on the east slope of the Sierra Nevada in Alpine, Inyo, and Mono Counties where it occurs in marshes and wet meadows near springs, seeps, and riparian areas. (INF, 2020)	May occur; limited distribution information
Colias behrii	Sierra sulphur butterfly	SCC	None	It occurs mainly in meadows over 9,000 feet amsl where *Vaccinium cespitosum* occurs. For the Inyo National Forest, there appears to be a congregation near Mono Lake and	May occur; limited distribution information

Scientific Name	Common Name	Federal Status	State Status	Habitat [a]	Potential To Occur/Notes [b]
				one to the south in Inyo and Tulare Counties. (INF, 2020)	
Euphilotes battoides mazourka	square dotted blue butterfly	SCC	None	The species is known on the west side of the Sierra Nevada from 8,000 to 13,000 feet amsl. Caterpillar plant host may be various wild buckwheats (*Eriogonum* spp.) including coastal buckwheat and sulphur-flower. (INF, 2020)	May occur; limited distribution information
Centrocercus urophasianus	greater sage-grouse (Bi-state DPS)	SCC	SSC	Large, interconnected expanses of sagebrush, with a native grass and forb understory. Occurs from 3,500 to 12,000 feet amsl. (Shuford et al., 2008)	May occur; limited distribution information.
Haliaeetus leucocephalus	bald eagle	SCC; BGEPA	SE; FP	Nesting and wintering habitat include ocean shores, lakes, and river margins. Nests usually within 1 mile of water. Not found in the high Sierra Nevada. Nests in large old growth trees, especially tall snags. Requires large bodies of water or free flowing rivers with abundant fish. Roosts communally in winter in dense, sheltered, and remote conifer stands. Forested stands with large, old dominant or co-dominant trees in the vicinity of lakes, reservoirs, rivers, or large streams that support an adequate food supply (USFS, 2001).	May occur; no recent records, but within mapped range and suitable habitat onsite
Circus hudsonius	northern harrier	None	SSC	Occurs in coastal salt and freshwater marshes. Nests and forages in grasslands, from salt grass in desert sink to mountain marshes. Nests on ground in shrubby vegetation, usually at marsh edge; nest built of a large mound of sticks in wet areas. Breeding from sea level to 9,000 feet amsl.	May occur; previously recorded within 10 miles in 2003 (CDFW, 2020a)
Accipiter gentilis	northern goshawk	None	SSC	Usually nests on north slopes, near water. Red fir, lodgepole pine, Jeffrey pine, and aspens are typical nest trees within north coast coniferous forest, subalpine coniferous forest, and upper montane coniferous forest habitats between 915 and 9,900 feet amsl.	May occur; previously recorded along Lee Vining Creek within 3 miles in 1981 (CDFW, 2020a)
Aquila chrysaetos	golden eagle	BCC; BGEPA	FP	Golden eagles occur locally in open country such as open coniferous	May occur; no recent records,

Scientific Name	Common Name	Federal Status	State Status	Habitat [a]	Potential To Occur/Notes [b]
				forest, sage-juniper flats, desert, and barren areas, especially in rolling foothills and mountainous regions. Within southern California, the species favors grasslands, brushlands, deserts, oak savannas, open coniferous forests, and montane valleys. Nesting is primarily restricted to rugged, mountainous country. Cliff-walled canyons provide nesting habitat in most parts of range; also, large trees in open areas.	but within mapped range and suitable habitat onsite
Empidonax traillii	willow flycatcher	SCC; BCC	SE	In general, prefers moist, shrubby areas, often with standing or running water; in California, restricted to thickets of willows, whether along streams in broad valleys, in canyon bottoms, around mountain-side seepages, or at the margins of ponds and lakes. In the west, generally occurs in beaver meadows, along borders of clearings, in brushy lowlands, in mountain parks, or along watercourses to 7,500 feet amsl. Meadows greater than 15 acres in size with water present and a woody riparian shrub component greater than 6.5 feet in height.	May occur; lowest elevations of the TAA occur in the vicinity of suitable habitat; previously observed along Lee Vining Creek within 3 miles in 2003 (CDFW, 2020a)
Setophaga petechia	yellow warbler	BCC	SSC	Riparian plant associations in close proximity to water. Also nests in montane shrubbery in open conifer forests in the Cascade Range and Sierra Nevada. Frequently found nesting and foraging in willow shrubs and thickets, and in other riparian plants including cottonwoods, sycamores, ash, and alders up to 8,000 feet amsl.	May occur; previously recorded along Lee Vining Creek within 10 miles in 2003 (CDFW, 2020a)
Sorex lyelli	Mount Lyell shrew	None	SSC	High elevation riparian areas in the southern Sierra Nevada. Requires moist soil, lives in grass or under willows. Uses logs, stumps, etc. for cover.	May occur; previously recorded onsite in 1967 (CDFW, 2020a)
Lepus townsendii townsendii	western white-tailed jackrabbit	None	SSC	Open areas with scattered shrubs and exposed flat-topped hills with open stands of trees, brush, and herbaceous understory within	May occur; previously recorded within 10 miles in

Scientific Name	Common Name	Federal Status	State Status	Habitat [a]	Potential To Occur/Notes [b]
				sagebrush, subalpine conifer, juniper, alpine dwarf shrub, and perennial grassland habitats, from 120 to 12,000 feet amsl.	1916 (CDFW, 2020a)
Vulpes vulpes necator	Sierra Nevada red fox	FCE	ST	Uses dense vegetation and rocky areas for cover and den sites. Found in a variety of habitats, including alpine, alpine dwarf scrub, broadleaved upland forest, meadow and seep, riparian scrub, subalpine coniferous forest, upper montane coniferous forest, and wetland at elevations above 2,500 feet amsl. Forested areas (red fir and lodgepole pine) and subalpine and alpine habitats in proximity to meadows, riparian areas, and brush fields above 5,000 feet amsl (USFS, 2001). Limited occurrence information on Mammoth Ranger District, but known to occur on adjacent national forests (INF, 2020).	May occur; previously recorded onsite in 1929 (CDFW, 2020a)
Martes caurina sierrae	Sierra marten	SCC	None	Needs variety of different-aged stands, particularly old-growth conifers and snags that provide cavities for dens/nests, within mixed evergreen forests with more than 40% crown closure along Sierra Nevada and Cascade Range from 8,000 to 10,300 feet amsl.	May occur; previously recorded onsite in 1929 (CDFW, 2020a)
Pekania pennanti [Martes pennanti pacifica]	fisher - West Coast DPS	FE [b]	FT	Forest or woodland landscape mosaics that include late-successional conifer-dominated stands at 6,500 to 10,000 feet amsl. High canopy cover needed (USFWS, 2016; Zielinski et al., 2004).	May occur; previously recorded within 3 miles in 1974 (CDFW, 2020a)
Taxidea taxus	American badger	None	SSC	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Needs sufficient food, friable soils and open, uncultivated ground. Preys on burrowing rodents. Digs burrows.	May occur; previously recorded within 10 miles in 1987 (CDFW, 2020a)
Ovis canadensis sierrae	Sierra Nevada bighorn sheep	FE	SE; FP	Alpine and subalpine zones, with open slopes where the land is rocky, sparsely vegetated, and characterized by steep slopes and canyons. Available water and steep,	May occur; no recent records, but within mapped range

Scientific Name	Common Name	Federal Status	State Status	Habitat [a]	Potential To Occur/Notes [b]
				open terrain free of competition from other grazing ungulates within alpine, alpine dwarf scrub, chaparral, chenopod scrub, Great Basin scrub, Mojavean desert scrub, montane dwarf scrub, pinon and juniper woodlands, riparian woodland, and Sonoran desert scrub habitats, from 5,000 to 9,000 feet amsl during the winter and 10,000 to 14,000 feet amsl during summer.	and suitable habitat onsite
Not Likely to Occur					
Margaritifera falcata	western pearlshell	SCC	None	Within the South Fork Kern River on the Kern Plateau. Key ecological conditions include cold creeks and rivers with clean water and where sea-run salmon or native trout persist (INF, 2020).	Unlikely to occur; outside of range
Plebulina emigdionis	San Emigdio blue butterfly	SCC	None	This butterfly is a rare and localized species ranging from 3,000 to 5,000 feet amsl in washes and alluvial fans. Only known locations occur in the southern portion of the Inyo forest in the desert scrub habitats that include desert saltbush species (*Atriplex* spp.) and associated scale insects and ants.	Unlikely to occur; outside of range
Plebejus icarioides inyo	Boisduval's blue butterfly	SCC	None	The Inyo Mountains are the only known location for this subspecies. Widespread in the Inyo Mountains, using several *Lupinus* species for larval food plant (INF, 2020).	Unlikely to occur; outside of range
Tuberochernes aalbui	cave obligate pseudoscorpion	SCC	None	The only known location is on the White Mountain Ranger District of the Inyo National Forest (INF, 2020).	Unlikely to occur; outside of range
Batrachoseps campi	Inyo Mountains salamander	SCC	SSC	Endemic to the Inyo Mountains but also found in the White Mountains.	Unlikely to occur; outside of range
Batrachoseps robustus	Kern Plateau salamander	SCC	None	Species abundant on the Kern Plateau especially in mesic areas and are found in nearly every drainage in the eastern Sierra Nevada from Walker Creek (east of Olancha) to Nine Mile Creek (AmphibiaWeb, 2020).	Unlikely to occur; outside of range
Anaxyrus exsul	black toad	SCC	ST; FP	Extremely limited range in Deep Springs Valley area (INF, 2020).	Unlikely to occur; outside of range

Scientific Name	Common Name	Federal Status	State Status	Habitat [a]	Potential To Occur/Notes [b]
				Associated with springs and adjacent riparian vegetation.	
Rana muscosa	mountain yellow-legged frog, northern DPS	FE	SE	High elevation lakes and wet meadow systems. On the Inyo National Forest, the species only occurs on the Mt. Whitney Ranger District (INF, 2020). Highly aquatic and rarely found more than 3.3 feet from water. They can be found sitting on rocks along the shoreline where there may be little or no vegetation. This species historically inhabited lakes, ponds, marshes, meadows, and streams at elevations typically ranging from approximately 4,500 to 12,000 feet amsl.	Unlikely to occur; outside of range
Rana sierrae	Sierra Nevada yellow-legged frog	FE	FT	Always encountered within a few feet of water. Tadpoles may require 2 to 4 years to complete their aquatic development. Found in streams, lakes, and ponds in montane riparian and a variety of other habitats from 4,495 to 11,975 feet amsl. Ranges throughout the northern Sierra Nevada in high elevation deep lakes (Sierra Nevada between north end of Mt. Whitney Ranger District to north end of Mono Lake Ranger District [INF, 2020]).	Unlikely to occur; outside of current range[c]
Dendragapus fuliginosus howardi	Mt. Pinos Sooty Grouse	SCC	SSC	On the east slope of the Sierra Nevada, in Inyo County, the subspecies is "common" north of the town of Bishop, but is generally restricted to isolated canyons farther south. In spring, grouse congregate near traditional hooting sites in high-elevation conifer forest. Hooting habitat usually consists of open, mature *Abies/Pinus* forest on or near a ridge between 6,000 and 10,000 feet amsl, in an area where the snowpack melts early (Shuford and Gardali, 2008).	Unlikely to occur; outside of range
Buteo swainsoni	Swainson's hawk	BCC	ST	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, and agricultural or ranch lands with groves or lines of trees. Requires adjacent suitable foraging areas such as grasslands,	Unlikely to occur; may occur as migrant, outside of breeding range

Scientific Name	Common Name	Federal Status	State Status	Habitat [a]	Potential To Occur/Notes [b]
				or alfalfa or grain fields supporting rodent populations.	
Coturnicops noveboracensis	yellow rail	BCC	SSC	Summer resident in eastern Sierra Nevada in Mono County. Freshwater marshlands. Breeds between 4,150 to 5,000 feet amsl.	Unlikely to occur; outside of breeding range
Strix occidentalis occidentalis	California spotted owl	SCC; BCC	SSC	Found in five vegetation types in the Sierra Nevada: foothill riparian/hardwood, ponderosa pine/hardwood, mixed-conifer forest, red fire forest, and the east side pine forest. Stands have at least 40% canopy cover and higher than average downed woody material and snags. Occurs at 7,700 to 10,000 feet amsl.	Unlikely to occur; outside of breeding range, no records in Mono County (USFWS, 2017)
Strix nebulosa	great gray owl	SCC	SE	Mixed coniferous forest where such forests occur in combination with large meadows or other vegetated openings between 2,400 and 7,500 feet amsl. With migration outside of breeding elevation up to 9,000 feet amsl.	Unlikely to occur; may occur as migrant, outside of breeding elevation
Xanthocephalus xanthocephalus	yellow-headed blackbird	None	SSC	Nests in freshwater emergent wetlands with dense vegetation and deep water. Often along borders of lakes or ponds. Nests only where large insects such as *Odonata* are abundant, nesting timed with maximum emergence of aquatic insects.	Unlikely to occur; outside of breeding range
Lasiurus frantzii	western red bat	None	SSC	Roosts primarily in trees, 2-40 feet above ground, from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging. In California, species occurs west of the Sierra Nevada/Cascade Range crest and deserts. Elevation range from sea level to 7,200 feet amsl.	Unlikely to occur; outside of range
Brachylagus idahoensis	pygmy rabbit	None	SSC	Sagebrush, bitterbrush, and pinyon-juniper habitats in Modoc, Lassen, and Mono Counties. Tall, dense, large-shrub stages of sagebrush, greasewood, and rabbitbrush. May avoid heavily grazed areas.	Unlikely to occur; outside of habitat range

Scientific Name	Common Name	Federal Status	State Status	Habitat [a]	Potential To Occur/Notes [b]
Gulo gulo	California wolverine	FCT	ST; FP	Found in a wide variety of high elevation habitats, including alpine, meadow and seep, north coast coniferous forest, riparian forest, subalpine coniferous forest, upper montane coniferous forest, and wetland from 1,640 to 4,921 feet amsl. Needs water source. Uses caves, logs, and burrows for cover and den area. Hunts in more open areas. Can travel long distances. Found in the north coast mountains and the Sierra Nevada. (USFS, 2001)	Unlikely to occur; previously recorded onsite, but determined to be extirpated (Spencer and Rustigian-Romsos, 2012)
Ovis canadensis nelsoni	Nelson desert bighorn sheep	SCC	FP	White Mountain area at elevations ranging from 6,000 to 12,000 feet amsl. Most of these animals occur in the White Mountain Wilderness, with approximately 10% of the population occurring outside this area in Silver Canyon (INF, 2020).	Unlikely to occur; outside of range

amsl = above mean sea level; DPS = distinct population segment; spp. = species; TAA = Terrestrial Assessment Area

Notes:

[a] All habitat information is derived from either the CNDDB (CDFW, 2020a) or the California Wildlife Habitat Relationships System Life History Accounts (CDFW, 2020b), unless otherwise noted.

[b] This species was listed as Endangered under the federal ESA on May 15, 2020 (USFWS, 2020b).

[c] The species is known to be absent from the Lee Vining FERC Project Boundary and connected tributaries; however, plans to reintroduce the species into features upstream from the Project Boundary are anticipated in 2022 (CDFW, 2021).

Federal Status

BCC = USFWS Bird of Conservation Concern
BGEPA = Listed under the federal Bald and Golden Eagle Protection Act
FCE = Candidate for listing as federally Endangered
FCT = Candidate for listing as federally Threatened
FE = Federally Endangered Species
FT = Federally Threatened Species
SCC = Inyo National Forest Species of Conservation Concern

State Status

FP = California Fully Protected Species
SE = California Endangered Species
SSC = California Species of Special Concern (CDFW, 2019)
ST = California Threatened Species

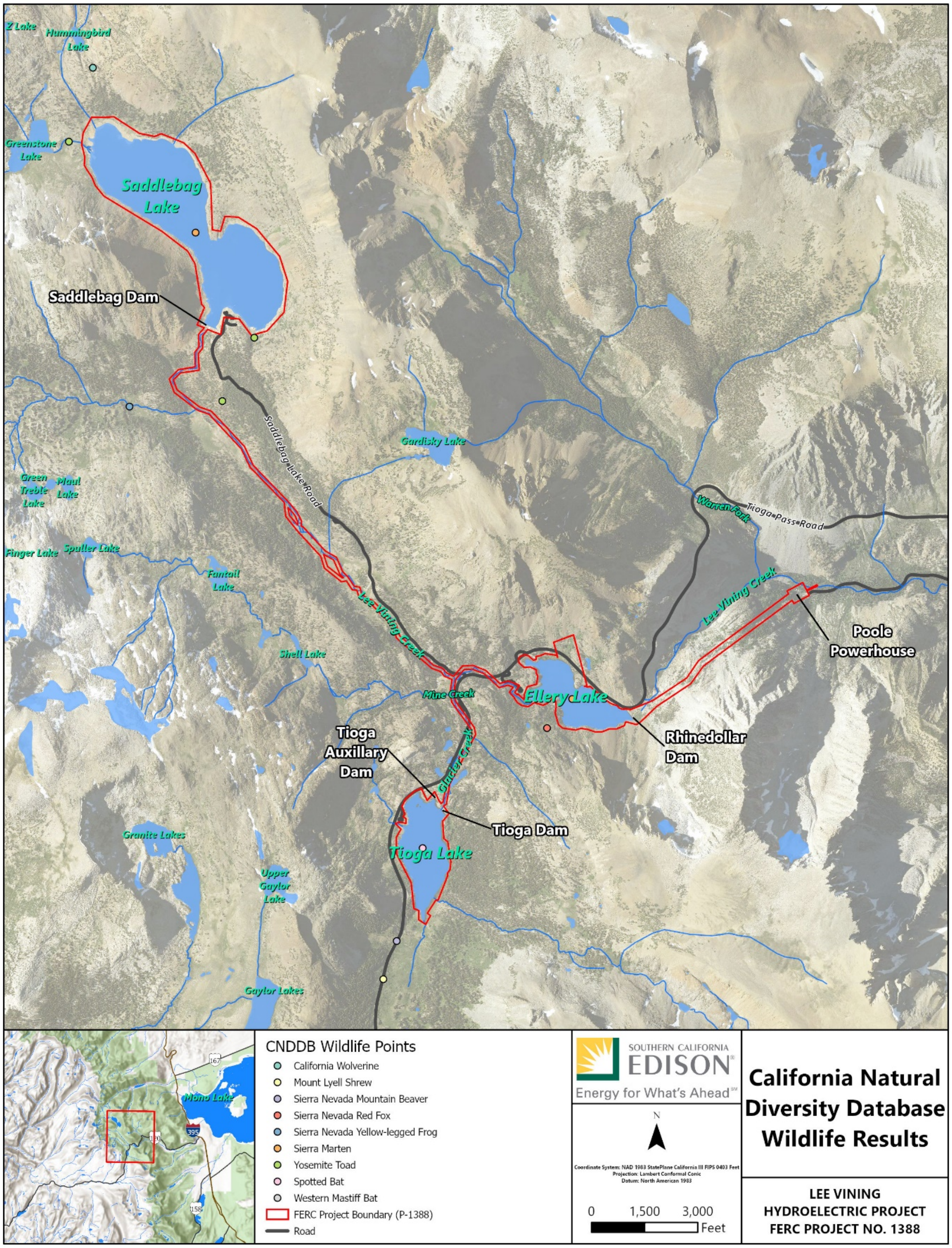


Figure 5.5-2. CNDDB Records of All Wildlife Species Recorded Documented in the Greater Project Vicinity

Table 5.5-3 lists the Birds of Conservation Concern with potential to occur in the TAA as identified by the USFWS (USFWS, 2020a). The table also provides an evaluation of their potential to occur and a summary of pertinent habitat information.

Table 5.5-3. USFWS Birds of Conservation Concern

Scientific Name	Common Name	Habitat [a]	Potential To Occur/ Notes
Gymnorhinus cyanocephalus	pinyon jay	Piñon-juniper woodland is used most extensively but flocks also breed in sagebrush (*Artemisia* spp.), scrub oak (*Quercus* spp.), and chaparral communities. In parts of its range (central Arizona, southern California), inhabits ponderosa and Jeffrey pine (*Pinus jeffreyi*) forests.	May occur
Falco mexicanus	prairie falcon	Inhabits dry, open terrain, either level or hilly. Breeding sites located on cliffs. Forages far afield, even to marshlands and ocean shores.	May occur
Selasphorus rufus	rufous hummingbird	Breeds in dense mature and second growth coniferous forests, deciduous woods, riparian thickets, swamps and meadows, farmland, pasture edges, orchards and city yards, parks and gardens in the Pacific Northwest United States and Canada. Migrants use montane meadows and alpine meadows in the Sierra Nevada as high as 11,500 feet amsl. Overwinter in Mexico.	Unlikely to occur; outside of breeding range.
Melanerpes lewis	Lewis's woodpecker	Important aspects of breeding habitat include an open canopy, a brushy understory offering ground cover, dead or downed woody material, available perches, and abundant insects. Three principal habitats are open ponderosa pine forest, open riparian woodland dominated by cottonwood, and logged or burned pine (*Pinus* spp.) forest; also found in oak (*Quercus* spp.) woodland, nut and fruit orchards, piñon pine–juniper (*Pinus cembroides*–*Juniperus* spp.) woodland, a variety of pine and fir (*Abies* spp.) forests, and agricultural areas including farm and ranchland. Often classified as a specialist in burned pine forest habitat.	May occur
Sphyrapicus thyroideus	Williamson's sapsucker	Throughout range, breeds in middle to high elevation conifer and mixed conifer-deciduous forests. Common in montane western larch, Douglas fir (*Pseudotsuga menziesii*), ponderosa pine, and pine-fir forests.	May occur
Picoides albolarvatus	white-headed woodpecker	Requires montane coniferous forests dominated by pines (*Pinus* ssp.), with tree species composition varying geographically. Within the Sierra Nevada, occupies mixed coniferous forest of ponderosa and sugar pines, white fir, red fir (*Abies magnifica*), Douglas fir, and black oak (*Quercus kelloggii*); occurs more locally on drier east-slope forests dominated by Jeffrey pine (*P. jeffreyi*) and in high-elevation lodgepole pine and western white pine (*P. monticola*) forests, and is generally absent from digger	May occur

Scientific Name	Common Name	Habitat [a]	Potential To Occur/ Notes
		pine (*P. sabiniana*)-dominated habitats at lower elevations on western flank of the Sierra Nevada.	
Contopus cooperi	olive-sided flycatcher	Primarily montane and northern coniferous forests. May occur at any elevation from sea level to timberline, but usually at mid- to high-elevation forest (3,018 to 6,988 feet amsl). Within the coniferous forest biome, most often associated with forest openings, forest edges near natural openings (e.g., meadows, canyons, rivers), human-made openings (e.g., harvest units), or open to semi-open forest stands. Frequently occurs along wooded shores of streams, lakes, rivers, beaver ponds, bogs, and muskegs, where natural edge habitat occurs and standing dead trees often are present.	May occur
Oreoscoptes montanus	sage thrasher	Shrub-steppe dominated by big sagebrush (*Artemisia tridentata*). Considered a sagebrush obligate but noted in black greasewood (*Sarcobatus vermiculatus*) habitat in Utah and Nevada and bitterbrush (*Purshia tridentata*) habitat in Washington. Migrants use sagebrush plains, arid shrub, grassland with scattered bushes, and open piñon-juniper woodland, primarily in arid or semiarid situations, rarely around towns. Overwinters in arid to semiarid, open and semi-open country with scrub, scattered bushes, and sagebrush.	Unlikely to occur; outside of breeding range.
Carpodacus cassinii	Cassin's finch	Generally open coniferous forests of interior western mountains over a broad elevational range. Often found in mature forests of lodgepole pine (*Pinus contorta*) and ponderosa pine (*P. ponderosa*)	May occur
Pipilo chlorurus	green-tailed towhee	Habitat varies with elevation. Dry shrubby hillsides (shrub-steppe) and post-disturbance shrubby second growth are most commonly used. Vegetation may be characterized as low brush cover, often interspersed with trees; avoids typical forest.	May occur
Spizella breweri	Brewer's sparrow	Breeds in shrublands; most closely associated with landscapes dominated by big sagebrush (*Artemisia tridentata*). Overwinters in sagebrush shrublands and brushy desert habitat, including desert scrub dominated by various saltbush species (*Atriplex* spp.) and creosote (*Larrea tridentata*).	Unlikely to occur; outside of breeding habitat.

amsl = above mean sea level; spp. = species

[a] All habitat information derived from *Birds of the World* (Billerman et al., 2020) as referenced by the IPaC list for the Project Area (USFWS, 2020a).

5.5.6. Game Species

Game species are animals hunted for sport or pleasure. Information on game species potentially present in the TAA is provided in this section because of their commercial and recreational value. Game species are regulated by CDFW and are defined under the California Fish and Game Code as follows:

- Resident and migratory game birds are defined in California Fish and Game Code §3500. Examples of upland resident game birds listed include blue grouse, wild turkey, mountain quail, and California quail. Upland migratory game birds include (but are not limited to) Wilson's snipe, band-tailed pigeon, and mourning dove.
- Game mammals are defined in California Fish and Game Code §3950(a) to include (but are not limited to) deer, elk, wild pig, black bear, rabbits and hares, and tree squirrels, as small game mammals. Note that mountain lions are included in §3950 but are explicitly excluded as a game mammal in §3950.1.

A brief summary of some of the game species in the TAA, including resident game birds, migratory game birds, and game mammals, is provided below.

5.5.6.1. Resident and Migratory Game Birds

Upland birds occurring in the TAA that meet the definition of resident game birds (California Fish and Game Code §3500) include (but are not limited to) mountain quail and California quail. Both species of quail are known to occur in dense, shrubby areas (Billerman et al., 2020). Birds that meet the definition of migratory game birds (California Fish and Game Code §3500) include mourning dove (CDFW, 2018). Mourning dove are known to occur in open areas, areas with scattered trees and woodland edges, as well as developed areas with a lot of human activity (Billerman, 2020).

5.5.6.2. Game Mammals

Mule Deer

Mule deer are among the most visible and widespread wildlife species in California. Deer hunting is regulated by California state law through CDFW. A hunting license and a hunting tag are required to take mule deer, and only bucks with antlers with demonstrable forks (or greater) may be taken, except during special hunts. Antlers must be forked on one side in the upper two-thirds section of the antler (CDFW, 2020c). The TAA is found in Deer Hunting Zone x9a. The general deer hunting season runs from September 26 to October 11. Mule deer have large territories that extend through a wide variety of habitats, from open grasslands to forested areas (Anderson and Wallmo, 1984).

OTHER GAME MAMMALS

Other game mammals occurring in the TAA include, but are not limited to, jackrabbit, black bear, and bobcat (CDFW, 2020c). Black bear and bobcat have large territories that extend through a wide variety of habitats (Lariviere, 2001; Young, 1958). Jackrabbits have much more limited ranges with black-tailed jackrabbit occurring in open shrubby areas (Best, 1996).

5.5.7. AVIAN AND RAPTOR PROTECTION

SCE has developed and implemented an Avian Protection Plan (APP) for all their facilities throughout their territory to protect native birds and raptors from electrocution and collision (SCE, 2015). The APP incorporates relevant guidelines published by the Avian Power Line Interaction Committee and the USFWS in 2005.

5.6. WETLAND, RIPARIAN, AND LITTORAL HABITAT

5.6.1. INTRODUCTION

This section describes wetland, riparian, and littoral habitats in the vicinity of SCE's Lee Vining Project (FERC Project No. 1388). The area assessed for these resources includes the FERC Project Boundary plus a 200-foot buffer, hereafter referred to as the TAA. The TAA extends from the reservoir behind Saddlebag Dam to the Poole Powerhouse tailrace.

Wetland, riparian, and littoral habitats occur throughout the TAA bordering the creeks, lakes, and impoundments. These habitats interdigitate with the surrounding upland habitat types described in Section 5.4, *Botanical Resources*. They also provide habitat for various wildlife species, including many amphibian species dependent upon moisture and water.

Additionally, the 2019 LMP defines Riparian Conservation Areas (RCAs) as one of the applicable management areas for the Inyo National Forest. RCAs are defined by type, including: (i) perennial streams; (ii) seasonally flowing streams; (iii) streams in inner gorge; (iv) those with special aquatic features (including lakes, wet meadows, bogs, fens, wetlands, vernal pools, and springs); and (v) other hydrologic or topographic depressions without a defined channel. All Project waters are within a designated RCA.

5.6.2. INFORMATION SOURCES

A literature review was performed to identify wetland, riparian, and littoral habitats in the TAA. These habitats have been mapped by the USFWS and compiled in the National Wetland Inventory's (NWI) Wetland Mapper available from the Wetlands Spatial Data Layer of the National Spatial Data Infrastructure (USFWS, 2020). The NWI provides the classification of known wetlands following the Classification of Wetlands and Deepwater Habitats of the United States (FGDC, 2013). This classification system is arranged in a hierarchy of (1) Systems, which share the influence of similar hydrologic, geomorphologic, chemical, or biological factors (i.e., Marine Estuarine, Riverine, Lacustrine, and Palustrine); (2) Subsystems (i.e., Subtidal and Intertidal; Tidal, Lower Perennial, Upper

Perennial, and Intermittent; or Littoral and Limnetic); (3) Classes, which are based on substrate material and flooding regime or on vegetative life forms; (4) Subclasses; and (5) Dominance Types, which are named for the dominant plant or wildlife forms. In addition, there are modifying terms applied to Classes or Subclasses.

5.6.3. HABITAT TYPES

Habitat types change gradually with elevation and distance from water sources, but the vegetation alliances interdigitate at all elevations. For example, riparian habitat is present throughout the FERC Project Boundary at all elevations and mixes with the various upland vegetation alliances at all elevations—either as an understory or as a canopy with an upland understory. Wetland, riparian, and littoral vegetation alliances, including common plant species, are described in detail in Section 5.4, *Botanical Resources*. Wildlife utilizing these areas is described in detail in Section 5.5, *Wildlife Resources*. The Wet Meadows Alliance, Willow (Shrub) Alliance, and Quaking Aspen Alliance predominantly comprise the wetland, riparian, or littoral habitats within the TAA.

Figure 5.6-1 shows the wetlands, riparian, and littoral habitats that are identified in the NWI. A more detailed NWI Mapbook is included as Appendix G. Figure 5.6-1 shows wetland features at a broad scale, and this mapping is not meant to replace an on-site analysis. Five Cowardin classification codes are identified by the NWI: PEM1B, PSSC, PUBH, L1UBHh, and R3RBH. Each code is a combination of various acronyms. For example, PEM1B is a combination of “P,” “EM,” “1,” and “B.” Table 5.61 lists the wetland, riparian, or littoral resource types and areas they represent, both in acres and as percentages of the total mapped area. The Cowardin Codes in the TAA are described in detail in the subsections below.

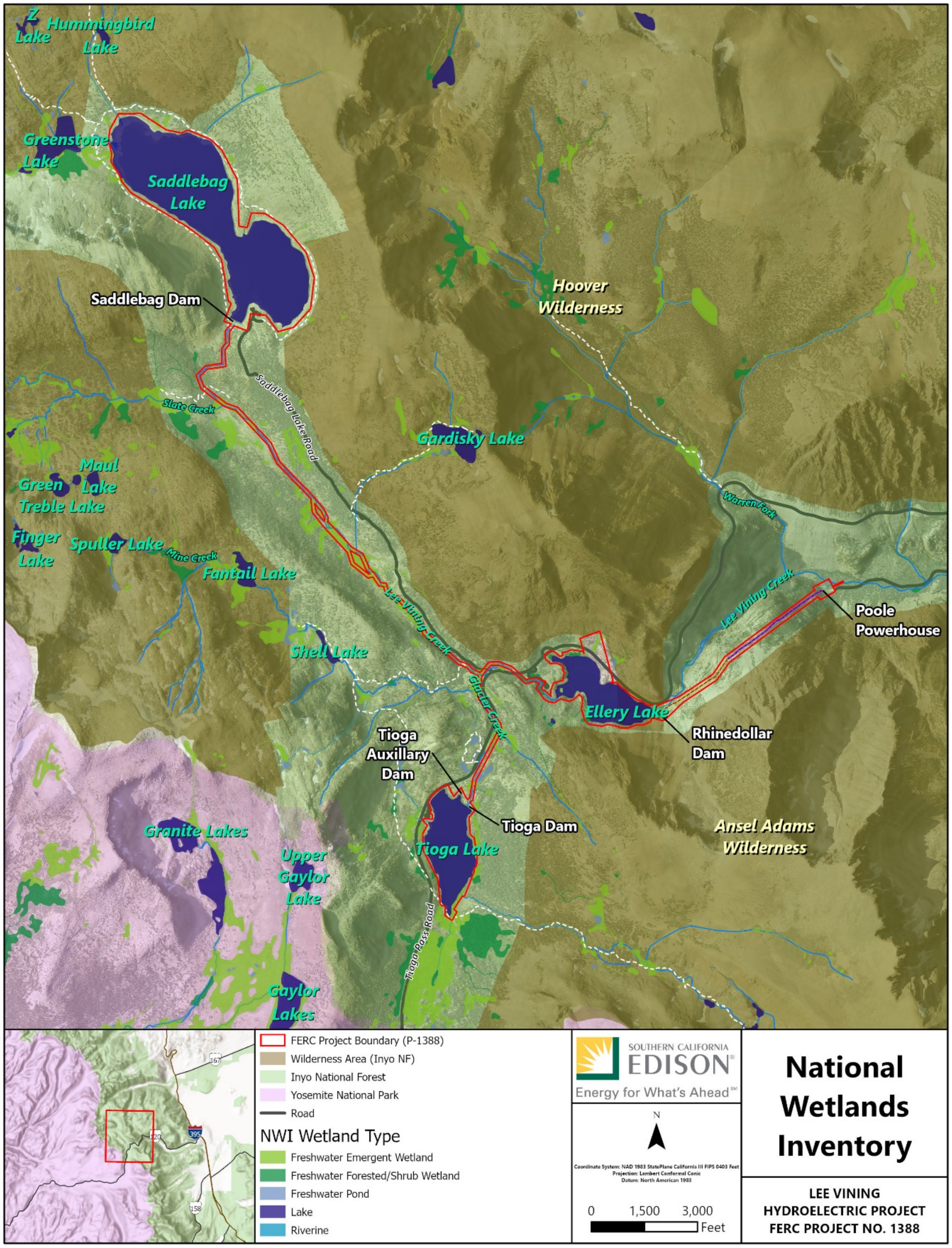


Figure 5.6-1. National Wetlands Inventory Features in the Project Area

Table 5.6-1. Summary of Wetland, Riparian, or Littoral Resource Types as Cowardin Class and Acreages

Wetland Resource Type	Cowardin Code	Number of Polygons	Acres	Percent Coverage
Freshwater Emergent Wetland	PEM1B	69	67.4	13.1
Freshwater Forested/Shrub Wetland	PSSC	16	6.6	1.3
Freshwater Pond	PUBH	4	2.6	0.5
Lake	L1UBHh	5	422.7	82.1
Riverine	R3RBH	13	15.3	3.0
Grand Total		**107**	**514.6**	**100.0**

5.6.3.1. Freshwater Emergent Wetland

COWARDIN CLASSIFICATION CODE: PEM1B

System Palustrine (P): The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 part per thousand (ppt). It also includes wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than 8 hectares (20 acres); (2) active wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than 2.5 meters (8.2 feet) at low water; and (4) salinity due to ocean-derived salts less than 0.5 ppt.

Class Emergent (EM): Characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants.

Subclass Persistent (1): Dominated by species that normally remain standing at least until the beginning of the next growing season. This subclass is found only in the Estuarine and Palustrine systems.

Water Regime Seasonally Saturated (B): The substrate is saturated at or near the surface for extended periods during the growing season, but unsaturated conditions prevail by the end of the season in most years. Surface water is typically absent but may occur for a few days after heavy rain and upland runoff.

5.6.3.2. Freshwater Forested/Shrub Wetland

COWARDIN CLASSIFICATION CODE: PSSC

System Palustrine (P): The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 ppt. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than 8 hectares (20 acres); (2) active wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than 2.5 meters (8.2 feet) at low water; and (4) salinity due to ocean-derived salts less than 0.5 ppt.

Class Scrub-Shrub (SS): Includes areas dominated by woody vegetation less than 6 meters (20 feet) tall. The species include true shrubs, young trees (saplings), and trees or shrubs that are small or stunted because of environmental conditions.

Water Regime Seasonally Flooded (C): Surface water is present for extended periods especially early in the growing season but is absent by the end of the growing season in most years. The water table after flooding ceases is variable, extending from saturated to the surface to a water table well below ground surface.

5.6.3.3. Freshwater Pond

COWARDIN CLASSIFICATION CODE: PUBH

System Palustrine (P): The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 ppt. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than 8 hectares (20 acres); (2) active wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than 2.5 meters (8.2 feet) at low water; and (4) salinity due to ocean-derived salts less than 0.5 ppt.

Class Unconsolidated Bottom (UB): Includes all wetlands and deepwater habitats with at least 25 percent cover of particles smaller than stones (less than 6 to 7 cm), and a vegetative cover less than 30 percent.

Water Regime Permanently Flooded (H): Water covers the substrate throughout the year in all years.

5.6.3.4. Lake

COWARDIN CLASSIFICATION CODE: L1UBHh

System Lacustrine (L): The Lacustrine System includes wetlands and deepwater habitats with all of the following characteristics: (1) situated in a topographic depression or a dammed river channel; (2) lacking trees, shrubs, persistent emergents, and emergent mosses or lichens with 30 percent or greater areal coverage; and (3) total area of at least 8 hectares (20 acres). Similar wetlands and deepwater habitats totaling less than 8 hectares are also included in the Lacustrine System if an active wave-formed or bedrock shoreline feature makes up all or part of the boundary, or if the water depth in the deepest part of the basin equals or exceeds 2.5 meters (8.2 feet) at low water. Lacustrine waters may be tidal or nontidal, but ocean-derived salinity is always less than 0.5 ppt.

Subsystem Limnetic (1): This Subsystem includes all deepwater habitats (i.e., areas greater than 2.5 meters [8.2 feet] deep below low water) in the Lacustrine System. Many small Lacustrine Systems have no Limnetic Subsystem.

Class Unconsolidated Bottom (UB): Includes all wetlands and deepwater habitats with at least 25 percent cover of particles smaller than stones (less than 6 to 7 cm), and a vegetative cover less than 30 percent.

Water Regime Permanently Flooded (H): Water covers the substrate throughout the year in all years.

Special Modifier Diked/Impounded (h): These wetlands have been created or modified by a manmade barrier or dam that obstructs the inflow or outflow of water.

5.6.3.5. Riverine

COWARDIN CLASSIFICATION CODE: R3RBH

System Riverine (R): The Riverine System includes all wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and (2) habitats with water containing ocean-derived salts of 0.5 ppt or greater. A channel is an open conduit either naturally or artificially created that periodically or continuously contains moving water, or that forms a connecting link between two bodies of standing water.

Subsystem Upper Perennial (3): This Subsystem is characterized by a high gradient. There is no tidal influence, and some water flows all year except during years of extreme drought. The substrate consists of rock, cobbles, or gravel with occasional patches of sand. The natural dissolved oxygen concentration is normally near saturation. The fauna is characteristic of running water, and there are few or no planktonic forms. The gradient is high compared with that of the Lower Perennial Subsystem, and there is very little floodplain development.

Class Rock Bottom (RB): Includes all wetlands and deepwater habitats with substrates having an aerial cover of stones, boulders, or bedrock 75 percent or greater and vegetative cover of less than 30 percent.

Water Regime Permanently Flooded (H): Water covers the substrate throughout the year in all years.

5.6.4. LEE VINING CREEK

Saddlebag Lake is fed by seasonal snowmelt. Flows from Saddleback Lake Dam are the headwaters of Lee Vining Creek. Lee Vining Creek flows through a riparian corridor with a series of freshwater emergent wetlands, where it is joined by a tributary, Slate Creek.

The creek flows through a culvert under Saddlebag Lake Road and another culvert under State Route 120 where it meanders through emergent wetlands and forested/shrub wetlands into Ellery Lake.

5.6.5. Glacier Creek

Glacier Creek begins from snowmelt on Mount Dana, east of Tioga Lake. The creek flows downstream into Tioga Lake where it enters the FERC Project Boundary. Flows from Tioga Lake Dam continue through ponds centering on freshwater emergent wetlands and then continue through a culvert under State Route 120. Glacier Creek is joined by Mine Creek, a tributary, and then flows to join Lee Vining Creek near the intersection of Saddleback Lake Road and State Route 120.

5.7. Rare, Threatened, and Endangered Species

5.7.1. Introduction

This section describes species listed as rare, threatened, or endangered (RTE) with potential to occur in the vicinity of SCE's Lee Vining Project (FERC Project No. 1388). The terms "Rare," "Threatened," and "Endangered" are specific to species listed or formally proposed to be listed under the California ESA and the federal ESA. The term "Rare" is specific to the designation associated with the California ESA and species listed in CDFW's *State and Federally Listed Endangered, Threatened, and Rare Plants of California* January 2, 2020, update (CDFW, 2020a). This section also describes species listed in the federal BGEPA and species listed as Fully Protected under the California Fish and Game Code. Collectively, the species discussed in this section are referred to as RTE species.

The area assessed for terrestrial plant and wildlife RTE species includes the FERC Project Boundary plus a 200-foot buffer, hereafter referred to as the TAA. The TAA extends from the reservoir behind Saddlebag Dam to the Poole Powerhouse tailrace (see Figure 5.5-1 in Section 5.5, *Wildlife Resources*). The AAA for RTE species (see Figure 5.3-1 in Section 5.3, *Fish and Aquatic Resources*) includes Project reservoirs (Saddlebag Lake, Tioga Lake, and Ellery Lake) and Project-affected stream reaches including Lee Vining Creek between Saddlebag Dam and Ellery Lake, between Rhinedollar Dam and Poole Powerhouse, and between Poole Powerhouse and the LADWP's Lee Vining Creek Diversion Dam impoundment. It also includes the Glacier Creek reach between Tioga Dam and its confluence with Lee Vining Creek.

5.7.2. Information Sources

A literature review was performed to identify RTE plant and wildlife species and habitats known to occur or potentially occur in the vicinity of the TAA or AAA. The literature review included a query of the CDFW's CNDDB (CDFW, 2020b) for USGS' Tioga Pass, Mount Dana, Lee Vining, Falls Ridge, Lundy, Dunderberg Peak, Vogelsang Peak, Koip Peak, Matterhorn Peak, and Tenaya Lake 7.5-minute topographic quadrangles. These quadrangles contain the FERC Project Boundary and habitat in the vicinity representative of habitat within the FERC Project Boundary. The literature review also included the

USFWS IPaC System (USFWS, 2020a) for the FERC Project Boundary and a review of the *Persistence Analysis for Species of Conservation Concern Inyo National Forest* (INF, 2019).

The vegetation alliances identified providing potentially suitable habitats for RTE species identified herein are discussed in detail in Section 5.4, *Botanical Resources*, and Section 5.6, *Wetland, Riparian, and Littoral Habitat.*

This section includes tables of RTE terrestrial wildlife species and the habitat elements the species are known to occupy. The sources used to determine these habitats are primarily derived from two locations: species accounts in the California Wildlife Habitat Relationship System and species accounts in CNDDB (CDFW, 2020b, 2020c). The species' habitat information is further supplemented by scientific literature or other resource agency information where referenced, including:

- *Mountain Yellow-legged Frog Conservation Assessment for the Sierra Nevada Mountains of California* (Brown et al., 2014)
- *Yosemite Toad Conservation Assessment* (Brown et al., 2015)
- *Decline, Movement and Habitat Utilization of the Yosemite Toad (Bufo canorus): an Endangered Anuran Endemic to the Sierra Nevada of California (Martin, 2008)*
- *Programmatic Biological Opinion on Nine Sierra Nevada Forests for Sierra Nevada Yellow-legged Frog, Mountain Yellow-legged Frog, and Yosemite Toad* (USFWS, 2014)
- *CDFW's Inland Desert Region 6 High Mountain Lakes Project* memo (CDFW, 2021)
- *Recovery Plan for the Sierra Nevada Bighorn Sheep* (USFWS, 2007)
- *Endangered and Threatened Wildlife and Plants; 90-Day Finding on a Petition to Delist the Lahontan Cutthroat Trout* (USFWS, 2008a)
- *Final Environmental Assessment for Hydropower License, Lee Vining Hydroelectric Project* (FERC, 1992)
- *Fall 2016 Fish Population Survey, Upper Lee Vining Creek, Mono County, California* (Salamunovich, 2017a and reports cited therein)
- *Revised Recovery Plan for the Paiute Cutthroat Trout* (USFWS, 2004)
- *Endangered Status and Critical Habitat Designation for the Owens Tui Chub* (USFWS, 1985)

5.7.3. Regulatory Background

A. Federal Law

I. Federal Endangered Species Act, 16 USC § 1531-1544

A federally endangered species is one facing extinction throughout all or a significant portion of its geographic range. A federally threatened species is one likely to become endangered in the foreseeable future throughout all or a significant portion of its range. The presence of any federally endangered or threatened species in a Project impact area generally imposes severe constraints on development, particularly if an action would result in "take" of the species or its habitat. The federal ESA defines the term "take" as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct. Harm, in this sense, can include any disturbance of habitats used by the species during any portion of its life history.

Proposed species or candidate species are those officially proposed by the USFWS for addition to the federal threatened and endangered species list.

Ii. Bald and Golden Eagle Protection Act, 16 USC § 668

The BGEPA provides for the protection of the bald eagle (*Haliaeetus leucocephalus*) and the golden eagle (*Aquila chrysaetos)* by prohibiting, except under certain specified conditions, the taking, possession, and commerce of such birds.

B. California Endangered Species Act, Cal. Fish & Game Code § 2050

The State of California considers an endangered species as one whose prospects of survival and reproduction are in immediate jeopardy. A threatened species is present in such small numbers throughout its range that it is likely to become an endangered species in the near future in the absence of special protection or management; and a rare species is present in such small numbers throughout its range that it may become endangered if its present environment worsens (under the California ESA, "rare" applies only to plants and not wildlife). Under the California ESA, "take" is defined as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." The presence of any state-listed threatened or endangered species generally imposes constraints on proposed actions, particularly if the action would result in "take" of the species or its habitat.

Species that are California fully protected include those protected by special legislation for various reasons, such as the mountain lion and white-tailed kite (*Elanus leucurus*). Fully protected species may not be taken or possessed at any time.

5.7.4. Special Status Plants

No plant species listed as rare, endangered, or threatened under federal ESA or California ESA are known to occur within the vicinity of the TAA. However, one plant species, whitebark pine (*Pinus albicaulis*), which is known to occur within the TAA, is listed as a Candidate species under the federal ESA. A petition to list the whitebark pine as an endangered species under the federal ESA and to designate critical habitat was submitted to the Secretary of the Interior through the USFWS in 2008 by the Natural Resources Defense Council (NRDC, 2008). In 2011, the USFWS completed the *12-Month Finding on a Petition to List* Pinus albicaulis *as Endangered or Threatened with Critical Habitat* (USFWS, 2011). In 2011, the USFWS added the whitebark pine to their Candidate species list. Between 2017 and 2020, the USFWS conducted a Species Status Assessment in 2017 through 2020 during which time the public was asked to submit any comments, research, or documentation relevant to the assessment (USFWS, 2019). USFS has not yet made a determination on listing status and critical habitat status (USFWS, 2011).

Whitebark pine occurs from the Canadian Rocky Mountains to the southern terminus of the Sierra Nevada. Its range includes the Glacier Creek and Lee Vining Creek watersheds in the FERC Project Boundary. All recent and historical occurrence records within these watersheds were mapped in a query on Calflora.org that also pulled from several sources (i.e., Consortium of California Herbaria, iNaturalist.org, and land manager surveys and checklists), and are shown on Figure 5.7-1 (Calflora, 2020). Whitebark pine was detected in rocky upland habitat along Lee Vining Creek within the FERC Project Boundary during SCE's 2016 riparian monitoring for FERC No. 1388 (Read, 2017).

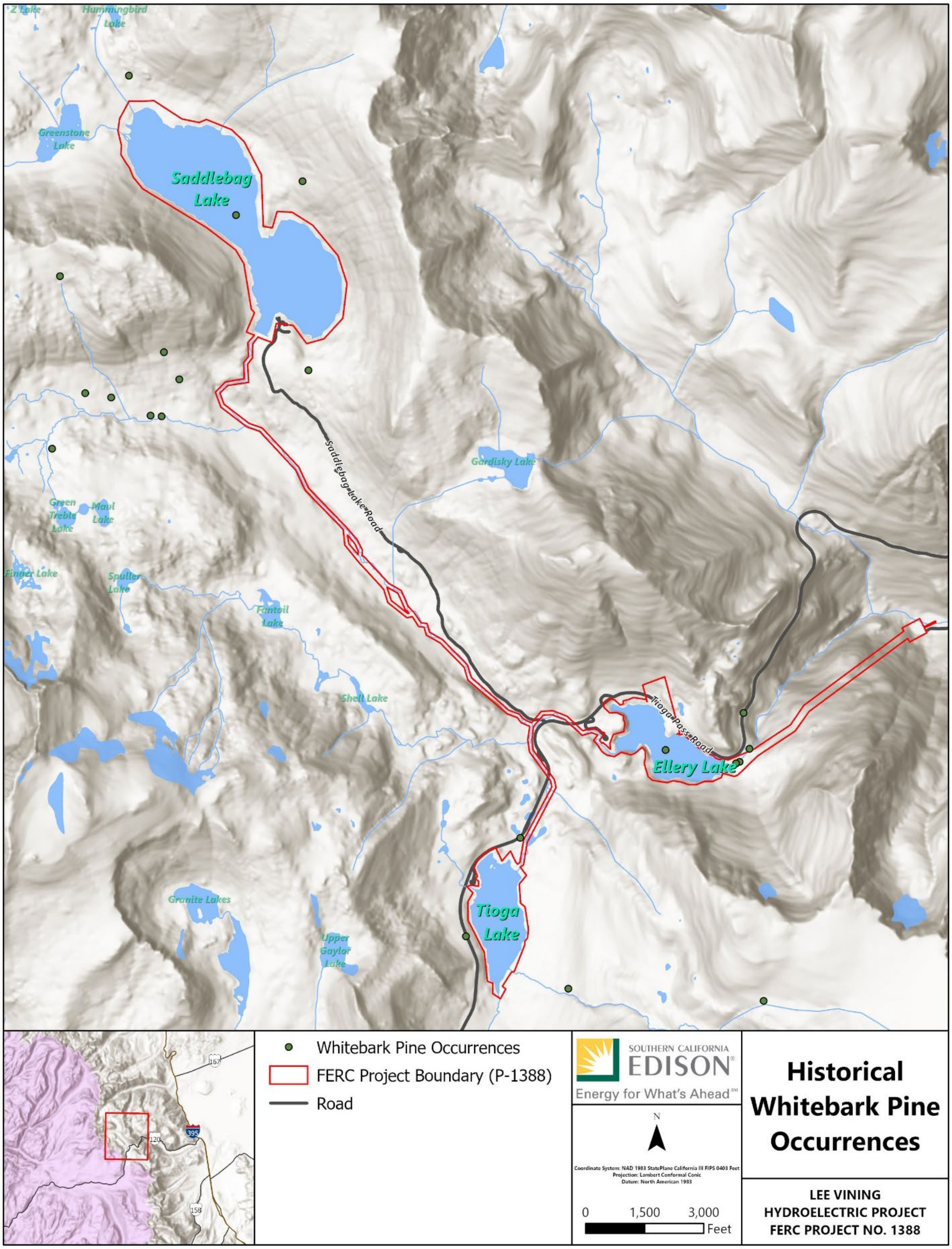


Figure 5.7-1. Historical Whitebark Pine Occurrences

The species is declining in the Sierra Nevada due to low recruitment (Leirfallom et al., 2015; Maloney, 2014; Keane et al., 1990) combined with high mortality (Meyer et al., 2016; Millar et al., 2012), largely due to extensive mountain pine beetle (*Dendroctonus ponderosae*) infestations and to a small extent due to white pine blister rust (*Cronartium ribicola*) (Jules et al., 2016; Millar et al., 2012). Little recruitment has been observed at high elevations, contrary to modeled predictions (Flanary and Keane, 2019; Dolanc et al., 2012). Prospects of adaptation to climate change in the Sierra Nevada are high (Lind et al., 2017; McLane and Aitken, 2012; Millar et al., 2012), and methods of assisting existing and future populations to develop resistance to the beetle have been found (Liu et al., 2017). Many studies have found that infrequent, low intensity fire promotes recruitment (Amberson et al., 2018; Goeking et al., 2019; Keane et al., 1990; Leirfallom et al., 2015; Loehman et al., 2017; Pansing and Tomback, 2019, Retzlaff et al., 2018; Slaton et al., 2019). Recovery is expected if land managers facilitate the increase in pest resistance, climate change resilience, the free flow of genetic material, and manage wildfire (Environment and Climate Change Canada, 2017; Keane et al., 2012).

5.7.5. Special Status Aquatic and Wildlife Species

A list of RTE terrestrial and aquatic wildlife species known to occur in the greater vicinity of the FERC Project Boundary was compiled and each species was assessed for its potential to occur. The potential for a special status species to occur is categorized as follows:

- Known to Occur: The species was recorded as occurring in the TAA or AAA, as determined by SCE reporting or as shown in CNDDB records, from within the last 30 years;
- May Occur: The species has potential to occur within the TAA or AAA because the species' habitat is present, the TAA or AAA is within the elevation range appropriate for the species, and the species has been previously recorded in the greater vicinity;
- Unlikely to Occur: The species is unlikely to occur because the Project is outside the known species range or the TAA or AAA does not support any habitat suitable for the species.

In summary, one RTE wildlife species is known to occur within the TAA or AAA; seven species have potential to occur; and six species identified in the literature search were determined unlikely to occur. Table 5.7-1 lists the RTE terrestrial and aquatic species identified during the literature search for the Project and provides an evaluation of their potential to occur in the TAA or AAA. The table also includes the status of each species and a summary of pertinent habitat information.

Table 5.7-1. Potential for Rare, Threatened, or Endangered Wildlife Species to Occur

Scientific Name	Common Name	Federal Status	State Status	Habitat	Potential To Occur/Notes
Known to Occur					
Anaxyrus canorus	Yosemite toad	FT	SSC	Primarily montane wet meadows; also, in seasonal ponds associated with lodgepole pine and subalpine conifer forest within meadow and seep, subalpine coniferous forest, and wetland habitat, from 6,400 to 11,300 feet (Brown et al., 2015; CDFW, 2020c)	Known to occur; previously observed in 2014 within wetland habitat adjacent to Saddlebag Lake (Psomas, 2014)
May Occur					
Haliaeetus leucocephalus	bald eagle	SCC; BGEPA	SE; FP	Nesting and wintering habitat includes ocean shores, lakes, and river margins. Nests usually within 1 mile of water. Not found in the high Sierra Nevada. Nests in large old growth trees, especially tall snags. Requires large bodies of water, or free flowing rivers with abundant fish. Roosts communally in winter in dense, sheltered, and remote conifer stands. Forested stands with large, old dominant or co-dominant trees in the vicinity of lakes, reservoirs, rivers, or large streams that support an adequate food supply (USFS, 2001).	May occur; no recent records, but within mapped range and suitable habitat present adjacent to large bodies of water (Saddlebag, Ellery, and Tioga Lakes)
Aquila chrysaetos	golden eagle	BCC; BGEPA	FP	Golden eagles occur locally in open country such as open coniferous forest, sage-juniper flats, desert, and barren areas, especially in rolling foothills and mountainous regions. Within southern California, the species favors grasslands, brushlands, deserts, oak savannas, open coniferous forests, and montane valleys. Nesting is primarily restricted to rugged, mountainous country. Cliff-walled canyons provide nesting habitat in most parts of range; also, large trees in open areas.	May occur; no recent records, but within mapped range and suitable habitat in steep cliff locations along adjacent to the FERC Project Boundary
Empidonax traillii	willow flycatcher	SCC; BCC	SE	In general, prefers moist, shrubby areas, often with standing or running water; in California, restricted to thickets of willows,	May occur; the lowest elevations of the TAA occur near the uppermost elevation

Scientific Name	Common Name	Federal Status	State Status	Habitat	Potential To Occur/Notes
				whether along streams in broad valleys, in canyon bottoms, around mountain-side seepages, or at the margins of ponds and lakes. In the west, generally occurs in beaver meadows, along borders of clearings, in brushy lowlands, in mountain parks, or along watercourses to 7,500 feet amsl. Meadows greater than 15 acres in size with water present and a woody riparian shrub component greater than 6.5 feet in height.	range for the species; previously observed in 2003 along Lee Vining Creek within 3 miles (CDFW, 2020b)
Vulpes vulpes necator	Sierra Nevada red fox	FCE	ST	Uses dense vegetation and rocky areas for cover and den sites. Found in a variety of habitats, including alpine, alpine dwarf scrub, broadleaved upland forest, meadow and seep, riparian scrub, subalpine coniferous forest, upper montane coniferous forest, and wetland; at elevations above 2,500 feet amsl. Forested areas (red fir and lodgepole pine) and subalpine and alpine habitats in proximity to meadows, riparian areas, and brush fields above 5,000 feet amsl (USFS, 2001). Limited occurrence information on Mammoth Ranger District but known to occur on adjacent national forests (INF, 2019).	May occur; previously recorded onsite in 1929 in the higher elevations of the TAA (CDFW, 2020b). Most recent observation at Sonora Pass in 2010 (Statham et al., 2012)
Pekania pennanti [Martes pennanti pacifica]	fisher - West Coast DPS	FE[a]	ST	Forest or woodland landscape mosaics that include late-successional conifer-dominated stands. 6,500 to 10,000 feet amsl. High canopy cover needed (USFWS, 2016a; Zielinski et al., 2004).	May occur; previously recorded in 1974 approximately 1.5 miles from Tioga Lake (CDFW, 2020b)
Ovis canadensis sierrae	Sierra Nevada bighorn sheep	FE	SE; FP	Alpine and subalpine zones, with open slopes where the land is rocky, sparsely vegetated and characterized by steep slopes and canyons. Available water and steep, open terrain free of competition from other grazing ungulates within alpine, alpine dwarf scrub, chaparral, chenopod scrub, Great Basin scrub, Mojavean desert scrub, montane dwarf scrub, pinon and juniper	May occur; no recent records, but within mapped range and suitable habitat onsite where vegetation is sparse

Scientific Name	Common Name	Federal Status	State Status	Habitat	Potential To Occur/Notes
				woodlands, riparian woodland, and Sonoran desert scrub habitats, from 5,000 to 9,000 feet amsl during the winter and 10,000 to 14,000 feet amsl during summer. (INF, 2019; CDFW, 2020c; USFWS, 2007)	
Unlikely to Occur					
Cyprinodon radiosus	Owens pupfish	FE	None	Owens pupfish once inhabited a wide variety of shallow-water habitats in the Owens Valley, including spring fed pools, sloughs, irrigation ditches, swamps, and flooded pastures.	Unlikely to occur; not observed during surveys conducted in 1986, 1987, 1999–2001, 2006, 2011, and 2016 in Lee Vining Creek between Saddlebag Dam and the confluence with Slate Creek (Salamunovich, 2017a and references cited therein; FERC, 1992). Established populations occur only in special refuges in the Owens Valley (Moyle, 2002)
Siphateles bicolor snyderi	Owens tui chub	FE	None	Characteristic habitat for this species includes calm water with aquatic plant beds and sandy or fine substrate (Moyle, 2002). Where Owens tui chub are abundant, water temperatures are typically over 20ºC and alkaline (Moyle, 2002).	Unlikely to occur; not observed during surveys conducted in 1986, 1987, 1999–2001, 2006, 2011, and 2016 in Lee Vining Creek between Saddlebag Dam and the confluence with Slate Creek (Salamunovich, 2017a and references cited therein; FERC, 1992)
Oncorhynchus clarkii seleniris	Paiute cutthroat trout	FT	None	Paiute cutthroat trout are associated with habitats similar to other western stream-inhabiting trout, which include cool, well-oxygenated streams, pools, undercut or overhanging banks, and abundant riparian cover (Moyle, 2002).	Unlikely to occur; not observed during surveys conducted in 1986, 1987, 1999–2001, 2006, 2011, and 2016 in Lee Vining Creek between Saddlebag Dam and the confluence with Slate Creek (Salamunovich, 2017a

Scientific Name	Common Name	Federal Status	State Status	Habitat	Potential To Occur/Notes
					and references cited therein; FERC, 1992). The closest known occurrence of this species to the Project is from 1974 in Delaney Creek, which is a tributary to the Tuolumne River in Yosemite National Park located about 4.5 miles from the Project across the Sierra Nevada crest from the Project watershed (CDFW, 2020b)
Oncorhynchus clarkii henshawi	Lahontan cutthroat trout	FT	None	Lahontan cutthroat trout occur in stream habitats characterized by cool, flowing water, available riparian cover, stable stream banks, water velocity breaks, and silt-free, rocky riffle-run areas, as well as large alkaline lakes (e.g., Pyramid Lake, Nevada) and alpine lakes (e.g., Lake Tahoe, California; USFWS, 2008a).	Unlikely to occur; not observed during surveys conducted in 1986, 1987, 1999–2001, 2006, 2011, and 2016 in Lee Vining Creek between Saddlebag Dam and the confluence with Slate Creek (Salamunovich, 2017a and references cited therein; FERC, 1992)
Anaxyrus exsul	black toad	SCC	ST; FP	Extremely limited range in Deep Springs Valley area (INF, 2019). Associated with springs and adjacent riparian vegetation (CDFW, 2020c).	Unlikely to occur; outside of range
Rana muscosa	mountain yellow-legged frog, northern DPS	FE	SE	High elevation lakes and wet meadow systems. On the Inyo National Forest, the species only occurs on the Mt. Whitney Ranger District (INF, 2019). Highly aquatic and rarely found more than 3.3 feet from water. They can be found sitting on rocks along the shoreline where there may be little or no vegetation. This species historically inhabited lakes, ponds, marshes, meadows, and streams at elevations typically ranging from approximately 4,500 to 12,000 feet amsl. (USFWS, 2014; CDFW, 2020b)	Unlikely to occur; outside of range

Scientific Name	Common Name	Federal Status	State Status	Habitat	Potential To Occur/Notes
Rana sierrae	Sierra Nevada yellow-legged frog	FE	ST	Always encountered within a few feet of water. Tadpoles may require 2 to 4 years to complete their aquatic development. Found in streams, lakes, and ponds in montane riparian and a variety of other habitats from 4,495 to 11,975 feet amsl. Ranges throughout the northern Sierra Nevada in high elevation, deep lakes (Sierra Nevada between north end of Mt. Whitney Ranger District to north end of Mono Lake Ranger District). (Brown et al., 2014; INF, 2019; CDFW, 2020c)	Unlikely to occur; outside of current range[b]
Buteo swainsoni	Swainson's hawk	BCC	ST	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, and agricultural or ranch lands with groves or lines of trees. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.	Unlikely to occur; may occur as migrant, outside of breeding range
Strix nebulosa	great gray owl	SCC	SE	Mixed coniferous forest where such forests occur in combination with large meadows or other vegetated openings between 2,400 to 7,500 feet amsl. With migration outside of breeding elevation up to 9,000 feet amsl.	Unlikely to occur; may occur as migrant, outside of breeding elevation
Gulo gulo	California wolverine	FCT	ST; FP	Found in a wide variety of high elevation habitats, including alpine, meadow and seep, north coast coniferous forest, riparian forest, subalpine coniferous forest, upper montane coniferous forest, and wetland from 1,640 to 4,921 feet amsl. Needs water source. Uses caves, logs, burrows for cover and den area. Hunts in more open areas. Can travel long distances. Needs water source. Uses caves, logs, burrows for cover and den area. Hunts in more open areas. Can travel long distances. Found in the north coast mountains and the Sierra Nevada (USFS, 2001).	Unlikely to occur; previously recorded onsite but determined to be extirpated (Spencer and Rustigian-Romsos, 2012)

Scientific Name	Common Name	Federal Status	State Status	Habitat	Potential To Occur/Notes
Ovis canadensis nelsoni	Nelson desert bighorn sheep	SCC	FP	White Mountain area at elevations ranging from 6,000 to 12,000 feet amsl. Most of these animals occur in the White Mountain Wilderness, with approximately 10% of the population occurring outside this area in Silver Canyon. (INF, 2019; USFWS, 2007)	Unlikely to occur; outside of range

°C = degrees Celsius; amsl = above mean sea level; CDFW = California Department of Fish and Wildlife Service; DPS = distinct population segment; ESA = Endangered Species Act; TAA = Terrestrial Assessment Area; USFWS = U.S. Fish and Wildlife Service

Notes:

[a] This species was listed as endangered under the federal ESA on May 15, 2020 (USFWS, 2020b).

[b] The species is known to be absent from the Lee Vining FERC Project Boundary and connected tributaries; however, plans to reintroduce the species into features upstream from the Project Boundary are anticipated in 2022. (CDFW, 2021)

Federal Status

BCC = The species is listed as a Bird of Conservation Concern by USFWS.
BGEPA = The species is listed under the federal Bald and Golden Eagle Act.
FCE = Candidate Endangered: The species is in the process of being reviewed by the USFWS for listing as Endangered under the federal ESA.
FCT = Candidate Threatened: The species is in the process of being reviewed by the USFWS for listing as Threatened under the federal ESA.
FE = Endangered: The species is formally listed as Endangered under the federal ESA.
FT = Threatened: The species is formally listed as Threatened under the federal ESA.
SCC = The species is listed as a Species of Conservation Concern by the Inyo National Forest.

State Status

FP = The species is listed as a California Fully Protected Species under California Fish and Game Code.
SCE = Candidate Endangered: The species is in the process of being reviewed by the CDFW for listing as Endangered under the California ESA.
SCT = Candidate Threatened: The species is in the process of being reviewed by the CDFW for listing as Threatened under the California ESA.
SE = Endangered: The species is formally listed as Endangered under the California ESA.
SSC = The species is listed as a California Species of Special Concern by CDFW (CDFW, 2019).
ST = Threatened: the species is formally listed as Threatened under the California ESA.

5.7.6. CRITICAL HABITAT

The USFWS is expected to make a determination on Critical Habitat status for the whitebark pine by 2021 (USFWS, 2011). If whitebark pine is elevated to threatened or endangered under the ESA, and Critical Habitat is determined to be beneficial to the recovery of the species, populations at the extremities of its natural range, such as the Sierra Nevada, will likely be included to preserve environmentally varied genotypes.

On August 26, 2016, the USFWS published the current Final Rule designating 750,926 acres of land as Critical Habitat for the Yosemite toad (*Anaxyrus canorus*) and 1,082,147 acres of land as Critical Habitat for the Sierra Nevada yellow-legged frog (*Rana sierrae*) in Alpine, Amador, Calaveras, El Dorado, Fresno, Inyo, Lassen, Madera, Mariposa, Mono, Nevada, Placer, Plumas, Sierra, Tulare, and Tuolumne Counties, California (USFWS, 2016b). On August 5, 2008, the USFWS published the current Final Rule designating approximately 417,577 acres of land as Critical Habitat for the Sierra Nevada bighorn sheep (*Ovis canadensis sierrae*) in Tuolumne, Mono, Fresno, Inyo, and Tulare Counties, California (USFWS, 2008b).

The FERC Project Boundary from Saddlebag Lake to just below Ellery Lake occurs within areas mapped as Critical Habitat for both Yosemite toad and Sierra Nevada yellow-legged frog (approximately 586 acres and 574 acres, respectively). Only a very small portion of the FERC Project Boundary (less than 1 acre) is within areas mapped as Critical Habitat for Sierra Nevada bighorn sheep. Figure 5.7-2 illustrates the location of the FERC Project Boundary with respect to the three species' Critical Habitat areas.

The USFWS has not designated any Critical Habitat for any fish species within the AAA.

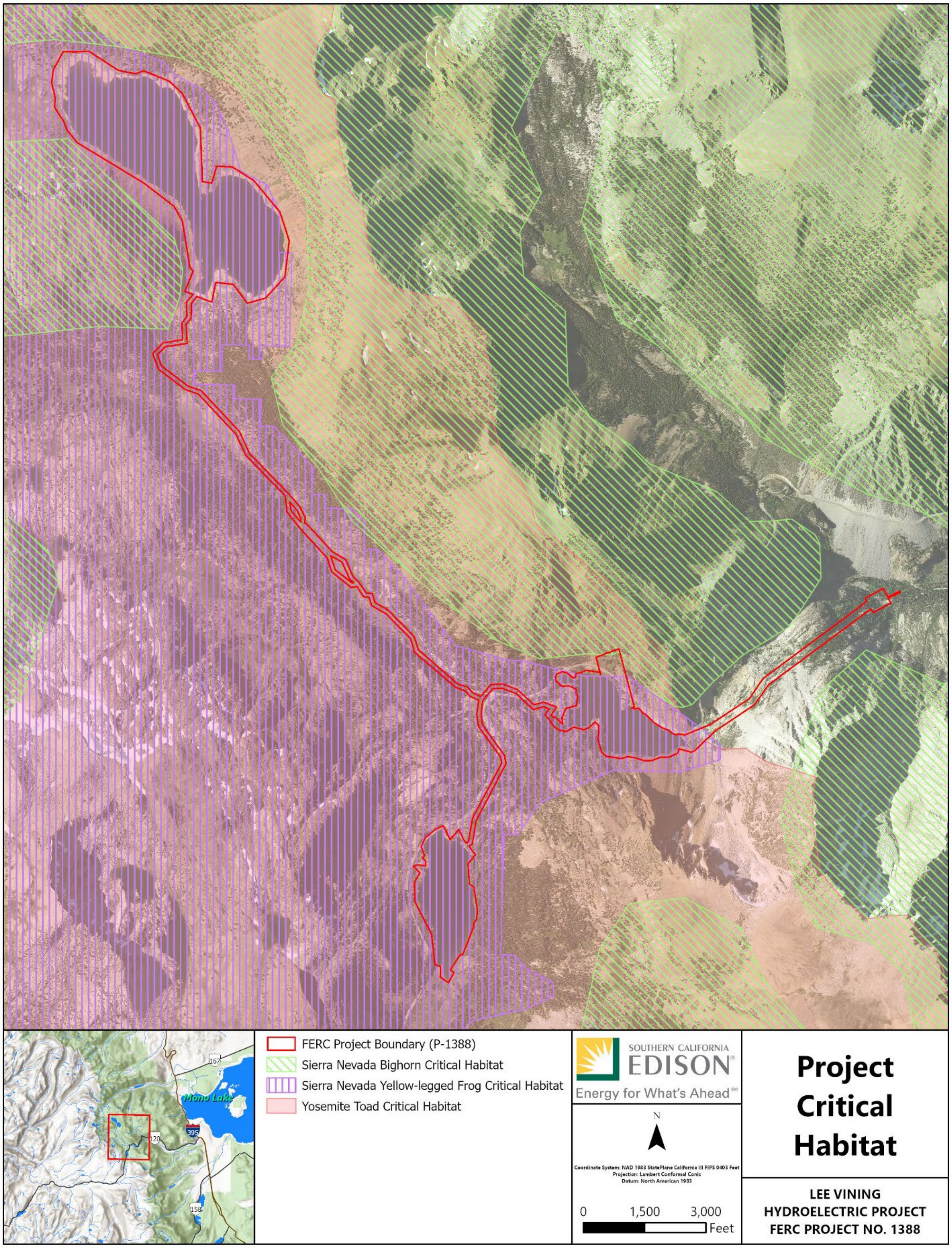


Figure 5.7-2. Critical Habitat Areas in Relation to the FERC Project Boundary

5.8. RECREATION RESOURCES

5.8.1. INTRODUCTION

This section describes recreational use within and in the vicinity of SCE's Lee Vining Project (FERC Project No. 1388). FERC content requirements for recreation are specified in 18 CFR § 5.6(d)(3)(viii).

5.8.2. INFORMATION SOURCES

This section was prepared utilizing the following primary information sources:

- *Inyo National Forest Land Management Plan* (USFS, 2019)
- *2015 Statewide Comprehensive Outdoor Recreation Plan* (CDPR, 2015)
- *Survey on Public Opinions and Attitudes on Outdoor Recreation in California Complete Findings* (CDPR, 2014)
- *California Wild and Scenic River System* (CDOT, 2020)
- *California Department of Fish and Wildlife Fishing Guide* (CDFW, 2020a)
- *National Wild and Scenic Rivers System* (IWSRCC, 2020)
- *Mountain Project* (REI, 2020)
- *Visitor Use Report*, *Inyo NF, USDA Forest Service, Region 5, National Visitor Use Monitoring Data collected FY 2016* (USFS, 2018a)

5.8.3. SETTING

The Project is located on Lee Vining and Glacier Creeks in the glacially carved upper Lee Vining Canyon, approximately 9 miles upstream of Mono Lake and the town of Lee Vining, California, and less than 1 mile north of the eastern entrance to Yosemite National Park. The Project consists of three high elevation reservoirs: Saddlebag Lake (elevation 10,089.4 feet), Tioga Lake (elevation 9,650.28 feet), and Ellery Lake (elevation 9,492.53 feet). Saddlebag Lake is relatively hidden in a valley higher than the rest, but Tioga and Ellery Lakes are adjacent to and visible from State Route 120, the highly trafficked, seasonal pass (Tioga Pass) through the Sierra Nevada that connects many of California's major metropolitan areas (Sacramento, San Francisco, Fresno, Los Angeles, San Diego) to prime outdoor recreation areas on either side of the range. Much of this traffic is a portion of the 4,586,463 annual visitors (based on 2019 estimates) traveling to or from the Yosemite National Park, one of the world's most popular outdoor recreation destinations (NPS, 2020a). Recreational use in the upper Lee Vining Canyon, and thus the economies of communities like Lee Vining and June Lake, is reliant on secondary use from these travelers. This recreation season is tied to the availability of Tioga Pass, which, on average, is only open from April to November, though these dates are highly dependent on snowpack and plowing for that year (NPS, 2020b).

The Project is located in the northernmost part of the Inyo National Forest, which stretches 165 miles north to south along the eastern Sierra Nevada, featuring over 2 million acres of pristine lakes, winding streams, rugged peaks, and arid Great Basin Mountains (USFS, 2020a). The Inyo National Forest features some of the world's oldest trees in the Ancient Bristlecone Pine Forest in the White Mountains that mark the eastern boundary of Owens Valley, glaciers along the Sierra Nevada crest, and an elevation range from the tallest peak in the lower 48 states (Mount Whitney at elevation 14,494 feet) to semiarid deserts and valleys at elevation 3,900 feet.

The Inyo National Forest also contains nine congressionally designated wilderness areas: Hoover, Ansel Adams, John Muir, Golden Trout, Inyo Mountains, Boundary Peak, South Sierra, White Mountain, and Owens River Headwaters. Devils Postpile National Monument, administered by the National Park Service, is within the Inyo National Forest in the Reds Meadow area west of Mammoth Lakes.

5.8.4. Existing Project Recreational Facilities

The current Project license does not include recreational facilities or any related resource management plan. However, during the previous relicensing effort, target resources included resident trout, riparian vegetation, riparian-associated wildlife, visual quality, and operational modifications to augment recreational fishing opportunities. Specifically, these resources were enhanced through the requirement of minimum instream flows (USFS 4e Condition No. 4; Articles 404 and 405), stable lake levels (USFS 4e Condition No. 6), and annual funding for CDFW's fish stocking program (Article 406). Minimum instream flows were required, in part, to enhance fishing opportunities in the upper Lee Vining Canyon and indirectly enhance recreation by increasing stream vegetation and creating more attractive water features. Measures to control lake levels at Tioga and Ellery Lakes were cited as important due to substantial visitor use and angling pressure along this heavily used portion of State Route 120. CDFW fish stocking efforts are currently implemented at multiple locations throughout the Project, and the license requires SCE funding for stocking efforts at Ellery Lake to mitigate for entrainment.

An overview of non-Project, Inyo National Forest recreation sites within the Project Vicinity will be discussed in the following sections.

5.8.5. Recreational Opportunities in the Project Vicinity

The Project Vicinity provides a broad range of recreational opportunities available to the public year-round. Primary recreational opportunities include fishing, hiking, camping, boating, rock climbing, ice climbing, sightseeing, and picnicking. The FERC Project Boundary and adjacent lands are entirely within the administrative boundary of the Inyo National Forest, although a small portion of Project lands at Ellery Lake are owned by SCE. While no portion of the Project Boundary is within a wilderness area, two wilderness areas—Hoover Wilderness to the north and Ansel Adams Wilderness to the south—tightly border the Project Area, excluding all Project facilities, Project water features, and State Route 120. Adjacent to the Project Boundary and downstream of Poole Powerhouse along Lee Vining Creek, the Inyo National Forest operates and maintains 10 conventional camping, 1 group camping, and 2 recreational vehicle camping areas; 1 day use (picnicking) site; 1 river and 1 lake fishing site; 8 trailheads; and 1 vista. The following sections summarize the major recreational facilities and opportunities found in Lee Vining Canyon.

5.8.5.1. Camping and Day-Use Areas

The White Mountain Ranger District of the Inyo National Forest operates and maintains recreational facilities and opportunities within Lee Vining Canyon, providing approximately 10 public campgrounds with 217 camping units in the canyon, one of which is a group unit accommodating up to 25 guests each, as summarized in Table 5.8-1 (USFS, 2020b). Other developed recreation sites include Saddlebag Day Use Picnic/Fishing Site, Tioga Lake Overlook Info Site, Boulder Day Use Area, and eight trailheads that will be discussed in a later section. These sites range in elevation from 10,000 feet at Saddlebag Lake to 7,300 feet at Lower Lee Vining Campground. The majority of these sites are adjacent to Project water features (Saddlebag Lake, Tioga Lake, Ellery Lake, Glacier Creek, and Lee Vining Creek), Saddlebag Lake Road, State Route 120, or along Lee Vining Creek downstream of Poole Powerhouse.

Table 5.8-1. Inyo National Forest Camping Facilities in Lee Vining Canyon (Listed Generally Upstream to Downstream)

Name	Type	Amenities	Sites	Open	Elevation (feet)
Saddlebag Lake Campground	Campground Camping	B/v/RV	19	July-Sep	10,000
Saddlebag Lake Trailhead Group Campground	Group Camping	B/R/v	1 (accommodates 25)	July-Sep	10,000
Sawmill Walk-in Campground	Campground Camping	No RVs or trailers/B/v	12	July-Sep	9,800
Junction Campground	Campground Camping	B/v	13	July-Oct	9,600
Tioga Lake Campground	Campground Camping	B/v/RV	13	July-Sep	9,700
Ellery Lake Campground	Campground Camping	B/v	21	Jul-Oct	9,500
Big Bend Campground	Campground Camping	B/v	17	Jul-Oct	7,800
Aspen Grove Campground	Campground Camping	B/v-p	45	May-Oct	7,500
Moraine Campground	Campground Camping	p	25	May-Oct	7,300
Cattleguard Campground	Campground Camping		15	USFS Administrative Use Only	7,300
Lower Lee Vining Campground	Campground Camping	B/v-p	51	May-Oct	7,300

Source: USFS, 2020b

B = bear boxes; DS = dump station; f = flush restroom; p = portable/pit restroom; R = reservations; RV = small recreational vehicles or short trailers only, no RV hook up; v = vault restroom; W = walk-in

5.8.5.2. Hiking

As depicted on Figure 5.8-1, within the Lee Vining Canyon, approximately 17 miles of trails (2.9 miles minimally developed, 3.4 miles moderately developed, 10.2 miles developed, and 0.5 mile fully developed) and 8 developed trailheads are maintained by the Inyo National Forest in the upper Lee Vining Canyon, many of which are adjacent to or partially within the FERC Project Boundary (USFS, 2018b). Many of these trails provide access for lake, pond, or river fishing; or access that leads to backpacking opportunities in the Hoover and Ansel Adams Wildernesses.

Overnight wilderness permits are available for overnight backpacking originating from the Inyo National Forest's Saddlebag Lake and Glacier Canyon Trailheads, which provide access to the Hoover and Ansel Adams Wildernesses, respectively. Inyo National Forest maintains records by entry date, entry trailhead, and number of hikers (often capped by quota per day). Table 5.8-2 provides a summary of overnight wilderness permits at the two trailheads for 2020. Permit records over the last several years indicate approximately 130 users per week over the collection period. In 2020, the weekly average was 132 users. As indicated in the data shown in Table 5.8-2 below, usage generally peaks during the summer between Independence Day and Labor Day weekends. While this is representative of overnight use in the Forest, it must be noted that while many of the hikes originating from trailheads in the Lee Vining Canyon are loops or long-distance hikes that will have hikers exit where they entered, use numbers do not account for hikers originating at a trailhead outside of, but ending within, the Lee Vining Canyon.

Overnight wilderness permit data does not account for the amount of day use certain wilderness trails receive from other hikers and anglers, so the Inyo National Forest conducts periodic day use counts—typically in August and approximately every 5 years—at Saddlebag Lake and the Harvey Monroe Hall Research Natural Area. All counts are conducted in the wilderness outside developed front country facilities. For 2016, the Inyo National Forest estimated 800 day-use hikers per week past Saddlebag Lake and 419 day-use hikers per week at the Harvey Monroe Hall Research Natural Area.

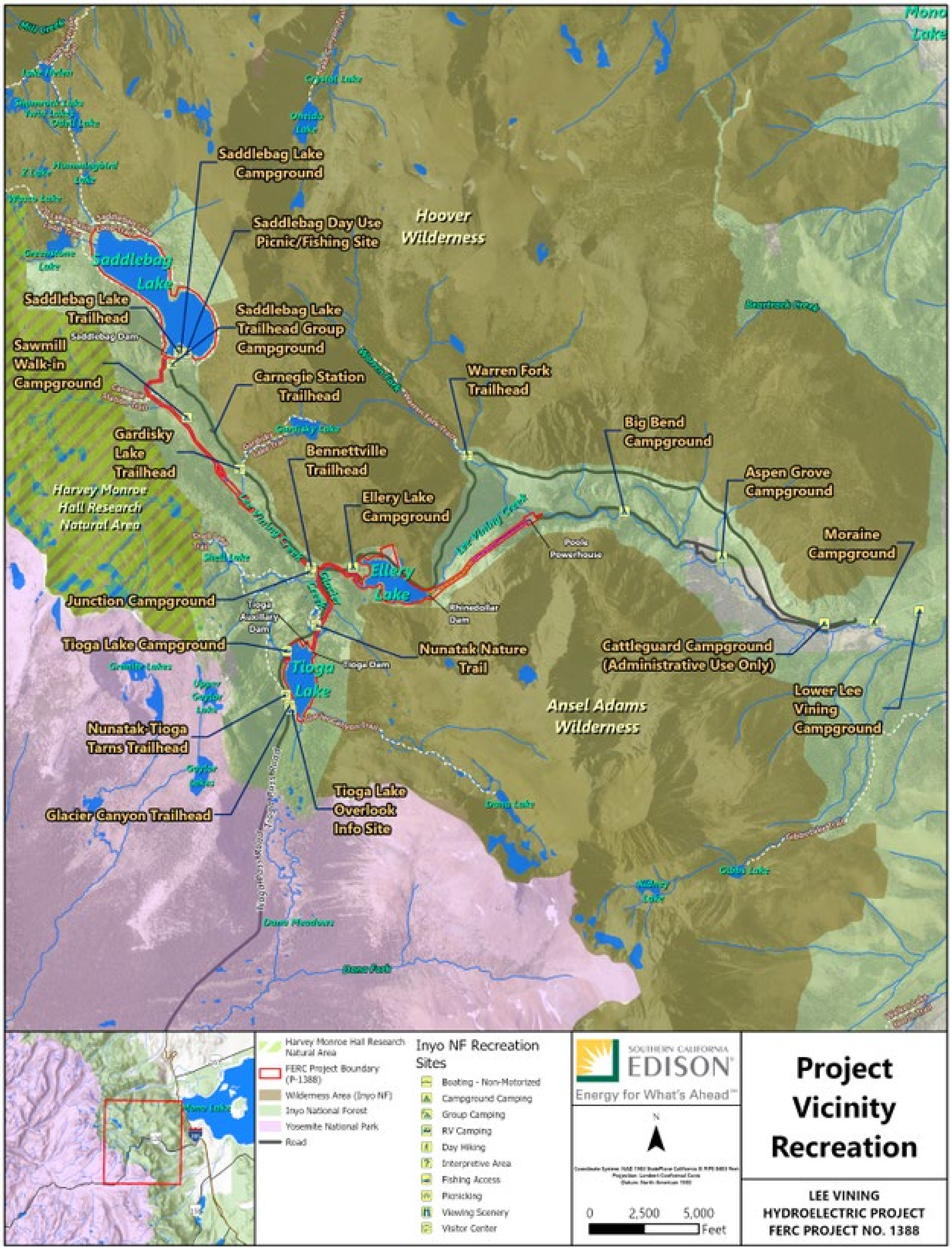


Figure 5.8-1. Recreation Opportunities in the Project Vicinity

Table 5.8-2. 2020 Permits for Overnight Wilderness Use (Saddlebag Lake and Glacier Canyon Trailheads)

Week	Saddlebag Lake	Glacier Canyon	COMBINED
June 1–6	4	2	6
June 7–13	33	0	33
June 14–20	66	3	69
June 21–27	102	18	120
June 28–July 4	241	19	260
July 5–11	177	20	197
July 12–18	132	8	140
July 19–25	228	18	246
July 26–August 1	244	18	262
August 2–8	227	24	251
August 9–15	228	28	256
August 16–22	186	24	210
August 23–29	148	21	169
August 30–September 5	209	11	220
September 6–12	145	24	169
September 13–19	60	6	66
September 20–26	36	12	48
September 27–October 3	23	0	23
October 4–10	12	0	12
October 11–17	0	0	0
October 18–24	0	0	0
October 25–31	7	0	7
TOTAL	***2508***	***256***	***2764***

Source: Adam Barnett, Pers. Comm., May 20, 2021

5.8.5.3. Fishing

Recreational fishing is one of the more popular recreational activities in the Lee Vining Canyon, both along creeks and in lakes. CDFW stocks many of these locations for recreational fishing as listed in Table 5.8-3, including all three Project reservoirs and the portion of Lee Vining Creek between Saddlebag and Ellery Lakes as shown on Figure 5.8-2). As contemplated in the previous relicensing proceeding, CDFW's goal for Lee Vining Creek was to "optimize trout habitat, particularly for the adult life stage sought by anglers, and manage the fishery to develop its wild trout component" (FERC, 1992). Portions of Lee Vining Creek, both above and below Poole Powerhouse, support a regionally important recreational fishery with heavy angler use, especially at the many camping facilities found adjacent to the creek. With target resources of resident trout and recreation in mind, the current license aimed to enhance those resources through the requirement of minimum instream flows (USFS 4e Condition No. 4; Articles 404 and 405), stable lake levels (USFS 4e Condition No. 6), and annual funding for CDFW's fish stocking program (Article 406). Minimum instream flows were required, in part, to enhance fishing opportunities in the upper Lee Vining Canyon and indirectly enhance recreation by increasing stream vegetation and creating more attractive water features. Measures to control lake levels at Tioga and Ellery Lakes were also cited as important, due to substantial visitor use and angling pressure along this heavily used portion of State Route 120.

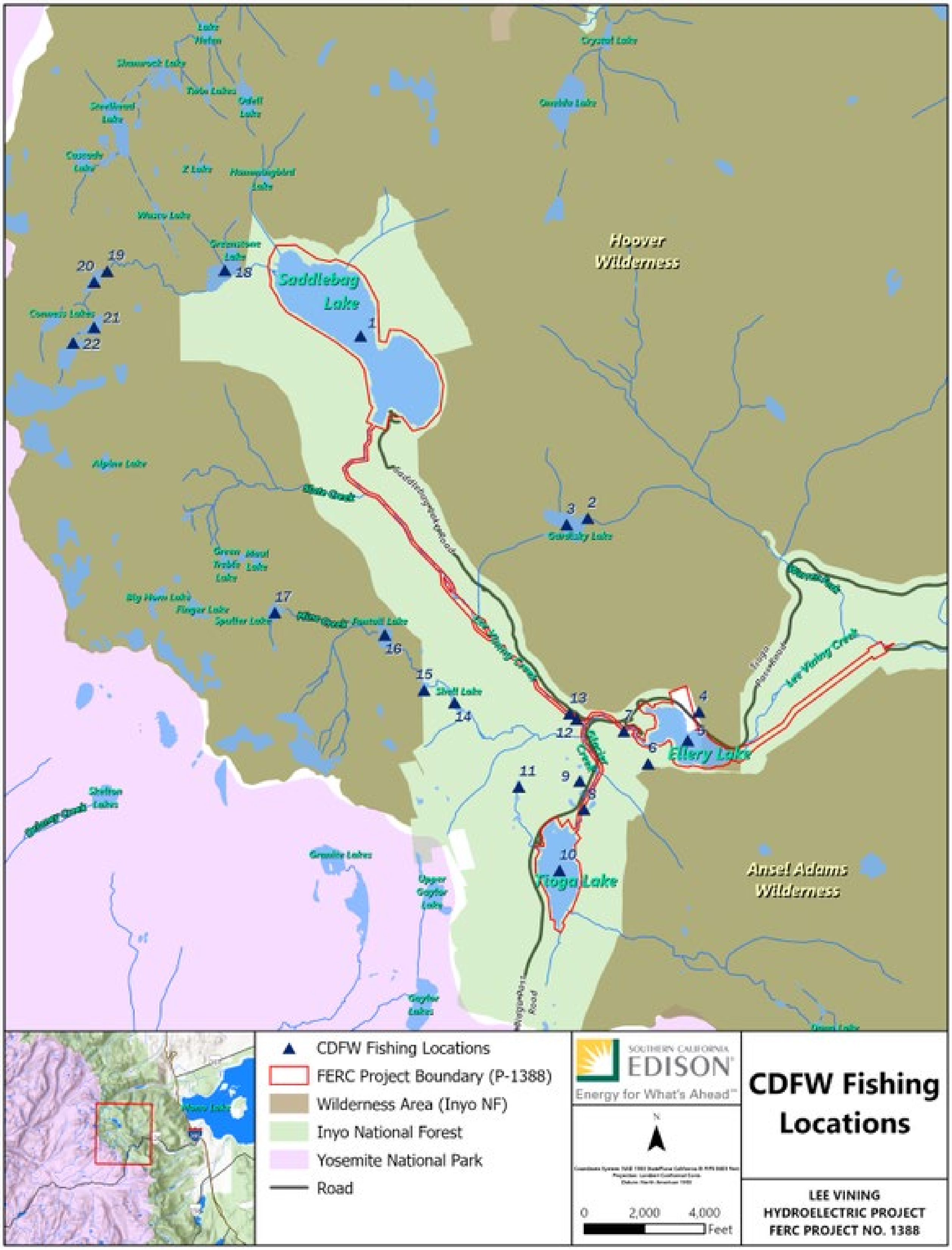


Figure 5.8-2. Fishing Sites in the Project Vicinity

Table 5.8-3. CDFW Fishing Location Data in Project Watershed

Map ID[a]	Location	Last Stocked	Species Present	Size	Elevation (feet amsl)
1	Saddlebag Lake	2019	HT	325 acres	10,087
2	Unnamed Lake #27256	N/A	not listed	not listed	not listed
3	Gardisky Lake	N/A	BT	19.92 acres	10,480
4	Richardson Tarn	N/A	BT	0.79 acres	9,548
5	Ellery Lake	2019	HT	68 acres	9,500
6	Unnamed Lake #17323	N/A	BT	0.32 acres	9,563
7	Lee Vining Creek, South Fork	2019	HT	3 acres	9,500
8	Unnamed Lake #17334	N/A	BT, RT	2.44 acres	9,616
9	Unnamed Lake #17326	N/A	BT	1.02 acres	9,614
10	Tioga Lake	2019	BT, RT	69.11 acres	9,636
11	Thimble Lake, upper	N/A	BT	1.32 acres	9,792
12	Saddlebag Creek	2019	HT	2 miles	10,087
13	Saddlebag Creek (Lee Vining Creek)	2019	not listed	not listed	not listed
14	Shell Lake	N/A	BT	4.08 acres	9,839
15	Unnamed Lake #17311	N/A	BT	2.19 acres	9,847
16	Fantail Lake	N/A	BT	8.61 acres	9,922
17	Spuller Lake	N/A	BT	4.67 acres	10,270
18	Greenstone Lake	N/A	BT	21.92 acres	10,124
19	Conness Lakes	N/A	GT	0.68 acres	10,540
20	Conness Lakes, lower	N/A	GT	5.37 acres	10,540
21	Conness Lake, middle	N/A	GT	6.91 acres	10,661
22	Unnamed Lake #17283	N/A	GT	2.43 acres	10,664

Source: CDFW, 2020a

amsl = above mean sea level; BT = brook trout; GT = golden trout; HT = hatchery trout; N/A = data not available; RT = rainbow trout

Notes:

[a] Note that the Map ID listed in this table corresponds to the label for each site on Figure 5.8-2.

5.8.5.4. Boating

The only boating resources in the upper Lee Vining Canyon are operated by the Saddlebag Lake Resort, a concessionaire of the Inyo National Forest, at the southern end of Saddlebag Lake. Use of the boat launch is available for a fee. The resort also offers fishing and pontoon boat rentals as well as a boat taxi service to the northern end of the lake, a popular location for anglers (SLR, 2020).

5.8.5.5. Climbing

According to MountainProject.com (REI, 2020), the Lee Vining Canyon/Tioga Road area hosts approximately 101 traditional, 36 sport, 24 top rope, 33 bouldering, 21 ice, 22 mixed, and 35 alpine climbing opportunities. Many of these climbing opportunities are found along Lee Vining Creek, between Ellery Lake and Poole Powerhouse, and along State Route 120 between Ellery Lake and Poole Powerhouse (REI, 2020). Ice climbers in particular, most often led by local guides, will park along Poole Powerhouse Road in a pullout just before the powerhouse and hike approximately 1.5 miles up the canyon to the ice falls (Adventure Projects, 2021).

5.8.6. Current and Future Recreation Needs and Management

5.8.6.1. FERC Form 80

The most recent recreational use information for the Project is provided in the *Licensed Hydropower Development Recreation Report*, FERC Form No. 80 (Form 80) filed in 2009. Prior to the removal of this requirement from FERC's regulations, SCE had filed and received approval for exemption from the requirements due to "little recreation potential at the Project" (FERC Order issued March 24, 2011). Before the exemption, SCE had most recently filed Form 80 data for the boat ramp and marina at Saddlebag Lake only, citing annual daytime recreation days[2] of 6,031 and a peak weekend average of recreation days of 122 (2009 Form 80). Facilities were also determined to be at 56 percent capacity.

5.8.6.2. 2015 California Statewide Comprehensive Outdoor Recreation Plan and Related Reports

According to the California Department of Parks and Recreation, the California Statewide Comprehensive Outdoor Recreation Plan "provides a strategy for statewide outdoor recreation leadership and action to meet the state's identified outdoor recreation needs" (CDPR, 2015).

[2] A recreation day is defined as a visit by a person to a development for recreational purposes during any portion of a 24-hour period.

While the 2015 California Plan does not offer specific data regarding current and future recreation needs, the following two reports are essential elements used in the Plan's development that provide information relevant to the Lee Vining area:

- *2012 Survey on Public Opinions and Attitudes on Outdoor Recreation in California Complete Findings* (CDPR, 2014)
- *Outdoor Recreation in California's Regions 2013* (CDPR, 2013)

The reports divide California into seven geographic regions; the Project is found in the California Department of Parks and Recreation's Sierra Planning Area, which includes Alpine, Amador, Calaveras, El Dorado, Inyo, Mariposa, Mono, Nevada, Placer, and Tuolumne Counties. The following general findings may be important in addressing current and future recreational needs in the Sierra Planning Area (CDPR, 2013):

- The region is mostly rural, heavily forested, and mountainous, with its lakes and rivers providing much of California's water supply.
- The region is second lowest in population density (35 people per square mile), and percentage growth in population by 2060 is estimated at 55 percent, greater than the state average of 41 percent.
- 2010 census data shows that the region's residents were mostly White (approximately 75 percent), with Hispanics as the lowest percentage of population of any region at 12.5 percent. By 2060, the White population is expected to decrease to 65 percent and the Hispanic population to increase to 21 percent.
- By 2060, the region is expected to have the second lowest percentage of residents ages 5 to 17 and the second highest percentage of residents age 65 and over.
- Recreational facilities such as day use areas (picnic/barbecue) are generally proportional to the region's population.
- The region had the highest total employment (33 jobs per 1,000 residents) related to outdoor recreation among all regions.
- The region had the highest total annual gross sales ($3.23 per 1,000 residents) related to outdoor recreation among all regions.

Based upon its research, the CDPR (2013) identifies five major outdoor recreational issues for California:

1. Economic challenges
2. Serving residents' needs
3. Improving access to recreation
4. Funding challenges
5. Ensuring that recreational projects conform to mandated plans

Specific strategies and action priorities related to these issues were developed and ranked by region.

The Sierra Planning Area was listed as the top priority for the following four actions (CDPR, 2013):

- Fund projects that support or create outdoor recreation; related jobs in the region. (Issue One, Action 3.1)
- Fund projects that support outdoor recreation; related sales and expenditures in the region. (Issue One, Action 2.2)
- Fund Land and Water Conservation Fund (LWCF) Projects to provide an equal amount of LWCF per capita grant funding across the regions. (Issue Four, Action 1.1)
- Provide LWCF technical assistance to increase and improve LWCF Project submissions. (Issue Four, Action 1.2)

5.8.6.3. Inyo National Forest–National Visitor Use Monitoring Report (Fiscal Year 2016 Data)

The National Visitor Use Monitoring (NVUM) Program has two goals: (1) to produce estimates of the volume of recreational visitation to national forests and grasslands, and (2) to produce descriptive information about that visitation, including activity participation, demographics, visit duration, measures of satisfaction, and trip spending connected to the visit (USFS, 2018a). The most recent visitor use report for the Inyo National Forest was updated on January 21, 2018, and summarizes data collected during fiscal year 2016. The following is a summary of that report.

Total visits to the Inyo National Forest[3] in fiscal year 2016 were estimated at 2,309,000 individuals. Many people frequent more than one site during their visit, so estimates are further broken down by site visits, totaling 4,624,000 visits.[4] The most commonly frequented site or area associated with the Inyo National Forest is Day Use Developed (2,608,000 visits), followed by Overnight Use Developed (876,000 visits), General Forest Area (850,000 visits), and Designated Wilderness (290,000 visits). Site visits are further broken down by each activity in which the individual participated during that visit. The most common activities selected by survey participants were viewing natural features, hiking/walking, relaxing, downhill skiing, viewing wildlife, and driving for pleasure. The most commonly chosen main activity by survey participants was downhill skiing, followed by hiking/walking, viewing natural features, and bicycling. A complete list of activity participation results is found in Table 5.8-4.

Demographic results estimate that 89.3 percent of visitors are White, followed by Hispanic/Latino (9.5 percent), Asian (9.1 percent), Black/African American (2.6 percent), American Indian/Alaska Native (2.5 percent), and Hawaiian/Pacific Islander (1.7 percent).

[3] The 2018 NVUM Report (USFS, 2018a) defines a national forest visit as the entry of one person upon a national forest to participate in recreational activities for an unspecified period of time. A national forest visit can be composed of multiple site visits. The visit ends when the person leaves the national forest to spend the night somewhere else.

[4] The 2018 NVUM Report (USFS, 2018a) defines a site visit as the entry of one person onto a national forest site or area to participate in recreational activities for an unspecified period of time. The site visit ends when the person leaves the site or area for the last time on that day.

Age distribution estimates 17 percent of visitors are children under the age of 16, and 23 percent are over the age of 60. Most visitors, an estimated 74.4 percent, live more than 200 miles from the Forest, and only 18 percent live within 50 miles.

Table 5.8-4. Activity Participation Results

Activity	% Participation	% Main Activity
Viewing Natural Features	45.3	8.5
Hiking/Walking	44.2	16.3
Relaxing	34.8	4.6
Downhill Skiing	34.1	32.3
Viewing Wildlife	30.3	0.6
Driving for Pleasure	23.6	1.8
Bicycling	11.9	8.2
Visiting Historic Sites	11.7	0.6
Developed Camping	11.6	3.6
Nature Center Activities	11.2	0.7
Fishing	11	5.8
Picnicking	8.6	0.4
Nature Study	7.8	0.3
Resort Use	7.8	0
Cross-country Skiing	6.8	5.5
Some Other Activity	6.6	4.9
Backpacking	4.9	2.2
Other Non-motorized	3.8	0.3
Off-Highway Vehicle Use	2.9	0.4
Primitive Camping	2.9	0.2
Motorized Trail Activity	2.7	0.4
Non-motorized Water	2.1	0.5
Gathering Forest Products	1.7	0
Other Motorized Activity	1	0.8
Hunting	0.6	0.5
Horseback Riding	0.6	0.2
Motorized Water Activities	0.4	0.1
No Activity Reported	0.3	0.6
Snowmobiling	0.3	0

Source: USFS, 2018a

5.8.7. Shoreline Management Plan and Buffer Zones

Shoreline management plans and buffer zones are discussed in detail in Section 5.9, *Land Use,* of this PAD.

5.8.8. National Wild and Scenic River System

No rivers in the Lee Vining Canyon, including all waterways within the Project Boundary, are currently included in the National Wild and Scenic River System. The nearest designated river to the Project is the Tuolumne Wild and Scenic River, the headwaters of which are located less than 2 miles southwest of Tioga Lake on the western slopes of the Sierra Nevada in Yosemite National Park. The Tuolumne Wild and Scenic River has been designated for its remarkable cultural and historic, fisheries and wildlife habitat, geologic, recreational, and scenic values (IWSRCC, 2020).

However, the Inyo National Forest Service's 2019 Land Management Plan (USFS, 2019) has recently identified over 75 river miles in the Mono Basin as eligible for inclusion in the National Wild and Scenic Rivers System, including all of Lee Vining Creek. The eligibility study conducted as part of the 2019 Land Management Plan development determined whether rivers are free-flowing, and whether they possess one or more outstandingly remarkable values (e.g., scenery, recreation, geology, fish and wildlife populations and habitat, prehistory, history). If so, they were found to be eligible. As such, the 2019 Land Management Plan lists the following desired condition and standard for river reaches identified as eligible:

- Desired Condition (MA-EWSR-DC)
  - 01. Eligible or recommended wild and scenic rivers retain their free-flowing condition, water quality, and specific outstandingly remarkable values. Recommended preliminary classifications remain intact until further study is conducted or until designation by Congress.
- Standard (MA-EWSR-STD)
  - 01. For interim management of Forest Service–identified eligible or recommended suitable rivers, use interim protection measures identified in Forest Service Handbook 1909.12, Section 84.3.

Once determined to be eligible, a preliminary classification of "wild," "scenic," or "recreational" was also applied to each eligible river or river segment according to the following general guidelines:

- Wild: Free of impoundments. Generally inaccessible except by trail. Shorelines essentially primitive with little or no evidence of human activity. Meets or exceeds water quality criteria.
- Scenic: Free of impoundments. Accessible in places by roads. Shorelines largely primitive and undeveloped, with no substantial evidence of human activities.

- Recreational: May have some impoundment or diversion, provided the waterway remains generally natural and riverine in appearance. Readily accessible by road or railroad. Shorelines may have some development and substantial evidence of human activity. No water quality criteria.

Figure 5.8-3 below depicts of all river segments within the Project Vicinity that Inyo National Forest has recently determined to be eligible for inclusion in the National Wild and Scenic River System. Inyo National Forest has classified Lee Vining Creek at various reaches as either wild, scenic, or recreational. Inyo National Forest has classified the headwaters of Lee Vining Creek to Greenstone Lake (1.6 miles) have been classified as wild for its scenic, recreational, and geologic values. From Greenstone Lake to Saddlebag Lake (0.5 mile), Inyo National Forest has classified Lee Vining Creek as scenic for its scenic, recreational, and geologic values. Lee Vining Creek from Saddlebag Dam to State Route 120 (3 miles within the FERC Project Boundary) as recreational for its scenic, recreational, and geologic values. Inyo National Forest has classified the remaining 0.4 mile of Lee Vining Creek (also within the Project Boundary) from State Route 120 to Ellery Lake as scenic for its geologic values. The bypassed portion of Lee Vining Creek from Ellery Dam to Poole Powerhouse (1.2 miles) is classified by the Inyo National Forest as scenic for its geologic values. The remaining 10.2 miles of Lee Vining Creek from Poole Powerhouse to Mono Lake is classified by Inyo National Forest as recreational for a mix of scenic, recreational, and geologic values (USFS, 2019).

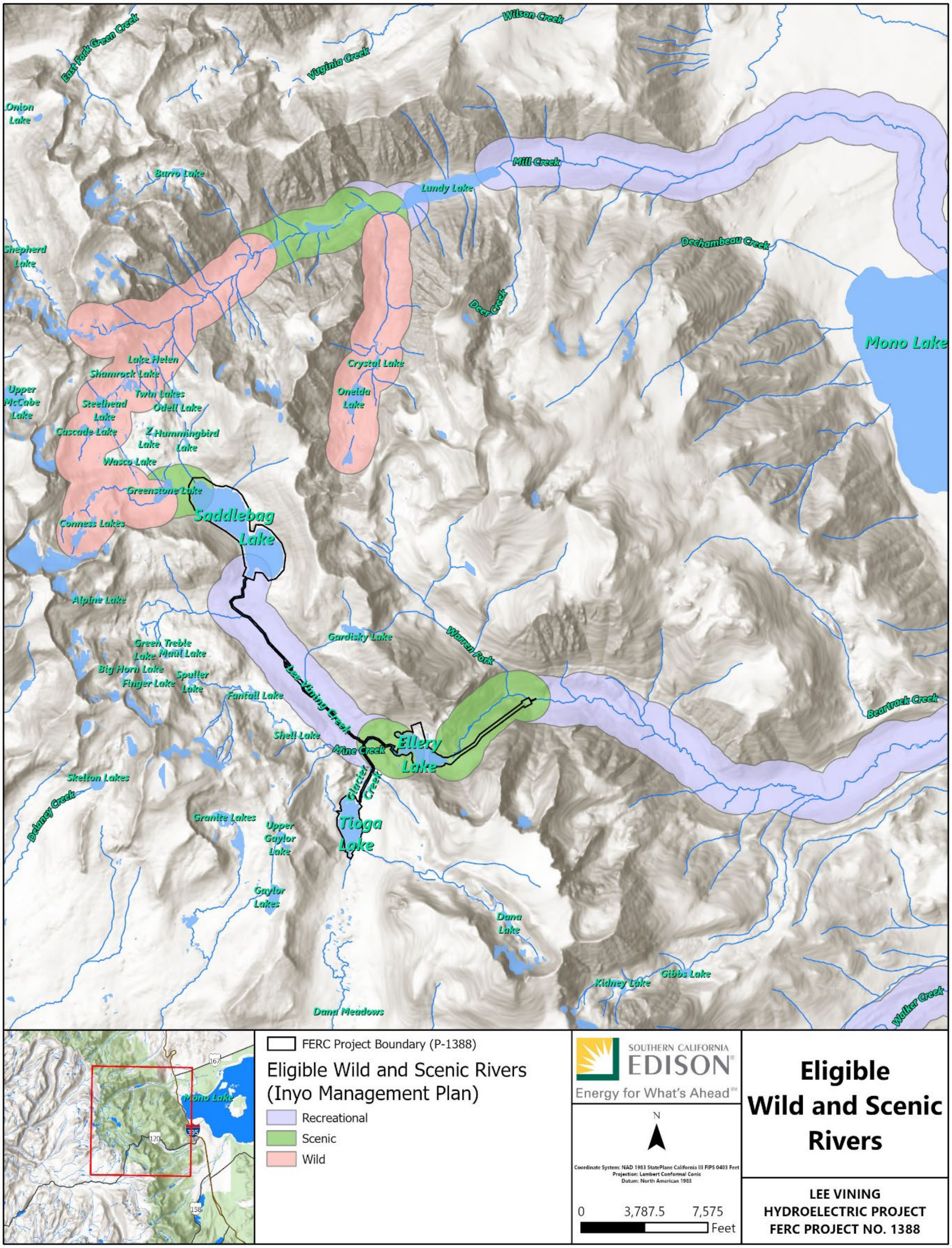


Figure 5.8-3. River Segments Eligible for National Wild and Scenic River System

5.8.9. State Protected River Segments

No rivers in the Project watershed are within the California Wild and Scenic River System (CDOT, 2020).

No rivers in the Project watershed are designated as California Wild or Heritage Trout Waters. The nearest such designation is approximately 8 miles southeast of the Project where Parker Lake is designated as California Wild Trout Water, including approximately 22 acres of aquatic habitat (CDFW, 2020b).

5.8.10. National Trail System

The National Trails System is composed of more than 55,000 miles of scenic, historic, and recreational trails that traverse wilderness, rural, suburban, and urban areas in 49 states (USFS, 2016). The nearest national trail to the Project is the Pacific Crest National Scenic Trail (PCT), which traverses along the western side of the Sierra Nevada crest through Yosemite National Park. The PCT extends approximately 2,650 miles from the Canadian border through Washington, Oregon, and California until reaching the Mexico border. The PCT is one of 11 national scenic trails and is considered one of the most remote, long-distance trails with over 54 percent of its path in designated wilderness (USFS, 2016). The Inyo National Forest actively manages only 86 miles of the PCT; however, approximately 1,378 total miles of the PCT are located in the Inyo National Forest, 787 miles of which are within designated wilderness (USFS, 2016).

5.8.11. Scenic Byways

One national forest scenic byway has been administratively designated on the Inyo National Forest in Lee Vining Canyon. The Lee Vining Canyon Scenic Byway is located along State Route 120, stretching between U.S. Route 395 (at 6,781 feet in elevation near the town of Lee Vining and Mono Lake) and the Yosemite National Park entrance (USFS, 2019).

5.8.12. Wilderness Areas

No portion of the FERC Project Boundary is within a designated wilderness area; however, the project is closely surrounded by two wilderness areas: the Hoover Wilderness to the north and Ansel Adams Wilderness to the south. The Hoover Wilderness was designated a wilderness area by Congress as part of the 1964 Wilderness Act and is managed jointly by the Inyo and Humboldt/Toiyabe National Forests. It encompasses approximately 128,000 acres and has become a popular hiking destination featuring spectacular scenery from the Great Basin to the crest of the Sierra Nevada. The Ansel Adams Wilderness was also designated a wilderness area as part of the 1964 Wilderness Act and is managed jointly by the Inyo and Sierra National Forests, as well as the Devils Postpile National Monument. The Ansel Adams Wilderness encompasses approximately 232,000 acres, spread along both sides of the Sierra Nevada and ranging in elevation from 3,500 to 13,157 feet. It too is a popular hiking destination, featuring 350 miles of trails, including portions of the John Muir Trail and PCT that wind through and past peaks, lakes, glaciers, and gorges (USFS, 2020c).

5.8.13. INYO NATIONAL FOREST LAND MANAGEMENT PLAN

Effective November 24, 2019, the 2019 Land Management Plan has been approved and is now the guiding direction for the Inyo National Forest, replacing the 1988 Land Management Plan and its amendments. The 2019 Land Management Plan is intended to identify long-term or overall desired conditions and provide general direction for achieving those desired conditions (USFS, 2019). Other relevant management and designated areas identified in the 2019 Land Management Plan are covered elsewhere in this document. The following sections will focus on Sustainable Recreation Management Areas and Recreation Opportunity Spectrums identified for the Project Area meant to provide management direction for future recreational experiences and activities (USFS, 2019).

5.8.13.1. Sustainable Recreation Management Areas

As shown on Figure 5.8-4, the 2019 Land Management Plan has designated all Project land within the Inyo National Forest as a Destination Recreation Area (High Use). Destination Recreation Areas are defined as having “high levels of recreation, supported by more facilities, amenities, and services than other areas” (USFS, 2019). Table 5.8-5 provides a summary of forest-wide desired conditions and potential management approaches related to Destination Recreation Areas in the Inyo National Forest.

The 2019 Land Management Plan also provides the following potential management approaches for Destination Recreation Areas in the Inyo National Forest:

- Changes in visitor use levels, patterns of use, or the necessity to protect resources may result in more infrastructure, heavier maintenance, or more controls such as setting capacity limits.
- Consider the future implications of additional infrastructure or development accommodating recreational use in areas adjacent to or within the developed area.
- Consider accommodating additional recreational special use authorizations or partnership agreements to support providing quality recreational experiences, visitor services, and interpretation and education.

Table 5.8-5. Desired Conditions and Management Approaches for Destination Recreation Areas

	Code	No.	Desired Condition
MA-DRA-DC	**01**	The developed area footprint within destination recreation areas is visually appealing and well maintained.	
MA-DRA-DC	**02**	A natural appearing landscape is retained outside the development footprint.	
MA-DRA-DC	**03**	Most recreational facilities are highly developed and in close proximity to each other.	
MA-DRA-DC	**04**	Developed sites meet national quality standards.	
MA-DRA-DC	**05**	Forest roads and trails provide users relatively easy access to destinations.	
MA-DRA-DC	**06**	The setting provides amenities and sustainable infrastructure to support a wide variety of recreational activities in close proximity to each other.	
MA-DRA-DC	**07**	Available infrastructure and amenities are consistent with user capacity.	
MA-DRA-DC	**08**	Interpretation and education activities provide learning opportunities to visitors about the natural and cultural environment and responsible visitor behavior.	
MA-DRA-DC	**09**	Traffic and parking does not negatively impact visitor experience.	

DC = Desired Condition; DRA = Destination Recreation Area

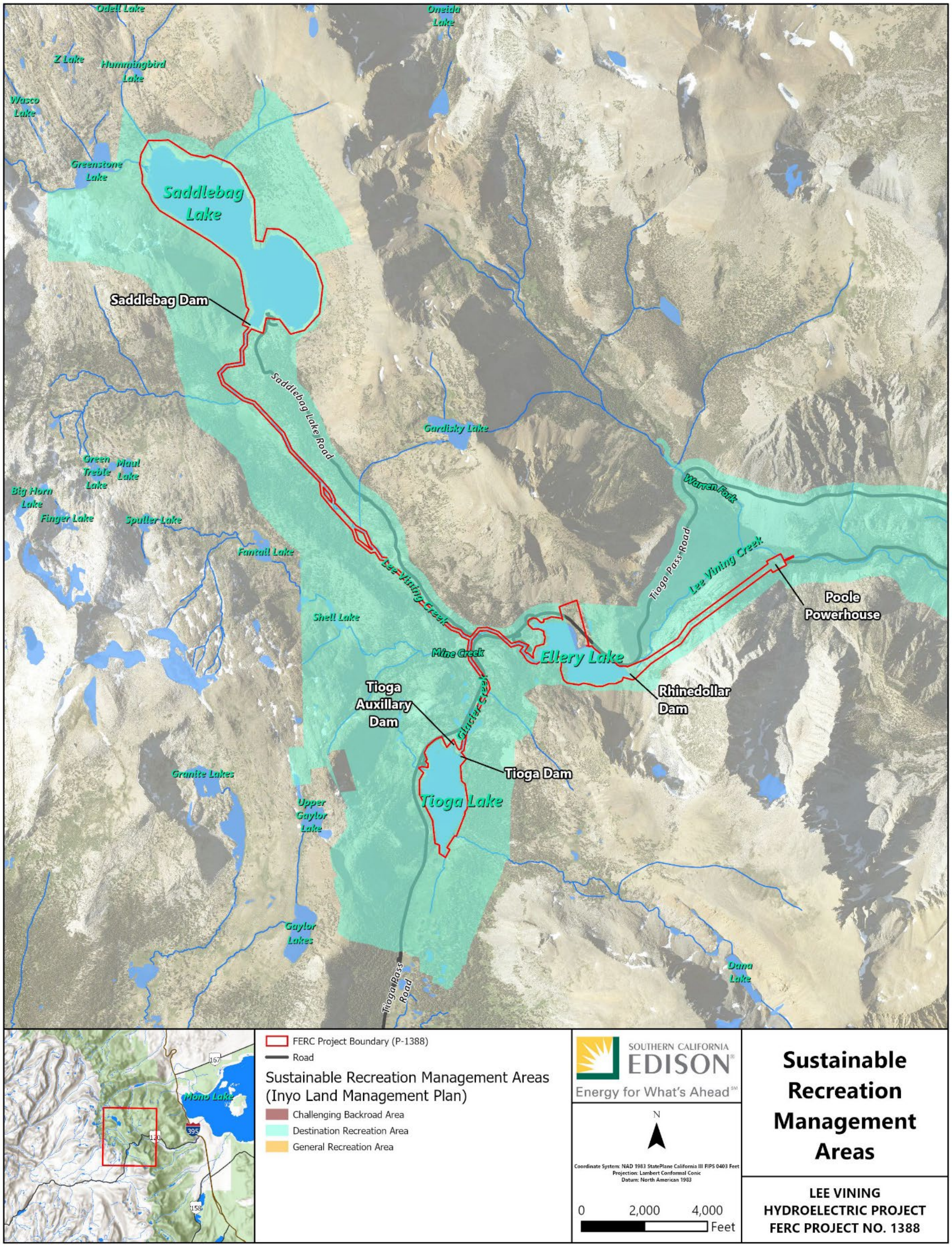


Figure 5.8-4. Sustainable Recreation Management Areas

5.8.13.2. Recreation Opportunity Spectrums

Recreation Opportunity Spectrums are designed to establish expectations and inform the management of settings when making decisions on facility and infrastructure design and development (USFS, 2019). As shown on Figure 5.8-5, the 2019 Land Management Plan identifies virtually all Project lands within the Inyo National Forest to be classified as Roaded Modified, while both Primitive and Semi-Primitive Non-Motorized each account for less than 1 percent of Project lands. Table 5.8-6 explains the physical, managerial, and social settings across each of these Recreation Opportunity Spectrums.

Table 5.8-6. Physical, Managerial, and Social Settings Across Recreation Opportunity Spectrums

Recreation Opportunity Spectrum	Physical Setting	Managerial Setting	Social Setting
Roaded Modified	**Theme:** Natural appearing with nodes and corridors of development such as campgrounds, trailheads, boat launches, and rustic, small-scale resorts **Infrastructure:** • Access–Classified road system for highway vehicle use • Fishing sites–Rivers, lakes, reservoirs with some facilities. • Camp/picnic sites–Identified dispersed and developed sites • Sanitation–Developed outhouses that blend with setting • Water supply–Often developed • Signing–Rustic with natural materials to more refined using a variety of materials such as fiberglass, metal, etc. • Interpretation–Simple roadside signs, some interpretive displays • Water crossing–Bridges constructed of natural materials	Opportunity to be with other users in developed sites; some obvious signs (information and regulation) and low to moderate likelihood of meeting Forest Service rangers	Moderate evidence of human sights and sounds; moderate concentration of users at campsites; little challenge or risk
Primitive	**Theme:** Remote, predominately unmodified, naturally evolving **Infrastructure:** • Access–Non-motorized trails • Fishing sites–Rivers and lakes • Camp/picnic sites–Not developed or defined, leave no trace • Sanitation–No facilities, leave no trace • Water supply–Undeveloped natural • Signing–Minimal, constructed of rustic, natural materials	Few signs, few encounters with rangers	Very high probability of solitude; closeness to nature; self-reliance, high challenge and risk; little evidence of people

Recreation Opportunity Spectrum	**Physical Setting**	**Managerial Setting**	**Social Setting**
	• Interpretation–Through self-discovery and at trailheads • Water crossing–Minimal, some bridges made of natural materials (wood) may exist but are rare		
Semi-Primitive Non-Motorized	**Theme:** Predominately natural/natural appearing; rustic improvements to protect resources **Infrastructure:** • Access–Non-motorized trails are present. Closed and temporary roads may be present but are not dominant on the landscape • Fishing sites–Rivers, lakes, and reservoirs • Camp/picnic sites–Not developed, leave no trace • Sanitation–No facilities, leave no trace • Water supply–Undeveloped natural • Signing–Rustic constructed of natural materials • Interpretation–Through self-discovery, at trailheads • Water crossing–Rustic structures or bridges made of natural materials	Minimum or subtle signing and regulations, some encounters with rangers	High probability of solitude, closeness to nature, self-reliance high to moderate challenge and risk; some evidence of others

Source: USFS, 2019

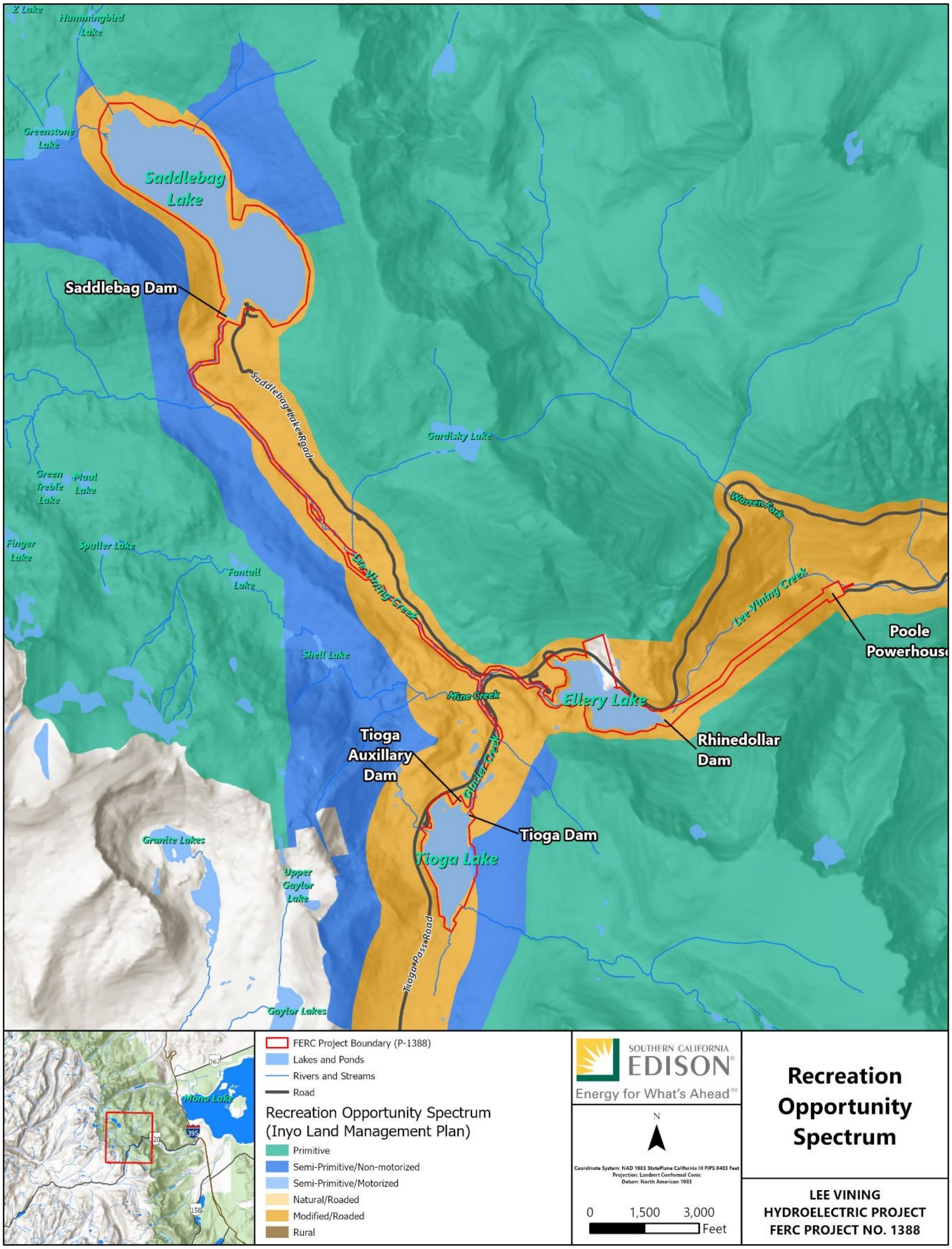


Figure 5.8-5. Recreation Opportunity Spectrum

5.8.14. Regionally or Nationally Important Recreation Areas

5.8.14.1. Yosemite National Park

Less than 1 mile southwest of Tioga Lake along State Route 120 is the entrance to Yosemite National Park, one of the most popular outdoor destinations in the world, boasting over 4 million annual park visitors and 4,586,463 visitors in 2019 (NPS, 2020a). It is most famous for the glacially carved granite walls and waterfalls of Yosemite Valley, but its approximately 759,620 acres of land extend well beyond the valley and feature meadows such as Tuolumne Meadows, giant sequoias, and vast wilderness areas (approximately 94 percent of the park) (NPS, 2020b), much of which is accessed along State Route 120 to the park's eastern entrance, where a large portion of those 4 million annual visitors make their way through the Inyo National Forest and the Project Area.

5.8.14.2. Mono Basin National Forest Scenic Area

Approximately nine miles downstream of Poole Powerhouse, Lee Vining Creek empties into Mono Lake, one of the oldest lakes in North America at over 700,000 years old. In 1984, Mono Basin was the first area to receive Congressional protection as a National Forest Scenic Area for its unique geologic, ecologic, and scenic resources.

5.9. Land Use

5.9.1. Introduction

This section describes land use and management for SCE's Lee Vining Project (FERC Project No. 1388) within and adjacent to the FERC Project Boundary. FERC content requirements for land use are specified in 18 CFR § 5.6(d)(3)(viii). A description of recreation resources is provided in Section 5.8, *Recreation*.

5.9.2. Information Sources

This section was prepared utilizing the following primary information sources:

- Inyo National Forest Land Management Plan (USFS, 2019)
- Mono County General Plan (Mono County, 2020)
- Multi-Resolution Land Characteristics (MRLC) Consortium's 2016 National Land Cover Database (NLCD) (MRLC Consortium, 2016)
- California Department of Forestry and Fire Protection (CAL FIRE) information (CAL FIRE, 2020a) and geographic information system (GIS) data (CAL FIRE, 2013, 2020b)

5.9.3. Land Use, Land Cover, and Land Management in the FERC Project Boundary and Adjacent Lands

The Project is located on Lee Vining and Glacier Creeks in the glacially carved upper Lee Vining Canyon, approximately 9 miles upstream of Mono Lake and the town of Lee Vining, California, and wholly within Mono County, California. Land ownership both within the FERC Project Boundary and within a 0.5-mile buffer of it are composed predominantly of federal lands administered by the Inyo National Forest, with a small portion of lands owned by SCE. According the FERC Project Boundary GIS data most recently approved and filed with FERC on January 7, 2013,[5] 97 percent (595.4 acres) of Project lands are federal lands administered by the USFS, and 3 percent (20.1 acres) are owned by SCE. However, according to Mono County tax data, it appears that a 4.6-acre parcel surrounding Poole Powerhouse is also owned by SCE but was represented as federal lands in the GIS data. Accordingly, the current FERC Project Boundary represents that approximately 96 percent (590.8 acres) of Project lands are owned by the USFS, and 4 percent (24.7 acres) are owned by SCE (Table 5.9-1 and Figure 5.9-1).

Table 5.9-1. Land Ownership within the FERC Project Boundary

Ownership	Acreage	Percentage of Total
Forest Service	590.8	96%
SCE	24.7	4%
Total Project Acreage	**615.5**	

SCE = Southern California Edison

[5] FERC's July 23, 2001, Order Amending License in Part, Approving Revised Exhibits, and Revising Annual Charges approved, in part, the deletion of the 6.4-mile-long, 115-kilovolt (kV) transmission line, extending from Poole Powerhouse to the Lee Vining Substation, from the Project license, to be effective on the date that SCE received all necessary permits or approvals from the USFS for the continued use of National Forest System Lands. These approvals were obtained in the form of a March 12, 2007, Electric Transmission Line Easement from the U.S. Forest Service authorizing the continued operation of the non-Project transmission line. In compliance with ordering paragraph (E) of FERC's July 23, 2001, Order, SCE filed the easement document and revised exhibit drawings with FERC on April 16, 2009. By order dated December 23, 2009, FERC approved the revised Exhibit G drawings, which reflect, in part, the deletion of the transmission line; however, the FERC Project Boundary GIS data filed with those drawings errantly did not delete the transmission line. All calculations assume the transmission line is no longer part of the FERC Project Boundary.

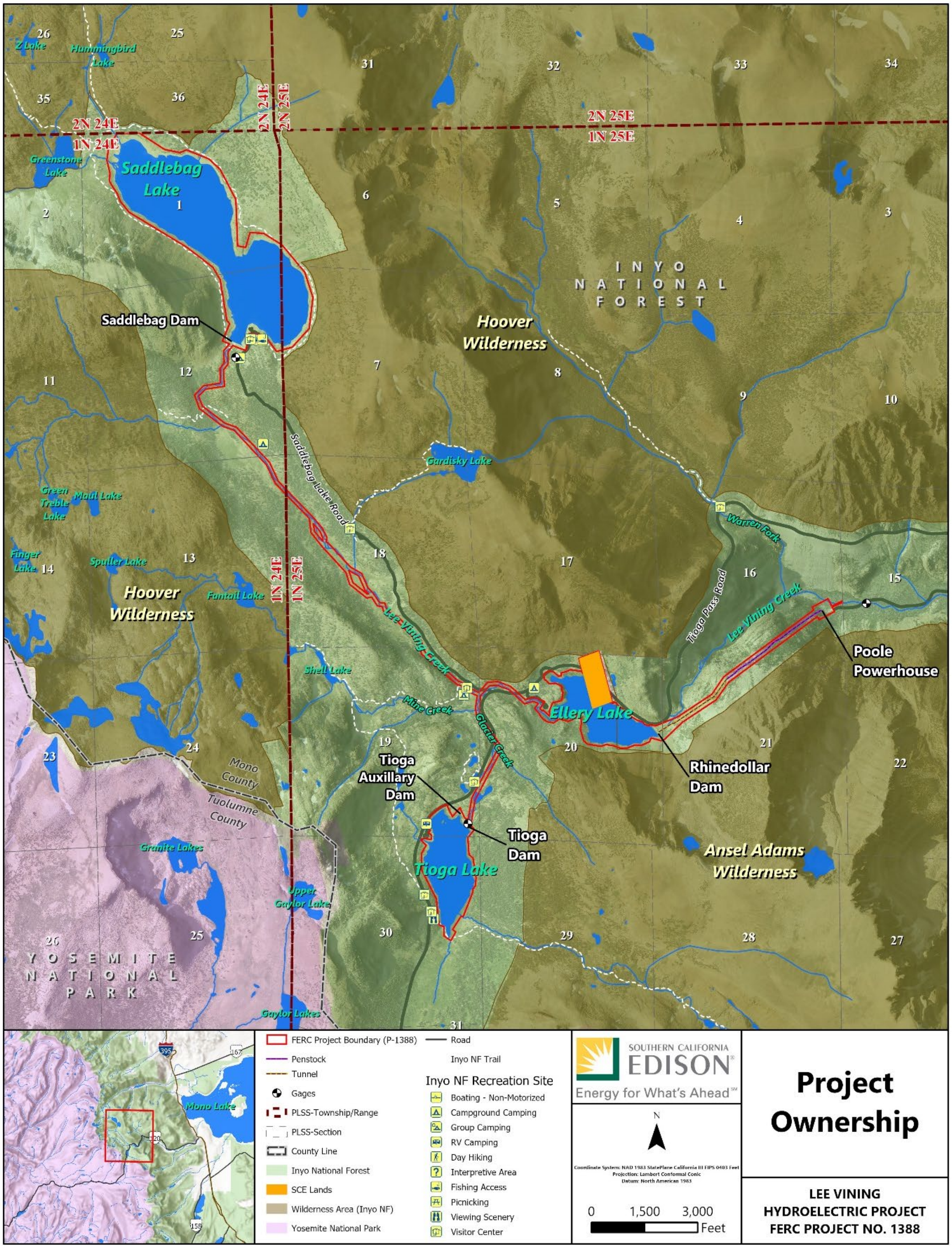


Figure 5.9-1. Project Land Ownership

Land use and cover within the FERC Project Boundary and within a 0.5-mile buffer of it was estimated by analyzing the MRLC Consortium's 2016 NLCD, which provides land use information by generalizing land cover within the area (MRLC Consortium, 2016), and is depicted on Figure 5.9-2. As summarized in Table 5.9-2, predominant land cover within the FERC Project Boundary is overwhelmingly classified as Open Water (62.2 percent), due largely to the narrowly drawn FERC Project Boundary around Project waters—Saddlebag, Tioga, and Ellery Lakes, and Lee Vining and Glacier Creeks.

The remainder of Project lands is largely dominated by Shrub/Scrub (21.19 percent) and Evergreen Forest (7.25 percent). To gain a better understanding of land use and cover in the broader Project Area, NLCD data was also analyzed within a 0.5-mile buffer of the current FERC Project Boundary. As is typical of the Upper Lee Vining Canyon, almost entirely within the Inyo National Forest, land cover is predominantly Shrub/Scrub (54.95 percent), Evergreen Forest (24.03 percent), Barren Land [Rock/Sand/Clay] (8.86 percent), and Open Water (6.72 percent).

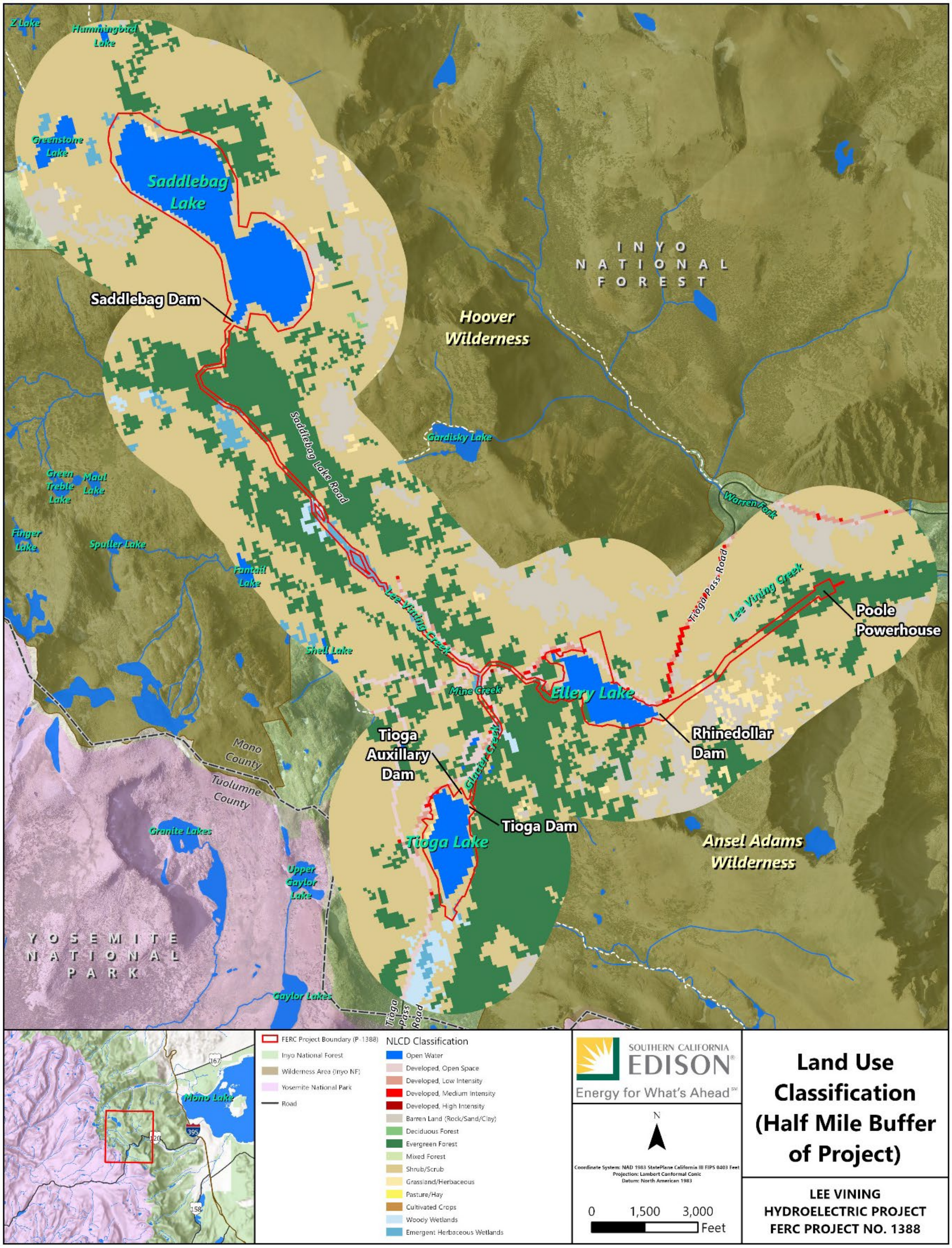


Figure 5.9-2. Land Use Classifications in Immediate Project Vicinity

Table 5.9-2. National Land Cover Database Classifications within the FERC Project Boundary

NLCD Classification	Description of Classification	0.5-mile Buffer of FERC Project Boundary		FERC Project Boundary	
		acres	percentage	acres	percentage
Shrub/Scrub	Areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage, or trees stunted from environmental conditions.	3,398.2	54.95%	130.4	21.19%
Evergreen Forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.	1,486.1	24.03%	44.7	7.25%
Barren Land (Rock/Sand/Clay)	Barren areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.	547.9	8.86%	23.0	3.73%
Open Water	All areas of open water, generally with less than 25% cover of vegetation or soil.	415.7	6.72%	382.9	62.21%
Developed, Open Space	Includes areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20% of total cover. These areas most commonly include large lot single-family housing units.	88.2	1.43%	6.6	1.07%
Grassland/ Herbaceous	Areas dominated by grammanoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling but can be utilized for grazing.	76.1	1.23%	7.3	1.18%

NLCD Classification	Description of Classification	0.5-mile Buffer of FERC Project Boundary		FERC Project Boundary	
		acres	percentage	acres	percentage
Emergent Herbaceous Wetlands	Areas where perennial herbaceous vegetation accounts for greater than 80% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.	70.6	1.14%	15.6	2.53%
Woody Wetlands	Areas where forest or shrub land vegetation accounts for greater than 20% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.	53.6	0.87%	2.6	0.43%
Developed, Low Intensity	Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20–49% of total cover. These areas most commonly include single-family housing units.	30.0	0.49%	1.7	0.28%
Developed, Medium Intensity	Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50–79% of the total cover. These areas most commonly include single-family housing units.	14.0	0.23%	0.8	0.14%
Deciduous Forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.	2.0	0.03%	0.0	0.00%
Developed, High Intensity	Includes highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/ industrial. Impervious surfaces account for 80–100% of the total cover.	1.3	0.02%	0.0	0.00%

FERC = Federal Energy Regulatory Commission; NLCD = National Land Cover Database

5.9.3.1. Shoreline Management Plan and Buffer Zones

There are no shoreline management plans or buffer zones associated with any of the Project reservoirs. The shorelines of Saddlebag and Tioga Lakes are located wholly on Inyo National Forest lands; a portion of the Ellery Lake shoreline is owned by SCE, with the remainder on Inyo National Forest lands. The FERC Project Boundary at each of these impoundments encompasses only the lands necessary for Project operations up to the reservoir elevation associated with the maximum operating capacity of each development. Generally, this boundary has been drawn through metes and bounds to encompass those reservoir elevations with a slight buffer due to the accuracy of the metes and bounds survey.

Article 410 of the Project license provides SCE the means to authorize specific uses and occupancies of Project shorelines that are not related to hydroelectric power or other Project purposes. These uses are typically referred to as non-Project uses. Currently, all non-Project use within the FERC Project Boundary is associated with recreational facilities managed by the Inyo National Forest or its concessionaires on Saddlebag, Tioga, and Ellery Lakes. Because all shoreline property is owned by either Inyo National Forest or SCE, there is no need for a formal permitting process or Shoreline Management Plan for this Project. SCE will continue to work with the Inyo National Forest on any activity associated with Project shorelines. It is SCE's general land use policy to provide an effective shoreline buffer that protects and enhances the Project's scenic, recreational, and other environmental values, while ensuring continued safe and reliable production of hydroelectric power.

5.9.3.2. Mono County General Plan

California Government Code §65300 requires each county to "adopt a comprehensive long-term general plan for the physical development of the county." Further, California Government Code § 65302(a) specifically requires that a land use element be included in each general plan. The land use element is generally considered to be the most representative section of the general plan. Its primary purpose is to "correlate all land use issues into a set of coherent development policies for the private lands in the unincorporated area of the county" (Mono County, 2020).

Mono County most recently updated the Land Use Element of its *Mono County General Plan* in 2020. According to the plan, all lands within the current Lee Vining FERC Project Boundary and within 0.5 mile of that boundary have been given the land use classification of Resource Management. The Resource Management designation is intended to recognize and maintain a wide variety of values in the lands outside existing communities and also indicates that the land may be valuable for uses including but not limited to recreation, surface water conservation, groundwater conservation and recharge, wetlands conservation, habitat protection for special-status species, wildlife habitat, visual resources, cultural resources, geothermal or mineral resources. The land may also need special management consideration due to the presence of natural hazards in the area (e.g., avalanche-prone areas, earthquake faults, flood hazards, or landslide or rockfall hazards) (Mono County, 2020). The majority of these lands is subject to the land use authority of the Inyo National Forest Service and is referred to in the 2019 Land Management Plan for the Inyo National Forest for guidance (Mono County, 2020). The Project falls within the Mono Basin community area, for which the Mono County General Plan has identified certain issues, opportunities, and constraints listed in Table 5.9-3, as well as specific goals and objectives listed in Table 5.9-4.

Table 5.9-3. Issues, Opportunities, and Constraints in the Mono Basin Community Area

No.	Issue/Opportunity/Constraint
1	Residents express conflicting sentiments about additional growth. The concept of a sustainable, successful economy is supported, but the fear is that communities will need to become too big or “citified” to achieve this, sacrificing the rural characteristics and healthy natural environment valued by residents. The challenge is to appropriately balance economic development goals with the desired rural community characteristics and protection of the natural, scenic, historical, and recreational values of the area. Growth does not necessarily mean becoming bigger; it could also mean improving what already exists within the current development footprint.
2	In cases where additional land is needed, the extremely limited private land base throughout the Mono Basin, and especially in Lee Vining, limits the potential for community expansion. Adjacent to Lee Vining, there is some potential for land exchanges or purchases either with the USFS or the LADWP. Policies and procedures are identified in the Landownership Adjustment Project Final Report.
3	Residents of Mono City are concerned about the expansion of their community beyond the current limits of the subdivision. They are concerned about possible impacts to visual quality and to the deer herd in the area. The impacts from increased traffic levels are also a concern.
4	Workforce housing opportunities, both to rent and buy, are needed to sustain the existing community and enable people to live where they work.
5	Residents are concerned about the visual appearance of Lee Vining, including vacant commercial properties, unattractive storage on residential lots, and the design of the built environment. High-quality design of the built environment that reflects the natural environment and protects open space and scenic values, along with green building practices, is supported.
6	Residents support public-service providers and the availability of services for all segments of the community, and also want to ensure infrastructure and facility development are compatible with the rural, natural, and scenic qualities of the Mono Basin. Mono City is concerned in particular about the adequacy of infrastructure to deliver water, and Lee Vining is particularly concerned about the sewage infrastructure.
7	Federal resource management agencies and LADWP own and manage much of the land in the Mono Basin. Residents expressed conflicting sentiments about protecting the natural environment and sensitive habitats versus the ability to use, access, and enjoy the land without overly restrictive regulations and/or fees. The challenge is to work with other agencies and within regulations to ensure the ability to use and enjoy the land while protecting its health.
8	Agriculture and grazing, including cows and sheep, was common in the Mono Basin at one time and is greatly reduced or does not exist now. The pastoral nature of agriculture and grazing, sheep grazing in particular, was part of the character of the Basin, a basis for an historical way of life, and is highly valued by some. Possibilities exist to adapt sheep-grazing practices to be compatible with resource protection and even to be used to enhance management of the natural landscape.

No.	Issue/Opportunity/Constraint
9	Residents are deeply concerned about vacant commercial properties in Lee Vining. The desire is to improve both the visual appearance and economic health of the community by addressing these properties through efforts such as commercial revitalization and investment, Main Street revitalization, the creation of a more business-friendly environment, and the protection of local economic assets and opportunities.
10	The physical layout of Lee Vining's Main Street area, where a five-lane highway under the authority of Caltrans bisects the corridor, creates challenges for establishing a vibrant, walkable commercial area, ensuring safe and convenient pedestrian crossings, and creating physical connectivity between the east and west sides of the highway.
11	Residents are concerned about the lack of jobs that enable people to live in the community. An increase in employment opportunities and diversity, along with a sustainable and diversified economy, is generally supported.
12	Residents are deeply concerned about bringing the community together in order to overcome prejudice, support equal opportunity, reach across cultural barriers, and build social capacity. Residents would like to increase the social capacity and vitality of their communities by encouraging citizens to contribute to community life. A concern is that increasing second-home ownership results in residents who do not participate in the community.
13	Residents are interested in Conway Ranch operations, and generally support sheep grazing, aquaculture and other historic agricultural uses and infrastructure. Water availability is a concern, with apparent support for Conway Ranch to receive its full allotment of water. Opportunities for expanding the agricultural operations are also of interest.
14	Residents are interested in upland water management in the north. Identified issues include general water distribution and flows, the de-watering of historically green ranches and meadows, riparian habitat and stream health, maximizing water delivery to Mono Lake, and water for Conway Ranch operations.

Source: Mono County, 2020

LADWP = Los Angeles Department of Water and Power; USFS = U.S. Forest Service

Table 5.9-4. Goals and Objectives in the Mono Basin Community Area

Goal	Description of Goal	Objectives
10	Maintain the spectacular natural values of the Mono Basin and rural, small-town character of communities by managing growth, ensuring high-quality aesthetics, and providing for community development needs to enhance the quality of life for residents.	*Objective 10.A.* Provide for the orderly growth of Lee Vining in a manner that retains the small-town character by directing future development to occur in and adjacent to Lee Vining. *Objective 10.B.* Manage buildout of the Mono City subdivision to retain its rural character. *Objective 10.C.* Encourage building types and architectural design compatible with the scenic and natural attributes of the Mono Basin. *Objective 10.D.* Maintain, protect, and enhance the natural, historical, and recreational attributes of the Mono Basin. *Objective 10.E.* Promote well-planned and functional community uses that retain small-town character and increase quality of life. *Objective 10.F.* Provide appropriate public infrastructure and service capability expansion to support development, public safety, and quality of life.
11	Grow a sustainable local economy with diverse job opportunities that offers year-round employment and wages that reflect the cost of living in the area.	*Objective 11.A.* Plan for a diversified, sustainable economy. *Objective 11.B.* Enhance and support the existing tourism-related economy *Objective 11.C.* Diversify the existing economic base and employment opportunities to achieve a more sustainable economy.
12	Build a safe, friendly community where people feel connected, work together to resolve community issues, and are involved in community activities and events.	*Objective 12.A.* Build healthy social connections and interactions that contribute to a sense of community. *Objective 12.B.* Encourage and support local events and programs that provide community and youth activities, capitalize on the tourist economy, and bring the community together. *Objective 12.C.* Encourage people to volunteer in the community and participate in events.

Source: Mono County, 2020

Notes:

Objectives 10 through 12 pertain to the Mono Basin Community Area, in which the Lee Vining Project is located.

Refer to the Land Use Element portion of General Plan for further definition of policies and actions for each proposed objective.

5.9.3.3. Inyo National Forest Land Management Plan

Effective November 24, 2019, the 2019 Inyo National Forest Land Management Plan (2019 LMP) was approved and is now the guiding direction for the Inyo National Forest, replacing the 1988 land management plan and its amendments. The 2019 LMP is intended to identify long-term or overall desired conditions and provide general direction for achieving those desired conditions (USFS, 2019). As it relates to land use, special uses of National Forest System lands are managed in a way that protects natural resources, public health, and safety. Table 5.9-5 provides a summary of forest-wide desired conditions related to land use in the Inyo National Forest. Further details regarding guidelines and potential management approaches for each desired condition may be found in the 2019 LMP.

Table 5.9-5. Inyo National Forest Forest-wide Desired Conditions Related to Land Use at the Project

Code	No.	Forest-wide Desired Land Use Conditions
LAND-FW-DC	01	Land ownership and access management support authorized activities and uses on National Forest System lands. Land exchanges promote improved management of National Forest System lands.
LAND-FW-DC	02	Coordination of land and resource planning efforts with other Federal, State, Tribal, county, and local governments, and adjacent private landowners, promotes compatible relationships between activities and uses on National Forest System lands and adjacent lands of other ownership.
INFR-FW-DC	01	A minimum and efficient national forest transportation system, administrative sites, and other infrastructure and facilities are in place and maintained at least to the minimum standards appropriate for planned uses and the protection of resources.
INFR-FW-DC	02	Management operations on the Inyo National Forest are energy and water efficient.
INFR-FW-DC	03	Roads allow for safe and healthy wildlife movement in areas of human development. Vehicular collisions with animals are rare.
REC-FW-DC	01	The diverse landscapes of the Inyo National Forest offer a variety of recreation settings for a broad range of year-round, nature-based recreation opportunities. Management focuses on settings that enhance the national forest recreation program niche.
REC-FW-DC	02	The condition, function, and accessibility of recreation facilities accommodate diverse cultures with appropriate activities available to the public.
REC-FW-DC	03	Recreation opportunities provide a high level of visitor satisfaction. The range of recreation activities contribute to social and economic sustainability of local communities.
REC-FW-DC	04	Areas of the national forest provide for a variety of activities with minimal impact on sensitive environments and resources.
REC-FW-DC	05	Visitors can connect with nature, culture, and history through a range of sustainable outdoor recreation opportunities.
REC-FW-DC	06	The management and operation of facilities are place based, integrated, and responsive to changes that may limit or alter access.

Code	No.	Forest-wide Desired Land Use Conditions
REC-FW-DC	07	New developed recreation infrastructure is located in ecologically resilient landscapes, while being financially sustainable, and responsive to public needs.
REC-FW-DC	08	Summer dispersed recreation occurs in areas outside of high visitation, developed facilities, or communities, and does not adversely impact natural or cultural resources.
REC-FW-DC	09	Permitted recreation uses, such as recreation special events or guided activities, are consistent with recreation settings, protect natural and cultural resources, and contribute to the economic sustainability of local communities.
REC-FW-DC	10	Forest recreation information is current, connecting people to the national forest through contemporary means including social media and available technology. Diverse communities are aware of recreation opportunities on the Inyo National Forest.
REC-FW-DC	11	The Inyo National Forest provides a range of year-round developed and dispersed recreation settings that offer a variety of motorized and non-motorized opportunities and recreation experiences.
REC-FW-DC	12	Trails used in summer provide access to destinations, provide for opportunities that connect to a larger trail system, provide linkages from local communities to the national forest, and are compatible with other resources.
REC-FW-DC	13	Trails meet trail management objectives based on trail-class and designed use.
SCEN-FW-DC	01	The Inyo National Forest provides a variety of ecologically sound, resilient, and visually appealing forest landscapes that sustain scenic character, supporting the national forest recreation program niche in ways that contribute to visitors' sense of place and connection with nature.
SCEN-FW-DC	02	Scenic character is maintained and/or adapted to changing conditions to support ecological, social, and economic sustainability on the Inyo National Forest and in surrounding communities.
SCEN-FW-DC	03	Scenic integrity is maintained in places people visit for high quality viewing experiences.
SCEN-FW-DC	04	The Inyo National Forest's scenic resources complement the recreation settings and experiences, as described by the range of scenery integrity objectives, while reflecting healthy and sustainable ecosystem conditions.
SCEN-FW-DC	05	The built environment meets or exceeds scenic integrity objectives and contributes to scenic stability.

Source: USFS, 2019

The 2019 LMP defines the following seven management areas for the Inyo National Forest: fire management zones, conservation watersheds, riparian conservation areas, sustainable recreation, recommended wilderness, eligible wild and scenic rivers, and the PCT corridor. The Lee Vining FERC Project Boundary and its 0.5 mile buffer fall within five of the seven management areas, as listed in Table 5.9-6.

Table 5.9-6. Inyo National Forest Management Areas Relevant to Project

Management Area	Discussion of Relevance to the Project
Fire Management Zones	Discussed in detail in Section 5.9.3.4., *Fire History and Fuels Management*
Conservation Watersheds	Discussed in detail in Section 3.0, *General Description of the River Basin*
Riparian Conservation Watersheds	Discussed in detail in Section 5.6, *Wetland, Riparian, and Littoral Habitat*
Sustainable Recreation	Discussed in detail in Section 5.8.13.1., *Sustainable Recreation Management Areas*
Eligible Wild & Scenic Rivers	Discussed in detail in Section 5.8.8., *National Wild and Scenic River System*

The 2019 LMP also defines the following ten designated areas for the Inyo National Forest: wilderness, Mono Basin National Forest Scenic Area, wild and scenic rivers, Ancient Bristlecone Pine Forest National Protection Area, the PCT, inventoried roadless areas, national recreation trails, research natural areas, scenic byways, and wild horse and burro territories. The only designated area to cross the FERC Project Boundary and its 0.5-mile buffer is the Lee Vining Canyon Scenic Byway (discussed in more detail in Section 5.8.11., *Scenic Byways*), which crosses the FERC Project Boundary multiple times as it runs along Ellery and Tioga Lakes. While not affecting the FERC Project Boundary and its 0.5-mile butter, the following designated areas are found near the Project:

- Hoover and Ansel Adams Wilderness Areas, which closely encompass the FERC Project Boundary (Section 5.8.12., *Wilderness Areas*);
- Inventoried Roadless Areas within the Upper Lee Vining Canyon;
- Mono Basin National Forest Scenic Area approximately 9 miles downstream of the Project and surrounding Mono Lake; and
- Harvey Monroe Hall Research Natural Area just west of the Project in the Hoover Wilderness and which can be accessed by the Carnegie Station Trail that crosses the FERC Project Boundary.

While no wild and scenic rivers are currently found in the Upper Lee Vining Canyon, the entirety of Lee Vining Creek within the FERC Project Boundary has been determined to be eligible for listing according to a variety of wild, scenic, and recreational values (Section 5.8.8., *National Wild and Scenic River System*).

5.9.3.4. Fire History and Fuels Management

According to CAL FIRE data, since 1910, there have been no recorded wildfires within or directly adjacent to the FERC Project Boundary or in the Upper Lee Vining Canyon (CAL

FIRE, 2020b). If the search is expanded to a 5-mile radius from the FERC Project Boundary, 11 wildfires have been recorded, as shown in Table 5.9-7.

Table 5.9-7. Wildfires within 5 Miles of the FERC Project Boundary Since 1910

Wildfire Name	Start Date	Containment Date	Cause	Acres Burned	Location
Unnamed	8/1/1970	8/1/1970	Playing with Fire	36.0	Inyo National Forest
Tioga	7/14/1996	7/16/1996	Lightning	13.8	Inyo National Forest
Azusa	5/29/2000	6/1/2000	Campfire	700.5	Inyo National Forest
Tioga	8/16/2008	8/20/2008	Miscellaneous	22.2	Inyo National Forest
Unnamed	1979	1979	Lightning	114.1	Yosemite National Park
Conness	9/13/1995	12/11/1995	Lightning	197.9	Yosemite National Park
Lembert	7/15/2014	10/31/2014	Lightning	4.4	Yosemite National Park
Gaylor	7/5/2014	7/6/2014	Campfire	0.1	Yosemite National Park
Unnamed	1977	1977	Unknown	9.9	Yosemite National Park
Walker	8/14/2015	10/31/2015	Miscellaneous	3815.9	Inyo National Forest
Marina	6/24/2016	7/7/2016	Miscellaneous	641.2	Inyo National Forest

Source: CAL FIRE, 2020b

Fire prevention and fuels management within and adjacent to the FERC Project Boundary are primarily provided by the Inyo National Forest through a cooperative program that involves an agreement for the exchange of fire protection services with federal wildland fire agencies, including the USFS, BLM, and National Parks Service (CAL FIRE, 2020a). The goal of the agreement is for the closest agency to respond to a wildfire, regardless of jurisdiction. Through this cooperative relationship, California is able to access federal and state resources throughout the United States to help in times of disaster, when CAL FIRE resources are depleted. In turn, CAL FIRE provides assistance, through interstate compact agreements, to the federal and other state wildfire agencies throughout the nation (CAL FIRE, 2020a).

According to CAL FIRE data, approximately 87 percent of Lee Vining Project lands are federal responsibility, and the remaining 13 percent are recognized as State Responsibility Areas by the Board of Forestry and Fire Protection where CAL FIRE is the primary emergency response agency responsible for fire suppression and prevention (Figure 5.9-3) (CAL FIRE, 2020b). These are typically lands covered wholly or in part by timber, brush, undergrowth, or grass, whether of commercial value or not, which protect the soil from erosion, retard runoff of water or accelerated percolation, and lands used principally for range or forage purpose (CAL FIRE, 2013).

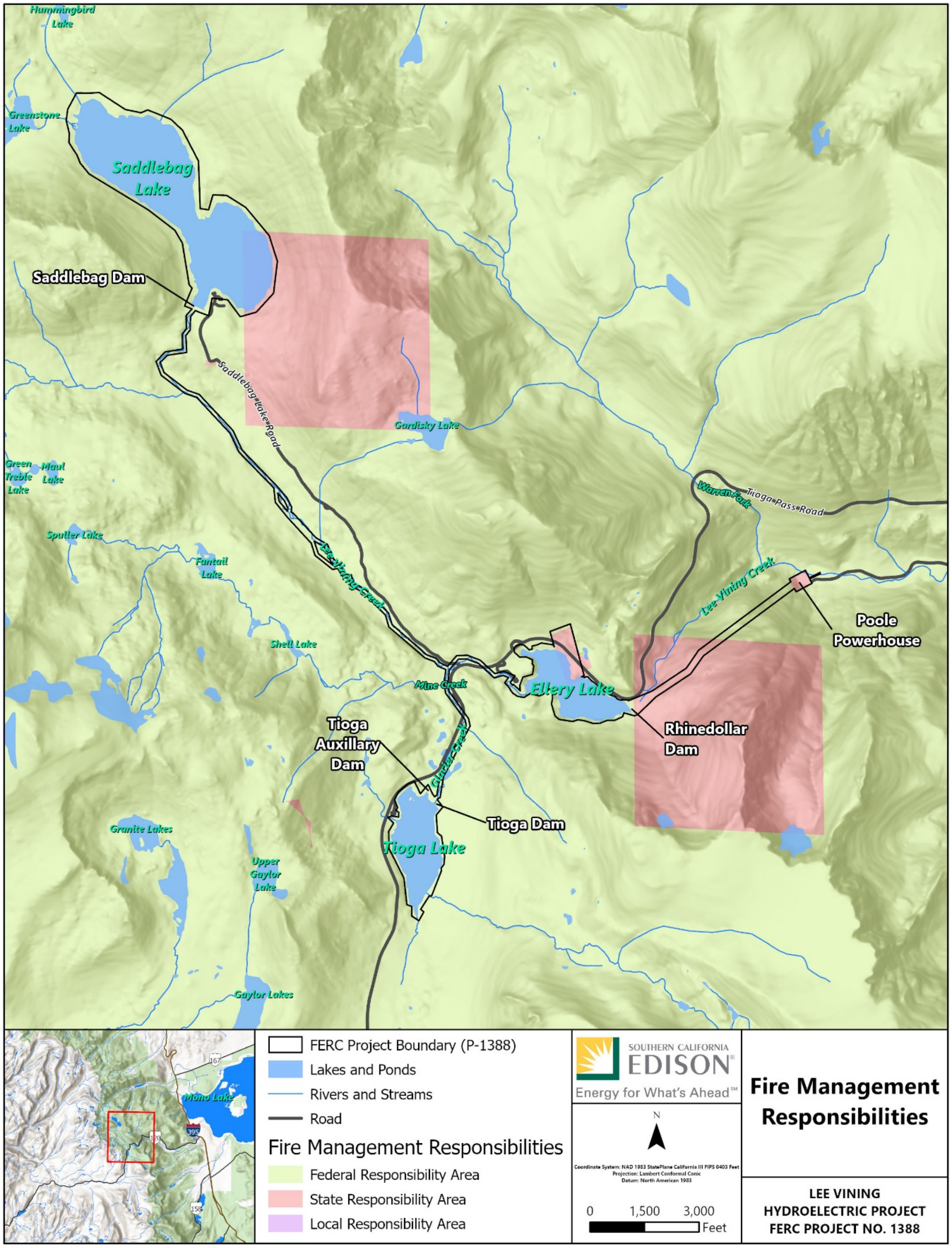


Figure 5.9-3. Federal and State Fire Management Responsibilities

As part of the development of the 2019 LMP, the Inyo National Forest designated strategic fire management zones to "support decision makers before a fire ignition occurs by pre-assessing the risk and benefits from wildland fire (both wildfire and prescribed fire) to areas on the landscape" (USFS, 2019). As shown on Figure 5.9-4, the portion of the Lee Vining Project within the Inyo National Forest falls within three strategic fire management zones, based on wildfire risk: Wildfire Restoration (88.2 percent of FERC Project Boundary), General Wildfire Protection (7.1 percent of FERC Project Boundary), and Community Wildfire Protection (2.5 percent of FERC Project Boundary). These fire management zones and desired conditions are described below in Table 5.9-8.

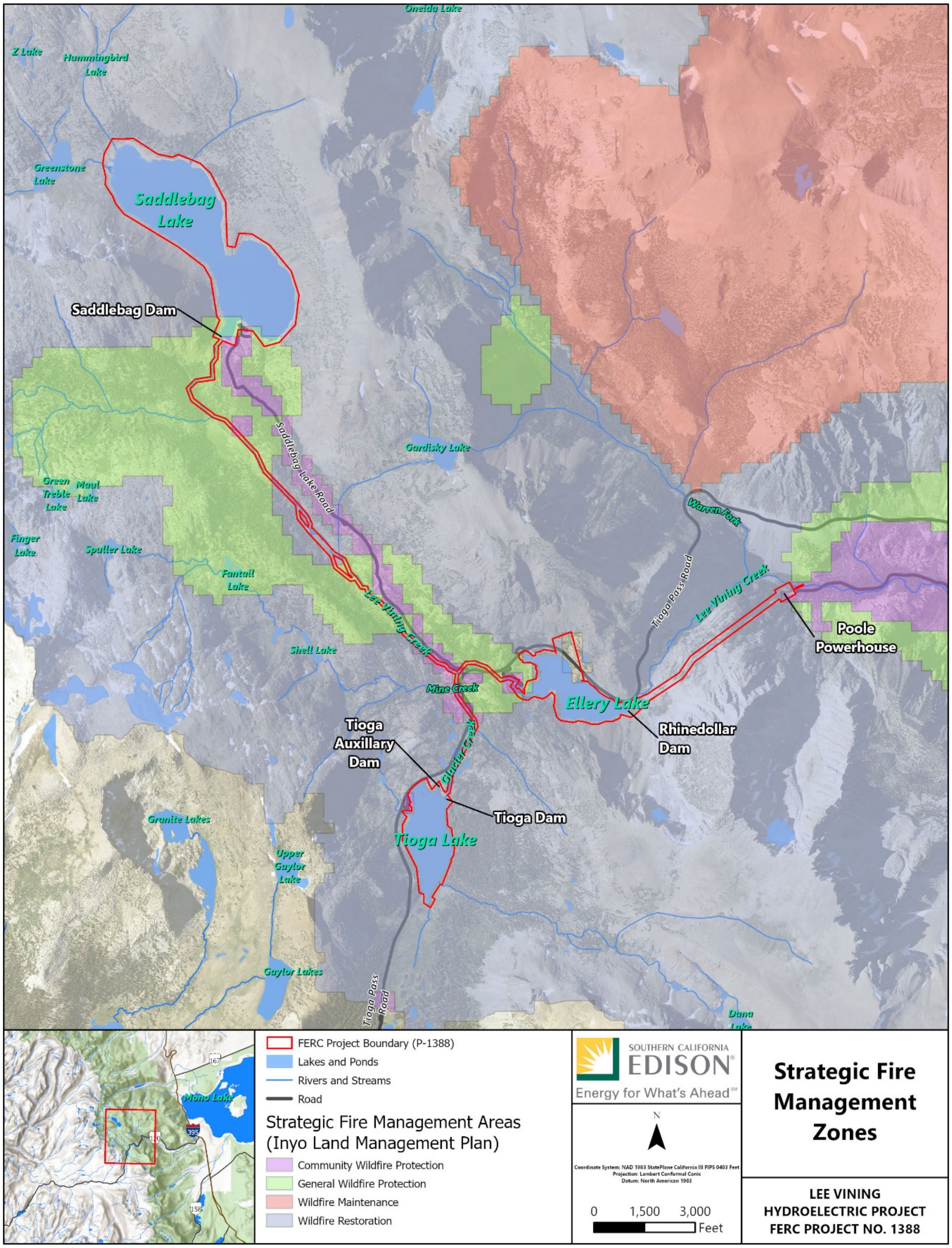


Figure 5.9-4. Strategic Fire Management Zones (Inyo National Forest Land Management Plan)

Table 5.9-8. Fire Management Zones and Desired Conditions in FERC Project Boundary

Strategic Fire Management Zone	Zone Description	Desired Conditions
Wildfire Restoration	The wildfire restoration zone identifies where conditions currently put some natural resource values at moderate risk of damage from wildfire. In general, wildfires that start in this zone pose a low to moderate threat to communities in average fire season conditions. Wildfires that burn in this zone can potentially benefit natural resources, but only under limited environmental conditions. Managing wildfires to meet resource objectives in this zone can be constrained due to fuel conditions and moderate risk to natural resources from wildfire. This zone is where some ecological restoration may be needed before using wildland fire under a wider range of weather, fuel moisture, and other environmental conditions.	01 The landscape is resilient to a range of fire effects, and wildland fire has a predominately positive benefit to ecosystems and resources. 02 Wildfire is managed to meet resource objectives under a wide range of environmental conditions. 03 The landscape is resilient to the impacts of wildfire. Over time, risk to natural resources is reduced sufficiently in the wildfire restoration zone to allow some areas to be categorized in the wildfire maintenance zone.
General Wildfire Protection	The general wildfire protection zone identifies where conditions currently put some natural resource and/or community values at high risk of damage from wildfire. In some areas, wildfires in the general wildfire protection zone may have negative effects on natural resources due to the natural fire regime and condition of the ecosystem. Wildfires that start in the general wildfire protection zone in some areas can contribute to the high fire risk in the community wildfire protection zone. Managing wildfires to meet resource objectives in this zone is often considerably constrained due to fuel conditions, the high risk of loss of natural resources, and the potential adverse impacts to communities threatened by wildfires starting in this zone. Although some wildfires that burn in this zone can potentially benefit some natural resources, high negative impacts to many natural resources are more likely under most weather, fuel moisture, and other environmental conditions during the fire season. Targeted ecological restoration and hazardous fuel reduction are needed in the general wildfire protection zone to safeguard communities and resources.	01 The threat to communities from wildfires starting in this zone is minimal due to vegetation conditions reaching a balance between excessive fuel loading and terrestrial ecosystem desired conditions. 02 The landscape is resilient and can tolerate varying effects of wildfires. Over time, risk to values is reduced sufficiently in the general wildfire protection zone to allow some areas to be placed in a lower risk zone including the wildfire restoration and wildfire maintenance zones.
Community Wildfire Protection	The community wildfire protection zone encompasses locations where communities, community assets, and private land could be at a very high risk of damage from wildfire where high fuel loadings exist. Wildfires that start in this zone contribute more to potential loss of community	01 Areas adjacent to communities with current high fire risk have low fuel loadings, designed to result in less intense fire behavior and to facilitate safe wildland fire operations. In some cases,

Strategic Fire Management Zone	Zone Description	Desired Conditions
	assets than any other strategic fire management zone. Within this zone, community buffer areas are identified and used to strategically mitigate vegetation directly adjacent to structures and allow for safer conditions for firefighters. Community buffers are measured from the structures in the community (see glossary). Maximum width of the buffer is based on potential fire behavior in adjacent areas under extreme fire weather conditions. The maximum width is sufficient to provide low radiant heat from areas of untreated fuels. Although some wildfires that burn in this zone can potentially benefit natural resources and help decrease fuels and threats from future wildfires, these potential benefits are less likely under most weather, fuel moisture, and other environmental conditions due to the very high risk to community assets during the fire season. The long-term focus is to create fire-adapted communities that are less reliant on aggressive wildfire protection. Under most weather and fuel conditions, wildfire mitigation, fuel reduction treatments, and fire protection is needed in the community wildfire protection zone to prevent direct threats to life or property. Wildfire is suppressed under most weather and fuel conditions due to the very significant risk of potential economic loss and public safety concerns posed by a wildfire occurring within this zone.	terrestrial ecosystem desired conditions may not be met. 02 Over time, risk to communities is reduced sufficiently in the community wildfire protection zone to allow some areas to be placed in a lower risk zone including the general wildfire protection or wildfire restoration zones.

To reduce fire hazards associated with Project facilities, SCE implements preventative measures that focus on threat to employees and facilities and include vegetative management, inspection of facilities, and mitigation of potential wildfire hazards that could impact business operations, employees, and SCE infrastructure (Kleinschmidt Associates, 2018). Vegetation management activities generally include the annual inspection and removal of vegetation threats to communications sites; evacuation routes; powerhouses and buildings; substations and switching yards; and SCE residential units (Kleinschmidt Associates, 2018). Other inspection activities include annual updates of the wildfire threat to Bishop/Mono Hydroelectric Operations and annual inspections of firehouse boxes (Kleinschmidt Associates, Inc., 2018). More specifically, SCE has identified three objectives to reduce wildfire risk at the Project site as detailed in Table 5.9-9 below. More detailed information regarding fire suppression and management at the Project site is found in SCE's Emergency Management Plan for the Project, much of which is considered CEII and not discussed here.

Table 5.9-9. SCE Wildfire Mitigation Strategies

Objective	Description
1: Prioritize vegetation management to mitigate wildfire hazard	• Remove high-risk vegetation identified by Vulnerability Assessment and maintain vegetated areas to meet or exceed the requirements of the California State Fire Law (Public Resources Code Section 4291). This includes a 30-foot zone where all flammable vegetation is removed and an additional 70-foot-wide zone of fuel modification. This includes thinning or reducing the height of brush and removal of tree limbs that serve as fuel ladders for fires to climb up into oaks and other tree species. These standards apply to all powerhouses, SCE buildings, equipment storage yards and communication sites. Some facilities currently meet Public Resources Code Section 4291 requirements, and some do not.
2: Ensure essential personnel can safely operate the Project	• Define coordinated evacuation routes and procedures. • Define and develop shelter-in-place procedures and supplies. o Food/logistics cache at Bishop Control Room and Lee Vining Substation/office. o Additional Logistics cache to be defined by SCE manager for the area. • Define essential personnel to coordinate evacuation access with the Sheriff. • Consider changing employee tours of duty on especially hot, dry, and/or windy summer days to avoid being in high risk fire zones during the afternoon hours.
3: Ensure operational communications methods support a safe and coordinated response to a wildfire for SCE personnel	• Assess operational communications strategy to improve communications throughout the Project Area, including satellite phone communications for powerhouses, intakes, and employee use along water conveyance systems. • Radio coverage in the area is generally good. In most cases, cell phones are used for day to day communications.

Source: Kleinschmidt Associates, Inc., 2018

SCE = Southern California Edison

5.10. Aesthetic Resources

5.10.1. Introduction

This section describes the aesthetic resources at and in the vicinity of SCE's Lee Vining Project (FERC Project No. 1388). Aesthetic resources include the visual characteristics of the lands and waters affected by the Project including a description of the dam, natural water features, and other scenic attractions of the Project and surrounding vicinity.

5.10.2. Information Sources and Visual Resources Management Plans

This section was prepared utilizing the following primary information sources:

- USDA Forest Service, Inyo National Forest main website (USFS, 2020a)
- *Land Management Plan for the Inyo National Forest* (USFS, 2019)
- National Forest Foundation data on the Inyo National Forest (NFF, 2020)

5.10.3. Project Facilities

5.10.3.1. Project Lands and Waters

The Project is located on Lee Vining and Glacier Creeks in the glacially carved upper Lee Vining Canyon, approximately 9 miles upstream of Mono Lake and the town of Lee Vining, California, and 1 mile north of the eastern entrance to Yosemite National Park. Land ownership both within the FERC Project Boundary and within a 0.5-mile buffer of it are composed predominantly of federal lands administered by the Inyo National Forest, with a small portion of lands owned by SCE. According to the FERC Project Boundary GIS data most recently approved and filed with FERC on January 7, 2013,[6] 97 percent (595.4 acres) of Project lands are owned by the USFS, and 3 percent (20.1 acres) are owned by SCE. However, according to Mono County tax data, it appears that a 4.6-acre parcel surrounding Poole Powerhouse is also owned by SCE but was represented as federal lands in the GIS data. Accordingly, the current FERC Project Boundary represents that approximately 96 percent (590.8 acres) of Project lands are owned by the USFS, and 4 percent (24.7 acres) are owned by SCE (Table 5.10-1). See Section 5.9, *Land Use*, for additional details.

Table 5.10-1. Land Ownership within the FERC Project Boundary

Ownership	Acreage	Percentage of Total
USFS	590.8	96%
SCE	24.7	4%
Total Project Acreage	**615.5**	

SCE = Southern California Edison; USFS = U.S. Forest Service

[6] FERC's July 23, 2001, Order Amending License in Part, Approving Revised Exhibits, and Revising Annual Charges approved, in part, the deletion of the 6.4-mile-long, 115-kilovolt (kV) transmission line, extending from Poole Powerhouse to the Lee Vining Substation, from the Project license, to be effective on the date that SCE received all necessary permits or approvals from the USFS for the continued use of National Forest System Lands. These approvals were obtained in the form of a March 12, 2007, Electric Transmission Line Easement from the USFS authorizing the continued operation of the non-Project transmission line. In compliance with ordering paragraph (E) of FERC's July 23, 2001, order, SCE filed the easement document and revised exhibit drawings with FERC on April 16, 2009. By order dated December 23, 2009, FERC approved the revised Exhibit G drawings, which reflect, in part, the deletion of the transmission line; however, the FERC Project Boundary GIS data filed with those drawings errantly did not delete the transmission line. All calculations assume the transmission line is no longer part of the FERC Project Boundary.

5.10.3.2. Visual Character of the Project

Project facilities include three dams and reservoirs, an auxiliary dam, an underground flowline consisting of a pipeline and penstock, and a powerhouse (see Figure 1.1-1). The principal project features were constructed in the early 1920s and have been part of the landscape and scenic character of the Lee Vining Canyon for approximately 100 years.

Saddlebag Dam impounds the 297-acre Saddlebag Lake; Tioga Dam impounds the 73-acre Tioga Lake; and Rhinedollar Dam impounds the 61-acre Rhinedollar (Ellery) Lake. Both Saddlebag Lake and Tioga Lake drain into Ellery Lake, which is the intake and regulating reservoir for the Poole Powerhouse. The intake structure is at Rhinedollar (Ellery Lake), and includes an underground pipeline and penstock, and the Poole Powerhouse. The Poole Powerhouse is a reinforced concrete building constructed in the 1920s. It is located on Lee Vining Creek east (downstream) of Ellery Lake.

The Project facilities are rockfill/earthen dams with some areas of exposed concrete in earth tone colors. The various dams and concrete areas are similar in color to the surrounding rock boulders and mountains, and blend in to their surrounding environment. The reinforced concrete Poole Powerhouse is beige in color, and is built directly next to, and flanked by, an exposed rock mountain, and also blends into the landscape with similar earth tone colors.

The scenic character of the impoundments and creek areas are predominantly undeveloped shorelines with occasional recreation facilities and structures. The surrounding vegetation primarily includes evergreen trees and forests, shrubs, grasses and grasslands, and meadows and wetlands with nearby lakes and creeks. Vegetated areas are followed by barren rock, exposed rock boulders, and distant views of hills and mountains beyond. The lowland and surrounding mountain areas are covered in dispersed snow in winter.

Photo 5.10-1 provides a view of the overall Project Area, Photos 5.10-2 through 5.10-5 show representative views of the Project dams, and Photo 5.10-6 provides a view of the Poole Powerhouse. Photos 5.10-7 through 5.10-11 provide representative views of reservoirs and creeks within the existing FERC Project Boundary.

Photo 5.10-1. Overview of Project Area

Photo 5.10-2. Saddlebag Dam

Photo 5.10-3. Tioga Dam and Spillway

Photo 5.10-4. Tioga Dam Outlet

Photo 5.10-5. Rhinedollar Dam (Ellery Lake) and Spillway

Photo 5.10-6. Poole Powerhouse

Photo 5.10-7. Glacier Creek

Photo 5.10-8. Lee Vining Creek below Rhinedollar Dam

Photo 5.10-9. Saddlebag Lake

Photo 5.10-10. Tioga Lake

Photo 5.10-11. Ellery Lake

5.10.4. Existing Aesthetic Resources Enhancement and Management Measures

The existing Project license includes aesthetic enhancement and management measures, as listed below.

- The Project operates under an Erosion Control Plan (Section 4(e) Condition 9) that provides general measures to control erosion, stream sedimentation, soil mass movement, and dust occurring as the result of planned small-scale construction associated with normal operation of the facilities (see Section 5.1, *Geology and Soils,* for additional information).

- The Project operates under a Visual Resource Protection Plan (Section 4(e) Condition 11), which maintains that any Project-related activities or maintenance will be conducted to minimize aesthetic impacts. Project-related activities will consider building materials, color, conservation of vegetation, and landscaping to preserve the aesthetics of the Project Area.

- The Project is subject to minimum instream flows (USFS 4e Condition No. 4; Articles 404 and 405) and stable lake levels (USFS 4e Condition No. 6), developed partly to improve visual quality, most notably lake levels for Ellery and Tioga Lakes along State Route 120 (see Section 5.2, *Water Resources*, for additional information).

5.10.5. Visual Character of the Project Vicinity

5.10.5.1. Nearby Scenic Attractions

The Project resides within Inyo National Forest in Mono County, California, which stretches 165 miles north to south along the eastern Sierra Nevada. With over 2 million acres, the Inyo National Forest features the oldest trees on the planet (Ancient Bristlecone Pine Forest), the tallest mountain in the lower 48 states (Mount Whitney at an elevation of 14,505 feet), and the oldest inland seas in America (Mono Lake). Other features of the Inyo National Forest include the Mammoth Lakes Basin, glaciers, desert land, and the eastern Sierra Nevada (USFS, 2020b).

Recreation opportunities at the national forest include camping, hiking, biking, hunting, water activities, nature viewing, climbing, fishing, and snow sports. The nearest national trail to the Project is the PCT, which traverses along the western side of the Sierra Nevada crest through Yosemite National Park (see Section 5.8, *Recreation Resources*, for more information).

One of the United States' most popular parks, Yosemite National Park, is located 1 mile west of the Project and had approximately 4.5 million visitors in 2019 (NPS, 2020). The Project is also surrounded by other federally designated national parks and national forests including:

- Tahoe National Forest
- Stanislaus National Forest
- Humboldt-Toiyabe National Forest
- Sierra National Forest
- Kings Canyon National Park
- Sequoia National Park
- Sequoia National Forest
- Death Valley National Park

Approximately 9 miles downstream of Poole Powerhouse, Lee Vining Creek empties into Mono Lake. Mono Lake is an inland sea that is over 700,000 years old and fills a natural basin of 695 square miles. Mono Lake features "tufa towers," mineral structures created when freshwater springs bubble up through the alkaline waters of the lake. The lake's salty water sustains trillions of brine shrimp, attracting millions of migratory birds to the area (MCC, 2020).

In 1984, Congress designated the Mono Basin National Forest Scenic Area within the California Wilderness Act (Pub. L. 98-425) to protect the geologic, ecologic, and cultural resources within the 116,274-acre scenic area surrounding Mono Lake (USFS, 2019). A comprehensive *Mono Basin National Forest Scenic Area Comprehensive Management Plan* was completed in 1989 to provide specific management guidance, zoned management mapping of the scenic area, and other management direction (USDA, 1989).

Source: MCC, 2020

Photo 5.10-12. Mono Lake

Mono Lake is the largest lake near the Project, but there are many small lakes nearby, such as Grant Lake, Lundy Lake, June Lake, Tenaya Lake, and the Twin Lakes. Other larger lakes nearby include Walker Lake, 60 miles northeast of the Project in Nevada, and Lake Tahoe, approximately 85 miles northwest of the Project. In addition, the Mammoth Lakes Basin, located partially within the John Muir Wilderness, is approximately 30 miles south of the Project.

Source: MCC, 2020

Photo 5.10-13. June Lake

The Project is surrounded by mountains. Nearby mountains include: Mount Warren, Mount Dana, Tioga Peak, Gaylor Peak, White Mountain, Ragged Peak, Mono Dome, Williams Butte, Mount Lewis, Cold Mountain, Tuolumne Peak, Polly Dome, Twin Peaks, Price Peak, Piute Mountain, Kuna Peak, Reversed Peak, Mammoth Mountain, Bear Creek Spire, Mount Gabb, and others.

5.10.5.2. Inyo National Forest Land Management Plan

The 2019 Inyo National Forest Land Management Plan (USFS, 2019) provides a planning framework for the management of uses and resources associated with the Inyo National Forest (see Section 5.8, *Recreation Resources*, and Section 5.9, *Land Use*, for more information). The Forest Service Land Management Planning Handbook (USFS, 2015) identifies scenic character as the combination of the physical, biological, and cultural images that gives an area its scenic identity and contributes to its sense of place. Scenic character provides a frame of reference from which to determine scenic attractiveness and to measure scenic integrity. The Inyo National Forest Land Management Plan identifies desired conditions for scenic character (see Section 5.9, *Land Use*, Table 5.9-5) and scenic integrity objectives (desired conditions) for the management and preservation of scenic character within the Inyo National Forest.

As described in the Inyo National Forest Land Management Plan (USFS, 2019), scenic integrity objectives describe the minimum thresholds for the management of the scenery resource, ranging from very high to low scenic integrity objectives. Scenic integrity objectives describe the degree to which desired attributes of the scenic character are to remain and reflect changes in public perceptions and the importance of viewing scenery as well as integrating scenery resources with the overall management of the landscape.

The USFS measures scenic integrity in five levels (USFS, 2019):

- **Very High:** landscapes where the valued scenic character "is" intact with only minute, if any, deviations. The existing scenic character and sense of place is expressed at the highest possible level.
- **High:** landscapes where the valued scenic character appears unaltered. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the scenic character so completely and at such scale that they are not evident.
- **Medium[7]:** landscapes where the valued scenic character appears slightly altered. Noticeable deviations must remain visually subordinate to the scenic character being viewed.
- **Low:** landscapes where the valued scenic character appears moderately altered. Deviations begin to dominate the valued scenic character being viewed but they borrow valued attributes such as size, shape, edge effect, pattern of natural openings, vegetative type changes, or architectural styles outside the landscape being viewed. They should not only appear as valued character outside the landscape being viewed, but compatible or complementary to the character within.
- **Very Low[8]:** landscapes where the valued scenic character appears heavily altered. Deviations may strongly dominate the valued scenic character. They may not borrow from valued attributes such as size, shape, edge effect, pattern of natural openings, vegetative type changes, or architectural styles within or outside the landscape being viewed. However, deviations must be shaped and blended with the natural terrain so that elements such as unnatural edges, roads, landings, and structures do not dominate the composition.

For lands within the FERC Project Boundary, the USFS predominantly identifies scenic integrity objectives as High (99.9 percent), with a miniscule amount of lands identified Medium and Very High[9] (see Figure 5.10-1). For lands within a half mile buffer of the FERC Project Boundary, the USFS predominantly identifies scenic integrity objectives as High (61 percent) and Very High (38 percent), with a miniscule amount of lands identified Medium (see Figure 5.10-1). The Inyo National Forest Land Management Plan also identifies potential management approaches relative to vegetation management and consideration of scenic character, such as minimizing visible lines in landscape areas where vegetation is removed and cleared areas include edges reflect the visual character of naturally occurring vegetation openings.

[7] The Inyo National Forest Land Management Plan defines this category as "Moderate," though the GIS data for scenic integrity objectives associated with the Land Management Plan defines this category as "Medium." We will refer to this category as Medium.

[8] While the Inyo National Forest Land Management Plan defines this category, there are no lands designated as "Very Low" in the GIS data for scenic integrity objectives associated with the Land Management Plan.

[9] Though small pieces of these designations cross into the current FERC Project Boundary, it appears that the intent of the data was for the entire FERC Project Boundary to be considered a High scenic integrity objective.

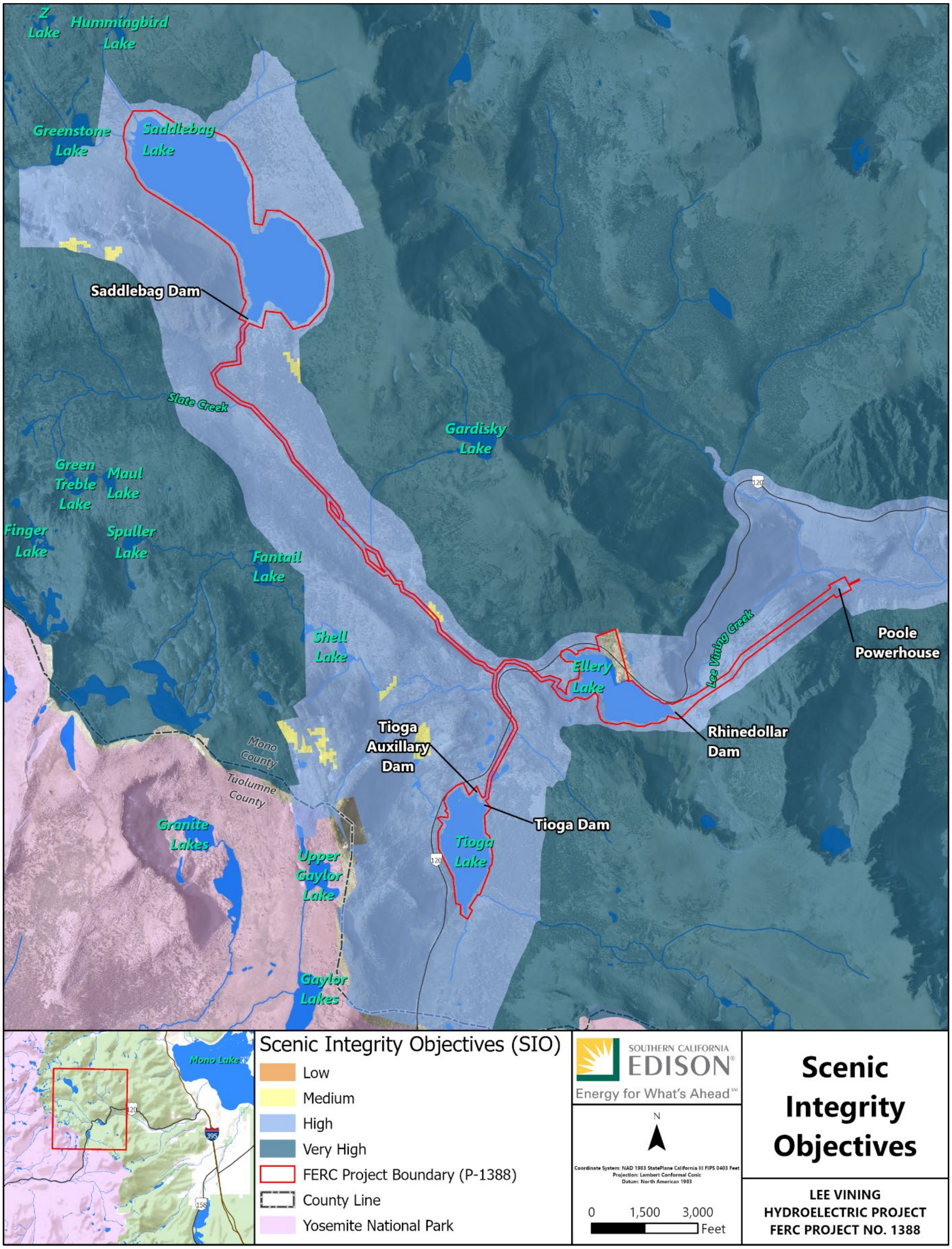


Figure 5.10-1. Inyo National Forest Land Management Plan Scenic Integrity Classifications for the Project Vicinity

5.10.6. Wild and Scenic Rivers and Scenic Highways/Byways

No rivers in the Project Area are currently included in the National Wild and Scenic Rivers System; however, the 2019 Inyo National Forest Land Management Plan (USFS, 2019) has recently identified over 75 miles of river in the Mono Basin as eligible for inclusion in the National Wild and Scenic Rivers System, including all of Lee Vining Creek (see Section 5.8, *Recreation Resources*, for more information).

The Project is located along scenic State Route 120, which runs west to east across the central part of California from Interstate 5 in the San Joaquin Valley near Lathrop through Yosemite National Park—where at 9,943 feet it is the highest mountain pass (Tioga Pass) in California—to its end at U.S. Route 6 near Mono Lake. The Project itself is approximately 1 mile north of the eastern entrance to Yosemite National Park and 9 miles west of Mono Lake along State Route 120. The road is typically closed in winter due to inclement weather conditions (AllTrips, 2020). The 64 miles of State Route 120 running through Yosemite National Park has been designated as the Tioga Road/Big Oak Flat Road National Scenic Byway by the Federal Highway Administration (USDOT, n.d.). The 12 miles of State Route 120 extending from the eastern boundary of Yosemite National Park to U.S. Highway 395 has also been designated a National Forest Scenic Byway on February 8, 1990, and is commonly known as the Lee Vining Canyon Scenic Byway (SNG, 2020).

5.11. Cultural Resources

5.11.1. Introduction

This section presents information about cultural resources in the vicinity of SCE's Lee Vining Project (FERC Project No. 1388). It provides: (1) a definition of the proposed Area of Potential Effects (APE); (2) a broad overview of the pre-contact Native American ethnographic and historic settings for contextual purposes; (3) a description of the known cultural resources (archaeological and built environment) within the proposed APE and Study Area, including identification of properties that are listed or eligible for listing in the National Register of Historic Places (NRHP); and (4) a discussion of ethnic or social groups that may attach significance to cultural resources within the proposed APE and vicinity. The resource information presented in this section is based primarily on research and surveys previously conducted by SCE. Tribal cultural resources are discussed separately in Section 5.12.

5.11.2. Area of Potential Effects

A Project's APE is defined in 36 CFR § 800.16(d) as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." SCE proposes that the APE for the Project include all lands within the FERC Project Boundary. Figure 5.11-1 depicts the Proposed APE.

5.11.3. Information Sources

The proposed Study Area for archaeological and architectural resources encompasses a 0.5-mile buffer around the proposed APE (Figure 5.11-1). The background research includes the proposed Study Area to facilitate knowledge about past settlement and subsistence practices, as well as past land use. The cultural resources section of this PAD was developed using information obtained from the SCE archives, the Inyo National Forest, and the California Historical Resources Information System (CHRIS) Eastern Information Center (EIC) at the University of California Riverside.

A records search was conducted utilizing the ArcGIS Online (AGOL) database, which is maintained by SCE and includes a heritage search of all USFS Heritage Programs in Region 5 within the SCE service territory as well as records searches from CHRIS.

The USFS Region 5 has developed and maintains corporate databases that include information about heritage resources and heritage resource investigations (Natural Resource Manager [NRM] Heritage Database) and geospatial data (GIS) in accordance with Section 112(2) of the NHPA and Forest Service Manual 2360. Region 5 Forests has shared with SCE all NRM and GIS data that intersect utility facilities (e.g., transmission and distribution facilities, roads) on all USFS lands. This information is summarized in Sections 5.11.8 and 5.11.9.

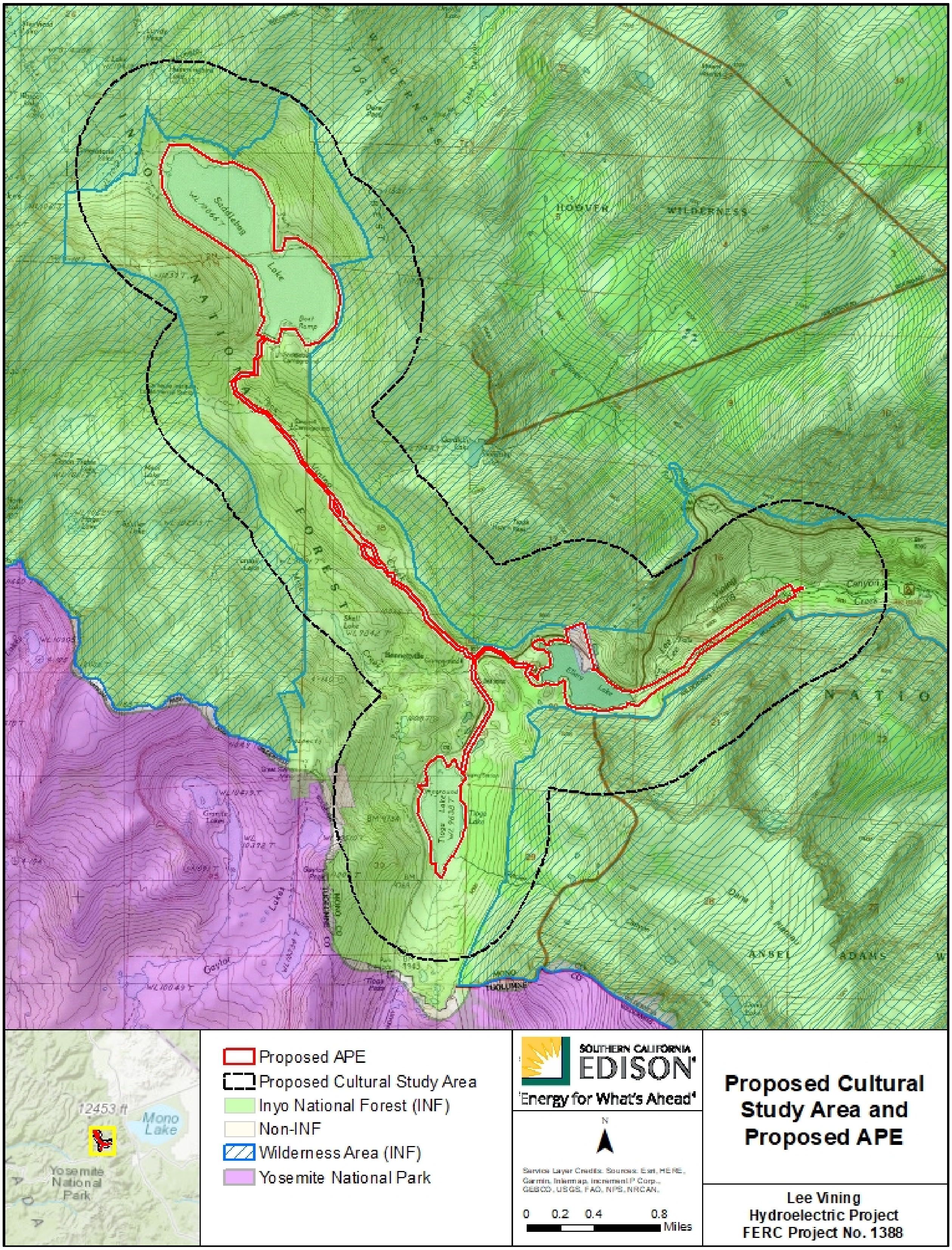


Figure 5.11-1. Proposed APE and Study Area.

SCE maintains a subscription from CHRIS. Under the terms of the subscription, SCE's CHRIS Access and Use Agreement, and the California Office of Historic Preservation's (OHP) Electronic Data Subscription Standard, SCE is permitted to maintain these data within an AGOL database and perform internal record searches using datasets and share said data with authorized and allowable users.

The Inyo National Forest was closed due to COVID-19 pandemic during development of this PAD. From the research conducted using the NRM and GIS data, we have identified studies and site records, which are listed in Tables 5.11-1 and 5.11-2. A record search will be scheduled with the Inyo National Forest once they have reopened.

The EIC was also closed due to the COVID-19 pandemic and then reopened on a limited basis in fall 2020. We obtained copies of mapped studies and site records, which are listed in Tables 5.11-1 and 5.11-2. Studies will be obtained from the EIC as soon as possible.

Other repositories housing information needed to develop the historic context were also closed; therefore, those context sections will be more fully developed at a later date.

5.11.4. Environmental Setting

5.11.4.1. Physical Environment and Climate

The Sierra Nevada forms an abrupt orographic boundary focusing significant precipitation on its mountainous western slopes. The crest blocks precipitation from reaching the enclosed basins beyond the eastern escarpment, producing an abrupt moisture dichotomy between the generally mesic, sub-alpine habitats of the tarn lakes and floodplain meadows of the Project Area, and the xeric sagebrush steppe and local riparian corridors of the Great Basin immediately to the east. Up to 125 centimeters of precipitation (water content) can fall along the crest annually, enlarging the winter snowpack at Tioga Pass and Lundy Pass, while the Mono Basin only a few miles east receives about 13 centimeters per year (Hodelka, 2020; Montague, 2010). At the Tuolumne Meadows (Montague, 2010), just west of the Project Area, maximum temperature in summer averages 21.7°C (71°F), with a minimum winter average of 2.6°C (37°F). The average winter maximum reaches 5.2°C (41°F), with chilling low averages of -13.0°C (8.6°F) annually. The high-altitude cold and significant winter precipitation supports a deep snowpack whose moisture is released slowly, supporting meadows and riparian habitats on both sides of the crest well into the summer.

The orographic effect also influenced past climate along the crest. The Project Area was fully glaciated during the Late Pleistocene with deep, scouring glaciers extending from the summits, burying and ultimately shaping the landforms of the Project Area. With glacial retreat culminating between 18,000 and 16,000 years ago, pluvial Lake Russell reached highstand (Ali, 2018; Hodelka, et al., 2020). The lake record shows several high-amplitude fluctuations on either side of the Pleistocene–Holocene transition, about 12,600 years ago, suggesting shifts in wet storms systems, pulses of glacial expansion locking up moisture, and glacial retreat providing surface water to the streams and basin lake.

The Early Holocene was drier and colder than today; sagebrush and grass pollen appears in the Early Holocene (earliest) section of a pollen core at Tioga Pass Lake (Spaulding, 1999). Cooler and wetter conditions, with brief forest expansions, arrive in the high country by about 6,000 calendar years (cal) Before Present (BP). Subalpine forest, the woodland pattern present today, was established about 2,500 years ago with expansions and contractions due to drought and climate punctuating the Late Holocene. Extreme drought is evident during the Medieval Climate Anomaly (Stine, 1994; Mensing et al., 2008). Although the mountain received winter moisture, it was not enough to support tarn lakes, and flashy stream and groundwater discharge depleted earlier in each season. Drowned trees in Tenaya Lake (Stine, 1994), downstream to the west from Tioga Pass, record the diminished surface water during the Medieval Climate Anomaly. The drought was long enough for woodlands to occupy the lake basins, unless there were other changes (tectonics, landslides) that altered the drainage and pool levels.

About 600 years ago, the Little Ice Age may have resulted in reactivated glaciers, due to increased orographic winter precipitation. The Little Ice Age glacial advance was confined to cirques (Gillespie and Zehfuss, 2004) and although the Project Area remained free of glaciers, it seems likely that snow depths were significant and may have been year-round. This may have affected recent patterns of resource productivity and access to the passes and corridors of the Sierra Crest just prior to European contact and the resulting dramatic changes in ethnohistoric land use surrounding Tioga Pass.

5.11.4.2. Geomorphological Context

Formed beneath the deep glaciers of Tioga Pass, the landscape of the Lee Vining Project Area is a product of the Late Pleistocene glaciation of the Sierra Crest. Glaciers extending from the cirques of Glacier Canyon below the northern escarpment of Mount Dana (13,057 feet amsl) coalesced with a glacial mass extending from upper reach of Lee Vining Canyon, Lundy Pass, and the eastern cirques of White Mountain (12,057 feet amsl) and Mount Conness (12,590 feet amsl). While the gravity of the western slope and the Grand Canyon of the Tuolumne pulled the Dana glacier westward, the Lee Vining glacier dropped eastward into the Great Basin, carving a dramatic canyon of its own as it extended toward the basin of Mono Lake and pluvial Lake Russell.

The bedrock of Tioga Pass and Lee Vining Canyon consists of granodiorite rocks of the Tuolumne Intrusive Suite (Coleman et al., 2004), and plutonic rocks that surround and intrude remnants of metasedimentary and metavolcanics rocks (Hodelka et al., 2020). While generally grey plutonic rocks encompass the Project Area, darker brown metavolcanics outcrop prominently in places, such as at Ellery Lake. The Pleistocene glaciers scoured the bedrock exposing patchy rock surfaces surrounded by rubble of canyon colluvium, irregular ground moraines, and well-formed lateral moraines.

With the retreat of glaciers in the Terminal Pleistocene and Early Holocene, extreme surface flow continued scouring the once-glaciated terrain. Pluvial Lake Russell in the Basin of Mono Lake reached its highstand during the period of glacial retreat (Ali, 2018) and high meltwater drainage into Lee Vining Canyon. Eventually streams turned into narrow floodplains and linear riparian habitats formed as drainages sought equilibrium in the scoured landscape. Tarn lakes, formed in minor cirques and in ground moraine catchments, are common near Tioga Pass and in the upper reach of Lee Vining Canyon. The developed reservoirs at Saddlebag Lake, Tioga Lake, and Ellery Lake augmented existing tarn basins in low-gradient steps below Tioga Pass and below Lundy Pass. Today, local drainages are generally steep, relatively straight channels with pools and riffles leading to dropping falls. The upper reach of Lee Vining Creek, however, has evolved into a meandering channel with a broad wetland floodplain between steep confining slopes. The floodplain shows distributary meanders and oxbows along a channel subject to high seasonal fluctuations due to local run-off, although the controlled output at Saddlebag Lake attenuates a portion of the natural seasonal dynamics. Where there is evidence of long-term floodplain stability, shown by relatively well-developed soils and an absence of recent channeling, the floodplain deposits have potential for preserving an intact, buried archaeological record. The Project Area is generally confined to this floodplain throughout the upper reaches of Lee Vining Creek.

Soils forming on the formerly glaciated landscape are, of course, Holocene-age profiles, typically part of the Stecum-Charcol series. These immature profiles are A-C horizons on young landforms of moraines, floodplains, and minor alluvial fans. The profiles are generally thin and shallow on local plutonic (i.e., granitic) bedrock (e.g., grus, till, or small floodplain meadows), but parent material on metamorphic rocks can show significant organic content with relatively mature development (A-Bt-C horizons) for a soil of relatively recent age (i.e., forming since deglaciation). The metamorphic parents can also act as groundwater reservoirs supporting meadow vegetation and complex biotic communities (Cooper et al., 2006). In general, however, soils and sedimentary parent material throughout the Project Area form a shallow veneer on local bedrock with deepest profiles in floodplain meadows. Where present, archaeological resources are likely to have surface manifestations even where shallowly buried deposits of young landforms exist.

5.11.4.3. Flora and Fauna

This section has been adapted from Davis-King and Snyder (2010), Montague (2010), and Stevens and Lenzi (2015). The Project Area lies at the western margin of the Basin and Range province, a region defined as semidesert due to the rain shadow effect of the adjacent Sierra Nevada. However, semidesert conditions are ameliorated by significant winter precipitation and spring runoff in high elevations common to the Project Area. Subalpine habitat and lodgepole pine (*Pinus contorta)* community flourishes adjacent to seasonally flooded riparian meadows. The subalpine areas dominant throughout much of the Project Area transition eastward to streamside riparian habitats in Lee Vining Canyon.

Subalpine communities occur between approximately 8,000 and 9,500 feet and are characterized by conifer forests often dominated by lodgepole pine (*Pinus contorta*), as mentioned, but also featuring Jeffrey pine (*Pinus jeffreyi*), white fir (*Abies concolor*), and occasional limber pine (*Pinus flexilis*) and whitebark pine (*Pinus albicaulis*). Wet meadows in subalpine habitats harbor root plants, especially various wild onion (*Allium* sp.) varieties, lupine (*Lupinus latifolius*), grasses, and sedges; the variety of useful plants available seasonally in well-watered areas of subalpine habitats is significant for Native people. Willows (*Salix* sp.) and cottonwood/aspen (*Populus* sp.) communities, along with the occasional Pinyon pine (*Pinus monophylla*), occupy the rock-bounded linear corridor of the lower Project Area along Lee Vining Canyon.

Fauna within these communities consist primarily of various mammals and migratory birds. Common summer residents of the subalpine zone include the mountain bluebird (*Sialia currucoides*), Clark's nutcracker (*Nucifraga columbiana*), gray-crowned rosy finch (*Leucosticte tephrocotis*), and white-crowned sparrow (*Zonotrichia leucophrys*). A variety of mammals are found within these communities at various times of the year; these include the yellow-bellied marmot (*Marmota flaviiventris*), Nuttall's cottontail (*Sylvilagus nuttallii*), mule deer (*Odocoileus hemionus*), coyote (*Canis latrans*), badger (*Taxidea taxus*), black bear (*Ursus americanus*), and, possibly, grizzly bear (*Ursus arctos horribilis*) (Montague, 2010). Mountain sheep (*Ovis canadensis*) would have also been present in the higher elevations historically. Rodents are particularly prevalent in higher elevations and of importance to Native Americans.

5.11.5. Cultural Setting of the Project and Vicinity

5.11.5.1. Pre-contact Setting of the Project Vicinity

The following discussion provides a generalized review of the adaptations of the prehistoric populations in the Mono Lake region as viewed through the lens of archaeological research presented by Montague's synthesis (2010) of the archaeology of the Tuolumne River watershed, Stevens et al.'s testing results (2015) at the nearby Mountain Warfare Training Center, Rosenthal's synthesis (2012) of the archaeology of Crane Flat, and recent work by Clay and King (2019) in the Bodie Hills. Following their lead, and other archaeologists who have worked in this part of Mono County (e.g., Basgall, 1998; Bettinger, 1981; Bieling, 1992; Fredrickson, 1991, 1998; Giambastiani, 1998; Halford, 1998, 2008; Noble, 1992; Overly, 2002, 2004), the pre-contact setting is divided into three temporal intervals: Early Holocene (pre-8200 cal BP), Middle Holocene (8200–3400 cal BP), and Late Holocene (3400–600 cal BP). For the Great Basin, the Late Holocene is subdivided into Newberry (3400–1300 cal BP), Haiwee (1300–600 cal BP), and Marana (600–150 cal BP), representing broad adaptive shifts in settlement location and artifact assemblages. The Great Basin sequence, which refers to time periods defined on the basis of hundreds of radiocarbon dates and changes in distinctive projectile point types (e.g., Thomas, 1981), is based on decades of detailed archaeological studies from the Mono Basin, and on broader archaeological research trends found within the larger western Great Basin region.

Early Holocene (pre-8200 cal BP)

Evidence of Early Holocene occupation in the Mono Basin is relatively sparse, represented by a few widely dispersed sites (Basgall, 1987, 1988; Hall, 1990). These early occupations of the region are typically identified by the presence of Great Basin Stemmed or fluted/concave-based projectile points, Pinto-series projectile points, and large percussion-flaked "greenstone" bifaces. These assemblages reflect a high degree of residential mobility with high percentages of debitage from local toolstone sources such as the Casa Diablo or Bodie Hills obsidian sources (Halford, 2001, 2008), but with formal tools made from distant, non-local sources (Basgall, 1989, 1991; Delacorte, 1999). Based on the near absence of milling equipment, there appears to be minimal use of seed resources among the population at this time. Instead, Early Holocene diets likely relied on hunting large and small game animals, the latter of which are particularly prevalent in the more arid parts of the region (Elston et al., 2014; Hall, 1990).

MIDDLE HOLOCENE (8200–3400 CAL BP)

The Middle Holocene (also referred to as the Little Lake Period by Bettinger and Taylor, 1974) is marked by the continued use of Pinto-series points (Basgall and McGuire, 1988; Delacorte et al., 1995; Gilreath, 1995; Hall, 1980; Jackson, 1985; Jenkins and Warren, 1984; Peak, 1975). The period overlaps the Early Martis period (5,000–3,000 cal BP) of the Sierra chronology. In the Inyo-Mono region, there is a noticeable gap in components dating to this interval (Basgall, 2009), although use of the Bodie Hills obsidian quarry continues (Halford, 2001, 2008). Middle Holocene assemblages are quite similar to those of the Early Holocene in respect to patterns of toolstone acquisition and use, mobility, and hunting adaptations. They differ by showing an increase in the frequency of milling equipment, a shift probably reflecting a broadening diet breadth in response to increased aridity and reduced environmental productivity (Antevs 1948; Warren and Crabtree, 1986).

NEWBERRY PERIOD (3400–1300 CAL BP)

Pre-contact populations continued to use highly mobile settlement systems during the Newberry Period, but the range of such systems appears to have contracted, becoming regularized within seasonal movements. Another important aspect of the Newberry Period is the trans-Sierra exchange of obsidian. Obsidian transport and exchange appears to have reached its peak during this interval (Rosenthal, 2012). The expansion of this system is indicated by an increase in quarry production and biface manufacture at several western Great Basin sources including Bodie Hills, Mono Lake, and Casa Diablo. The pattern is mirrored by a peak in obsidian hydration frequencies from these sources at sites in the western Sierra Nevada. Sourcing at these sites indicates that obsidian primarily was transferred in an east-west direction, with the distribution of obsidian from these sources demarcated by watershed boundaries that would have made north-south travel more difficult (Davis-King and Snyder, 2010; Montague, 1996; Rosenthal, 2012).

It has been hypothesized that the peak in trans-Sierra obsidian conveyance was due to the more regularized settlement patterns that emerged during this interval that allowed for more predictable interaction among neighboring populations (Basgall, 1983; Ericson, 1982; Gilreath and Hildebrandt, 1997, 2011; Goldberg et al., 1990; Hall, 1983; King et al., 2011). Regular, trans-Sierra travel of people on both flanks of the mountain range is supported by the clustering of sites along east-west travel corridors leading from the Summit/Virginia, Tioga/Mono/Parker, and Donohue passes. Of these, Mono Trail, passing through Bloody Canyon, Mono Pass, and Tuolumne Meadows, provided the easiest route between Yosemite Valley and Mono Lake (Montague, 2010).

HAIWEE PERIOD (1300–600 CAL BP)

The Haiwee Period is marked by the adoption of the bow and arrow in the Sierra Nevada and southwest Great Basin. Archaeologically, this shift in technology is identified by the presence of Rose Spring projectile points in assemblages. In addition to this major technological change, it appears that a restructuring of local subsistence-settlement systems also occurred. Excavations throughout the region indicate the emergence of permanent or semi-permanent lowland villages, characterized by residential structures, bedrock milling features, extensive assemblages of flaked and ground stone tools, and a diverse set of floral and faunal remains. Such residences were probably supported by more temporary upland pinyon camps and centralized seed production stations in the valley bottoms (Basgall and McGuire, 1988; Bettinger, 1989). In higher elevation settings near the Sierra crest, sites from this period are more likely to contain bedrock milling stations, features, ground stone, and midden deposits, suggesting more intensive use of montane environments (Montague, 2010). The relationships between these sites indicate that seasonal transhumance had become more spatially confined, resulting in more intensive use of less profitable resources within progressively smaller foraging areas. Reduced residential mobility is also indicated by decreased flaked stone material diversity, a more even balance between tool and debitage material types, and greater use of expedient, non-curated milling equipment (Basgall, 1989; Basgall and Giambastiani, 1995; Basgall and McGuire, 1988; Bettinger, 1989, 1999a, 1999b; Bettinger and Baumhoff, 1982; Delacorte, 1990; Delacorte and McGuire, 1993).

Accompanying these decreases in settlement mobility and likely higher degrees of territoriality was a collapse of interregional obsidian exchange (Bettinger, 1977, 1982; Bettinger and King, 1971; Gilreath and Hildebrandt, 1997). Production and exchange of Great Basin obsidians over the Sierra Nevada appears to have declined significantly as indicated by hydration frequencies at both western Sierra sites and the quarries themselves (Rosenthal, 2012). The collapse of these production-exchange systems has been attributed to a variety of factors, the most likely being increased territoriality and technological change. With respect to increased territoriality, it has been argued that prior to the Haiwee Period there was a relatively high demand for obsidian and few constraints inhibiting its acquisition (Gilreath and Hildebrandt, 1997). Later in time, decreased mobility accompanied by increased population density and territoriality restricted free movement across the landscape, inhibiting the distribution of obsidian and other trade goods over large distances. The decline of trans-Sierra obsidian exchange can also be attributed to decreasing demand for obsidian due to changes in flaked stone technology (i.e., reduced need for toolstone with small arrow points made on debitage instead of bifaces), reducing the overall importance of the toolstone (Basgall and Giambastiani, 1995; Gilreath and Hildebrandt, 1997; Goldberg et al., 1990).

MARANA PERIOD (600–150 CAL BP)

Key indicators of the Marana interval include Cottonwood and Desert Side-notched projectile points. Many of the trends established in the Haiwee continued forward during this interval, including the more intensive use of local environments, particularly increased use of riparian and lacustrine settings (to obtain flies, shrimp, shellfish, waterfowl, and tule seeds), pine nuts in the intermediate zones, and a variety of root crops and small mammals in the subalpine zones of the Sierra Nevada. This intensification can likely be attributed to large, dense populations, as evidenced in the Sierra by well-developed midden deposits dating to this period (Moratto, 1999).

ARCHAEOLOGICAL INVESTIGATIONS

Among the first well-documented excavations in the region is Bettinger's (1981) investigation at the Lee Vining site (CA-MNO-446) near the mouth of Lee Vining Canyon. Projectile points and source-specific hydration suggested a long span of occupation, with intensive use beginning in the Newberry period. Bettinger characterized the later-dating deposits as the remains of a summer residential base. An obsidian cache was found, with large biface blanks apparently intended for trade. Geochemical sourcing revealed a marked shift in the profile of obsidian sources used over time, with Casa Diablo dominating earlier deposits and a wider variety of more-local sources represented in later deposits.

York (1990) conducted test excavations in the immediate Project Area in support of a previous relicensing of the Lee Vining Project, as well as in the nearby Rush Creek and Lundy Hydroelectric Project areas—all in generally similar settings in the canyons of the eastern Sierra scarp. The tested pre-contact sites, which York generally characterizes as temporary camps, displayed a limited range of flaked and ground stone artifacts. Projectile point types and obsidian hydration measurements suggested occupations ranging from the Newberry through Marana periods; geochemical sourcing revealed the use of a wide variety of east-side obsidian sources dominated by Casa Diablo and Mono Glass Mountain.

Wickstrom and Jackson (1993) and McGuire (1994) reported on test excavations at a series of sites along the Rush Creek Four-Lane Project area, extending several miles south along the U.S. Route 395 corridor from the mouth of Lee Vining canyon. Carpenter (2001) later conducted data-recovery investigations at two of these sites. The pre-contact sites investigated during this project were generally sparse, shallow deposits indicative of temporary camps or task-specific areas, again with diverse obsidian source profiles dominated by Mono Glass Mountain and Mono Craters, and dating primarily to the Haiwee and Marana periods. The exception was the more substantial multi-locus deposit at MNO-891 on Rush Creek, which contained a Newberry-period component dominated by Casa Diablo obsidian, and which still represents one of the few documented substantial residential sites on the western rim of the Mono Basin. This finding of a shift from a Newberry-period focus on Casa Diablo obsidian and other major sources, to a later focus on a wider range of locally available obsidian sources, echoes Bettinger's (1981) earlier finding and has been repeated in many investigations in the Inyo-Mono region. This wholesale shift in patterns of toolstone acquisition may be the result of a collapse in trade networks at the beginning of the Haiwee period, increasing territorial circumscription, or some combination of these.

Surveys in the pinyon belt on the northern rim of the Mono Basin (Clay and King, 2019; Eerkens and King, 2002) have revealed hundreds of small rock rings in association with pinyon poles and other signs of intensive Marana-period use of this important resource; the rings likely represent the remains of dismantled green-cone caches. Also, near the eastern shore of Mono Lake, the complex of v-wing antelope traps documented by Arkush (1995) records another important archaeological signature of Mono Basin Paiute subsistence practices.

A substantial amount of archaeological work has also taken place in the upper elevations of Yosemite National Park immediately west of the Project Area, most notably the testing work in Dana Meadows by Montague (1996) and Hull et al. (1995). Similar to sites on the eastern slope, most of these sites were dominated by flaked stone debris with smaller quantities of ground stone artifacts, bedrock milling features, and features such as hearths. Obsidian from Inyo-Mono sources was the overwhelmingly dominant material, as it is throughout much of the park.

5.11.5.2. Ethnographic Context of the Project Vicinity

Prior to non-native people entering the region, it was occupied by and in the traditional territory of a Northern Paiute group, the Kukzadikaa. The term Kukzadikaa derives from the Northern Paiute word, *kutsavi,* for the alkali fly (*Ephydra hians*), a greatly prized food by the people of Mono Lake. The Kukzadikaa harvested the pupae of the fly, which they made into a soup and used for trade items elsewhere. This summer food was supplemented by pinyon pine nuts gathered in the autumn, acorn, and the Pandora moth larvae along with other vegetable and animal foods. The people traveled widely, from Walker Lake in Nevada to Yosemite Valley in Mariposa County, and up and down the eastern Sierra Nevada piedmont. They had alternately friendly and unfriendly relations with their neighbors the Miwuk to the west, the Me-Wuk to the northwest, and the Washoe to the north. Abutting their territory to the northeast, east and southeast were other Shoshonean groups of Northern Paiute and Western Shoshone.

Kutzadikaa territory occupies the western Basin and Range Provence, but summer activities take place in the Sierran Biotic Province, which provides diverse biotic communities encompassing five belts. Their terrain has an elevation span from about 6,500 feet amsl at Mono Lake to more than 13,000 feet amsl at Mount Dana. Much of the territory had abundant water, supplied by the perennial Lee Vining Creek and Glacier Canyon in particular, while there are many tarns, springs, creeks, and meadows, with typical Sierra Nevada temperatures of cold, wet months in the winter, and very hot and dry months in the summer. This varied landscape provided a diversity of edible, material, medicinal, and other resources for the people.

The Northern Paiute are a geographically widespread linguistic group that extends from an area just south of Mono Lake, north to Goose Lake into Oregon and Idaho, and west to the Little Humboldt and Reese Rivers. This vast area included numerous groups connected by language but somewhat diverse in culture due in part to the varied environment in which they lived. Although there were some early investigations by Stephen Powers in the mid-1870s and Wesley Powell in 1880, C. Hart Merriam appears to be the first to talk with people who had experienced the first non-natives' arrival. Willard Park investigated the people in the 1930s, and Emma Lou Davis prepared the first ethnographic overview of the Project-area people in 1965. Section 5.12, *Tribal Resources,* provides additional background and citations.

Merriam observed that the people easily moved between the Great Basin and the Sierra Nevada, especially into what became Yosemite National Park. John Muir also observed the lifeways of the Kutzadikaa, and there are several early non-anthropological documents relating to the people going to the western Sierra to collect or trade for black oak acorn. A seasonal round was part of normal life for the Kutzadikaa, who often wintered at Walker Lake due to milder winters, and spent summers in Yosemite Valley, finding the Lee Vining area good for spring and autumn activities. Small familial groups were the most common form or social gatherings throughout the year, although communal hunting for animals such as pronghorn or rabbits was common. People traveled freely and frequently, thus making transportation corridors a principal resource type. Small camps, often with one or two residences or brush shelters are frequently noted, along with pine nut camps, medicine gathering areas, water modification features, and a few other site types. Around Mono Lake, Emma Lou Davis (1965) observed that the Kukzadikaa used “almost every square mile of open country [which] was visited and now shows a telltale flake or two of obsidian. These can be called use areas. There are other places, perennially favored as camps, where chipping waste lies thick. These can be referred to as occupancy areas.”

Material culture largely reflects subsistence and residence patterns, with milling slabs and less frequent rock mortars indicative of seed and nut processing, tools reflecting scraping, cutting, and smoothing of items, possibly imported Owens Valley Brownware, and stone tools made of local materials (Bodie Hills being in their territory), as well as imported or gathered obsidian. Basketry was functional, but especially in the early 20th century became such an elevated art that the Mono Lake weavers, such as Lucy Telles, Carrie Bethel, and Tina Charley, are among the more revered Indian basket makers in the world. Both twined and coiled varieties are found in several functional types and dimensions.

Ethnohistorically, the Northern Paiute began to see changes to their environment and encounters by outsiders as early as 1800, if not before. The horse, for example, had been introduced into the American southwest and Plains in the 1700s, with Northern Paiute groups accepting the animal and becoming much more nomadic in search of bison. There was a great ecological factor for horse acceptance in that it allowed equestrians to travel long distances to acquire food and other items to bring back to a more central location. Another important factor was the westward encroachment of various groups including Hispanic explorers, French and other fur trappers, and settlers of many affiliations. Both Washo and Paiute oral histories have stories about the Spanish “conquistadors” and men wearing silver plates coming into their territory in search of precious metals.

In 1827, Jedediah Smith, on his journey west from California east to the Great Salt Lake, encountered 20 to 30 presumably Paiute men on horses at Walker Lake, along with numerous other groups who had horses or with whom he exchanged horses for supplies. Then, by 1850, the rush for riches in California and western Nevada particularly affected the lifestyle and environment of the people, and the story of what happened to the westernmost Northern Paiute is similar to that of other people affected by argonauts. Also, by this time, non-native items of metal, glass, and ceramics had found a place in Paiute material culture. Several documents about Mono County Native American history include detailed accounts of Kutzadikaa Paiute interaction with the newcomers. Some 50,000 head of livestock, 21,000 people, and 6,200 wagons passed through Northern Paiute territory on their way to California. It does not take much imagination to visualize how this might have affected the environment and lifeways of the Northern Paiute. Seed plants eaten, trampled, and destroyed, water fouled, game either shot or chased away leaving little upon which the Kutzadikaa could survive. It is not surprising then that in 1858 the San Francisco Bulletin reported that the Indians at Mono Lake noted there was gold there, and they were "friendly to the whites. They wish them to come among them, so that they may get work and buy blankets." The transition into the government period of overseeing certain Indians had begun, moving into a reservation period for some Native Americans and a period of neglect for others, like the Kukzadikaa. There is also an important story to be told about the integration of the Kukzadikaa into the labor force of the area, even including employment on construction and maintenance of the Project.

5.11.5.3. Historic Period Context of the Project Vicinity

To set up the historic contexts within which the Project was developed and within which some of these resources will be evaluated, the history of the proposed APE and surrounding area has been divided into the following main themes: early exploration and mining; logging; agriculture and ranching; transportation; hydroelectric development; and recreation.

EARLY EXPLORATION AND MINING

Although the exact route is unknown, it has been surmised that exploration of Mono County by non-native people began in the early 1800s when trappers Jedediah Strong Smith, Robert Evans, and Silas Goble may have crossed Sonora Pass on their journey to the Great Salt Lake in 1827. In 1834 Joseph Reddeford Walker, leading an expedition of 40 soldiers, followed the East Walker River through Mono County on their way to what would later become California's San Joaquin Valley. Other parties passed through the county in the 1840s including Lt. John C. Fremont and the Bartleson-Bidwell Party (Chappell, 1947:235; Trexler, 1980:1).

As with much of the Sierra Nevada, non-native settlement in Mono County began after California became a state and gold was discovered at Colma in the early 1850s. In 1852, specimens of gold-bearing quartz were discovered while Lt. Tredwell Moore and his detachment were chasing Chief Tenaya and a band of "Yosemite Indians" through Mono Pass. The specimens were displayed in Mariposa, and as a result the lure of gold inspired Leroy "Lee" Vining and others to come to the area and establish themselves on what became known as Vining's Gulch or Creek (now Lee Vining Creek). While there is no evidence that he struck a significant amount of gold, in the 1860s he established a sawmill at his rancho on Vining Creek where lumber was cut for shipment to Aurora, then the county seat of Mono County. The mill was located approximately 2 miles up canyon from Lee Vining. The town of Lee Vining (first named Leevining) is a descendant of this enterprise (Carle and Banta, 2008; Chappell, 1947; Trexler, 1980).

During the mid-to late-1800s the main routes over the Sierra Nevada ran west to east via Sonora and Mono passes. The latter in particular was a well-known trail to the Native Americans advising Lt. Moore on the route to Mono Lake, and the precursor to Tioga Road (Trexler, 1980). Some of the travelers were miners, others were packers with provisions for settlements. When a prospecting party explored the Tioga Pass area in the 1860s, they discovered ore near Tioga Hill, and left a marker consisting of a flattened tin can with the location scratched into it with a knife. The ore they brought out was never assayed and the party never returned. Around 1875, William Brusky, while herding sheep in the area, found the marker, and carried out ore that was pronounced worthless. Undaunted, he returned to the location and by 1877 he had found ore rich in silver (Trexler, 1980). Claims were made in 1878 and the Tioga Mining District was organized. The Great Sierra Consolidated Silver Company bought up all the claims on Tioga Hill in 1881, some 350 of them. They planned to drill a tunnel that went 1,784 feet into the hill at the "Sheepherder Claim" but in order to do that a road had to be constructed to transport the drilling equipment across the Sierra. Some of the other claims were worked; however, the silver they thought they would find eluded them. The mining company, which was suffering financially, pulled out in 1884. By this time though, they had constructed the Great Sierra Wagon Road (now Old Tioga Road), meant to bring men, equipment (including the drilling equipment), and supplies from the Central Valley, east to the mining districts in Tuolumne and Mono Counties (Trexler, 1980).

Although mining did not pan out along Lee Vining Creek, it did elsewhere in Mono and surrounding Counties. Between 1852 and 1900 settlers established several towns and provided services to the miners. The first settlements, Dogtown and Monoville, served the Virginia and Mono Gulch mines by 1859. Sixteen miles north of Monoville, W.S. Body discovered a claim and established Bodie, which at its peak (between 1879 and 1881) had 10,000 residents. The Dogtown and Monoville settlements were short lived, in part due to their locations and lack of water for placer mining but unlike the mines in the Tioga District they were productive. Due to the influx of settlers, petitions to the California legislature to create Mono County started in 1860. The legislation passed and Mono County was created in 1861. In 1886 Mono County was second in gold and silver production in California. Larger settlements that still exist today also have their roots in early settlement and mining in this era including Lee Vining (1852), Bishop (1862), and Bridgeport (1864) (Cain, 1961; Carle and Banta, 2008; Chapell, 1947).

LOGGING

The need for timber to build mining-related structures, buildings, and entire towns was the catalyst for the timber industry in this area. The best timber was located near Bridgeport and South of Mono Lake. By 1863, there were four sawmills in the area, including Lee Vining's and as others near Big Meadows (Bridgeport) and Lundy. Pine was harvested for lumber, mine props, and cordwood, while pinion and juniper were harvested for mine props and fuel (Chappell, 1947). By 1879, most of the lumber was shipped to Bodie to build the many dwellings in the area and to shore up the mining adits. By the early 1880s the Bodie Railway and Lumber Company had been organized; they planned to tap into the lumber south of Mono Lake (Mono Mills) (Cain, 1961). Up until the 1880s lumber was hauled by wagon along roads constructed between the various settlements in the area. The Bodie-Benton railroad was first constructed in 1881, allowing for timber to be hauled to Bodie from Mono Mills. In 1882, after construction had been completed 5 million feet of lumber and 27,000 cords of wood were shipped to Bodie from Mono Mills (Cain, 1961).

An act of congress created the Sierra Forest Reserve in 1893 in order to control not only logging, but also grazing. At this time the lands within the reserve were managed by the U.S. Department of the Interior. However, in 1905 President Roosevelt reassigned the forest reserves to the newly created USFS. Gifford Pinchot was chosen to head up the Sierra Reserve, which became the Sierra National Forest. The Inyo National Forest, where the majority of the Project is located, was carved out of the Sierra Reserve, and was created in 1907 (Selters, 2012).

The construction of roads throughout the region aided the expansion of the timber industry. However, as more land was added to the Inyo National Forest, one of its main missions became the protection of wilderness areas and enhancement of recreation. Although timber and grazing managements are still goals, the forest itself is known as a "flagship" forest that manages the non-timber mandates of the USFS as well (Selters, 2012).

AGRICULTURE AND RANCHING

The influx of settlers and the need for sustenance spurred the agriculture and ranching industries. The more fertile areas in the county such as the Bridgeport and Antelope valleys were quite productive. Bridgeport Valley provided pasture lands for cattle and sheep while the Antelope Valley provided produce such as apples, pears, berries, and wheat (Cain, 1961). Land around Mono Lake was also used for pasturage and crops that were irrigated via ditches by water from Lee Vining Creek in the 1880s. By that time, more than 2,000 acres of land around the lake were under cultivation. Crops and cattle were shipped to the larger mining camps of Bodie and Aurora. Even though the stock market crashed in the 1880s and productivity at Bodie dropped off, these family farms continued to raise stock and to grow hay, alfalfa, wheat, barley, potatoes, and other root vegetables. Irrigation from Lee Vining Creek gradually stopped with the development of the Lee Vining Hydroelectric Project, and little cultivation occurs in the Lee Vining area today (Costello and Marvin, 1983).

Stock, sheep, and cattle were taken to the high country for grazing in the summers. They were driven over the passes, including Tioga and Mono, and were left to graze in the open country. As noted earlier, much of the land in the higher elevations became part of the U.S. Forest Reserves in 1893 and then, at the turn of the century, became managed by the USFS (Theodoratus, 1984). Sheep grazing became prohibited on U.S. Forest Preserve lands in 1893 due to the perceived destructive nature of this type of grazing. Cattle grazing continued in the higher elevations in the summer and eventually, by the 1920s, became a rather large enterprise for many (Selters, 2012; Theodoratus, 1984). As the snow melted in the spring, ranchers drove their cattle into the higher elevations, via a network of trails and stage roads built for the mines. Given the distance and amount of time it took to travel, most ranchers established camps in the high country for the summer (Theodoratus, 1984).

By the 1920s the invention of the automobile and construction of roads greatly reduced travel time and enabled the ranchers to truck their cattle at least partway into the mountains to graze. Since the cattle returned to the same areas each year, they knew the range and the ranchers, were able to spend their summers together on their ranches, instead of in temporary summer camps (Theodoratus, 1984). Automobiles also enhanced other local industries such as logging and recreation.

TRANSPORTATION

Transportation is key to the development of Mono County as well as surrounding areas east of the Sierra Nevada. As noted earlier, supplies were first brought in by packers via trails that ran from the west across the mountains, one of those being the Mono Trail which was the predecessor to the Tioga Road not constructed until the 1880s (Trexler, 1980).

One of the earlier solutions to finding more efficient means of crossing the mountains was the construction of toll roads under franchises granted by the state and county. Individuals and companies maintained the road and collected fees from those who used it. Among the first was a road over Sonora Pass that was completed by 1868 and by the 1870s a stage line operated over this road (Chappell, 1947).

Construction of Tioga Road began in 1882 and was completed in 1883. Different sources indicate that the construction was accomplished by at least 35 or even more (250) Chinese laborers. In the end, the road was never used to haul the mining equipment nor the ore over the pass, and though the route was built by means of a franchise and was technically a toll road, tolls were never charged. Instead, it served mainly as a road used by tourists to travel to Yosemite Valley via horse or wagon until automobiles were allowed in the park in 1913 (Trexler, 1980).

Railroads were planned, but large ones connecting the towns along the east side in the vicinity of the APE were never established. Instead, a small 32-mile-long track, the Bodie-Benton Railroad, was established to connect Bodie to Mono Mills. The Bodie-Benton railroad was first constructed by Chinese laborers, but due to anti-Chinese sentiment, their encampment was removed, and the railroad was finished by union laborers. As noted earlier, it provided for hauling timber between Bodie and Mono Mills. Although it was intended to be constructed further south to Benton, it was never extended (Carle and Banta, 2008).

Of course, many trails linked the early mining claims, and mining-related settlements such as Bodie, Aurora, Big Meadows, and Lee Vining, providing a means of travel and the hauling of supplies and timber (Chappell, 1947). Eventually, many of the trails became wagon roads and were paved. Like Tioga Road, a trail preceded U.S. Route 395. The trail, sometimes known as the Camino Sierra, led from Los Angeles to Lake Tahoe roughly paralleling portions of the present highway. This highway and its predecessors provided a link to routes over the mountains to the west side settlements. Portions were paved in 1932 but did not become a four-lane highway until the 1990s (Carle and Banta, 2008). Today the highway is a major transportation route connecting Los Angeles to the Canadian Border.

HYDROELECTRIC DEVELOPMENT

Development of the Lee Vining Hydroelectric Project was started by James Stuart Cain. He was an entrepreneur and stockholder in the Standard Consolidated Mining Company in Bodie, California. In 1902, Cain and his partner R.T. Pierce claimed appropriation rights on the waters of Rush Creek and planned to survey Lee Vining Creek. By 1907, Cain had controlling interest in the California-Nevada Canal Water and Power Company. That year he obtained rights-of-way on public land to construct reservoirs on Lee Vining Creek at Saddlebag and Ellery (also known as Rhinedollar) Lakes, and on Glacier Canyon at Tioga Lake, as well as the right to build numerous ditches and flumes (Williams and Hicks, 1989).

By 1911, Cain had created the Pacific Power Company and built a power plant at Mill Creek, north of Lee Vining Creek. The firm also received Cain's rights to Lee Vining Creek. Delos Allen Chappell, president of Nevada-California Power Company the developer of the Bishop Creek Hydroelectric System, purchased substantial interest in Pacific Power Company. In 1915, he and Cain reorganized the firm as the Pacific Power Corporation, which was acquired by Nevada-California Electric Corporation. Cain turned his interests to Mono County mining projects, and Chappell died in 1916 as the result of an accident. Nevada-California Electric Corporation legally dissolved the Pacific Power Corporation in 1922. In 1923, control of Lee Vining Creek water rights went to its Nevada-California Electric Corporation's subsidiary, Southern Sierras Power Company. Southern Sierras Power Company completed development of the Lee Vining No. 1 and No. 3 Powerhouses by the end of 1924. The Lee Vining powerhouses would eventually supply power to the Imperial Valley (Williams and Hicks, 1989).

In 1936, Southern Sierras Power Company was dissolved. Its operating properties were transferred to its parent company, Nevada-California Electric Corporation. In 1941, the corporation changed its name to California Electric Power Company, which operated the Lee Vining Creek system until they merged with Southern California Edison on January 1, 1964 (Diamond and Hicks, 1988; Williams and Hicks, 1989).

RECREATION

Recreation has a very long history in the Lee Vining area and it still thrives today. The many lakes, streams, and mineral and hot springs in the area provide opportunities for relaxation, fishing, and swimming, while the surrounding forests and mountains provide opportunities for packing, hunting, and camping. Of course, the winters with their heavy snowpack provided for activities such as skiing and snowshoeing. Mono Lake was a big draw not only because of its unusual beauty, but also because of the unique salinity that kept swimmers more buoyant than other lakes. Lee Vining Creek as well as other streams in the watershed were popular with fishermen as were Saddlebag, Ellery, and Tioga lakes. Hot springs, such as Fales Hot Springs, established in the early 1860s, were not only used for recreation, but were also perceived as a way to improve one's health. They were a popular stopping point for packers, and other travelers where one could stay at the hotel for a night or longer to clean up and rest (Cain, 1961).

Recreational packing, though not popular in the early days of settlement, gained steam during the last decades of the 19th century when local residents began taking trips to explore their mountainous surroundings. The rise of mountaineering as a recreational activity further fueled local interest in exploration, and ranchers and farmers in the areas began to rent out their pack animals and themselves as guides. By the 1920s, packing had become a profitable business, as ever-increasing numbers of people with automobiles could reach the Sierra Nevada and pursue recreation activities such as fishing, hunting, camping, and skiing (Woolfenden et al., 2007). Pack stations continued in popularity throughout the middle of the 20th century but began to decline after the 1960s when government contracts dried up and people relied on cars and airplanes to get them where they wanted to go. Additionally, regulations passed in the 1960s limited to fifty the number of head each pack station could run in the Inyo National Forest, which led to a consolidation of pack stations and decrease in operations. By 1990, there were fewer than 50 pack stations operating in the Sierra Nevada, more than an 80 percent reduction from historic highs earlier in the century (Woolfenden et al., 2007).

Yosemite and Mono Lake were the other big draws for recreationists. Until Tioga Road was completed, packers would take groups of people over Mono Pass into Yosemite Valley. They also took groups of people to Mono Lake via Tuolumne Meadows. One of the earlier accounts is from 1858 when a group, including a woman and a baby, led by packers, left from Mono Lake and traveled over the pass to Yosemite Valley (Trexler, 1980). The construction of Tioga Road allowed for more visitors to travel to the park and Mono Lake via packing or wagons. Once the road opened to automobiles after the turn of the century, visitors to Yosemite and Mono Lake increased.

Skiing was very popular early on. The first rope tow in the hills above Lee Vining was constructed in the early 1930s. Back-country alpine skiing was also quite popular among more adventurous recreationists. By then several businesses that catered to the early recreationists had been established in the town of Lee Vining. Also, within the APE, these activities lead to the establishment of rustic camps such as Girdasky's Camp Tioga (now Tioga Pass Resort) in the early 1900s (Carle and Banta, 2008). The trail passed near the camp and, later, the Tioga Road, located slightly further away, provided easy access. Girdasky's camp provided accommodations for hunters, fishermen, hikers, and back-country skiers. There are also reports that they employed locally based Native Americans in the 1920s and 30s (Davis-King and Snyder, 2010).

As mining ceased, recreation helped the town of Lee Vining survive. Today, it is mostly a tourist stop and a destination for those who want to relax and enjoy a variety of activities year-round.

5.11.6. Summary

In summary, the proposed APE and surrounding area have a lengthy history that started in the early 1800s and continues today. The following sections describe previous studies and the archaeological sites, as well as built-environment resources that have been recorded to date. These resources are a testimony to the pre-contact, ethnographic, and historic period development of the area explored in the previous sections.

5.11.7. Previous Cultural Resource Studies

Thirty-two previous cultural resource investigations were identified within the proposed Study Area (Table 5.11-1). Of these, 19 have been conducted within the proposed APE or overlap the proposed APE and Study Area. Among them are the preparation of a Historic and Archaeological Preservation Plan (HAPP [White, 1983]); four studies conducted during the last relicensing (Diamond and Hicks, 1988; White,1985a, 1985b; and York, 1990); and the preparation of an Historic Properties Management Plan (White, 1990). The archaeological studies conducted for the previous relicensing are discussed in the following paragraphs, while the built environment studies are discussed in Section 5.11.9. Maps of the previous studies are located in Appendix H (Confidential).

A HAPP was prepared by David White for the cultural resource studies for the previous relicensing. This plan defined the APE for the previous relicensing, required inventory and evaluation of archaeological sites and built-environment resources potentially affected by activities associated with the projects, and outlined the methods to be used to accomplish compliance with Section 106 of the NHPA (White, 1983).

Studies were conducted for the relicensing in 1984, including a Mono County Parks and Recreation Campground Expansion and the 115-kilovolt (kV) transmission line that runs from Rush Creek Powerhouse to Poole Powerhouse via the Lee Vining Substation as well as a portion of the parallel telephone line (White, 1985a:7). The transmission line and telephone line have been removed from the current FERC Project Boundary. Nine archaeological sites were revisited or recorded during this survey (CA-MNO-720, -2413, -2414, -2415 -2416, -2417, -2418, -2419, -2420). Preliminary NRHP eligibility evaluations of sites CA-MNO-2414, -2415, -2417, and -2418 were conducted. CA-MNO-2414 was recommended as eligible while 2415, -2417, and -2418 were recommended as not eligible (White, 1985a:47-48, 52-53). The State Historic Preservation Office (SHPO) concurred with these findings in a letter dated September 19, 1988 (Gualtieri, 1988). Further study was recommended at sites CA-MNO-720, -2413, -2416, -2419, and -2420 (White, 1985a:48, 52-56). Only CA-MNO-2417 is located within the current FERC Project Boundary; the rest are located outside of the boundary.

The remaining portion of the telephone line that parallels the 115kV transmission line that runs from Rush Creek Powerhouse to Poole Powerhouse via the Lee Vining Substation was surveyed in 1985. For the purposes of this PAD, discussion of this study is abbreviated since the telephone line is no longer located within the current FERC Project Boundary (proposed APE). Briefly stated, three archaeological sites were recorded during the survey (White, 1985b:6-7). Preliminary recommendations regarding NRHP eligibility were made. Two of the sites were recommended as not eligible for the NRHP and further study was recommended for one of them (White, 1985b:23-26).

In 1987, Vickie Clay and M.C. Hall conducted a survey of Tioga, Saddlebag, and Ellery Lakes. They recorded one historic-period site (CA-MNO-2437) and ten prehistoric, multi-component, and historic-period cultural isolates (Clay et al., 1988:i). CA-MNO-2437 is located within the current FERC Project Boundary.

In 1990, Andrew York conducted an evaluation of eight archaeological sites for the previous relicensing (CA-MNO-720, -2413, -2414, -2416, -2419, -2420, -2422, and -2437). CA-MNO-2414, -2416, and -2419 were recommended as eligible for the NRHP. CA-MNO-720, -2413, -2420, -2422, and -2437 were recommended not eligible (York 1990:13-31). Only site CA-MNO-2437 is located within the current FERC Project Boundary. The other sites are within areas that were within the previous FERC Project Boundary that have since been removed. The SHPO concurred with these findings in a letter dated February 16, 1990 (Gualtieri, 1990).

Table 5.11-1. Previous Cultural Resource Studies Located Within the Proposed Study Area and APE

IC Number	SCE Document ID	USFS Number	Author(s)	Year	Report Title
MN-00153	--	--	Bodie, C.D.	1980	*Archaeological Reconnaissance Report- Saddlebag Lake Campground Reconstruction*
MN-00120	--	R1981050400201	Burton, J.	1980	*Archaeological Reconnaissance Report-Junction Campgrounds Rehabilitation*
MN-00107	--	--	Faust, N. A.	1980	*Archaeological Reconnaissance Report- Sawmill Campground Rehabilitation Project*
MN-00217	--	ARR #05-04-0270	Crist, M. K.	1982	*A Cultural Resources Reconnaissance of the Leggett Hydroelectric Project Mono County, California*
--	1160002	--	White, D.R.M	1983	*Historic and Archaeological Preservation Plan for Eastern Sierra Hydroelectric Projects in Mono and Inyo Counties, California: Lundy (FERC 1390), Lee Vining Creek (FERC 1388), Rush Creek (FERC 1389), and Bishop Creek (FERC 1394)*
MN-00802	1160170	R1987050400441	White, D.R.M	1985a	*Results of the 1984 Field Season, Cultural Resources Survey, for the Historic and Archaeological Preservation Plan for Eastern Sierra Hydroelectric Projects, In Mono and Inyo Counties, California: Lundy (FERC Project 1390), Lee Vining Creek (FERC Project 1388), Rush Creek (FERC Project 1389), and Bishop Creek (FERC Project 1394)*
--	1160187	--	White, D.R.M	1985b	*Results of the 1985 Field Season, Cultural Resources Survey, for the Historic and Archaeological Preservation Plan for Eastern Sierra Hydroelectric Projects, In Mono and Inyo Counties, California: Lee Vining Creek (FERC Project 1388) and Rush Creek (FERC Project 1389)*
MN-00424	1160218	--	Clay, V. L. and M.C. Hall	1988	*Results of The 1987 Field Season Cultural Resources Survey for The Historic and Archaeological Preservation Plan for The Lee Vining Creek Hydroelectric Project (FERC #1388) And The Rush Creek Hydroelectric Project (FERC #1389)*
MN-00417	1160198	--	Diamond and Hicks	1988	*Historic Overview of the Rush Creek and Lee Vining Creek Hydroelectric Projects*

IC Number	SCE Document ID	USFS Number	Author(s)	Year	Report Title
--	1160241	--	White	1988	*Guide to Areas Surveyed for the Historic and Archaeological Preservation Plan for Eastern Sierra Hydroelectric Projects in Mono and Inyo Counties, California: Lundy (FERC Project 1390), Lee Vining Creek (FERC Project 1388), Rush Creek (FERC Project 1389), and Bishop Creek (FERC Project 1394)*
--	1160283	--	Lehmann et al.	1989	*Summary Report for the Historical Investigation of Water Rights for Rush Creek and Lee Vining Creek*
MN-00418	1160279	--	Williams and Hicks	1989	*Evaluation of the Historic Resources of the Lee Vining Creek (FERC Project 1388) and Rush Creek (FERC Project 1389) Hydro Electric Systems, Mono County, California*
MN-00515	--	ARR #05-04-0467	Balint, T and W. Woolfended	1990	*Archaeological Reconnaissance Report- Ellery Lake Pipe*
--	1160298	--	White, D.R.M	1990	*Management Plan for Historic and Archaeological Resources Associated with the Lee Vining Creek Hydroelectric Project (FERC Project No. 1388), Mono County, California*
--	1160288	--	York, A.	1990	*An Evaluation of Twenty-One Archaeological Sites on the Lee Vining Creek, Rush Creek, and Lundy Hydroelectric Projects, Mono and Inyo Counties, California*
--	1161328	--	Taylor, T.T.	1996	*Historic American Engineering Record Lee Vining Creek Hydroelectric System, Triple Cottage Building No. 102 HAER No. CA-180-A*
--	--	R1996050400707	Unknown	1996	*Lee Vining Canyon Bighorn Sheep Enhancement Project*
--	--	R1997050400720	Unknown	1997	*Tioga Pass Resort Evaluation*
--	1160470	--	Taylor, T.T.	1998	*Archaeological Survey and Assessment Report Eastside Hydro Gaging Station Automation Project Rush Creek and Lee Vining Creek Hydroelectric System Mono Basin, Mono County, California*
--	--	R2004050401073	Unknown	2004	*OHV Routes Inventory and Designation Survey*
MN-00984	--	R2004050401073c	Penelope A. Spears	2006	*Heritage Resources Report (Off-Highway Vehicle (OHV) Route Designation Strategy)*
MN-00925	--	R2007050401250	West, Crystal	2007	*Heritage Resources Report (Saddlebag Lake Wedding)*

IC Number	SCE Document ID	USFS Number	Author(s)	Year	Report Title
--	1164552	--	Parr, R.E.	2010	*Cultural Resources Assessment for the Southern Californian Edison Company Saddlebag Dam Geomembrane Liner Installation Project, Inyo National Forest, Mono County, California*
MN-01079	1163528	R2010050401456	Switalski, H and S. Hutmacher	2010	*Heritage Resource Inventory Report for the Southern California Edison Co.'s Replacement of Two Deteriorated Pole Structures on the Control-Morgan-Plant 2 55kV Transmission Line (4770-0355) and Two H-Frame Structures on the Lee Vining-Poole 115kV Transmission Line (4750-1597)*
MN-01053	--	R2009050401346	Leach-Palm, L., P. Brandy, J. King, P. Mikkelsen, L. Seil, L. Hartman, J. Bradeen, B. Larson, and J. Freeman	2010	*Cultural Resources Inventory of Caltrans District 9 Rural Conventional Highways in Inyo, Eastern Kern, Mono and Northern San Bernardino Counties, Summary of Methods and Findings*
MN-01054	1164522	R2010050401539	Parr, R.E.	2010	*Cultural Resource Assessment for The Southern California Edison Company Saddle Bag Dam Geomembrane Liner Installation Project, Inyo National Forest, Mono County, California*
MN-01107	1163657	R2010050401458	Hubert Switalski and Andrea Bardsley	2011	*Archaeological Survey Report and Historical Resource Evaluation for the Proposed Rhinedollar (overhead) 12kv Distribution Circuit Rebuild Project (6085-4800, 8-4816), Lee Vining Creek Hydroelectric System, Inyo National Forest, Mono County, California*
MN-01104	--	--	Willis W.	2011	*Tioga Road Survey*
MN-01125	1163028	--	Hoffman and Dietler, J	2012	*Letter Report: Cultural Resources Letter Report for IO 322880, Cultural Resources Monitoring for Southern California Edison Emergency Repairs, Rhinedollar*
--	--	R2012050401734	--	2012	*Travel Management Road Closures, North Zone, CA*
--	1163000	R2014050401857	Switalski. H	2014	*Heritage Resources Inventory Report for the Southern California Edison Company's Rebuild of an Underground*

IC Number	SCE Document ID	USFS Number	Author(s)	Year	Report Title
					Conduit Along State Route 120 (6485-4815, 8-4805), Ellery Lake, Inyo National Forest, Mono County, California.
--	1164638	--	Nixon and Pacheco	2018	*Cultural Resource Inventory Report for TRR GO 131-D Evaluation Project Along the Lee Vining-Poole 115-kV Transmission Line, Inyo National Forest, Mono County, California (USFS ARPA Permit# LVD18031)*

ARPA = Archaeological Resource Protection Act; FERC = Federal Energy Regulatory Commission; IC = Information Center; kV = kilovolt; NADB = National Archaeological Database; SCE = Southern California Edison; USFS = U.S. Forest Service

5.11.8. Previously Identified Archaeological Sites

Archival research conducted to date indicates that there are seven pre-contact, zero multi-component (pre-contact and historic-period), and nine historic-period archaeological sites previously recorded within the proposed Study Area. Of these, two pre-contact, zero multi-component, and four historic-period archaeological sites are located within the proposed APE. The types of sites and their NRHP eligibility are listed in Table 5.11-2. Pre-contact sites primarily include bedrock milling stations, lithic scatters, and ground stone. Historic-period sites include historic debris and the remains of buildings or structures. The remains at the Tioga Pass Resort (P-26-003308) may be related to Native American employees that worked there. Two of the archaeological sites within the proposed APE have been evaluated for their eligibility for listing in the NRHP and were determined not eligible (CA-MNO-2437 and P-26-006236). The locations of these sites are depicted on maps located in Appendix H (Confidential).

Table 5.11-2. Previously Recorded Archaeological Sites Located Within the Proposed Study Area and APE

Primary Number	Trinomial	USFS Number	Site Type	Composition of Site	NRHP Eligibility	In APE	In Study Area	Property Owner
P-26-000016	CA-MNO-16	05045101165	Prehistoric	Lithic Scatter	No Data	Yes*	No*	USFS
P-26-000203	CA-MNO-203	05045100342	Prehistoric	Lithic Scatter	No Data	No	Yes	USFS
P-26-000354	CA-MNO-354	05045201165	Prehistoric	Lithic Scatter	No Data	No	Yes	USFS
P-26-000537	CA-MNO-537	--	Prehistoric	Lithic Scatter	No Data	No	Yes	USFS
P-26-001679	CA-MNO-1679	05045100400	Historic	Bennettville Mine	No Data	No	Yes	USFS
P-26-001926	CA-MNO-1926	--	Prehistoric	Lithic Scatter	No Data	Yes	No	N/A
P-26-002417	CA-MNO-2417	05045100702	Prehistoric	Lithic Scatter	Not Eligible 09/22/88 FERC821004D	No	Yes	USFS
P-26-002437	CA-MNO-2437	05045101163	Historic	Structures; Historic Debris	Not Eligible 02/06/90 FERC821004D	Yes	Yes	SCE
P-26-003231	CA-MNO-3171	--	Historic	Historic Debris	No Data	No	Yes	USFS
P-26-003308	--	05045101259	Historic	Tioga Pass Resort	Historic District 07/29/1997, USFS970709A	Yes	Yes	USFS
--	--	05045101427	Historic	Historic Debris	No Data	Yes	No	USFS
--	--	05045101749	Historic	1880 Steam Engine	No Data	No	Yes	USFS
--	CA-MNO-5391	05045101750	Historic	Old Road Segment	No Data	No	Yes	USFS
--	CA-MNO-5392	05045101751	Historic	Historic Camp	No Data	No	Yes	USFS
P-26-005847	--	--	Historic	Historic Road	No Data	No	Yes	N/A
P-26-006236	--	05045101683	Historic	Rhinedollar 12kV Circuit	Not Eligible 06/06/2011, USFS110413A	Yes	No	USFS

APE = Area of Potential Effects; kV = kilovolt; N/A = data not available; NRHP = National Register of Historic Properties; SCE = Southern California Edison; USFS = U.S. Forest Service; *Site Record Very Old, Location is Uncertain

5.11.9. Lee Vining Hydroelectric Project

The Project location offers geographical advantages for high-head hydroelectric generation due to the steep topography and annual snowpack. The Lee Vining Creek Hydroelectric System is composed of three dams and reservoirs, and auxiliary dam, a conduit, a powerhouse and related structures, and a substation and related structures. Built between 1917 and 1924, original plans called for a second powerhouse, which ceased to operate in 1940, and the construction of a third powerhouse that was never undertaken (Williams and Hicks, 1989). The Project was evaluated for the NRHP by James C. Williams and Robert A. Hicks in 1988. The only element of the system that was determined eligible was the triplex cottage located at Lee Vining Powerhouse No. 1 (i.e., Poole Powerhouse).

The period of significance for the cottage is between 1920 and 1930. It is a French Eclectic triplex designed by G. Stanley Wilson, an architect based in Riverside, California. “His work was of very high quality, and he was a leading practitioner of the Spanish-Colonial revival during the 1920s” (Williams and Hicks, 1989:26). The building is considered eligible for the NRHP under Criterion C, distinctive architectural characteristics that represent the work of a master.

The rest of the system was determined not eligible because the engineering techniques used in constructing the Lee Vining Hydroelectric Project and its components were commonplace for hydroelectric systems built during the 1920s. Good examples of commonplace components are the rock-filled dams at Saddlebag, Ellery, and Tioga Lakes (Williams and Hicks, 1989). Additionally, background research and fieldwork conducted when the Project was evaluated revealed that one of the related cottages had been removed, one was greatly altered, and other buildings removed or were substantially altered. Major additions had also been made in the form of switchracks, transformers, fencing, and grading. Williams and Hicks also determined that decommissioning of Powerhouse No. 3 had greatly compromised the Project's overall integrity (Williams and Hicks, 1989). Project elements that were recorded and evaluated are listed in Table 5.11-3.

Table 5.11-3. Lee Vining Hydroelectric Project Elements

Primary Number	HAER Number	Description	Date of Construction	NRHP Eligibility
--	--	Poole Powerhouse; Building No. 101	1924	Not Eligible
--	CA-180-A	Lee Vining Creek Hydroelectric System Triplex Cottage; Building No. 102	1924	Eligible
--	--	Woodshed; Building No. 103	1925	Not Eligible
--	--	Storage Shed; Building No. 104	1927	Not Eligible
--	--	Radio Room; Building No. 105	1925	Not Eligible
--	--	2-Car Garage; Building No. 107	1927	Not Eligible

Primary Number	HAER Number	Description	Date of Construction	NRHP Eligibility
--	--	Pumphouse; Building No. 109	1925	Not Eligible
--	--	Water Tank	1925	Not Eligible
--	--	Transformer Bank	Unknown[a]	Not Eligible
--	--	Switch Yard	Unknown[a]	Not Eligible
--	--	Flowline, Tunnel, Penstock	1920-1927	Not Eligible
--	--	Rhinedollar Dam (Ellery Lake)	1927	Not Eligible
--	--	Rhinedollar Flume	1952	Not Eligible
--	--	Flume House	1956	Not Eligible
--	--	Valve House	Unknown[a]	Not Eligible
--	--	Patrolman's Cabin/Vacation House	1942	Not Eligible
--	--	Tioga Dam	1928	Not Eligible
--	--	Auxiliary Dam (Tioga Lake)	1928	Not Eligible
--	--	Instrument Building (Tioga Lake)	ca. 1950s	Not Eligible
--	--	Saddlebag Dam	1920	Not Eligible
--	--	Fire House	1955	Not Eligible
--	--	Venturi Flume	1949	Not Eligible
--	--	Valve House	Unknown[a]	Not Eligible
--	--	Flow Line (Lee Vining Creek)	1950	Not Eligible
--	--	Instrument Building (Lee Vining Creek)	Unknown[a]	Not Eligible

Source: Williams and Hicks, 1989

HAER = Historic American Engineering Record; NRHP = National Register of Historic Places
Note:
[a] Dates of construction were not in SCE's records (Williams and Hicks, 1989)

The only other built-environment resources known to be located within the proposed Study Area at this time are the Rhinedollar Circuit (P-26-006236), the Tioga Pass Resort (P-26-003308), and segments of the old Tioga Road.

5.11.10. IDENTIFICATION AND CONSULTATION WITH THE TRIBES

The California Native American Heritage Commission (NAHC) was contacted on July 23, 2020, via an emailed letter from Davis-King & Associates on behalf of SCE. The NAHC responded with a list of Tribal contacts on July 27, 2020. The list was further refined by Davis-King & Associates and SCE to included broader representation. A public kick-off meeting for the Lee Vining relicensing was held virtually on May 5, 2020, and an initial TWG meeting was held on January 27, 2021. Since then, two other meetings have been held on February 24 and March 31, 2021. The definition of the APE, results of the research conducted to date, and general information about the PAD and proposed Study Plans were presented at the meetings. No comments with regard to cultural resources were identified during the kick-off meeting. Refer to Section 2.2, *Early Relicensing Activities,* for additional information. No other outreach has been conducted to date. This information will be updated following additional early informal consultation.

5.11.11. CURRENT CULTURAL RESOURCE MANAGEMENT

SCE prepared a Cultural Resources Management Plan for the Project in 1990 (White, 1990). The plan identified (1) specific measures undertaken by SCE to avoid adverse impacts to the NRHP eligible properties located within the 1990 FERC Project Boundary and (2) various programmatic measures that SCE is required to implement. The management plan only addresses NRHP eligible properties, of which only the triplex cottage at Poole Powerhouse is located within the current FERC Project Boundary (White 1990:3-4).

5.12. TRIBAL RESOURCES

5.12.1. INTRODUCTION

This section presents information about Tribal Resources and Native American Tribes known to have cultural interests in the vicinity of SCE's Lee Vining Project (FERC Project No. 1388). It also discusses Tribal lands and/or resources, including Native American Traditional Cultural Properties (TCPs), which could be affected by O&M of the Project. FERC's content requirements for this section are specified in 18 CFR §5.6(d)(3)(xii):

> Tribal resources. A description of Indian tribes, tribal lands, and interests that may be affected by the project Components of this description include:
>
> > (A) Identification of information on resources specified in paragraphs (d)(2)(ii)-(xi) of this section to the extent that existing project construction and operation affecting those resources may impact tribal cultural or economic interests, e.g., impacts of project-induced soil erosion on tribal cultural sites; and
> >
> > (B) Identification of impacts on Indian tribes of existing project construction and operation that may affect tribal interests not necessarily associated with resources specified in paragraphs (d)(3)(ii)-(xi) of this Section, e.g., tribal fishing practices or agreements between the Indian tribe and other entities other than the potential applicant that have a connection to project construction and operation.

Information presented in this section was collected from readily available, existing ethnographic and ethnohistoric sources, along with other archival data, and represents the type of resources that may be important to local Tribes. Tribal consultation, archival research, and ethnographic interviews have not yet occurred, but will be conducted and/or used to provide information and ensure Tribal interests and concerns are identified and addressed.

5.12.2. Proposed Study Area and Area of Potential Effects

The proposed Study Area and APE for Tribal resources will be refined further when consultation occurs. For the present document, the proposed APE is defined as all land within the FERC Project Boundary; the proposed Study Area incorporates a 5-mile radius around the APE (Figure 5.12-1).

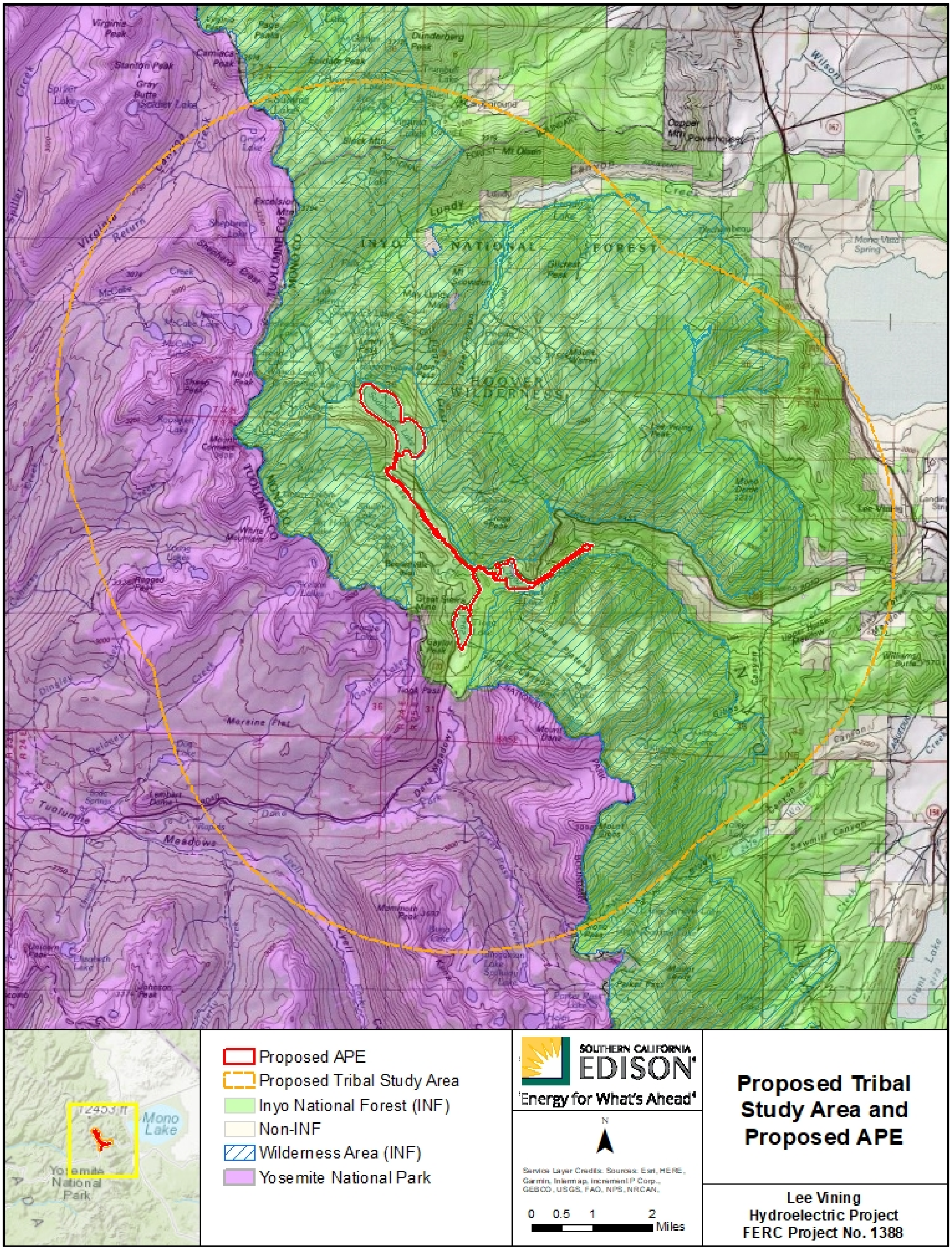


Figure 5.12-1. Proposed Tribal Resources APE and Study Area.

5.12.3. Information Sources

Data acquisition was compromised by the closure of archives and other repositories due to COVID-19 safety considerations. SCE relied upon online data, previous SCE studies, Inyo National Forest data, the CHRIS EIC at the University of California Riverside, and the Davis-King & Associate’s library.

This section was prepared utilizing the following primary information sources:

- Native American Heritage Commission (NAHC) Sacred Lands File and Native American Consultation List (NAHC, 2020)
- Project management plans and reports (White 1983, 1985, 1990).
- Emma Lou Davis (n.d., 1962, 1963, 1965) summaries of historic and Native American archaeology and heritage in the region.
- Existing ethnographic literature including Davis-King (2007, 2010); Davis-King and Snyder (2010); Fowler and Liljeblad (1986); Merriam (n.d., 1898-1938), and Powers (1976).

5.12.4. Identification of Tribes

5.12.4.1. Background Introduction

Review of various ethnogeographic and territorial monographs along with ethnographic investigations for the current Project license suggests that the current FERC Project Area was inhabited by the Kukzadikaa Paiute, a group of families occupying the Lee Vining (also known as Leevining in the earliest days) drainage, Mono Lake, the Bodie Hills, the area of Lundy, as well as broader areas used in their seasonal rounds to include the area that is now Yosemite National Park, and easterly to Walker Lake, in Nevada. Other groups have some affiliation with the area, including the Southern Sierra Miwuk, the Central Sierra Me-Wuk, possibly the Washo to the north, and Owens Valley Paiute to the south.

The NAHC (2020) conducted a Sacred Lands File search, with negative results, and did not identify any ethnographic studies conducted in the proposed APE. They provided a list of Tribes to contact, limited to eastern Sierra Nevada groups who are considered potential Stakeholders. Information from the USFS, National Park Service, and/or Bureau of Indian Affairs (BIA) regarding groups with whom they consult may supplement the list of Tribal Stakeholders.

5.12.4.2. Tribes with an Interest in the Project Area

Eleven Tribal groups have expressed interest in the Project Area; of these, six are included on the NAHC list. An additional five groups were sent a letter notifying them about the Project. These Tribal groups have representatives of various bands including, in alphabetical order, the Me-Wuk, Miwuk,[10] Owens Valley Paiute, Northern Paiute, and Washo. Other notified groups have Western Shoshone affiliation. FERC communicates with recognized and unrecognized Tribal groups; this policy is followed by SCE as well. Several of the Tribal groups have been contacted informally, meetings have been held with two groups, and more formal contact is planned later in 2021. Due to the proximity of Yosemite National Park to the western portion of the Project, there is a consideration of Yosemite National Park Native American consultation here. Yosemite National Park consults with seven affiliated Tribes (SATs) on a regular and group basis. Six of those SAT Tribes are discussed below with the one missing group (the Chukchansi Yokuts of Picayune Rancheria) being too far west on the Sierran slope to have affiliation with the Project. Tribal groups identified are described briefly below, again in alphabetical order.

American Indian Council of Mariposa County (also known as Southern Sierra Miwuk Nation)

The as-of-yet federally unrecognized American Indian Council of Mariposa County (AICMC; also known as the Southern Sierra Miwuk Nation; an SAT) is the group most commonly affiliated with the eastern portion of Yosemite National Park and Mariposa County. Members of the group have Mono Lake Paiute and Miwuk heritage and are knowledgeable about the resources and geography of the Project Area. A trans-Sierran walk, assembled both by Miwuk and Paiute, occurs between Mono County near Mono Lake from the Farrington Ranch, crossing Mono Pass into Dana Meadows, and down through the Yosemite high country near the Tioga Road to Tenaya Lake in Tuolumne County. The direction of the hike changes from year-to-year.

Big Pine Paiute Tribe of Owens Valley

The federally recognized Big Pine Paiute Tribe, located in Inyo County, California, has actively pursued historic and cultural data about their people and is greatly interested in Paiute heritage and sacred areas in Inyo and Mono Counties specifically. The Tribe has a Tribal Historic Preservation Officer (THPO) guided in part by cultural advisors. There are about 600 Tribal members, a majority of whom reside on the 279-acre Big Pine Indian Reservation. Big Pine Tribal members and/or ancestors used upper regions of the Sierra Nevada especially for summer activities and travel.

Bishop Paiute Tribe

The federally recognized Bishop Paiute Tribe, one of the SAT, is located in Inyo County, California and has also actively pursued historic and cultural data about their people, and is greatly interested in Paiute heritage and sacred areas in Inyo and Mono counties specifically. The Tribe has a THPO with oversight by a Cultural Advisory Committee and the Tribal Council. The Tribe is the fifth largest in California, with about 2,000 Tribal members, many of whom reside on the 875-acre Bishop Paiute Indian Reservation (Bishop Paiute Tribe, 2021). Bishop Tribal members and/or ancestors used upper regions

[10] The similarity in English pronunciation of Me-Wuk and Miwuk should not be construed to be a minor spelling variation, as each has linguistic relevance being a separate language. Each stands alone, the former used by the Central Sierra Me-Wuk and the latter used by the Southern Sierra Miwuk.

of the Sierra Nevada especially for summer activities and for travel. Several Kukzadikaa are enrolled with this Tribe.

BRIDGEPORT INDIAN COLONY

The Bridgeport Indian Council, located in Mono County, California, is the closest federally recognized Tribe to the Project Area and is a SAT. They have actively pursued historic and cultural data about their people; according to their webpage, the Tribal community consists of Me-Wuk, Mono, Paiute, Shoshone, and Washo descendants (Bridgeport Indian Colony, 2012). The Tribe has about 200 Tribal members and 80 acres of land (Committee on Natural Resources, 2012), but maintains a cultural department to oversee heritage resource matters. Tribal members and/or ancestors used the Project Area for food acquisition and travel. Several Kukzadikaa are enrolled with this Tribe.

FORT INDEPENDENCE INDIAN COMMUNITY OF PAIUTE INDIANS OF THE FORT INDEPENDENCE RESERVATION

The federally recognized Fort Independence Community of Paiute Indians (Inyo County) has an interest in their Tribal history and heritage. Members of this Tribe have affiliation or heritage with other Paiute Tribes in the eastern Sierra. They have a THPO and other cultural advisors, and participate in cultural discussions on projects geographically as far-ranging as their people (https://www.fortindependence.com/). Like the Big Pine people, Fort Independence Native Americans were marched south to the Kern River and the Tehachapi Range in 1863.

MONO LAKE INDIAN COMMUNITY (MONO LAKE KUKZADIKAA TRIBE)

The Mono Lake Indian Community also known as the Mono Lake Kukzadikaa Tribe is at present federally unrecognized, but has been a long-time affiliated Tribe with Yosemite and is one of the SATs. Federal legislation to recognize the Kukzadikaa was introduced to Congress in September 2020. They are the closest Tribe to the Project, and many Tribal members are knowledgeable about the resources and heritage of the region. Under a 501(c)(3) nonprofit organization, they also operate the Mono Lake Kutzadikaa Indian Community Cultural Preservation Association, which assists in cultural overview, and they have been actively working for recognition by the BIA.

NORTH FORK MONO TRIBE

The North Fork Mono Tribe is located in the central Sierra Nevada foothills up to the Sierran crest. They are recognized by the state of California and live on several BIA trust allotments. Composed of more than 150 Tribal members, the North Fork Mono Tribe has long been active and has been a strong voice for the advocacy of all Tribal cultural resources, including the many plants and materials still gathered and the birds and animals of the area. They have recently mapped the Mono Trail on the western side of the Sierra to connect with various passes, such as Mono, Parker, and Tioga, and the eastern Sierra portion of the Mono Trail.

NORTH FORK RANCHERIA OF MONO INDIANS

The North Fork Rancheria of Mono Indians is a federally recognized Indian Tribe listed in the Federal Register as the Northfork Rancheria of Mono Indians of California. This large Tribe is located in the small community of North Fork, in rural Madera County. As a western Sierra Nevada Tribe, affiliation with this Project Area might be questioned, but the North Fork people speak a version of Northern Paiute, and have deep ancestral and genealogical ties to Mono Lake and areas south. They conduct an annual Mono Nation walk which crosses the Sierra either east to west or west to east in alternating years; this walk is on a different alignment than the AICMC-Kutzadikaa walk mentioned previously. North Fork is an SAT and has expressed an interest in the Project via SCE's Project webpage.

TUOLUMNE BAND OF ME-WUK INDIANS

The Tuolumne Band of Me-Wuk Indians, located in Tuolumne, California, is a federally recognized Tribe with ancestral territory that extends into much of Yosemite and the Tioga Pass region. Located about 50 miles due west of the upper Project reservoirs, the Tuolumne Rancheria supports heritage programs and preservation throughout the region, largely in Tuolumne County. Although they do not have a THPO, they have a very strong and active heritage resource program. Tribal members have ancestors affiliated with Bridgeport and Mono Lake, as well as all three Sierran Miwok language groups. They are an SAT.

WALKER RIVER RESERVATION

The federally recognized Walker River Paiute Tribe (also known as *Agai-Dicutta* "Trout Eaters") is located in Nevada on the Walker River Reservation created in 1874. The reservation has more than 1,200 people residing on their land base of nearly 325,000 acres. The Tribe's connection to the Project is directly related to seasonal rounds where the Sierra Nevada provided summer camps and higher-elevation resources, and the present reservation area was a traditional wintering ground due to milder winters (Walker River Paiute Tribe, 2021). Although more than 60 miles distant, there are strong genealogical and historical ties to the Kukzadikaa.

WASHOE TRIBE OF NEVADA AND CALIFORNIA

The federally recognized Washoe[11] Tribe of Nevada and California has deep heritage into the Mono County region, although the majority of their land base and Tribal members reside in Nevada. The Tribe has a THPO who works with a cultural advisory committee composed mainly of Washo-speaking elders. They have several distinct colonies; and members of the Woodfords Colony in Markleeville, Alpine County, have the greatest affiliation with the Project Area. These people, the Southern Washo, are known as the *Hungalelti.*

[11] While the formal name of the Tribe includes the word "Washoe" due to federal government wording, the people prefer the term "Washo" when not referring to the Tribal name.

5.12.5. Ethnography and Ethnohistory

At the time the first history was written about the Project Vicinity, the area was mainly used by and in the traditional territory of a Northern Paiute group, the Kukzadikaa. The term Kukzadikaa derives from the Northern Paiute word, *kutsavi*, for the alkali fly (*Ephydra hians*), a greatly prized food of the people of Mono Lake (Blaver, 2001) and elsewhere (Fowler and Liljeblad, 1986:437). The Kutzadikaa harvest the pupae of the brine fly, which they make into a soup and use for trade items elsewhere. This summer food is supplemented by pinyon pine (*Pinus monophylla*) nuts gathered in the autumn, acorn, and the Pandora moth (*Coloradia pandora*) larvae. The people traveled widely, from Walker Lake in Nevada to Yosemite Valley in Mariposa County, and up and down the eastern Sierra Nevada piedmont. They had alternately friendly and unfriendly relations with their neighbors the Miwuk to the west, the Me-Wuk to the northwest, and the Washo to the north. Abutting their territory to the northeast, east, and southeast were other Uto-Aztecan speaking groups of Northern Paiute and Western Shoshone, with whom they were friendlier.

5.12.5.1. Ethnographers

The Northern Paiute are a geographically widespread linguistic group which extends from an area just south of Mono Lake, north to Goose Lake into Oregon and Idaho, and east to the Little Humboldt and Reese rivers. This vast area includes numerous groups connected by language but somewhat diverse in culture due in part to the varied environment in which they lived. As such, there are a number of principal ethnographers of the Northern Paiute, most of which are not discussed below because their interests lie with people great distances and different environments from the Project. Listed here are those ethnographers who had some connection to the people of the Project Area.

Although there were some early investigations by Stephen Powers in the mid-1870s and Wesley Powell in 1880, C. Hart Merriam appears to be the first to get into the area to talk with people who had experienced the first nonnatives' arrival. Willard Park (1933-1940; see also Fowler, 1989) investigated the Walker River area in the 1930s, and Emma Lou Davis (1965) prepared the first ethnographic overview of the Project-Area people. There is also a substantial unpublished archive, including the notes of Davis, Margaret Wheat, Omer Stewart, Sven Liljeblad, Warren d'Azevedo, and numerous others. The data are held in multiple institutions, largely in the American west, but none of these were open for investigation due to COVID-19 restrictions.

C. Hart Merriam

Among the earlier anthropological accounts were those from C. Hart Merriam's trips in 1898, 1900, and 1901. He recorded information from Bridgeport in 1900 and from Mono Lake in 1900 and 1901, followed by numerous visits to Mariposa, Midpines, Bull Creek Yosemite, and Hetch Hetchy over the next 3 decades. His journals cover 40 years of handwritten notes (1898-1938).[12] The first located reference to Yosemite in his notes was

[12] References to Merriam's field journal herein provide the year of his observations, but are grouped together in the references section as Merriam, 1898 to 1938.

from mid-August 1898, where Merriam made the observation that Yosemite Valley was nearly empty, with only a "few Mewuk Indians...left in the valley" and no Paiute (Merriam, 1898:85-100). Two years later, Merriam (1900:63) visited Bridgeport and recorded that the Indians, "were feeding on acorn meal mush and soup made of pine nuts." He observed that oaks are not found in the region, and asking the Bridgeport people about the acorn, found that "the Piutes cross the passes to gather them on the west slope. Sometimes they trade pine nuts with the Digger Indians for acorn" (Merriam, 1900:64).

From Bridgeport, Merriam then traveled south to Mono Lake, where he found two women preparing acorn whom he said were "just returning from a trip across the Sierra for gathering acorns" (Merriam, 1900:67). In September of 1900, Merriam camped for a few days on Lee Vining Creek and talked with the people at two camps on the Adam Farrington Ranch.[13] He wrote: "These Indians carry their baskets across to the Yosemite to sell to tourists and consequently want fancy prices. They also get acorns on the west slope" (Merriam, 1900:70). Merriam (1923:375) noted:

> Farther north, in the middle Sierra region, the Mono Lake Koo-tsa-be dik-kah (a branch of Northern Piute) have long made a practice of climbing Bloody Cañon and Mono Pass in order to visit Tuolumne Meadows for hunting and fishing, and not infrequently descended the west slope as far as Yosemite Valley to obtain acorns and to trade with the Muwa [Miwuk] Indians of that region, while contrawise, the Yosemite Indians sometimes visited Mono Lake.

This observation is important in that the most direct and perhaps faster route to Mono Lake from Yosemite Valley would be through Lee Vining Canyon, but the native people chose instead to hike over the Mono Pass and down Bloody Canyon. It is also important because there were no fish in Tuolumne Meadows before the 1860s (Davis-King and Snyder, 2010), meaning that Merriam's observation refers to a historic activity. Still, the people who supplied this information probably also thought of the Sierra crossing as something they had always done, before and after fish were planted. Merriam's 1955 essay on the Mono Paiute and their use of the Mono Trail for the obsidian trade says the following:

> Chunks of the rough obsidian were sometimes carried long distances to be worked, and doubtless also to be bartered with other tribes, as shown by accumulations of stone flakes and "rejects" in remote spots, even on the faraway west flank of the Sierra. The site of these ancient workshops may be seen today on a commanding eminence a little north of the Yosemite. It is where the trail from Mono Pass and Lake Tenaya breaks through the dark green forest of pines and firs

[13] The Farrington Ranch, often referenced by Native Americans, is located on Walker Creek in Bloody Canyon; research was not conducted to see if this geographic reference was an error on the part of Merriam, or if there were two Farrington ranches. The Walker Creek Farrington Ranch was often the winter home of Bridgeport Tom's extended family and remains today as the eastern biennial starting point of the annual Mono Pass hike. Bridgeport Tom was an extremely important leader with numerous descendants in the Project region.

> and suddenly comes out on a ridge of bare rock overlooking a new world—a world of granite domes, yawning chasms, and lofty mountains. The abruptness of the transition is startling. [Merriam, 1955:73-74]

Although Merriam referenced the Mono Trail, it is unlikely that the specific place about which he wrote was on the Mono Trail itself (as currently plotted on the USGS maps), since by this time in his life and research, Merriam stayed along established vehicle routes. He also took the Bishop-Mono Lake Stage Line where he could get off at "Leevining Creek Power House." Probably the location was on or near the Tioga Road that had usurped the trail by 1883 (Davis-King and Snyder, 2010). Trade was not one-way, as Merriam made clear (1966:76). While in Bridgeport in 1902, Merriam recorded that the Indians had acorn from Hetch Hetchy and that he

> greatly surprised one of the Indians in the Paiute camp east of Bridgeport. I was talking a little Paiute to him when he told me he understood part but didn't "savvy" Paiute very well as he came from the other (west) side of the Sierra. Oh, I said, you are Mu'wa, and talked to him in his own language, whereupon he grinned from ear to ear and was very much astonished. [Emphasis in original. Merriam, n.d., 1902:241]

In October 1910, like many other times, Merriam (1910:154) recorded that he went to a Yosemite Valley Indian camp and found "a couple of dozen Indians are there now, all of same Tribe—Mew'wah—some having come up from El Portal" and others from Colorado. The next day "Some Piute Indians came in from Mono Lake to take part in the dances" (Merriam 1910:155). After the ceremonies that night it rained and snowed, and Merriam felt sympathy for the visiting Mono Lake people who had no shelter. The Mono Lake people decided to return home, traveling up the Yosemite Falls Trail, camping near the top the following night, at daylight heading through the snow "for Tuolumne Meadows and Mono Lake. They say they will go through Leevining Creek Pass instead of Mono Pass as there is less snow that way" (Merriam, 1910:157).

Additional information from Merriam is anticipated when repositories reopen.

FREDERICK HULSE

Frederick Seymour Hulse, a physical anthropologist by training, came to California in 1934 to work with Alfred Kroeber at the University of California, Berkeley (Giles, n.d.). Kroeber sent Hulse to the eastern Sierra Nevada in the summer of 1935 to collect oral histories about European contact with Native Americans. This study was part of the Works Progress Administration's (WPA) Great Depression program to collect California native languages, vocabularies, stories, and cultural traits. The WPA program, organized as the State Emergency Relief Administration, compiled unpublished stories and oral histories from American Indian people. Hulse prepared a list of at least 32 Native Americans from whom he gathered materials in Inyo and Mono counties, including Lee Vining and

Bridgeport. He hired bilingual Paiute to interview elders, and among the stories collected were those told by:

- Tina Charley (Lee Vining; born about 1850; stories, customs, autobiography)
- Jake Gilbert (Lee Vining; born about 1850; stories, customs, autobiography)
- Susie Jim (Bridgeport; born about 1845; old "Indian customs")
- Joe Lent (Bridgeport; birth date not found; old "Indian customs")
- Jim Lundy (Miwok, perhaps born in the 1870s; his life and escape from the Mother Lode)
- Silas Smith (Bridgeport; born about 1859; stories)
- Bridgeport Tom (Bridgeport, Mono Lake, Coleville, Round Valley; perhaps born around 1849; origin stories)

Hulse's (n.d.) *Lee Vining Paiute Ethnographic Notes* contain the "Beginning of Mono Lake," told by Jake Gilbert and Tina Charley, followed by other stories involving Mono Lake and the Lee Vining corridor. These and other original stories of creation and lifeways will inform future studies, as they are specifically about Lee Vining, Mono Lake, Indian trails (east-west travel), the water of the Sierra Nevada, and more. Also important, several of the Hulse interviewees are ancestors of people with whom Project personnel will be interviewing in the next few years.

EMMA LOU DAVIS

Emma Lou Davis is known for her work with the Indian people of Mono Lake, having written "Hunter-Gatherers of Mono Lake" in 1962 followed by *An Ethnography of the Kuzedika Paiute of Mono Lake, Mono County, California* in 1965. She (1962:27) described the seasonal round of the Mono Lake Kukzadikaa but added:

> In addition to its appeal as a food larder, Mono Lake basin was a cross-roads for trade and travel. Four trans-Sierran trails, crossing Mammoth, Mono, Walker [Virginia Creek] and Tioga Passes, debouched into the valley. Here they were intersected by a north-south piedmont trail.

Each spring Kukzadikaa families left their winter camps and moved toward the Sierra where they "camped along streams in sheltered canyons and gorged on such early greens as wild onions and cress. Deer were available when they were migrating from winter ranges at low altitudes to summer ranges high in the Sierras [sic]" (Davis, 1963:203). Around Mono Lake,

> the pattern of land utilization was such that almost every square mile of open country was visited and now shows a telltale flake or two of

> obsidian. These can be called use areas. There are other places, perennially favored as camps, where chipping waste lies thick. These can be referred to as occupancy areas [Davis, 1963:204].

The seasonal round of "trade and travel commenced as the high passes cleared of snow. The Kukzadikaa freely traveled to other areas as pleasure or necessity dictated and other people came into the area to visit and to harvest" (Davis, 1965:29).

Davis recognized that deer were hunted more frequently than mountain sheep (a change from the past) when she did her research, but that the "Mountain sheep ranged as high as the Sierra summit, feeding on alpine plants…both sheep and deer killed far from home were boned out on the spot, the meat sun dried and then carried home in the hide" (Davis 1965:33). She observed that the mule deer returned each year and that if one were to judge by the deer herds of that time

> the Mono Lake people were in a favorable deer locale. A large herd has a summer range in the high country just west of the lake [e.g., Lee Vining Creek] and there is another concentration in the Laurel Creek-Sherwin Creek area near Mammoth Mountain. There is, however, no certainty that deer were previously as plentiful in the region as were sheep (*Ovis canadensis*). [Davis, 1965:26-27]

A valuable contribution in Davis' study is her Figure 5 *Map of food crop localities and deer migration routes*, which shows a deer migration route from the hills east of Mono Lake up Lee Vining Creek canyon, along with three plotted villages or campsites, one at the southwest side of Tioga Lake, between Tioga Pass and the lake. She indicates pine nuts were gathered on the southern banks of Lee Vining Creek. This map is reproduced, with the proposed Project APE plotted, as Figure 5.12-2.

DAVID WHITE (SCE)

David White (1983, 1985) prepared overviews and management plans for the Project as for the present license, and noted that ethnographic data suggests that there may be at least seven categories of archaeological resources in the Project Area, most of which remain relevant to today's Tribal uses. These seven categories are traveler's camps, temporary hunting camps, ambush/game blind locales, Pandora moth larvae collecting sites, vegetation procurement sites, obsidian procurement/processing sites, and rock art/shrine sites. Some survey was conducted by White, but none of the Project reservoirs were investigated. Taylor (1998) supplemented some of White's work, but documented no Native American values or outreach.

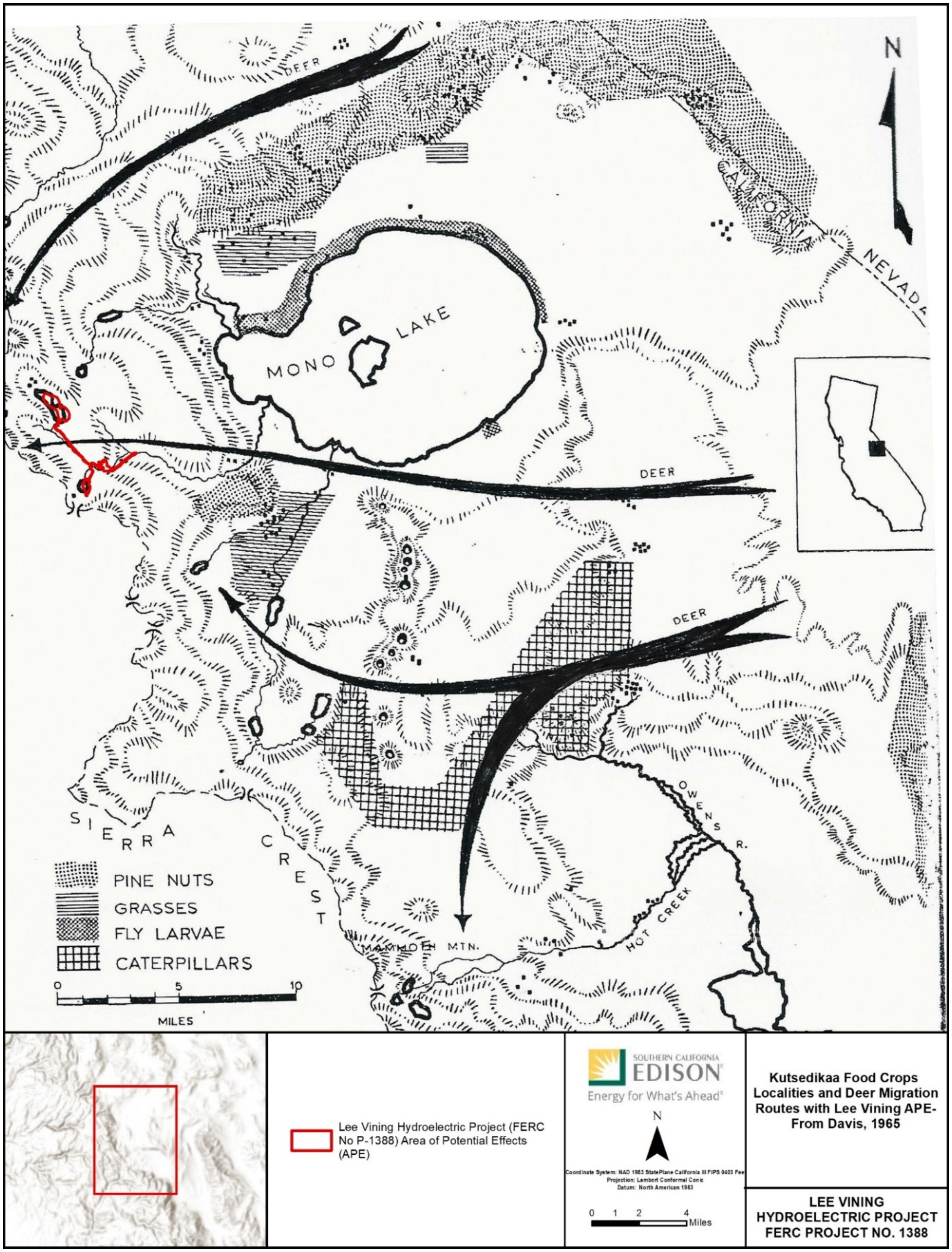


Figure 5.12-2. Kutzadikaa Food Crop Localities and Deer Migration Routes with Lee Vining Proposed APE Indicated in Red.

5.12.5.2. Ethnographic Summary

Prior to non-native people entering the Project Area, the Northern Paiute Kutzadikaa occupied the territory of the FERC Project Boundary and proposed Study Area. There was some land use overlap in the upper tarns and reservoirs with Me-Wuk, Miwok, and Washo. For this discussion, emphasis is placed on the Northern Paiute, a linguistically homogenous but politically and culturally distinct people. The Northern Paiute language is one of two that contribute to Western Numic, part of the Uto-Aztecan family. The language is very closely affiliated with that spoken by the Owens Valley Paiute, a group immediately south of the Kutzadikaa. Other neighbors include various Northern Paiute groups such as the *T vusid kad* and the *Aga'id kad* to the north, the Washo also to the north and west, and the Southern Sierra Miwok and Central Sierra Me-Wuk to the west (Fowler and Liljeblad, 1986). Fowler and Liljeblad also give the name Kutsavid kad to the people, a name which translates to “kutsavi eaters.”

Important large- and medium-sized mammal species to the area include pronghorn (*Antilocapra americana*), Rocky Mountain mule deer (*Odocoileus hemionus hemionus*), jackrabbit (*Lepus* sp.), cottontail (*Sylvilagus* sp.), various squirrels, chipmunks, mice, rats, gophers, and importantly in the past, bighorn sheep. Carnivores, including otters, foxes, weasels, martins, raccoons, bears, bobcats, cougars, and coyotes are present throughout much of the county, but appear not to have been hunted. Arthropods, including insects, were seasonally important to Kukzadikaa Indians, especially the Mono Lake brine shrimp (*Artemia monica*), the alkali fly (*Ephydra hians*), otherwise known in its pupal stage as the kutsavi, and the Pandora moth (*Coloradia pandora*), a moth whose caterpillar stage, *piaggi*, was favored by the Paiute. The Mono Lake fly and brine shrimp helped support the dozens of waterfowl known to come to the lake in prehistory. Grebes, pelicans, cormorants, herons, egrets, geese, and ducks were some of the waterfowl valued for their flesh, eggs, bones, and feathers. Other birds, especially the grouse and quail, were important food items. Some birds, such as the golden eagle (*Aquila chrysaetos*) or the black-billed magpie (*Pica pica*), were especially important for regalia and other ceremonial purposes.

There are a number of distinct native fishes in Mono County associated with either the Lahontan Basin system in the north or the Death Valley system in the south. The Lahontan Basin system in Mono County includes the portion drained by the Walker River, a tributary to ancient Lake Lahontan. The Death Valley system includes the Mono Basin, with no evidence that it historically supported native fish (Sada, 2000), and the Owens Basin. Of the 16 native fish in the entire two systems, eight are known historically in Mono County: Lahontan cutthroat trout (*Oncorhynchus clarki henshaw*), speckled dace (*Rhinichthys osculus*), Lahontan redside (*Richardsonius egregious*), Owens sucker (*Catostomus fumeiventris*), Owens pupfish (*Cyprinodont radiosus*), Owens tui chub (*Gila bicolor snyderi*), mountain whitefish (*Prosopium williamsoni*), and the Paiute sculpin (*Cottus beldingi*) (Sada, 2000).

Structures varied seasonally and functionally, with the *koni*, a dome-shaped familial winter house being primary. Paiute note that the door is often away from the prevailing wind, but a view to the east is desired. Smoke exited the house from a central opening at the top of the structure. Depending on the size of the family, the house could be quite large—up to 15 feet in diameter—and the homes at Mono Lake often had a long entrance tube to prevent cold air and snow from entering the residence. Brush shelters are also very common in the area, usually formed from sagebrush into circles or semi-circles, without a firepit, roof, or set entrance. These shelters were meant to protect from the wind more than anything else, and historic photographs show that people hung various tools, clothing, baskets, and other items from the brush, with a working floor often covered with artifacts from tool or basket manufacture. These sagebrush shelters have a surprising survival rate and are extant on the shores of Mono Lake not far from the Project. Photographs and descriptions of Mono Lake winter homes often indicated a more substantial winter home with a semi-subterranean foundation. Where such houses were constructed, they would often house two or three other families, and according to Fowler and Liljeblad (1986) may have a group size up to 50 people. Summer camps were much smaller and much more family oriented.

Material culture largely reflects subsistence and residence patterns, with milling slabs and less frequent rock mortars indicative of seed, nut, medicine, and meat processing, tools reflecting scraping, cutting, and smoothing of items, possibly imported Owens Valley Brownware, and stone tools made of local materials (Bodie Hills obsidian sources being in their territory), as well as imported obsidian. Basketry was functional, but especially in the early 20th century became such an elevated art that the Mono Lake weavers, such as Lucy Telles, Carrie Bethel, and Tina Charley are among the more revered California basketmakers in the world. Artifacts relating to this American-period art include sharpened ferrous-metal nails for awls, perforated tin can lids used for sizing split willow rods, and windowpane scrapers for cleaning willow. Both twined and coiled varieties are found in several functional types and dimensions.

Ethnohistorically, the Northern Paiute began to see changes to their environment and encounters by outsiders as early as 1800, if not before. The horse, for example, had been introduced into the American southwest and Plains in the 1700s, with Northern Paiute groups accepting the animal and becoming much more nomadic in search of bison (Steward, 1938). Steward also noted the great ecological factor in the horse acceptance in that it allowed equestrians to travel long distances to acquire food and other items to bring back to a more central location. Another important factor was the westward encroachment of various groups including Hispanic explorers, French and other fur trappers, and settlers of many affiliations. Both Washo and Paiute oral histories have stories about the Spanish “conquistadors” and men riding large “deer” and wearing silver plates coming into their territory in search of precious metals well before the westward movement of the Americans. In 1827, Jedediah Smith, on his journey west from California east to the Great Salt Lake, encountered 20 to 30 presumably Paiute men on horses at Walker Lake, and with numerous other Indian groups who had horses or with whom he exchanged horses for supplies (Brooks, 1977; Fletcher, 1924; Sullivan, 1934).

Then, by 1850, the rush for riches in California and western Nevada particularly affected the lifestyle and environment of the people, and the story of what happened to the southwesternmost Northern Paiute is similar to that of other people affected by argonauts. Also, by this time, non-native items of metal, glass, and ceramics had found a place in

Paiute material culture. Several documents about Mono County Native American history include detailed accounts of Kutzadikaa Paiute interaction with the newcomers (e.g., Cain, 1956, 1951; Davis-King, 2010; Fletcher, 1982, 1987, to name a few). According to Stewart (1962), 50,000 head of livestock, 21,000 non-native people, and 6,200 wagons passed through Northern Paiute territory on their way to California. It does not take much imagination to visualize how this might have affected the environment and lifeways of the Northern Paiute. Seed plants eaten, trampled, and destroyed, water fouled, game either shot or chased away leaving little upon which the Kutzadikaa could survive. It is not surprising then that in 1858 the *San Francisco Bulletin* reported that the Indians at Mono Lake told the correspondent that there was gold in their area, and they were "friendly to the whites. They wish them to come among them, so that they may get work and buy blankets." The transition into the U.S. government period of overseeing certain Indians had begun, moving into a reservation period for some Native Americans and a period of neglect for others, like the Kukzadikaa. There is also an important story to be told about the integration of the Kukzadikaa into the labor force of the area, even including employment on construction and maintenance of the Project.

VARIOUS LEE VINING INDIAN CENSUS DATA

Prior to white contact, an estimated 6000 people were spread across Northern Paiute territory in Nevada (Fowler and Liljeblad, 1986). How many of these may have been Kukzadikaa is not indicated, but Emma Lou Davis (1965) reported that only 37 Paiute still lived in Lee Vining by 1960. There were several efforts to count California Indians, among them Kelsey (1909), who, in his attempt to document all California Indians who were "homeless" or not located on a reservation, recorded in 1906 that Mono County had 110 families with 415 individuals who were without land. In addition to the Bridgeport Indian Colony, Antelope Valley, and Benton Rancheria whose members were not counted by Kelsey, there were six heads of households who owned land. It appears that at the time Kelsey took his census, the people of Mono Lake and Lee Vining were living in Bodie, or otherwise were grouped with the Bodie people. Kelsey indicated the Foster Fee allotment, 23 families in Bodie, and two families in Farrington as owning land, with an additional 12 families not owning land, and 13 families at Mono Lake (usually meaning Lee Vining area) as not owning land. Numerous others were also at Antelope Valley, Benton, and Bridgeport.

Extant census data were briefly reviewed to identify families and groups which may have heritage in the Project Area. An example of the Office of Indian Affairs data located a few Native Americans living in Leevining, at Mono Lake (referencing a town, perhaps Mono City), and the Farrington Ranch are provided below. This list includes many who made their summer residence in Yosemite Valley, and many whose descendants still live in the Project Area.

- Billie Abraham (Paiute, born 1899) Farrington Ranch (OIA, 1940)
- Ed Andrews (Paiute, born 1916) Leevining (with family, wife and two daughters) (OIA, 1940)

- Carrie Bethel (Paiute, born 1898) Leevining (OIA, 1943)
- Harry Bethel (Paiute, born 1902) Leevining (OIA, 1940)
- Margaret Sam Calvin (Washo and Paiute, born in 1923) Leevining (OIA, 1943)
- Dick Charley (Paiute, born 1903) Leevining (and wife Alice Charley) (OIA, 1940)
- Tina Charley (Paiute, born 1870) Leevining (living with daughter Nancy Charley, grandson Harrison Mike, nephew Foster Murphy) (OIA 1940)
- Dondero Children (Paiute), five children born of Italian John Dondero and wife, Mono Lake (OIA, 1940)
- Lulu Hess (Paiute, born 1894) Leevining (and three children, including August, Stanley, and Lawrence) (OIA, 1940)
- Mildred Hess (Paiute, born 1905) Leevining (and two daughters, one son, and stepson Earl Watterson) (OIA, 1940)
- Julia Horton (Paiute, born 1927) Farrington Ranch (Niece of B. Abraham) (OIA, 1940)
- Henry Jamison (Paiute, born 1872) Leevining (OIA, 1940). (May have had the only Indian Allotment on Lee Vining Creek)
- Jasper Jack (Paiute, born 1893) Leevining (and wife Elena) (OIA, 1940)
- Alta Sam Lundy (Paiute, born 1924) Leevining recently married; maiden name Sam) (OIA, 1941)
- Carol Lorraine Summers (Paiute, born 1932) Leevining (OIA, 1943)
- Harry Tom (Paiute, born 1899) Mono Lake (and wife, son, and two daughters) (OIA, 1930)

5.12.6. Tribal Lands

The Kukzadikaa are not yet recognized by the federal government, and no federal trust lands have been identified in the Project Area. There are some Indian allotments in the Mono Basin, including one commonly known as The Lee Vining Allotment. This 160-acre allotment belonged to Henry Jamison, assigned in 1901, put into federal trust in 1907, and transferred to fee status in 1923 (INF Land Status Book, n.d.). The allotment was located on Lee Vining Creek north and east of the town, well outside the Project. None of the other allotments are proximate to the Project. The closest federally-recognized Tribe to the Project, as noted, is the Bridgeport Indian Colony, but some Kutzadikaa are Tribal members of the AICMC, Bishop Paiute Tribe, Tuolumne Band of Me-Wuk Indians, and perhaps others.

5.12.7. Tribal Interests

No field investigation of Tribal groups or interests has occurred in the Project Area, and the earlier relicensing ethnographic overview was largely an archival review (White, 1983) with no ethnographic interviews or field studies. For the current relicensing effort, a letter was sent to all of the Tribes listed in section 5.12.4, *Identification of Tribes*, with one additional Tribe, the North Fork Mono Rancheria, requesting to be involved. Tribal outreach will be conducted to obtain information. Respect for and acknowledgement of sensitive or significant resources will be honored.

5.12.7.1. Traditional Cultural Properties

A TCP is a resource that is eligible for inclusion in the NRHP based on its associations with the cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community. TCPs are rooted in a traditional community's history and are important in maintaining the continuing cultural identity of that community. A TCP must have integrity and meet at least one of the four NRHP eligibility criteria (36 CFR 63) to be considered a historic property (defined as a resource listed in or determined eligible for listing in the NRHP). When a traditional cultural place is evaluated as eligible for listing in the NRHP, it is termed a TCP. To date, no TCPs have been identified, but the potential for these will be investigated more fully during the Study Plan development and implementation.

5.12.7.2. Tribal Cultural Places and Values

As noted, no ethnographic study of the Project appears to have been prepared and, unlike most other relicensings, does not have a baseline upon which to begin analysis. Also, since there has not been an opportunity to conduct record searches due to COVID-19 closures, there is little that has been identified. Nonetheless, based on previous interactions with the Tribal groups, there are some activities and places that may be important. These are discussed below in no particular order.

Ethnobiological Considerations

The Project Area was not investigated for ethnobiological background materials, but previous studies have suggested that this will be a major factor of interest to the Tribal groups. The Kukzadikaa remain knowledgeable and close to their land, gathering kutsavi when the larvae are ready, searching for medicine plants in favored glens, gathering pine nuts, piagi, and other foods when they emerge. Medicine plants of all types are abundant in the Project Study Area and several Kutzadikaa are known to gather. Ceremony still occurs around such items, and it is anticipated that this topic will be expanded during the Study Plan development. In addition to cultural uses of plants and animals, it is anticipated the Kutzadikaa will want to have dialogue about the Project Area invasive plants and their eradication (2009 letter from Kutzadikaa Tribe to Yosemite National Park, Appendix E in Davis-King and Snyder, 2010).

TRANSPORTATION CORRIDORS

The Project Area, especially the Lee Vining Creek and upper meadow areas, were prime summer locations for the Kukzadikaa. The general corridor was used for transportation, but it appears that other nearby routes were more popular, especially those leading up Walker Creek (Bloody Canyon) to Mono Pass and Dana Meadows, or the route up Mill Creek past Lundy and into Warren Fork or points further west. The Mono Pass route is shorter by perhaps 3 or 4 miles, with less treacherous landscape, and only 600 feet or so difference in elevation gain to get to the Dana Meadows areas in contrast to Lee Vining Creek.

Trails in the Project region, most of which were described in detail by Davis-King and Snyder, 2010 (see especially Trails 27-30, 33, 35-37) are described briefly below. A depiction of the trails is found in Figure 5.12-3. Note that this map depicts only those trails previously plotted. Additional trails, like that which followed Lee Vining Creek from the town to at least Warren Fork of Lee Vining Creek, and the trail to Lundy will be investigated in future.

A detailed discussion about transportation corridors in the Project Area is not intended for this section; rather, sufficient data are presented to alert the reader to the importance, quantity, and nature of such trails that will be a theme of Tribal resource studies.

Mono Trail

The Mono Trail is a complex trail system on both the east and west slopes of the Sierra Nevada. Portions of the trail in the Study Area were mapped as existing trails by earlier explorers and cartographers such as California (1873), Hoffmann and Gardner (1868), Muir (1890a and 1890b), and Wheeler (1880).

Dana Fork to Tioga Pass

The Dana Fork of the Tuolumne River trail went from Parker Pass Creek toward Tioga Pass. The Tioga Road took the place of the trail early on; consequently, the trail is shown as such on only two maps: Clayton, 1861 (Figure 7) and Johnson, 1887. This trail's heritage is supported by the presence of archaeological sites along it. The trail was used in every sense—local, connector, and trans-Sierra—especially in Dana Meadows where moraines coming out of Parker Pass Creek create varied vegetation and soils as well as hunting opportunities (Davis-King and Snyder, 2010). The presence of occasional soda and mineral springs makes the area more interesting, too.

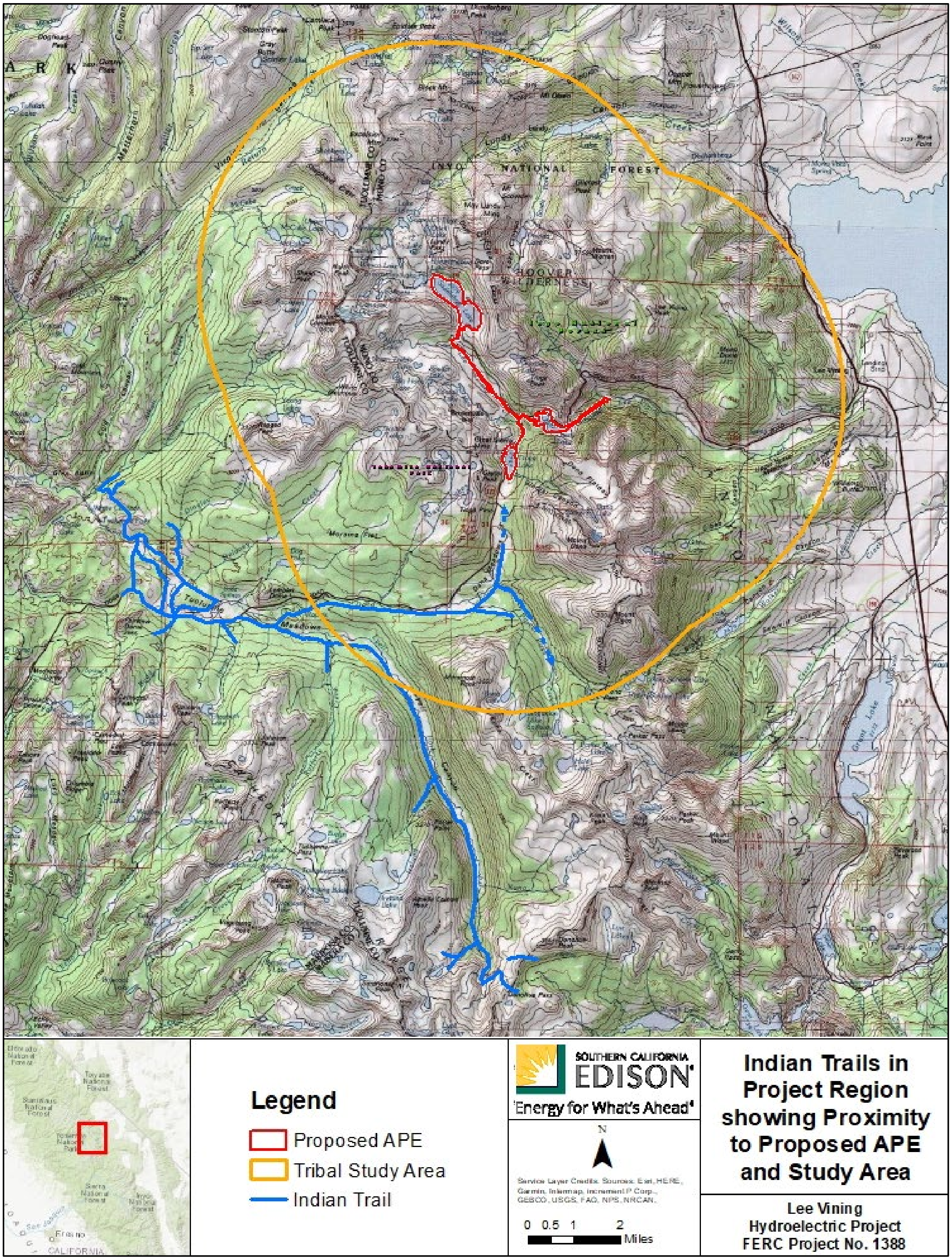


Figure 5.12-3. Some Indian Trails in Project Region showing Proximity to Proposed APE and Study Area.

Dana Fork toward Mono Pass

Maps beginning with Trask (1853) show this trail or parts of it, as do Benson (1897), California (1873), Clayton (1861), DeGroot (1863), Farley (1861), Hoffmann and Gardener (1868), Johnson (1887), LeConte (1893), LeConte and others (1896), McClure (1895, 1896), Muir (1890a, 1890b), and Wheeler (1880). Maps made after Benson's have shown the Tioga Road rather than the Dana Meadows section of the Mono Trail. The segment between the Gaylor Lakes and the present Mono Pass trail from the Tioga Road was abandoned long ago but has been recorded by Yosemite National Park as an archaeological site, and was part of the Mono Trail blazed and described as an Indian route to the eastern Sierra by Tom McGee in 1857 (Paden and Schlichtmann, 1955).

A portion of this trail appears to pass through the future Tioga Lake, and continues on to and terminates at Saddlebag Lake (LeConte et al., 1896). McClure (1895) also shows a road from Lee Vining to Gibbs Creek, and a trail from that point more westerly passing on the north end of Ellery Lake before continuing to Tioga Pass. Another trail follows the Tioga crest above the Warren Fork of Lee Vining Creek and leads to Lake Canyon above Lundy Lake, first passing by Saddlebag, which appears to be two separate lakes at this time. Evidence suggests these are Native American trails as well, based largely on adjacent archaeological sites.

Current Tioga Road to Mono Pass Trail

The present trail to Mono Pass from the Tioga Road first appeared as a connector between the Tioga and Mono pass trails on Johnson (1887) and LeConte (1893). There are Native American archaeological sites along this route which was also used by sheep men and by miners. Mining occurred along the Sierra crest where the granitic rocks are overridden by a variety of metamorphic rocks (Huber et al., 1989); most mining locations were accessed from the east side. There were trail connectors for supply and communication between Lundy, Bennettville, and Golden Crown at Mono Pass, of which this trail was one. Before the mines, however, Indian people used the same route, and, because it provided access more from the east side than from the west, it is probable that much of its use was by Indians traveling from the east side, rather than those coming from the west, although this speculation is supported only the trail's unusual orientation. The Kutzadikaa communicated that they had been told of this trail out of Silver Lake, south of Mono Pass, which went along the crest (2009 letter from Kutzadikaa Tribe to Yosemite National Park, Appendix E in Davis-King and Snyder, 2010). The same letter referenced a trail from Lundy Lake to Saddlebag, but this was not researched for the PAD.

PLACE NAMES

Mount Dana

Mount Dana can be viewed from much of the Project Area and is an important place to the local people. Called *Kuna*, which is a word in Northern Paiute and means firewood or hot, and may also refer to charcoal (Anonymous informer to Kroeber [1916]; see Davis-King, 2010). Steward (1933) also describes a place here, with the name *Tubogi*.

Other Place Names

Other place names are known in the area, but the archival data are not accessible presently.

5.12.7.3. Archaeological Sites with Ethnographic Affiliations in/near the Proposed APE

No archaeological sites with certain ethnographic affiliations have been identified in the proposed APE.

5.12.8. Current Cultural Resource Management

SCE prepared a Historic and Archaeological Preservation Plan for the Project (White, 1983). The plan identified specific measures undertaken by SCE to avoid adverse effects to the NRHP-eligible properties located within the FERC Project Boundary and various programmatic measures that SCE is required to implement. Measures include cultural resource surveys, documentation of cultural resources, NRHP evaluation of cultural resources, evaluation of potential Project effects, preparation of treatment plans for eligible resources, and annual reporting.

5.12.9. Potential Adverse Effects

SCE's review of readily-available information and early consultation with interested parties has not identified impacts to Tribal resources in the Project Area. Outreach and consultation with Tribes may alter this situation.

5.12.10. Proposed Mitigation and Enhancement Measures

No additional mitigation or enhancement measures relating to Tribal resources are planned at this time. SCE plans to evaluate this as part of the relicensing process in consultation with Stakeholders. Should any major changes be planned for the Project, appropriate BMPs to address effects on Tribal resources would be implemented. In the interim, the Historic and Archaeological Preservation Plan for the Project guidelines oversee Project resource treatment.

5.13. Socioeconomic Resources

5.13.1. Introduction

The Lee Vining Project is located near the town of Lee Vining in Mono County, California, approximately 5 miles east of the Project facilities. Lee Vining is a small town with a total area of approximately 5 square miles, located at elevation 6,781 feet (see Figure 1.1-1). The surrounding area has almost no development aside from the roads that traverse the vicinity. Mono County is centrally located on the eastern side of California. Tuolumne, Mariposa, Madera, and Fresno Counties border to the west; Alpine County borders to the north; and Inyo County borders to the south. The state of Nevada lies to the east. Transportation through the county is provided by an extensive road system: "U.S.

Highways 6 and 395 traverse in a general north-south direction, while numerous scenic byways and county roads run east-west within the county" (CEDD, 2021a).

The following is a summary of socioeconomic data for the town of Lee Vining and Mono County, where the Project is located, including population patterns, average household income, and employment sectors. The area assessed for socioeconomic data includes the FERC Project Boundary plus a 0.5-mile buffer.

5.13.2. Information Sources

This section was prepared utilizing the following primary information sources:

- U.S. Census Bureau information (2019)
- California Employment Development Department (CEDD, 2021a, 2021b)
- MRLC Consortium's 2016 NLCD (MRLC Consortium, 2016)
- Inyo National Forest Land Management Plan (USFS, 2019)

5.13.3. General Land Use Patterns

The Project is located on Lee Vining and Glacier Creeks in Mono County, California, on federal land within the Inyo National Forest. The predominant land cover types are evergreen forested lands, shrub/scrub, barren, grassland/herbaceous, and open water (MRLC Consortium, 2016) (see Figure 5.9-2 and Table 5.9-2 in Section 5.9, *Land Use*).

The Inyo National Forest Management Plan manages the forest for a variety of land uses, including recreation, wilderness use, maintenance, and improvement of habitat, rangeland, timber production, and the exploration and development of mineral resources, particularly energy resources (USFS, 2019). Land use in the immediate area otherwise consists of recreational uses such as hiking, camping, fishing, and sightseeing.

See Section 5.9, *Land Use*, for a more detailed discussion on land use, land cover, and land management.

5.13.4. Population Patterns

Lee Vining is a small town with a population of approximately 98 people. It is classified as a census-designated place (CDP) for the purposes of socioeconomic data collection and statistical purposes under the U.S. Census Bureau. Between 2017 and 2018, the population of Lee Vining declined from 102 residents to 89, a 12.7 percent decrease (Data USA, 2021a). By 2019, the U.S. Census Bureau estimates placed the population of Lee Vining up again to 98 persons. Between 2016 and 2019, the town's population fluctuated, but generally numbers of residents stayed between 90 and 95 persons (U.S. Census Bureau, 2019a) (Table 5.13-1). The current population of Mono County is approximately 14,310 people and has experienced a total growth of 0.7 percent since 2010, a rate significantly slower than the rest of the State of California (growth of 5.4 percent) (U.S. Census Bureau, 2019b, 2019c).

The next largest towns near Lee Vining are Mammoth Lakes (8,235 people), Bridgeport (575 people), and Yosemite Valley (1,035 people). Table 5.13-1 summarizes the population estimates for the towns of Lee Vining and Mono County, as well as for the State of California, as reported in the 2010 Census and 2019 American Community Survey Demographic and Housing survey results.

Table 5.13-1. Comparison of Changes in Total Populations in Lee Vining, Mono County, and the State of California

City/County/State	2010 Census Population	2019 Population Estimates	% Change 2010-2016
Lee Vining	222	98	-56.0%
Mono County	14,206	14,310	+0.7%
California	37,254,519	39,283,497	+5.4%

Source: U.S. Census Bureau, 2019a, 2019b, 2019c

The median age in Lee Vining is 59.8 years old, which is significantly older than the median age of Mono County residents at 37.7 years old (U.S. Census Bureau, 2019a, 2019b). The total number of civilians in the labor force in Mono County (ages 16 or older) between 2015 and 2019 was 72 percent, with 10.1 percent of the population living below the poverty line (U.S. Census Bureau, 2019d).

As of 2018, the diversity of Lee Vining is characterized by a White (Non-Hispanic) population of approximately 72 residents, 8 White (Hispanic) residents, and 5 Black or African-American (Non-Hispanic) residents (Data USA, 2021a). Approximately 10.1 percent (or 9 residents) of Lee Vining are foreign-born (outside the United States). The rate of foreign-born residents in Mono County is 17.6 percent (Data USA, 2021b).

5.13.5. Economic Indicators

5.13.6. Project Vicinity Employment Sources

The Lee Vining economy employs 84 people. The largest industries in the area are Construction (26 people) and Other Services, Except Public Administration (26 people); followed by Professional, Scientific & Technical Services (20 people) (Data USA, 2021a). The median household income in Mono County was $62,260 in 2019 (U.S. Census, 2019d). This is lower than the state median household income of $75,235 (U.S. Census, 2019e). Median household income data for the town of Lee Vining was not publicly available at the time of this writing.

From 2017 to 2018, employment in Lee Vining declined from 88 to 84 employees, a decrease of 4.55 percent (Data USA, 2021a). Distinguishing between the largest industry types listed above, the most common job groups by number of people living in Lee Vining are Management Occupations (26 people), Community and Social Service Occupations

(26 people), and Business & Financial Operations Occupations (20 people) (Data USA, 2020a).

5.13.7. Household Information

Table 5.13-2 provides the income, employment, and workforce statistics for households and families for Mono County from the 2019 Census survey.

Table 5.13-2. Household and Family Distribution and Income for Mono County

Mono County	
2015 to 2019 Households	4,765
2019 Percentage of Population in the Workforce	72.0%
2015 to 2019 Median Household Income (in 2019 dollars)	$62,260
January to December 2019 Unemployment Rate	3.7%
Average Household Size	2.93

Source: U.S. Census Bureau, 2019d; CEDD, 2021b

Table 5.13-3 compares the county-wide median and mean household incomes for Mono County and the county's CDPs. The median household income varies significantly by CDP throughout the county, with the communities near Mammoth Lakes generally having higher overall income levels.

Table 5.13-3. Household Income for Mono County Census-Designated Places

Household Income in the Past 12 Months (In 2019 Inflation Adjusted Dollars)		
Location	**2019 Median**	**Annual Change 2018–2019 (Percent)**
County-wide	$62,260	-1.20
Mono County CDPs		
Mammoth Lakes	$62,990	-3.27
Aspen Springs	N/A	N/A
Benton	$40,735	-10.4
June Lake	$97,750	-6.38
Swall Meadows	$107,813	+25.6
Paradise	N/A	N/A
Chalfant	$63,634	-20.57
Sunny Slopes	$44,674	-19.7
Crowley Lake	$89,706	-1.69
McGee Creek	N/A	N/A
Lee Vining	N/A	N/A
Mono City	N/A	N/A
Bridgeport	N/A	N/A
Walker	$62,634	-13.0
Coleville	N/A	N/A
Topaz	N/A	N/A

Source: U.S. Census Bureau, 2019f, 2019g, 2019h, 2019i, 2019j, 2019k, 2019l, 2019m

CDP = census-designated place; N/A = data not available

Page Intentionally Left Blank

6.0 PRELIMINARY ISSUES, PROPOSED STUDIES, AND PLANS

This section presents potential resource issues and lists proposed studies and analyses needed to support evaluation of potential effects from continued Project O&M. This section also describes existing and proposed environmental measures and relevant comprehensive plans. FERC content requirements for this section are specified in 18 CFR § 5.6(d)(4).

Potential resource issues associated with the Project that are listed in subsections herein were identified from the following:

- Review and evaluation of relevant readily available information (see Section 5.0, *Description of Existing Environment*);
- Discussions with SCE personnel familiar with Project O&M and resources in the Project Vicinity;
- Early engagement meetings held with Stakeholders (including resource agencies, tribes, and interested members of the public), including focused TWG meetings. Finalized meeting notes are available at www.sce.com/leevining; a list of meetings, notes, and attendee names is found in Appendix B; and
- Stakeholder interest statements provided as part of the Project Questionnaire and written study requests from interested Stakeholders received as part of the TWG meeting process are included in Appendix B.

SCE reviewed and evaluated the study requests submitted by the Stakeholders. From these requests and ongoing discussions in the TWG meetings, SCE has identified a suite of issues that could result from potential Project-induced effects and have a clear nexus to ongoing Project O&M activities.

Section 6.1 presents issues for which additional data gathering or studies are needed to assess potential Project effects. Note that no potential resources issues or data gaps related to Project effects have been identified for socioeconomic resources (Section 5.13).

6.1. PRELIMINARY RESOURCE ISSUES WITH INFORMATION GATHERING NEEDS OR PROPOSED STUDIES

This section identifies preliminary issues identified for which data gathering, potential studies, and/or analyses may be needed to address Project effects or complete the license application.

SCE has identified 15 preliminary Study Plan topics related to water resources, aquatic resources, wildlife resources, botanical resources, recreation use, and cultural/tribal resources for which information gathering or studies are proposed. Each preliminary topic/resource issue summarized in Table 6.1-1 includes the following information to support information gathering to address information gaps: 1) Potential Resource Issue; 2) Data Gap(s); 3) Project Nexus; and 4) Proposed Study Approach. As described in Section 6.2.1, these proposed studies have been developed in consultation with TWG members. Not all potential study topics suggested by TWG members have been adopted; where this is the case, SCE has discussed the basis for this approach in Section 6.2 below.

Proposed studies and/or approaches should be considered preliminary and are subject to modification pending subsequent meetings, consultation with Stakeholders, and submission of study requests by interested parties, as described in Section 2.0, *Plans, Schedule, and Protocols*.

Table 6.1-1. Resource Issues, Data Gaps, and Potential Studies

Study Plan Topic	Potential Resource Issue	Data Gap(s)	Project Nexus	Proposed Study Approach
Water Quality	• Project operations have the potential to alter water quality in Project reservoirs and affected stream reaches, which may affect fish or other aquatic species, or exceed Regional Water Quality Control Board objectives for Project waters.	• Recent data are needed to characterize water quality parameters within Project-affected stream reaches.	• Project operations may affect water quality in Saddlebag Lake, Tioga Lake, Ellery Lake, Glacier Creek downstream of Tioga Lake, Lee Vining Creek between Saddlebag Lake and Ellery Lake, and Lee Vining Creek between Ellery Lake and the LADWP diversion dam. Current data are needed to assess water quality in Project waters in relation to Regional Water Quality Control Board objectives.	Stream and Reservoir Water Quality (WQ-1) • Profiles of water temperature, DO, pH, specific conductivity, and turbidity will be measured at the reservoirs. Profiles will be measured during spring, summer, and fall at each site, at 1-meter intervals at each reservoir's location of maximum depth. A multi-parameter water quality meter (HydroLab, YSI, or similar) will be used to measure profiles, and a GPS unit will be used to record the location of each profile. • Stream samples will be collected from just below the water surface as a composite sample from a well-mixed area of each stream site. Parameters will be measured in spring, summer, and fall.
Reservoir Fish Populations	• Project operations have the potential to affect condition of recreational fisheries within Project reservoirs.	• There is no current information regarding the distribution of fish species of management interest in the Project Area. • CDFW would like more information about potential shift in fish population from brook trout to brown trout.	• Project operations have the potential to affect environmental conditions within Project reservoirs, including water quality and water surface elevations.	Reservoir Fish Population (AQ-1) • Reservoir sampling will be conducted using gillnetting and boat electrofishing, dependent on access. • Species composition, relative abundance, age-distribution, and condition will be characterized within Project reservoirs.
Stream Fish Populations	• Project operations have the potential to affect condition of recreational fisheries within Project-affected reaches.	• Lee Vining Creek fish population data gaps include species composition, density, and age-distribution of the existing trout communities in Lee Vining Creek between the confluence of Slate Creek and the confluence of Glacier Creek, in Lee Vining Creek downstream of Poole Powerhouse, and in Glacier Creek downstream of Tioga Dam. • CDFW would like more information about potential shift in fish population from brook trout to brown trout.	• Project operations have the potential to affect environmental conditions within streams downstream of Project impoundments, including water quality and quantity.	Stream Fish Population (AQ-2) • Sampling methods will include electrofishing, provided that environmental conditions allow electrofishing to be performed safely and effectively. • Species composition, density, age-distribution, and condition of the existing trout communities will be characterized in Project-affected reaches.
Aquatic Habitat and Sediment Characterization	• Project operations have the potential to affect quantity and quality of aquatic habitat for fish populations within Project-affected stream reaches.	• There is limited information available to characterize habitat types, identify spawning patches, or to determine potential habitat-related limiting factors for the trout population.	• Project operations have the potential to affect environmental conditions (e.g., substrate, cover, water depth and velocity) within Project-affected stream reaches. Changes in environmental conditions can affect the abundance, distribution, and structure of the local fish communities.	Aquatic Habitat Mapping and Sediment Characterization (AQ-3) • Pedestrian surveys to delineate aquatic habitat will be conducted in Project-affected reaches during late summer/fall base flows. • Concurrent with habitat mapping, the location, size, quality, and particle distribution of spawnable gravel patches (i.e., coarse sediment) will be recorded.
Aquatic Invasive Plants and Algae	• Colonization of stream reaches by invasive aquatic plants and algae, including Didymo *(Didymosphenia geminata)*, have the potential to modify aquatic habitat conditions, thereby altering stream communities.	• Didymo has been known to occur in Lee Vining Creek since at least 2005 between Saddlebag Dam and the confluence of Slate Creek, and to a lesser extent between Slate Creek and Glacier Creek. No additional published material was available to determine the spatial distribution of Didymo or other invasive aquatic plant species in Project reaches.	• Project operations could affect the extent of invasive aquatic plants and algae including Didymo in reaches downstream of Project reservoirs.	Aquatic Invasive Plants (AQ-4) • Estimate percent cover of invasive algae and aquatic plants using modifications of standard methods for assessing aquatic plant cover and sub-sampling of representative transects will be used to visually assess cover, plant types, and dominant species at each site.

Study Plan Topic	Potential Resource Issue	Data Gap(s)	Project Nexus	Proposed Study Approach
Project Hydrology and Project Operations	• Potential effects of Project operations on stream hydrology and resource conditions below Poole Powerhouse in response to resource optimization.	• Analysis of hourly streamflow gage data in Lower Lee Vining Creek to evaluate potential Project-related effects. • Information on resource conditions below Poole Powerhouse is incomplete.	• Project operations affect streamflow and hydrology. • Reach between Poole Powerhouse and the LADWP Diversion may be affected by hydro-optimization.	<u>Operations and Hydrology Model (AQ-5)</u> <u>Hydrology</u> • Hydrologic gage data will be compiled from SCE and LADWP for the duration of the established period of record to establish frequency, magnitude, and seasonality of resource optimization events. • Evaluation of susceptibility of recreation sites to hydro-optimization will be evaluated. • Data will be compiled and summarized for use in resource evaluations. <u>Operations Modeling</u> Development of excel-based model of Project inflows, outflows, and constraints will be developed to be used in conjunction with studies and PM&E development.
Lower Lee Vining Creek Channel Structure	• Project operations have the potential to affect fluvial processes and channel morphology in Lee Vining Creek between Poole Powerhouse and LADWP Diversion.	• Information is lacking to assess channel morphology or sediment supply and transport in Lee Vining Creek between Poole Powerhouse and LADWP Diversion.	• Project operations (e.g., flow regulation) potentially alter fluvial processes and channel morphology between Poole Powerhouse and LADWP Diversion.	<u>Lower Lee Vining Creek Channel Morphology (AQ-6)</u> • Classify transport and response reaches in Lee Vining Creek between Poole Powerhouse and LADWP Diversion using existing remote sensing imagery. • Characterize channel morphology, fluvial processes, and bed mobility at responsive study sites within the range of operational control of the Project.
Botanical Resources	• Special-status botanical resources or USFS SCC that are either known or have the potential to occur in the Project Area and could be affected by Project O&M including Whitebark pine (*Pinus albicaulus*). • Introduction and/or spread of invasive plant populations due to Project maintenance activities.	• Current survey of the Project for special-status botanical, USFS SCC, or invasive plant populations.	• Project maintenance activities could result in direct and/or indirect effects on sensitive natural communities (including riparian areas) and special-status plants or USFS SCC. • Project maintenance activities could result in the spread or introduction of invasive plants.	<u>General Botanical Resources Survey (TERR-1)</u> • A literature review will be conducted to determine if any additional special-status botanical resources have been identified as having the potential to occur within the Project Area. • Habitat Mapping to include: o A review of existing USFS vegetation communities to determine if any suitable habitat for special-status botanical resources has been identified within the Project Area. o Mapping of potentially suitable habitat for special-status plants. • Conduct pedestrian surveys at appropriate times of the year (e.g., blooming period) to maximize the opportunity to observe special-status plant species as determined by the literature review. Surveys include: o Mapping of special-status plant populations. o Mapping of invasive species of concern to the USFS.

Study Plan Topic	Potential Resource Issue	Data Gap(s)	Project Nexus	Proposed Study Approach
Wildlife Resources	• Potential effects from Project O&M on special-status wildlife species or USFS SCC that are either known or have the potential to occur in the Project Area including: o Yosemite toad o Riparian bird species, including Willow Flycatcher (*Empidonax traillii*)	• Current survey of the Project Area for special-status wildlife, USFS SCC, or invasive plant populations.	• Project maintenance activities could result in direct and/or indirect effects on special status wildlife species or USFS SCC.	<u>General Wildlife (TERR-2)</u> • Perform pedestrian surveys at appropriate times of the year (e.g., nesting season) to maximize the opportunity to observe special-status wildlife species as determined by the literature review. • Conduct trail camera surveys, including installation of up to four trail cameras at locations likely to capture wildlife, such as Sierra Nevada red fox and fisher that may not be observable during pedestrian surveys. Exact locations of cameras will be determined in consultation with the relevant stakeholders. <u>Yosemite Toad Surveys</u> • Focused surveys for the Yosemite toad will be conducted to determine the extent of the species in the Yosemite toad study area. Three survey visits will be conducted during the Yosemite toad breeding season (June 1 through September 30), with each visit spaced at least 3 weeks apart and the first visit conducted approximately 1 month after snow melt sufficient to develop breeding habitat, such as wet meadow. • Pedestrian traffic associated with recreational use of areas within and adjacent to the occupied Yosemite toad habitat at Saddlebag Lake will be monitored in conjunction with the Yosemite toad surveys. Surveys will be scheduled during anticipated periods of high-to-moderate visitation and different water levels. <u>Willow Flycatcher Habitat Assessment</u> • The portion of Lee Vining Creek downstream of Poole Powerhouse and upstream of the reservoir at the LADWP Dam will be assessed for the presence of suitable nesting habitat for willow flycatcher and relevant subspecies. The assessment will be conducted by reviewing the remote vegetation classification, then refining the potential habitat areas by reviewing aerial photography, then ground-truthing the areas likely to support potential nesting habitat.

Study Plan Topic	Potential Resource Issue	Data Gap(s)	Project Nexus	Proposed Study Approach
Recreation Use	• Requirement to characterize existing recreation use and access associated with Project resources and assess future recreation needs associated with the Project.	• Use data is minimal for determining how recreation users are utilizing Project Area and the degree to which Inyo National Forest facilities are associated with the Project.	• Existing Project facilities and operations have the potential to promote incremental use of the Project Area for recreation purposes. • All recreation facilities in the upper Lee Vining Canyon are currently owned and operated by the Inyo National Forest. However, many of these sites are either partially within or directly adjacent to the existing Project boundary or may be otherwise affected by the Project. • Degree of nexus with Project facilities and operations is unclear but will be assessed as part of this study.	Recreation Use Assessment (REC-1) • During the first study season (2022), user surveys will be conducted on-site using a survey form (available in both English and Spanish) at all developed Inyo National Forest recreation sites in the Lee Vining Canyon. These initial surveys are intended to collect the primary reason for each recreators visit to determine which Inyo National Forest recreation sites or areas may have a potential connection to the Project and thus would warrant inclusion in the broader studies proposed in the second study season (2023). • For the sites identified as having a Project nexus from field season one (2022) surveys, additional visitor surveys will be conducted in the second study season using a survey form (available in both English and Spanish) to collect recreation user characteristics and demographics (e.g., origin, gender, age and group size); satisfaction; type of activities; length of stay; and perception of crowdedness, site conditions, fees and site needs. Spot counts and/or traffic/trail counters will also be implemented at certain locations. • Creel sampling will be conducted according to the standard protocols published in *Fisheries Techniques* (Third Addition; Zale et al. 2013). Surveys will utilize a field data sheet to collect angler characteristics (e.g., origin, gender, age and group size); determine current angler timing, effort, harvest, composition, and success; and estimate catch-per-unit effort by species.
Facilities Condition	• It is necessary to evaluate the condition of and public accessibility to existing recreation facilities directly related to the Project.	• No data regarding existing conditions and accessibility is available.	• Under 18 CFR §2.7, licensees whose projects include land and water resources with outdoor recreational potential have a responsibility to develop those resources in accordance with area needs. This includes the provision for adequate public access to such Project facilities and waters and consideration of the needs of persons with disabilities in the design and construction of such facilities and access. All recreation facilities in the upper Lee Vining Canyon are currently owned and operated by the Inyo National Forest. However, many of these sites are either partially within or directly adjacent to the existing FERC Project Boundary or may be otherwise affected by the Project. • Degree of nexus with Project facilities and operations is unclear but will be assessed as part of this study.	Existing Recreation Facilities Condition Assessment (REC-2) • A dispersed use assessment will be conducted within and adjacent to the FERC Project Boundary at each of the Project reservoirs (Saddlebag, Ellery, and Tioga). • A facility inventory and condition assessment will be performed on the recreation sites identified as part of the REC-1 2022 field season user surveys as having a nexus to the Project. Generally, the study will include an inventory and cursory condition assessment of the following within the study area: general assessment of the condition of facilities; universal accessibility of facilities; public safety measures; signage and wayfinding; and site-specific circulation roads, campsite spurs, and parking areas.

Study Plan Topic	Potential Resource Issue	Data Gap(s)	Project Nexus	Proposed Study Approach
Project Lands and Roads	• It may be necessity to modify the current existing FERC Project Boundary, lands, and roads to address current use and future needs.	• Comprehensive catalogue of how existing roads are used to access the Project does not exist.	• FERC requires in 18 CFR §4.41 that the FERC Project Boundary encompass all lands, roads, and trails necessary for Project purposes, including the O&M of the Project over the term of the FERC license.	Project Lands and Roads (LAND-1) • Analyze the existing FERC Project Boundary within GIS software to determine whether mapping errors or omissions are present in the representation of Project lands needed for operation under the current license. • Gather accurate land ownership and lease agreement data for existing Project lands to confirm ownership boundaries and representation of federal lands used for Project purposes. • Consult with SCE O&M staff to determine whether the existing FERC Project Boundary adequately encompasses all lands needed for current operations or any proposed changes to facilities or operations. • Consult with SCE and USFS staff to identify roads or access trails that may be used for Project purposes, such as for O&M of Project facilities or access to Project-related recreation opportunities. Assess the condition of roads or access trails identified for Project purposes.
Visual Resources	• Need to determine consistency of Project operations, maintenance, and facilities on visual quality of key viewing areas of Project lands.	• Project components have not been evaluated against the Scenic Integrity Objectives for Lee Vining Canyon.	• Operation, maintenance, and construction activities associated with the Project may affect scenic resources associated with the Project lands. The Visual Resource Assessment will characterize existing visual resources within the existing FERC Project Boundary.	Visual Resource Assessment (LAND-2) • Inventory, map, and describe Project infrastructure, operation, maintenance, and construction activities that may have the potential to affect visual resources of the Project Area. • Document existing PM&E measures, including the existing Visual Resource Protection Plan implemented under the existing license. • Conduct a viewshed analysis (via GIS), identify Key Observation Points and determine what portion of the Project lands and associated landscape are potentially visually affected by Project-related activities.
Cultural Resource	• Project O&M could affect cultural resources that are listed in or eligible for listing in the NRHP.	• There may be cultural resource studies and records that have not been digitized and could not be obtained because all repositories are closed due to COVID-19. These will be retrieve when the repositories are open.	• Project O&M activities could result in direct and/or indirect effects on cultural resources.	Cultural Resource (CUL-1) • Complete records search and compile additional information from available repositories. • Conduct a pedestrian survey within the APE in areas that have not been surveyed or should be resurveyed and identify any new sites. • Record and document all sites and built environment resources.
Tribal Resources	• Project O&M may be currently or potentially impacting NRHP-eligible cultural resources.	• Develop an ethnographic overview/background of the Project Area. • Conduct interviews with tribes.	• Known tribal and ethnographic resources in the Project.	Tribal Resource (TRI-1) • Conduct background archival research of the study area. • Identify and document tribal resources identified within or immediately adjacent to the APE. • Conduct a thorough Native American ethnographic/ethnohistoric survey of the APE. • Conduct interviews with knowledgeable informants.

APE = Area of Potential Effects; CDFW = California Department of Fish and Wildlife; CFR = Code of Federal Regulations; DO = dissolved oxygen; ESA = Endangered Species Act; FERC = Federal Energy Regulatory Commission; GIS = geographic information system; GPS = Global Positioning System; LADWP = Los Angeles Department of Water and Power; NRHP = National Register of Historic Places; O&M = operation and maintenance; PM&E = Protection, Mitigation, and Enhancement; SCC = Species of Conservation Concern; SCE = Southern California Edison; USFS = U.S. Forest Service

Page Intentionally Left Blank

6.2. TECHNICAL STUDY PLANS

SCE has prepared 15 preliminary draft Study Plan outlines based on the resource issues and data gaps identified in Table 6.1-1. The Study Plans, included in Appendix C, are preliminary and intended to be high level as this time, but with the intent to start providing Stakeholders with additional information about each proposed study. SCE's intent is to refine these Study Plans in collaboration with Stakeholders as part of the Study Plan development process (refer to Table 2.1-1, *Lee Vining Process Plan and Schedule*).

1. Stream and Reservoir Water Quality (WQ-1)
2. Reservoir Fish Population (AQ-1)
3. Stream Fish Population (AQ-2)
4. Aquatic Habitat Mapping and Sediment Characterization (AQ-3)
5. Aquatic Invasive Plants (AQ-4)
6. Operations Model (AQ-5)
7. Lower Lee Vining Creek Channel Morphology (AQ-6)
8. General Botanical Resources Survey (TERR-1)
9. General Wildlife (TERR-2)
10. Recreation Use Assessment (REC-1)
11. Existing Recreation Facilities Condition Assessment (REC-2)
12. Project Lands and Roads (LAND-1)
13. Visual Resource Assessment (LAND-2)
14. Cultural Resource (CUL-1)
15. Tribal Resource (TRI-1)

During early relicensing activities, Stakeholders were provided the opportunity to review and comment on the proposed study objectives prior to their inclusion in this document. Comments received during TWG meetings are included as part of the Consultation Matrix included with each plan. SCE reviewed the comments received and incorporated, as applicable, in the draft Study Plan outlines. SCE has also provided a response to comments on each study to provide a rationale for why a suggested objective, rationale, or method has not been adopted. SCE does not consider these plans to be approved and will consider additional comments received following issuance of the PAD, consistent with the process plan and schedule and 18 CFR § 16.8.

SCE proposes to implement studies starting in Spring 2022 and continue into 2023, as needed. Study results will be provided to stakeholders after the data are collected, tabulated, summarized, and checked for quality. Stakeholders will be provided an opportunity to review the draft study results, and any comments received will be reviewed and incorporated, as applicable, into final study reports. Specific timelines for completing the draft and final reports will be developed for each study.

6.3. PRELIMINARY RESOURCE TOPICS NOT ADDRESSED BY STUDY PLANS

In reviewing study requests and in discussions with the TWG, SCE has determined that based on the information provided, some of the issues identified are neither a result of Project-induced effects, nor do they have a nexus to Project O&M activities. Table 6.3-1 identifies preliminary resource issues identified by stakeholders for which SCE is not proposing a specific study—either because data are available to assess potential Project effects or SCE does not see a strong nexus to the Project.

Where SCE is not proposing specifically to address a request through a study, SCE's rational is described. To the extent possible and as described below, SCE has identified elements of the request that can be accommodated within planned studies

Studies presented in this PAD are preliminary; Stakeholders will have an opportunity to discuss issues that SCE chooses not to include, as well as any additional issues, following SCE's submittal of the PAD as provided for pursuant to 18 CFR § 16.8 (alternatively 18 CFR § 5.9 if FERC directs that SCE utilize the Integrated Licensing Process). Refer to Appendix B for Stakeholder study requests.

Table 6.3-1. Studies or Study Elements Not Adopted (see Appendix B, Consultation Record)

Proposed Study Topic	Entity and Date	Basis for Request	SCE Response
Peak Flow Study	Mono Lake Committee (2/22/2021)	LADWP diverts water below the Project; A 2013 Settlement Agreement between the LADWP and the SWRCB implementing a court ordered restoration effort clarifies the use of the natural hydrograph downstream of the LADWP diversion to restore functional and self-sustaining stream systems with healthy riparian ecosystem components. This study is intended to determine if Project operations and facilities are able to deliver peak flows that may aid in restoration of habitat.	SCE notes that it is not party to the agreement referenced by the Mono Lake Committee; however, the Operations Model that is being developed to look at Project hydrology and operations constraints should provide Stakeholders with information about the potential for the Project to provide peak flows. SCE has not adopted this as a study objective because there is no Project nexus between SCE operations and settlement Parties' ability to meet settlement agreement commitments downstream of the Project.
Information Sharing	Mono Lake Committee (3/15/2021)	Mono Lake Committee desires additional information regarding SCE's reservoir storage information for purposes of coordinating recovery projects related to downstream habitat conditions. Mono Lake Committee proposed a study to understand the constraints SCE has in sharing information with Stakeholders, agencies, and the public. The information of interest includes forecasted operations and real-time reservoir and flow data.	SCE anticipates that procedures and expectations around information sharing and communication models will be part PM&E measures included in a Final License Application; however, a study is not necessary as there are no operational or facility questions associated with this request.
Non-point source contamination of Project waters at road pull-outs	February 25 Recreation TWG Meeting	Potential for non-point source from increased vehicle pull-outs around Project waters, specially from dirt areas around Saddlebag Lake at the Ellery pull-out and north end of Tioga Lake.	The California Department of Transportation owns and manages those pull-outs, which are outside of the FERC Project Boundary. SCE does not see a Project nexus as the bulk of this traffic and use is incidental to vehicles transiting to nearby Yosemite National Park.
Yosemite Toad Population Dynamics	California Department of Fish and Wildlife request	Requesters note designation of critical habitat for Yosemite toad (*Anaxyrus canorus*) in the FERC Project Boundary and potential sensitivity of Yosemite toad to Project operations given dependence on aquatic systems; increased recreational activities as a result of the creation of	SCE agrees that information on potential Project effects on Yellowstone Toad populations should be developed as part of FERCs responsibilities to consult on ESA-listed species; however, the survey methods and scope of the proposed study goes beyond what is necessary to understand Project

Proposed Study Topic	**Entity and Date**	**Basis for Request**	**SCE Response**
		the reservoir could have direct impacts (e.g., crushing) or indirect (e.g., Yosemite toad avoidance of suitable habitat because of human presence/recreational activities) impacts on Yosemite toad populations. To assess potential impacts, CDFW included Visual Encounter Surveys, Epithelia Bd swabs, and Mark and Recapture Surveys.	effects. SCE has consulted with CDFW and USFWS in developing a terrestrial survey for RTE species, which is summarized in Study *TERR-2 General Wildlife*.
Riparian Monitoring and Community Health	California Department of Fish and Wildlife request	CDFW suggested that questions about riparian community assemblages might be appropriate and could be similar to those conducted at Bishop Creek.	Sufficient data exists from ongoing Riparian Monitoring Evaluations conducted as part of the existing license—the most recent evaluation is being conducted during the summer of 2021. With regard to Bishop Creek, black cottonwood (*Populus trichocarpa*) is not present in Lee Vining Canyon and there are no data to suggest any impairment of riparian conditions.
Geomorphology Assessment	California Department of Fish and Wildlife request	During review of comparable Bishop Creek studies, it was suggested that the relicensing team conduct a geomorphology study with comparable objectives do develop a sediment budget for the system.	During subsequent discussions with the TWG, it was discussed that the high-gradient and granitic nature of the Lee Vining Project Area reduces the need for detailed geomorphic characterization and sediment budgets beyond what currently exists. A desire to characterize sediment in Project Area and below Poole Powerhouse has been included in Study *AQ-3 Aquatic Habitat Mapping and Sediment Characterization Study Plan*, and a channel morphology study for reaches below the Poole Powerhouse is described in Study *AQ-6 Lower Lee Vining Creek Channel Morphology Study Plan*.

CDFW = California Department of Fish and Wildlife; ESA = Endangered Species Act; FERC = Federal Energy Regulatory Commission; LADWP = Los Angeles Department of Water and Power; PM&E = Protection, Mitigation, and Enhancement; RTE = rare, threatened, and endangered; SCE = Southern California Edison; SWRCB = State Water Resources Control Board; TWG = Technical Working Group; USFWS = U.S. Fish and Wildlife Service

6.4. Relevant Qualifying Federal or State and Tribal Comprehensive Waterways Plans

Section 10(a)(2)(A) of the Federal Power Act, 16 USC Section 803 (a)(2)(A), requires FERC to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. On April 27, 1988, FERC issued Order No. 481-A, revising Order No. 481, issued October 26, 1987, establishing that FERC will accord Federal Power Act Section 10(a)(2)(A) comprehensive plan status to any federal or state plan that 1) is a comprehensive study of one or more of the beneficial uses of a waterway or waterways; 2) specifies the standards, the data, and the methodology used; and 3) is filed with the FERC Secretary.

FERC currently lists 107 comprehensive management plans for the State of California (FERC 2020), of which 13 pertain to waters in the vicinity of the Project (Table 6.4-1).

Table 6.4-1 Qualifying Federal, State, or Tribal Comprehensive Waterways Plans Potentially Relevant to the Project

Federal, State, Local, or Tribal	**Resource Management Plans/Policies**
Federal	Bureau of Land Management. 1993. *Bishop Resource Management Plan*. Department of the Interior, Bishop, California. April.
State	California Department of Fish and Game. 2003. *Strategic Plan for Trout Management: A Plan for 2004 and Beyond*. Sacramento, California. November.
State	California Department of Fish and Game. 2007. *California Wildlife: Conservation Challenges, California's Wildlife Action Plan*. Sacramento, California..
State	California Department of Fish and Game. U.S. Fish and Wildlife Service. 2010. *Final Hatchery and Stocking Program Environmental Impact Report/Environmental Impact Statement*. Sacramento, California. January.
State	California Department of Fish and Wildlife. 2008. *California Aquatic Invasive Species Management Plan*. Sacramento, California. January 18.
State	California Department of Parks and Recreation. 2013. *Outdoor Recreation in California's Regions 2013*. Sacramento, California.
State	California Department of Parks and Recreation. 2014. *2012 Survey on Public Opinions and Attitudes on Outdoor Recreation in California Complete Findings*. Sacramento, California.
State	California Department of Parks and Recreation. 2015. *California Statewide Comprehensive Outdoor Recreation Plan.* Sacramento, California.
State	California State Water Resources Control Board. 1975. *Water Quality Control Plan on the Use and Disposal of Inland Waters Used for Power Plant Cooling*. Sacramento, California. June.
State	California State Water Resources Control Board. 2015. *ISWEBE Plan: Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California*. Sacramento, California. April. [Amended May 2017 and August 2018.]

Federal, State, Local, or Tribal	Resource Management Plans/Policies
Federal	National Park Service. 1993. *The Nationwide Rivers Inventory*. Department of the Interior, Washington, D.C.
Federal	U.S. Fish and Wildlife Service. Canadian Wildlife Service. 1986. *North American Waterfowl Management Plan*. Department of the Interior. Environment Canada. May.
Federal	U.S. Fish and Wildlife Service. No Date. *Fisheries USA: The Recreational Fisheries Policy of the U.S. Fish and Wildlife Service*. Washington, D.C.

6.5. RELEVANT RESOURCE MANAGEMENT PLANS

In addition to the waterways comprehensive plans listed above, some agencies have developed resource management plans to help guide their actions regarding specific resources of jurisdiction. The resource management plans listed below (Table 6.5-1) may be relevant to the Project and may be useful in the relicensing proceeding for characterizing desired conditions.

Table 6.5-1 Other Potentially Relevant Resource Management Plans

Federal, State, Local, or Tribal	Resource Management Plans/Policies
Federal	Bureau of Land Management. 1987. *Final Environmental Impact Statement for 19 Wilderness Study Areas within the Benton-Owens Valley and the Bodie-Coleville Study Areas*. Department of the Interior, Bakersfield, California.
Federal	U.S. Forest Service. 1988. *Inyo National Forest Land and Resource Management Plan. Department of Agriculture, Bishop, California*. August.
Federal	U.S. Forest Service. 1989. *Mono Basin National Forest Scenic Area Comprehensive Management Plan*. Department of Agriculture, Bishop, California.
Federal	U.S. Forest Service. 2004. *Sierra Nevada National Forest Land and Resource Management Plan, Amendment*. Department of Agriculture, Vallejo, California. January.
Local	Mono County. 2020. *Mono County General Plan*. Mono County Planning Division, Mammoth Lakes, CA..
Federal	U.S. Fish and Wildlife Service. 2013. *Greater Sage-grouse (*Centrocercus urophasianus*) Conservation Objectives: Final Report.* Denver, Colorado. February.
Federal	U.S. Forest Service. 2018. *Land Management Plan for the Inyo National Forest Fresno, Inyo, Madera, Mono, and Tulare Counties, California; Esmeralda and Mineral Counties, Nevada.*
Federal	U.S. Forest Service. 2019. *Land Management Plan for the Inyo National Forest Fresno, Inyo, Madera, Mono, and Tulare Counties, California; Esmeralda and Mineral Counties, Nevada.*

7.0 LITERATURE AND SOURCES CITED

7.1. SECTION 1.0

None.

7.2. SECTION 2.0

None.

7.3. SECTION 3.0

CDEC (California Data Exchange Center). 2020. Ellery Lake (ERY) Precipitation Averages. CA.gov Department of Water Resources. Accessed: April 14, 2021. Available online: https://cdec.water.ca.gov/dynamicapp/profile?s=ERY&type=precip.

FERC (Federal Energy Regulatory Commission). 1992. *Final Environmental Assessment for Hydropower License*. Lee Vining FERC Project No. 1388-001. California. Federal Energy Regulatory Commission, Office of Hydropower Licensing, Washington, D.C. December 30.

LADWP (Los Angeles Department of Water and Power). 1987. *Mono Basin Geology and Hydrology.* Los Angeles Department of Water and Power Aqueduct Division – Hydrology Section. March.

MLC (Mono Lake Committee). 2020. About Mono Lake. Accessed: August 2020. Available online: https://www.monolake.org/about/.

MRLC Consortium (Multi-Resolution Land Characteristic Consortium). 2016. Multi-Resolution Land Characteristics Consortium. Accessed: August 2020. Available online: https://www.mrlc.gov.

SCE (Southern California Edison Company). 2018. *Supporting Technical Information Document, Tioga Lake Dams*. FERC Project No. 1388-CA. May 2018.

_____. 2019. *Supporting Technical Information Document, Rhinedollar Dam*. FERC Project No. 1388-CA. September 2019.

SWRCB (State of California State Water Resources Control Board). 1994. *Decision 1631: Decision and Order Amending Water Right Licenses to Establish Fishery Protection Flows in Streams Tributary to Mono Lake and to Protect Public Trust Resources at Mono Lake and in the Mono Lake Basin*. Mono Basin Clearinghouse. Accessed: August 2020. Available online: https://www.waterboards.ca.gov/waterrights/board_decisions/adopted_orders/decisions/d1600_d1649/wrd1631.pdf.

_____. 2013. *Settlement Agreement Regarding Continuing Implementation of Water Rights Orders 98-05 and 98-07*. In the matter of: City of Los Angeles Department of Water and Power, Water Right Licenses Nos. 10191 and 10192. Accessed: August 2020. Available online: https://www.waterboards.ca.gov/waterrights//water_issues/programs/mono_lake/docs/mb_sttlmntagrmnt_signed.pdf.

U.S. Climate Data. 2020. *Weather history Lee Vining - December 2019.* Accessed: August 2020. Available online: https://www.usclimatedata.com/climate/lee-vining/california/united-states/usca0601.

USFS (U.S. Forest Service). 2019. *Land Management Plan for the Inyo National Forest. Fresno, Inyo, Madera, Mono and Tulare Counties, California; Esmeralda and Mineral Counties, Nevada*. R5-MB-323a. Pacific Southwest Region. September. Accessed: August 24, 2020. Available online: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd664404.pdf.

7.4. SECTION 4.0

Diamond, Valerie H. and Hicks, Robert A. 1988. *Historic Overview of the Rush Creek and Lee Vining Creek Hydroelectric Projects*. Project Managers: Dorothea Theodoratus and Clinton M. Blount. Submitted to Southern California Edison Company, Rosemead, California, by Theodoratus Cultural Research, Inc., Fair Oaks, California. August.

SCE (Southern California Edison Company). 2018a. *Supporting Technical Information Document, Saddlebag Lake Dam*. FERC Project No. 1388-CA. May 2018. Revised September 26, 2019.

_____. 2018b. *Supporting Technical Information Document, Tioga Lake Dams*. FERC Project No. 1388-CA. May 2018.

_____. 2019. *Supporting Technical Information Document, Rhinedollar Dam*. FERC Project No. 1388-CA. September 2019.

_____. 2020. Project Generation and Outflows Data provided by SCE's Martin Ostendorf and Vince White and tabulated/summarized by ERM's Carissa Shoemaker.

USGS (U.S. Geological Survey). 2020. Water-Year Summary for Site USGS 10287760. Accessed: July 2020. Available online: https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&&adr_begin_date=2018-10-01&adr_end_date=2019-09-30&site_no=10287760&agency_cd=USGS.

7.5. SECTION 5.0

7.5.1. GEOLOGY AND SOILS

Barth, A.P., J.D. Walker, J.L. Wooden, N.R. Riggs, and R.A. Schweickert. 2011. "Birth of the Sierra Nevada magmatic arc: Early Mesozoic plutonism and volcanism in the east-central Sierra Nevada of California." *Geosphere* 7(4):877–897. Accessed: August 2020. Available online: https://doi.org/10.1130/GES00661.1.

Bateman, P.C. 1965. *Geology and Tungsten Mineralization of the Bishop District California*. Geological Survey Professional Paper 470. Prepared in cooperation with the State of California, Department of Conservation, Division of Mines and Geology. Washington, D.C. Accessed: June 2021. Available online: https://pubs.usgs.gov/pp/0470/report.pdf.

Bateman, P.C. 1992 *Plutonism in the central part of the Sierra Nevada batholith, California.* U.S. Geological Survey. Professional Paper 1483. Washington, D.C. Accessed: June 2021. Available online: https://doi.org/10.3133/pp1483.

Bursik, M. 1991. "Relative Dating of Moraines Based on Landform Degradation, Lee Vining Canyon, California." *Quaternary Research* 35:451–455. Accessed: August 2020. Available online: https://doi.org/10.1016/0033-5894(91)90057-C.

California Department of Conservation. 2018. DOC Maps: Mines and Mineral Resources. Accessed: July 20, 2020. Available online: https://maps.conservation.ca.gov/mineralresources/.

______. 2020. *Statutes & Regulations*. January 2020. Surface Mining and Reclamation Act of 1975. Prepared by California Department of Conservation, Mine Reclamation: Sacramento, California.

CASC Engineering and Consulting, 2020. "Lee Vining Open House Info," YouTube video, 9:38, posted by Southern California Edison, January 13, 2021, https://www.youtube.com/watch?v=EGVsfSKT-YI.

CGS (California Geological Survey). 2015. CGS Information Warehouse: Mineral Land Classification. Accessed: July 20, 2020. Available online: https://maps.conservation.ca.gov/cgs/informationwarehouse/mlc/.

ESE (Environmental Science and Engineering, University of California, Los Angeles). 1975. Robert K. Kawaratani, and Richard L. Perrine. *Wilderness water quality: Bishop Creek baseline study, 1974*. Davis: California Water Resources Center, University of California.

FERC (Federal Energy Regulatory Commission). 1992. *Final Environmental Assessment for Hydropower License*. Lee Vining FERC Project No. 1388-001. California. Federal Energy Regulatory Commission, Office of Hydropower Licensing, Washington, D.C. December 30.

______. 1997. *Order Issuing New License*. Project No. 1388-001. February 4.

Gillespie, Alan R., and Douglas H. Clark. 2011. "Chapter 34 - Glaciations of the Sierra Nevada, California, USA." In *Quaternary Glaciations - Extent and Chronology: A Closer Look*, edited by J. Ehlers, P.L. Gibbard, and P.D. Hughes. *Developments in Quaternary Sciences* 15:447–462. Amsterdam: Elsevier Science. Accessed: August 2020. Available online: https://doi.org/10.1016/B978-0-444-53447-7.00034-9.

Gillespie, Alan R., and Paul H. Zehfuss. 2004. "Glaciations of the Sierra Nevada, California, USA*."* In *Quaternary Glaciations - Extent and Chronology, Part II: North America*, edited by J. Ehlers, and P.L. Gibbard. *Developments in Quaternary Sciences* 2 (Part B): 51–62. Amsterdam: Elsevier Science. Accessed: August 2020. Available online: https://doi.org/10.1016/S1571-0866(04)80185-4.

Huber, N. King, Paul C. Bateman, and Clyde Wahrhaftig. 1989. *Geologic Map of Yosemite National Park and Vicinity, California.* Department of the Interior, U.S. Geological Survey Map I-1874 scale 1:125,000, Washington, D.C. Accessed: August 2020. Available online: https://pubs.usgs.gov/imap/i1874/.

Jones & Stokes Associates. 1993. *Environmental Impact Report for the Review of Mono Basin Water Rights of the City of Los Angeles*. Draft. JSA 90-171. Prepared for California State Water Resources Control Board, Division of Water Rights [Lead Agency], Sacramento, CA.

LADWP (Los Angeles Department of Water and Power). 1987. *Mono Basin Geology and Hydrology.* Los Angeles Department of Water and Power Aqueduct Division – Hydrology Section. March.

Lahren, M.M. 1989. "Tectonic studies of the Sierra Nevada: Structure and stratigraphy of miogeoclinal rocks in Snow Lake pendant, Yosemite-Emigrant wilderness; and TIMS analysis of the Northern Sierra terrane." Doctoral dissertation. University of Nevada, Reno.

Lajoie, K.R. 1968 "Late quaternary stratigraphy and geologic history of Mono Basin." Doctoral dissertation. University of California, Berkeley.

Le, K., J. Lee, L.A. Owen, and R. Finkel. 2007. "Late Quaternary slip rates along the Sierra Nevada frontal fault zone, California: Slip partitioning across the western margin of the Eastern California Shear Zone–Basin and Range Province." *GSA Bulletin* 119(1-2):240–256. Accessed: August 2020. Available online: https://doi.org/10.1130/B25960.1.

Lidke, D.J. 2000. Fault number 1181, Northern Roberts Mountains fault. In Quaternary fault and fold database of the United States: U.S. Geological Survey. Accessed: July 20, 2020. Available online:

https://earthquake.usgs.gov/cfusion/qfault/show_report_AB_archive.cfm?fault_id=1181&section_id=.

Millar, C.I., and W.B. Woolfenden. 1999. “The Role of Climate Change in Interpreting Historical Variability.” *Ecological Applications* 9(4):1207–1216. Accessed: August 2020. Available online: https://doi.org/10.1890/1051-0761(1999)009[1207:TROCCI]2.0.CO;2.

Phillips, F. 2017. “Glacial chronology of the Sierra Nevada, California, from the Last Glacial Maximum to the Holocene.” *Geographical Research Letters* 43(2):527–552. Accessed: June 2021. Available online: https://doi.org/10.18172/cig.3233.

R2 (R2 Resource Consultants). 2002. *Sediment Bypass Alternatives for Lee Vining Creek*. Prepared for Los Angeles Department of Water and Power. Prepared by R2 Resource Consultants, Redmond, Washington, with support of Montgomery Watson Harza, Bellevue, Washington. March 29.

Sawyer, T.L., and W.A. Bryant, compilers. 1995. Fault number 42, Silver Lake Fault, in quaternary fault and fold database of the United States: U.S. Geological Survey. Accessed: July 20, 2020. Available online: https://earthquake.usgs.gov/cfusion/qfault/show_report_AB_archive.cfm?fault_id=42&section_id=.

_____. 2002. Fault number 41, Mono Lake fault. In Quaternary fault and fold database of the United States: U.S. Geological Survey. Accessed: July 20, 2020. Available online: https://earthquake.usgs.gov/cfusion/qfault/show_report_AB_archive.cfm?fault_id=41&section_id=.

Sawyer, T.L., compiler. 1995. Fault number 65a, Southern Sierra Nevada Fault Zone, independence section. In Quaternary fault and fold database of the United States: U.S. Geological Survey. Accessed: July 20, 2020. Available online: https://earthquake.usgs.gov/cfusion/qfault/show_report_AB_archive.cfm?fault_id=65&section_id=a.

SCE (Southern California Edison Company). 1997a. *Plan for Control of Erosion, Stream Sedimentation, Soil Mass Movement, and Dust*. Lee Vining Hydroelectric Project. FERC No. 1388-016. September.

_____. 1997b. *Plan for Storage and/or Disposal of Excess Construction/Tunnel Spoils and Slide Materials*. Lee Vining Hydroelectric Project. FERC No. 1388-016. September.

Schweickert, R.A., and M.M. Lahren. 1987. “Continuation of Antler and Sonoma orogenic belts to the eastern Sierra Nevada, California, and Late Triassic thrusting in a compressional arc.” *Geology* 15(3):270–273. Accessed: August 2020. Available online: https://doi.org/10.1130/0091-7613(1987)15<270:COAASO>2.0.CO;2.

USGS (U.S. Geological Survey). 2018. Mineral Resources Online Spatial Data. Mineral Resources Data System: U.S. Geological Survey database. Accessed: July 29, 2020. Available online: https://mrdata.usgs.gov/.

Vaughn, D.E. 1983. *Soil Inventory of the Benton-Owens Valley Area, Inyo and Mono Counties, California.* Draft. U.S. Department of the Interior, Bureau of Land Management.

Vorster, P. 1985. "A Water Balance Forecast Model for Mono Lake, California." Thesis, Presented to the Faculty of California State University, Hayward. Mono Lake Committee, Mono Basin Clearinghouse. Accessed: July 20, 2020. Available online: https://www.monobasinresearch.org/onlinereports/waterbalance.php.

Wieczorek, G.F., and S. Jäger. 1996. "Triggering mechanisms and depositional rates of postglacial slope-movement processes in the Yosemite Valley, California." *Geomorphology* 15:17–31. Accessed: August 2020. Available online: https://doi.org/10.1016/0169-555X(95)00112-I.

7.5.2. Water Resources

CEDEN (California Environmental Data Exchange Network). 2020. Database. State Water Resources Control Board, Sacramento, CA. Accessed: June 14, 2020. Available online: http://ceden.org/index.shtml.

Cohen, A.P. 2019. "Comparative limnology of high-elevation lakes and reservoirs and their downstream effects." University of California, Santa Barbara, doctoral dissertation. ProQuest ID: Cohen_ucsb_0035D_14552. Accessed: August 2020. Available online: https://escholarship.org/uc/item/3466p1n8.

Diamond, Valerie H. and Hicks, Robert A. 1988. *Historic Overview of the Rush Creek and Lee Vining Creek Hydroelectric Projects*. Project Managers: Dorothea Theodoratus and Clinton M. Blount. Submitted to Southern California Edison Company, Rosemead, California, by Theodoratus Cultural Research, Inc., Fair Oaks, California. August.

FDA (Food and Drug Administration). 2019. Technical Information on Development of FDA/EPA Advice about Eating Fish for Women Who Might Become Pregnant, Breastfeeding Mothers, and Young Children. Accessed: August 27, 2020. Available online: https://www.fda.gov/food/metals-and-your-food/technical-information-development-fdaepa-advice-about-eating-fish-women-who-are-or-might-become.

FERC (Federal Energy Regulatory Commission). 1992. *Final Environmental Assessment for Hydropower License*. Lee Vining FERC Project No. 1388-001. California. Federal Energy Regulatory Commission, Office of Hydropower Licensing, Washington, D.C. December 30.

______. 1997. *Order Issuing New License*. Project No. 1388-001. February 4.

Google Earth. 2020. Map showing Lee Vining Creek Watershed, accessed online using Google Earth Pro. Accessed: July 20, 2020.

LADWP (Los Angeles Department of Water and Power). 1987. *Mono Basin Geology and Hydrology.* Los Angeles Department of Water and Power Aqueduct Division – Hydrology Section. March.

LRWQCB (Lahontan Region Water Quality Control Board). 2019. *Water Quality Control Plan for the Lahontan Region* (as amended). First published in 1995, revised 2019. Accessed: August 2020. Available online: https://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/references.html.

Lund, L.J. 1988. *Water Quality of Bishop Creek and Selected Eastern Sierra Nevada Lakes*. Report of Research for 1986–1988. Submitted to Southern California Edison. Riverside: University of California.

Melack, J.M., J.L. Stoddard, and C.A. Ochs. 1985. “Major Ion Chemistry and Sensitivity to Acid Precipitation of Sierra Nevada Lakes.” *Water Resources Research* 21(1): 27–32, doi:10.1029/WR021i001p00027.

Sadro, S., C.E. Nelson, and J.M. Melack. 2012. “The Influence of Landscape Position and Catchment Characteristics on Aquatic Biogeochemistry in High-Elevation Lake-Chains.” *Ecosystems* 15(3):363–386.

Salamunovich, T. 2017. *Fall 2016 Fish Population Survey, Upper Lee Vining Creek, Mono County, California*. Draft Report. Prepared for E Read & Associates Inc. by Normandeau Associates, Arcata, California. February 13.

SCE (Southern California Edison Company). 2017. *Southern California Edison Invasive Mussel Prevention Plan.* Rosemead, CA. July.

______. 2018a. *Supporting Technical Information Document, Saddlebag Lake Dam*. FERC Project No. 1388-CA. May 2018. Revised September 26, 2019.

______. 2018b. *Supporting Technical Information Document, Tioga Lake Dams*. FERC Project No. 1388-CA. May 2018.

______. 2019. *Supporting Technical Information Document, Rhinedollar Dam*. FERC Project No. 1388-CA. September 2019.

______. 2020. *Lee Vining Hydroelectric Project Description.* FERC Project No. 1388-CA. April 2020.

Stoddard, J.L. 1987. “Alkalinity dynamics in an unacidified alpine lake, Sierra Nevada, California.” *Limnology and Oceanography* 32(4):825–839.

SWRCB (State of California Water Resources Control Board). 1989. *Analysis of Water Rights Held by Southern California Edison for the Rush and Lee Vining Creek Projects*. Memorandum, Files – 262.0(10-09).

______. 1994. *Decision 1631: Decision and Order Amending Water Right Licenses to Establish Fishery Protection Flows in Streams Tributary to Mono Lake and to Protect Public Trust Resources at Mono Lake and in the Mono Lake Basin*. Mono Basin Clearinghouse. Accessed: August 2020. Available online: https://www.waterboards.ca.gov/waterrights/board_decisions/adopted_orders/decisions/d1600_d1649/wrd1631.pdf.

______. 2013. *Settlement Agreement Regarding Continuing Implementation of Water Rights Orders 98-05 and 98-07*. In the matter of: City of Los Angeles Department of Water and Power, Water Right Licenses Nos. 10191 and 10192. Accessed: August 2020. Available online: https://www.waterboards.ca.gov/waterrights//water_issues/programs/mono_lake/docs/mb_sttlmntagrmnt_signed.pdf.

______. 2017. *Eastern Sierra Hydroelectric Power Projects Ongoing Operations and Maintenance Water Quality Certification*. October 3.

______. 2018. eWRIMS GIS System. Accessed: September 9, 2020. Available online: https://waterrightsmaps.waterboards.ca.gov/viewer/index.html?viewer=eWRIMS.eWRIMS_gvh#.

USEPA (U.S. Environmental Protection Agency). 2020. WATERS application accessed using Google Earth KMZ online. Accessed: July 20, 2020.

USGS (United States Geological Survey). 2020. StreamStats: Streamflow Statistics and Spatial Analysis Tools for Water-Resources Applications. Accessed: July 20, 2020. Available online: http://streamstats.usgs.gov.

Williams, M.W., and J.M. Melack. 1991. “Solute Chemistry of Snowmelt and Runoff in an Alpine Basin, Sierra Nevada.” *Water Resources Research* 27(7):1575–1588, doi:10.1029/90WR02774.

7.5.3. Fish and Aquatic Resources

Adams, P., C. James, and C. Speas. 2008. *Rainbow Trout (*Oncorhynchus *mykiss) Species and Conservation Assessment.* Grand Mesa, Uncompahgre, and Gunnison National Forests. March.

Bell, M.C. 1991. *Fisheries Handbook of Engineering Requirements and Biological Criteria*. Fish Passage Development and Evaluation Program. U.S. Army Corps of Engineers, North Pacific Division. Portland, Oregon.

Calkins, D.J. 1989. *Winter habitats of Atlantic salmon, brook trout, brown trout and rainbow trout, A literature review*. U.S. Army Corps of Engineers. Special Report 89-34. October.

CDFW (California Department of Fish and Wildlife). 2020. California Natural Diversity Database (CNDDB) RareFind 5. Commercial Version, Biogeographic Data Branch. Accessed: April 20, 2020. Available online: https://wildlife.ca.gov/data/cnddb.

Cohen, A.P. 2019. "Comparative limnology of high-elevation lakes and reservoirs and their downstream effects." University of California, Santa Barbara, doctoral dissertation. ProQuest ID: Cohen_ucsb_0035D_14552. Accessed: August 2020. Available online: https://escholarship.org/uc/item/3466p1n8.

EA (EA Engineering, Science, & Technology, Inc). 1986. *Instream Flow and Fisheries Studies for the Upper Lee Vining Creek Hydroelectric Project.* Prepared for Southern California Edison Company. June 1986.

______. 1987a. *East Side Sierra Hydroelectric Relicensing Studies: Fish Populations in Upper Lee Vining Hydroelectric Project.* Prepared for Southern California Edison Company. October 1987.

______. 1987b. *East Side Sierra Hydroelectric Relicensing Studies: Impacts of Reservoir Drawdown on Fish Populations*. Prepared for Southern California Edison Company. March 1987.

FERC (Federal Energy Regulatory Commission). 1992. *Final Environmental Assessment for Hydropower License*. Lee Vining FERC Project No. 1388-001. California. Federal Energy Regulatory Commission, Office of Hydropower Licensing, Washington, D.C. December 30.

Herbst, D.B., and R.B. Medhurst. 2010. *Report on South Lake and Saddlebag Lake Invertebrate Inventories*. October 20, 2010.

Moyle, P.B. 2002. *Inland Fishes of California.* Berkeley: University of California Press.

Rehn, A.C., R.D. Mazor, and P.R. Ode. 2015. *The California Stream Condition Index (CSCI): A New Statewide Biological Scoring Tool for Assessing the Health of Freshwater Streams*. SWAMP Technical Memorandum, SWAMP-TM-2015-0002. California Department of Fish and Wildlife, Southern California Coastal Water Research Project.

Rost, A., and C. Fritsen. 2014. "Influence of a tributary stream on benthic communities in a *Didymosphenia geminata* impacted stream in the Sierra Nevada, USA." *Diatom Research* 29(3):249–257, DOI:10.1080/0269249X.2014.929029.

Sada, D.W. 2007a. *Fish Population Surveys in Lee Vining Creek, Mono County, California, 1999 - 2006.* Submitted to Southern California Edison Company, Rosemead, California. June 8.

______. 2007b. *Aquatic Habitat Monitoring, Lee Vining Creek, Mono County, California, 1999, 2000, 2001, and 2006*. Submitted to Southern California Edison Company, Rosemead, California. June 5.

Sada, D.W., and C. Hogle. 2011. *Lee Vining Creek, Mono County, California Fish Population Survey, October 2011*. December 15.

Salamunovich, T. 2017a. *Fall 2016 Fish Population Survey, Upper Lee Vining Creek, Mono County, California.* Draft Report. Prepared for E Read & Associates Inc. by Normandeau Associates, Arcata, California. February 13.

______. 2017b. *Fall 2016 Aquatic Habitat Survey, Upper Lee Vining Creek, Mono County, California*. Draft Report. Prepared for E Read & Associates Inc. by Normandeau Associates, Arcata, California. February 13.

SCE (Southern California Edison Company). 1981. Application for license for major project-existing dam, Project No. 1388, Lee Vining Project. Rosemead, California. August 25, 1939.

______. 2007. Amended Preliminary Draft Environmental Assessment (APDEA). FERC Project Nos. 2085, 2175, 67, and 120. Attachment H. February.

SWRCB (State Water Resources Control Board). 2020a. California Environmental Data Exchange Network (CEDEN) electronic database maintained by the State Water Resources Control Board for taxonomic results of historical benthic macroinvertebrate samples collected in Kern, CA and Tulare County, CA. Accessed: July 2020. Available online: http://www.ceden.org/.

______. 2020b. Bioassessment Scores Map Network operated by the State Water Resources Control Board: an interactive compilation of data collected from 1999 through 2015 as part of the Perennial Streams Assessment, Reference Condition Management Program, Southern Stormwater Monitoring Coalition, U.S. Forest Service, and Regional Board Bioassessment Monitoring Programs. Accessed: July 2020. Available online: https://www.waterboards.ca.gov/water_issues/programs/swamp/bioassessment/csci_scores_map.html.

Watz, J., E. Bergman, O. Calles, A. Enefalk, S. Gustafsson, A. Hagelin, P.A. Nilsson, J.R. Norrgard, D. Nyqvist, E.M. Osterling, J.J. Piccolo, L.D. Schneider, L. Greenberg, and B. Jonsson. 2015. “Ice cover alters the behavior and stress level of brown trout *Salmo trutta*.” *Behavioral Ecology* 26(3):820–827.

7.5.4. Botanical Resources

Cal-IPC (California Invasive Plant Council). 2020. Cal-IPC Inventory. Berkeley, CA. Accessed: June 28, 2020. Available online: https://www.cal-ipc.org/plants/inventory/.

CCH (Consortium of California Herbaria). 2021. Consortium of California Herbaria. Data provided by the participants of the Consortium of California Herbaria for special status plant species. Regents of the University of California. Berkeley. Accessed: April 27, 2021. Available online: http://ucjeps.berkeley.edu/consortium/.

CDFW (California Department of Fish and Wildlife). 2020. California Natural Diversity Database. CDFW, Natural Heritage Division. Sacramento, CA. Accessed: November 9, 2020. Available online: https://wildlife.ca.gov/data/cnddb.

______. 2021. *Special Vascular Plants, Bryophytes, and Lichens List.* CDFW, Natural Heritage Division. Sacramento, CA. April. Accessed: June 2021. Available online: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109383&inline.

CNPS (California Native Plant Society). 2020. Inventory of Rare and Endangered Plants (online edition, v8-03 0.39). CNPS Rare Plant Program. Sacramento, CA. Accessed: June 2, 2020. Available online: http://www.rareplants.cnps.org.

FERC (Federal Energy Regulatory Commission). 1990. *Environmental Assessment of Potential Cumulative Impacts Associated with Hydropower Development in the Mono Lake Basin, California.* FERC Nos. 1388, 1389, 1390, 3259, and 3272. FERC Office of Hydropower Licensing. Washington, D.C.

INF (Inyo National Forest). 2019. *Persistence Analysis for Species of Conservation Concern, Inyo National Forest*. Inyo National Forest, Region 5 Regional Office, and Washington Office Enterprise Program.

Jepson Flora Project. 2020. Jepson eFlora. The Jepson Herbarium. Regents of the University of California. Berkeley. December, Revision 8. Accessed: June 28, 2020. Available online: https://ucjeps.berkeley.edu/eflora/.

NRM – TESP/IS (Natural Resources Manager – Threatened, Endangered, and Sensitive Plants/Invasive Species). 2018. Botany At Risk Species and Invasive Species Inventory Database. Obtained from Inyo National Forest Staff on February 16, 2021. USDA Forest Service, Inyo National Forest. Bishop, CA. April.

Psomas. 2010. *Biological Resources Evaluation Technical Report for the Southern California Edison South Lake Dam, Agnew Lake Dam, Saddlebag Lake Dam, and Tioga Lake Dam, and Auxiliary Dam Maintenance and Geo-Membrane Lining Projects.* Prepared for: Southern California Edison, Eastern Hydro Division, San Dimas, CA. Santa Ana, CA.

______. 2013. *Summary of Biological Resources Determination of No Effect on Listed Species for Southern California Edison Company's Tioga Lake Dams Geomembrane Liner Installation Project, Mono County, California*. Santa Ana, CA.

Read, E. 2012. *Lee Vining Creek (FERC No. 1388), Riparian, Aquatic Habitat, and Fish Population Monitoring: Phase 2 (Year 2) Compared to Baseline and 2006.* Prepared for Southern California Edison Co. Orange, CA. February 28.

______. 2017. *Lee Vining Creek (FERC No. 1388), Riparian Monitoring Phase 2 Year 3 (2016) Compared to Previous Years.* Prepared for Southern California Edison Company. Orange, CA. February 13.

USFS (U.S. Forest Service). No Date. *Vegetation Classification & Mapping*. CALVEG Mapping Zones. Accessed: July 2021. Available online: https://www.fs.usda.gov/detail/r5/landmanagement/resourcemanagement/?cid=stelprdb5347192.

______. 2019. *Land Management Plan for the Inyo National Forest. Fresno, Inyo, Madera, Mono and Tulare Counties, California; Esmeralda and Mineral Counties, Nevada*. R5-MB-323a. Pacific Southwest Region. September. Accessed: August 24, 2020. Available online: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd664404.pdf.

______. 2020a. Geospatial Data on Vegetation Communities. Obtained from Inyo National Forest Staff on February 16, 2021. Pacific Southwest Region 5. Vallejo, CA.

______. 2020b. Whitebark Pine Range. Pacific Southwest Region 5 State Level Datasets. U.S. Department of Agriculture, Forest Service. January 29. Accessed: May 2021. Available online: https://www.fs.usda.gov/detail/r5/landmanagement/gis/?cid=STELPRDB5327836

7.5.5. Wildlife Resources

AmphibiaWeb. 2020. Species Account for *Batrachoseps robustus*. University of California, Berkeley, CA. Accessed: August 24, 2020. Available online: http://amphibiaweb.org.

Anderson, A., and O. Wallmo. 1984. *Odocoileus hemionus*. Mammalian Species No 219. *American Society of Mammalogists,* 9 pp.

Best, T.L. 1996. *Lepus californicus*. Mammalian Species No. 530. *American Society of Mammalogists*. 10 pp.

Billerman, S.M., B.K. Keeney, P.G. Rodewald, and T.S. Schulenberg (Eds). 2020. *Birds of the World*. Cornell Laboratory of Ornithology, Ithaca, NY, USA. Accessed: August 2020. Available online: https://birdsoftheworld.org/bow/home.

Blood, B.R. 2018. *Guide to the Terrestrial Mammals of Southern California*. Unpublished manuscript. Research Associate in Mammalogy, Natural History Museum of Los Angeles County.

CaliforniaHerps.com. 2020a. California Snakes Range Maps: A Guide to the Amphibians and Reptiles of California. July 1. Accessed: August 2020. Available online: http://www.californiaherps.com/snakes/snakesmaps.html.

______. 2020b. California Lizards Range Maps: A Guide to the Amphibians and Reptiles of California. July 1. Accessed: August 2020. Available online: http://www.californiaherps.com/lizards/lizardsmaps.html.

CDFW (California Department of Fish and Wildlife). 2018. *2018-2019 California Waterfowl & Upland Game Hunting Regulations*. Public Use of Department Lands. Effective July 1, 2018–June 20, 2019.

_____. 2019. *Special Animals List.* Sacramento, CA: CDFW, Natural Heritage Division. August.

_____. 2020a. California Natural Diversity Database (CNDDB) RareFind 5. Commercial Version, Biogeographic Data Branch. Accessed: April 20, 2020. Available online: https://wildlife.ca.gov/data/cnddb.

_____. 2020b. California Wildlife Habitat Relationships System (CWHR) Life History Accounts and Range Maps. Biogeographic Data Branch. Sacramento, CA: CDFW Biogeographic Data Branch (BDB). Accessed: August 2020. Available online: https://wildlife.ca.gov/Data/CWHR/Life-History-and-Range.

_____. 2020c. California Mammal Hunting Regulations. Accessed: August 2020. Available online: http://www.eregulations.com/california/hunting/mammal/.

_____. 2021. Memo to SCE FERC Relicensing Terrestrial Working Group: CDFW's Inland Desert Region 6 High Mountain Lakes Project. Bishop, CA: CDFW Bishop Field Office.

INF (Inyo National Forest). 2019. *Persistence Analysis for Species of Conservation Concern, Inyo National Forest*. Inyo National Forest, Region 5 Regional Office, and Washington Office Enterprise Program. September.

_____. 2020. *At-Risk Aquatic and Terrestrial Species on Inyo National Forest*. January 1, 2020. Unpublished list maintained by the Inyo National Forest. USDA Forest Service.

Lariviere, S. 2001. *Ursus americanus*. Mammalian Species No. 647. *American Society of Mammalogists*. 11 pp.

Psomas. 2006. *Determination of No Effect on Listed Species for Maintenance Activities to Rhinedollar Dam, Southern California Edison Company's Lee Vining Creek Hydro Project, Mono County, CA*. Psomas: Santa Ana, CA.

_____. 2010. *Biological Resources Evaluation Technical Report for the Southern California Edison South Lake Dam, Agnew Lake Dam, Saddlebag Lake Dam, and Tioga Lake Dam, and Auxiliary Dam Maintenance and Geo-Membrane Lining Projects.* Prepared for: Southern California Edison, Eastern Hydro Division, San Dimas, CA. Santa Ana, CA.

_____. 2013. *Summary of Biological Resources Determination of No Effect on Listed Species for Southern California Edison Company's Tioga Lake Dams Geomembrane Liner Installation Project, Mono County, California*. Santa Ana, CA.

_____. 2014. Focused Survey Field Notes from Tanessa Hartwig for Tioga Lake Geomembrane Project. July 23. Internal copy of staff field notes.

_____. 2018. *Rodent Control Report and Plan for Hydroelectric Projects at Bishop Creek, Inyo County, and Lee Vining Creek, Mono County, California*. September 26 Letter to SCE. Psomas: Santa Ana, CA.

SCE (Southern California Edison Company). 2015. *Avian Protection Plan*. SCE-EHS-ENVIRO-PL-1.

Shuford, W.D., and T. Gardali, Eds. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Spencer, W., and H. Rustigian-Romsos. 2012. *Decision-Support Maps And Recommendations for Conserving Rare Carnivores In the Interior Mountains of California*. Conservation Biology Institute. August.

USFS (U.S. Forest Service). 2001. *Ansel Adams, John Muir, and Dinkey Lakes Wilderness Management Plan, Final Environmental Impact Statement, Inyo and Sierra National Forests.* Biological Assessment/Biological Evaluation. Accessed: August 2020. Available online: https://www.fs.usda.gov/detailfull/inyo/landmanagement/planning/?cid=FSBDEV3_003888&width=full.

_____. 2019. *Land Management Plan for the Inyo National Forest. Fresno, Inyo, Madera, Mono and Tulare Counties, California; Esmeralda and Mineral Counties, Nevada*. R5-MB-323a. Pacific Southwest Region. September. Accessed: August 24, 2020. Available online: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd664404.pdf.

USFWS (U.S. Fish and Wildlife Service). 2015. Birds of Conservation Concern. Last Updated: September 25. Accessed: August 2020. Available online: https://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php.

_____. 2016. *Final Species Report, Fisher (*Pekania pennanti*), West Coast Population*. March. USFWS.

_____. 2017. *California spotted owl (*Strix occidentalis occidentalis*) Conservation Objectives Report*. USFWS, Sacramento Fish and Wildlife Office, Sacramento, CA. October 2017.

_____. 2020a. IPaC resource list [for the Project Area]. April 10. Accessed: August 2020. Available: https://ecos.fws.gov/ipac/location/index.

_____. 2020b. Endangered and Threatened Wildlife and Plants; Endangered Species Status for Southern Sierra Nevada Distinct Population Segment of Fisher. *Federal Register* Vol. 85, No. 95: 29532. Washington, D.C.: USFWS. May 15.

Young, S.P. 1958. *The Bobcat of North America, Its History, Life Habits, Economic Status and Control, with List of Currently Recognized Subspecies*. Washington, D.C: The Wildlife Management Institute.

Zielinski, W.J., R.L. Truex, G. Schmidt, R. Schlexer, K.N. Schmidt, and R.H. Barrett. 2004. “Home range characteristics of fishers in California.” *Journal of Mammalogy* 85(4):649–657.

7.5.6. Wetland, Riparian, and Littoral Habitat

FGDC (Federal Geographic Data Committee). 2013. *Classification of Wetlands and Deepwater Habitats of the United States*. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, D.C.

USFWS (U.S. Fish and Wildlife Service). 2020. Wetlands Mapper. Washington D.C.: USFWS, National Wetlands Inventory. Accessed: July 2020. Available online: http://www.fws.gov/wetlands/Data/Mapper.html.

7.5.7. Rare, Threatened, and Endangered Species

Amberson, J., M. Keville, and C. Nelson. 2018. “Effects of Disturbance on Tree Community Dynamics in Whitebark Pine (*Pinus albicaulis* Engelm.) Ecosystems.” *Forests* 9:566.

Brown, C., M.P. Hayes, G.A. Green, and D.C. Macfarlane. 2014. *Mountain Yellow-legged Frog Conservation Assessment for the Sierra Nevada Mountains of California, USA, A Collaborative Inter-Agency Project.* USDA Forest Service, Pacific Southwest Region: Vallejo, CA. R5-TP-038. July.

Brown, C., M.P. Hayes, G.A. Green, D.C. Macfarlane, and A.J. Lind. 2015. *Yosemite Toad Conservation Assessment, A Collaborative Inter-Agency Project.* USDA Forest Service, Pacific Southwest Region: Vallejo, CA. R5-TP-040. January.

Calflora. 2020. Information on California plants for education, research, and conservation, with data contributed by public and private institutions and individuals, including the Consortium of California Herbaria. The Calflora Database [a non-profit organization]. Berkeley, California. Accessed: June 23, 2020. Available online: https://www.calflora.org/.

CDFW (California Department of Fish and Wildlife). 2019. *Special Animals List.* Sacramento, CA: CDFW, Natural Heritage Division. August.

_____. 2020a. *State and Federally Listed Endangered, Threatened, and Rare Plants of California*. State of California, Natural Resources Agency, Department of Fish and Wildlife, Biogeographic Data Branch, California Natural Diversity Database (CNDDB). January 2.

_____. 2020b. California Natural Diversity Database (CNDDB) RareFind 5. Commercial Version, Biogeographic Data Branch. Accessed: April 20, 2020. Available online: https://wildlife.ca.gov/data/cnddb.

_____. 2020c. California Wildlife Habitat Relationships System (CWHR) Life History Accounts and Range Maps. Sacramento, CA: CDFW Biogeographic Data Branch (BDB). Accessed: June 2021. Available online: https://wildlife.ca.gov/Data/CWHR/Life-History-and-Range.

_____. 2021. Memo to SCE FERC Relicensing Terrestrial Working Group: CDFW's Inland Desert Region 6 High Mountain Lakes Project. Bishop, CA: CDFW Bishop Field Office.

Dolanc, C.R., J.H. Thorne, and H.D. Safford. 2012. "Widespread shifts in the demographic structure of subalpine forests in the Sierra Nevada, California, 1934 to 2007." *Global Ecology and Biogeography* 22:264–276. Blackwell Publishing Ltd.

Environment and Climate Change Canada. 2017. *Recovery Strategy for the Whitebark Pine (*Pinus albicaulis*) in Canada* [Proposed]. Species at Risk Act Recovery Strategy Series. Environment and Climate Change Canada, Ottawa. viii + 54 pp.

FERC (Federal Energy Regulatory Commission). 1992. *Final Environmental Assessment for Hydropower License*. Lee Vining FERC Project No. 1388-001. California. Federal Energy Regulatory Commission, Office of Hydropower Licensing, Washington, D.C. December 30.

Flanary, S.J., and R.E. Keane. 2019. "Whitebark pine encroachment into lower-elevation sagebrush grasslands in southwest Montana, USA." *Fire Ecology* 15: 42.

Goeking, S.A., D.K. Izlar, and T.C. Edwards, 2019. "A Landscape-Level Assessment of Whitebark Pine Regeneration in the Rocky Mountains, USA." *Forest Science* 65(1):87-99.

INF (Inyo National Forest). 2019. *Persistence Analysis for Species of Conservation Concern Inyo National Forest.* Inyo National Forest, Region 5 Regional Office, and Washington Office Enterprise Program.

Jules, E.S., J.I. Jackson, P.J. van Mantgem, J.S. Beck, M.P. Murray, and E A. Sahara. 2016. "The relative contributions of disease and insects in the decline of a long-lived tree: a stochastic demographic model of whitebark pine (*Pinus albicaulis*)." *Forest Ecology and Management* 381:144–156.

Keane, R.E., D.F. Tomback, C.A. Aubry, A.D. Bower, E.M. Campbell, C.L. Cripps, M.B. Jenkins, M.F. Mahalovich, M. Manning, S.T. McKinney, M.P. Murray, D.L. Perkins, D.P. Reinhart, C. Ryan, A.W. Schoettle, and C.M. Smith. 2012. *A Range-Wide Restoration Strategy for Whitebark Pine* (*Pinus albicaulis)*. General Technical Report RMRS-GTR-279. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 108 p.

Keane, R.E., S.F. Arno, J.K. Brown, D.F. Tomback. 1990. "Modeling stand dynamics in whitebark pine (*Pinus albicaulis*) forests." *Ecological Modeling* 51(1–2):73–95.

Leirfallom, S.B., R.E. Keane, D.F. Tomback, and S.Z. Dobrowski. 2015. "The effects of seed source health on whitebark pine (*Pinus albicaulis)* regeneration density after wildfire." *Canadian Journal of Forest Research* 45:1597–1606.

Lind, B.M., C.J. Friedline, J.L. Wegrzyn, P.E. Maloney, D.R. Vogler, D.B. Neale, and A.J. Eckert. 2017. "Water availability drives signatures of local adaptation in whitebark pine (*Pinus albicaulis* Engelm) across fine spatial scales of the Lake Tahoe Basin, USA." *Mol Ecol* 26:3168–3185. doi:10.1111/mec.14106.

Liu, J., H. Williams, X.R. Li., A.W. Schoettle, R.A. Sniezko, M. Murray, A. Zamany, G. Roke, and H. Chen. 2017. "Profiling methyl jasmonate-responsive transcriptome for understanding induced systemic resistance in whitebark pine (*Pinus albicaulis*)." *Plant Mol Biol* 95:359–374. Accessed: August 2020. Available online: https://doi.org/10.1007/s11103-017-0655-z.

Loehman, R.A., R.E. Keane, L.M. Holsinger, and Z. Wu. 2017. "Interactions of landscape disturbances and climate change dictate ecological pattern and process: spatial modeling of wildfire, insect, and disease dynamics under future climates." *Landscape Ecology* 32:1447–1459.

Maloney, P.E. 2014. "The multivariate underpinnings of recruitment for three *Pinus* species in montane forests of the Sierra Nevada, USA." *Plant Ecol* 215:261–274. Accessed: June 2021. Available online: https://doi.org/10.1007/s11258-013-0295-6.

Martin, D.L. 2008. *Decline, Movement and Habitat Utilization of the Yosemite Toad (Bufo canorus): An Endangered Anuran Endemic to the Sierra Nevada of California*. Santa Barbara, CA: University of California.

McLane, S.C., and S.N. Aitken. 2012. "Whitebark pine (*Pinus albicaulis*) assisted migration potential: testing establishment north of the species range." *Ecological Applications* 22(1):142–153. doi:10.1890/11-0329.1.

Meyer, M.D., B. Bulaon, M. MacKenzie, and H.D. Safford. 2016. "Mortality, structure, and regeneration in whitebark pine stands impacted by mountain pine beetle in the southern Sierra Nevada." *Canadian Journal of Forest Research* 46(4):572–581. Accessed: June 2021. Available online: https://doi.org/10.1139/cjfr-2015-0464.

Millar, C.I., R.D. Westfall, D.L. Delany, M.J. Bokach, A.L. Flint, and L.E. Flint. 2012. "Forest mortality in high-elevation whitebark pine (*Pinus albicaulis*) forests of eastern California, USA; influence of environmental context, bark beetles, climatic water deficit, and warming." *Canadian Journal of Forest Research* 42(4): 749–765. Accessed: August 2020. Available online: https://doi.org/10.1139/x2012-031.

Moyle, P.B. 2002. *Inland Fishes of California.* Berkeley: University of California Press.

NRDC (National Resource Defense Council). 2008. *A petition to list the whitebark pine,* Pinus albicaulis, *as an endangered species under the Endangered Species Act.* Accessed: August 2020. Available online: https://www.fws.gov/nevada/nv_species/documents/whitebp/NRDCPetitionWhitebarkPine12082008.pdf.

Pansing, E.R., and D.F. Tomback. 2019. "Survival of Whitebark Pine Seedlings Grown from Direct Seeding: Implications for Regeneration and Restoration under Climate Change." *Forests* 10(8):677.

Psomas. 2006. *Determination of No Effect on Listed Species for Maintenance Activities to Rhinedollar Dam, Southern California Edison Company's Lee Vining Creek Hydro Project, Mono County, CA*. Psomas: Santa Ana, CA.

_____. 2010. *Biological Resources Evaluation Technical Report for the Southern California Edison South Lake Dam, Agnew Lake Dam, Saddlebag Lake Dam, and Tioga Lake Dam, and Auxiliary Dam Maintenance and Geo-Membrane Lining Projects.* Prepared for: Southern California Edison, Eastern Hydro Division, San Dimas, CA. Santa Ana, CA.

_____. 2013. *Summary of Biological Resources Determination of No Effect on Listed Species for Southern California Edison Company's Tioga Lake Dams Geomembrane Liner Installation Project, Mono County, California*. Santa Ana, CA.

_____. 2014. Focused Survey Field Notes from Tanessa Hartwig for Tioga Lake Geomembrane Project. Internal copy of staff field notes, July 23.

_____. 2018. *Rodent Control Report and Plan for Hydroelectric Projects at Bishop Creek, Inyo County, and Lee Vining Creek, Mono County, California.* September 26 Letter to SCE. Psomas: Santa Ana, CA.

Read, E. 2017. *Lee Vining Creek (FERC No. 1388), Riparian Monitoring Phase 2 Year 3 (2016) Compared to Previous Years.* Prepared for Southern California Edison Company. Orange, CA. February 13.

Retzlaff, M., R. Keane, D. Affleck, and S. Hood. 2018. "Growth Response of Whitebark Pine (*Pinus albicaulis* Engelm) Regeneration to Thinning and Prescribed Burn Treatments." *Forests* 9(6):311.

Salamunovich, T. 2017. *Fall 2016 Fish Population Survey, Upper Lee Vining Creek, Mono County, California*. Draft Report. Prepared for E Read & Associates Inc. by Normandeau Associates, Arcata, California. February 13.

Slaton, M.R., M. MacKenzie, T. Kohler, and C.M. Ramirez. 2019. "Whitebark Pine Recruitment in Sierra Nevada Driven by Range Position and Disturbance History." *Forests* 10(5):455.

Spencer, W., and H. Rustigian-Romsos. 2012. *Decision-Support Maps And Recommendations for Conserving Rare Carnivores In the Interior Mountains of California*. Conservation Biology Institute. August.

Statham, M.J., A.C. Rich, S.K. Lisius, and B.N. Sacks. 2012. "Discovery of a Remnant Population of Sierra Nevada Red Fox (*Vulpes Vulpes Necator*)." *Northwest Science* 86(2):122–132.

USFS (U.S. Forest Service). 2001. *Ansel Adams, John Muir, and Dinkey Lakes Wilderness Management Plan, Final Environmental Impact Statement, Inyo and Sierra National Forests.* Biological Assessment/Biological Evaluation. Accessed: August 2020. Available online: https://www.fs.usda.gov/detailfull/inyo/landmanagement/planning/?cid=FSBDEV3_003888&width=full.

USFWS (U.S. Fish and Wildlife Service). 1985. Endangered Status and Critical Habitat Designation for the Owens Tui Chub. 50 *Federal Register* 31592. Final Rule. Monday, August.

_____. 2004. *Revised Recovery Plan for the Paiute Cutthroat Trout* (*Oncorhynchus clarki seleniris*). Region 1. Portland, Oregon. ix + 105 pp.

_____. 2007. *Recovery Plan for the Sierra Nevada Big Horn Sheep*. California/Nevada Operations Office. Sacramento, CA. xiv + 199 pages.

_____. 2008a. Endangered and Threatened Wildlife and Plants; 90-Day Finding on a Petition to Delist the Lahontan Cutthroat Trout. 50 *Federal Register* 52257. Tuesday, September.

_____. 2008b. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Sierra Nevada Bighorn Sheep (*Ovis canadensis sierrae*) and taxonomic revision. *Federal Register*, Vol. 73, No. 151: 45534–45604. August 5.

_____. 2011. Endangered and threatened wildlife and plants, 12-month finding on a petition to list *Pinus albicaulis* as endangered or threatened with critical habitat. *Federal Register,* Vol. 76, No. 138: 42631–42654.

_____. 2014. *Programmatic Biological Opinion on Nine Forest Programs on Nine National Forests in the Sierra Nevada of California for the Endangered Sierra Nevada Yellow-legged Frog, Endangered Northern Distinct Population Segment of the Mountain Yellow-legged Frog, and Threatened Yosemite Toad.* Sacramento, CA. December 19.

_____. 2016a. *Final Species Report, Fisher* (*Pekania pennanti*), *West Coast Population.* USFWS. March.

_____. 2016b. Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for the Sierra Nevada Yellow-Legged Frog, the Northern DPS of the Mountain Yellow-legged Frog, and the Yosemite Toad: Final Rule. *Federal Register,* Vol. 81, No. 166: 59046–59119. August 26.

_____. 2019. Endangered and Threatened Species: Review of Domestic and Foreign Species that are Candidates for Listing as Endangered or Threatened, etc. Regulations.gov. October 9. Accessed: August 2020. Available online: https://www.regulations.gov/document?D=FWS-HQ-ES-2019-0009-0001.

_____. 2020a. IPaC resource list [for the Project Area]. April 10. Accessed: April 2020. Available online: https://ecos.fws.gov/ipac/location/index.

_____. 2020b. Endangered and Threatened Wildlife and Plants; Endangered Species Status for Southern Sierra Nevada Distinct Population Segment of Fisher. *Federal Register,* Vol. 85, No. 95: 29532. Washington, D.C.: USFWS. May 15.

Zielinski, W.J., R.L. Truex, G. Schmidt, R. Schlexer, K.N. Schmidt, and R.H. Barrett. 2004. “Home range characteristics of fishers in California.” *Journal of Mammalogy* 85(4):649–657.

7.5.8. Recreation Resources

Adventure Projects, Inc. 2021. “Map of Lee vining area showing approach hike.” Mountain Project. Accessed: June 2021. Available online: https://www.mountainproject.com/photo/107490759.

Barnett, Adam (U.S. Forest Service). 2021. Email communication with Matthew Harper (Kleinschmidt Associates, Inc.) regarding Inyo National Forest Wilderness Permit data. May 20, 2021.

CDFW (California Department of Fish and Wildlife). 2020a. Fishing Guide. Accessed: August 2020. Available online: https://apps.wildlife.ca.gov/fishing/.

______. 2020b. Designated Wild and Heritage Trout Waters. Accessed: August 2020. Available online: https://www.wildlife.ca.gov/fishing/inland/trout-waters.

CDOT (California Department of Transportation). 2020. California Wild and Scenic River System. Accessed: August 2020. Available online: https://dot.ca.gov/programs/environmental-analysis/standard-environmental-reference-ser/volume-1-guidance-for-compliance/ch-19-wild-scenic-rivers#CWSRS.

CDPR (California Department of Parks and Recreation). 2013. *Outdoor Recreation in California's Regions 2013*. California Department of Parks and Recreation, Sacramento, CA.

______. 2014. *2012 Survey on Public Opinions and Attitudes on Outdoor Recreation in California Complete Findings*. California Department of Parks and Recreation, Sacramento, CA.

______. 2015. *Meeting the Park Needs of All Californians, 2015 Statewide Comprehensive Outdoor Recreation Plan*. California Department of Parks and Recreation, Sacramento, CA. Accessed: October 2020. Available online: http://reports.parksforcalifornia.org/2015scorp/.

FERC (Federal Energy Regulatory Commission). 1992. *Final Environmental Assessment for Hydropower License*. Lee Vining FERC Project No. 1388-001. California. Federal Energy Regulatory Commission, Office of Hydropower Licensing, Washington, D.C. December 30.

IWSRCC (Interagency Wild and Scenic Rivers Coordinating Council). 2020. National Wild and Scenic Rivers System. Accessed: August 2020. Available online: https://www.rivers.gov.

NPS (National Park Service). 2020a. Park Statistics. Accessed: August 2020. Available online: https://www.nps.gov/yose/learn/management/statistics.htm.

_____. 2020b. Plan Your Visit: Historical Seasonal Opening and Closing Dates. Accessed: August 2020. Available online: https://www.nps.gov/yose/planyourvisit/seasonal.htm.

REI (Recreational Equipment, Inc.). 2020. Mountain Project. Accessed: August 2020. Available online: https://www.mountainproject.com/.

SLR (Saddlebag Lake Resort). 2020. Saddlebag Lake Resort Website. Accessed: August 2020. Available online: http://www.saddlebaglakeresort.com/index.html.

USFS (U.S. Forest Service). 2016. *Draft Revised Land Management Plan for the Inyo National Forest*. Pacific Southwest Region. R5-MB-294. Accessed: October 2020. Available online: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd591054.pdf.

_____. 2018a. *Visitor Use Report*. Inyo NF, USDA Forest Service, Region 5, National Visitor Use Monitoring Data collected FY 2016. United States Department of Agriculture.

_____. 2018b. National Forest System Trails GIS layer. Obtained from Inyo National Forest Staff on August 28, 2018.

_____. 2019. *Land Management Plan for the Inyo National Forest. Fresno, Inyo, Madera, Mono and Tulare Counties, California; Esmeralda and Mineral Counties, Nevada*. R5-MB-323a. Pacific Southwest Region. September. Accessed: August 24, 2020. Available online: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd664404.pdf.

_____. 2020a. *Inyo National Forest Visitors Guide*. Accessed: June 2021. Available online: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd550643.pdf.

_____. 2020b. Campground Camping. Accessed: June 2021. Available online: https://www.fs.usda.gov/activity/inyo/recreation/camping-cabins/?recid=20228&actid=29.

_____. 2020c. Wilderness Areas. Accessed: June 2021. Available online: https://www.fs.usda.gov/recarea/inyo/recreation/recarea/?recid=26204.

7.5.9. Land Use

CAL FIRE (California Department of Forestry and Fire Protection). 2013. *State Responsibility Area and Facilities.* Accessed: July 2020. Available online: https://www.fire.ca.gov/media/2136/facilities_sra_map.pdf.

______. 2020a. Cooperative Efforts. Accessed: July 2020. Available online: https://www.fire.ca.gov/programs/fire-protection/cooperative-efforts/.

______. 2020b. Fire Perimeters and SRA/FRA/LRA GIS Data. Accessed: July 2020. Available online: https://frap.fire.ca.gov/mapping/gis-data/.

Kleinschmidt Associates. 2018. *Fire Suppression Plan – June Action Item*. Memorandum. Dated August 8, 2018. Sent to Bishop Creek Technical Work Group Members.

Mono County. 2020. *Mono County General Plan. Mono County Planning Division, Mammoth Lakes, CA*. Accessed: August 24, 2020. Available online: https://monocounty.ca.gov/planning/page/general-plan.

MRLC Consortium (Multi-Resolution Land Characteristic Consortium). 2016. Multi-Resolution Land Characteristics Consortium. Accessed: August 24, 2020. Available online: https://www.mrlc.gov.

USFS (U.S. Forest Service). 2019. *Land Management Plan for the Inyo National Forest. Fresno, Inyo, Madera, Mono and Tulare Counties, California; Esmeralda and Mineral Counties, Nevada*. R5-MB-323a. Pacific Southwest Region. September. Accessed: August 24, 2020. Available online: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd664404.pdf.

7.5.10. Aesthetic Resources

AllTrips. 2020. Mammoth Lakes California, Tioga Pass. Accessed: July 15, 2020. Available online: https://www.allmammoth.com/scenic_drives/tioga_pass.php.

MCC (Mono County California). 2020. California’s Eastern Sierra. Mono Lake. Accessed: July 15, 2020. Available online: https://www.monocounty.org/places-to-go/mono-lake/.

NFF (National Forest Foundation). 2020. Our Forests, Inyo National Forest. Accessed: July 15, 2020. Available online: https://www.nationalforests.org/our-forests/find-a-forest/inyo.

NPS (National Park Service). 2020. Visitation Numbers, 2019 by the Numbers. Last Updated: March 10, 2020. Accessed: July 15, 2020. Available online: https://www.nps.gov/aboutus/visitation-numbers.htm.

SNG (Sierra Nevada Geotourism). 2020. Lee Vining Canyon Scenic Byway. Accessed: July 15, 2020. Available online: https://sierranevadageotourism.org/entries/lee-vining-canyon-scenic-byway/2aedf156-ee52-401a-8a58-58f277e1310e.

USDA (United States Department of Agriculture). 1989. *Mono Basin National Forest Scenic Area Comprehensive Management Plan*. Inyo National Forest, United States Department of Agriculture, Pacific Southwest Region. Accessed: August 20, 2020. Available online: https://www.monobasinresearch.org/images/legal/scenicareacmp.pdf.

USDOT (U.S. Department of Transportation, Federal Highway Administration). n.d. Tioga Road/Big Oak Flat Road. Accessed: June 10, 2021. Available online: https://www.fhwa.dot.gov/byways/byways/2302.

USFS (U.S. Forest Service). 2015. *FSH 1909.12 - Land Management Planning Handbook, Chapter 20 – Land Management Plan*. Accessed: June 2021.

Available online: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd567391.pdf.

_____. 2019. *Land Management Plan for the Inyo National Forest. Fresno, Inyo, Madera, Mono and Tulare Counties, California; Esmeralda and Mineral Counties, Nevada*. R5-MB-323a. Pacific Southwest Region. September. Accessed: August 24, 2020. Available online: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd664404.pdf.

_____. 2020a. Inyo National Forest. Accessed: July 15, 2020. Available online: https://www.fs.usda.gov/main/inyo/.

_____. 2020b. Inyo National Forest, Wilderness Areas. Accessed: July 15, 2020. Available online: https://www.fs.usda.gov/recarea/inyo/recarea/?recid=26204.

7.5.11. Cultural Resources

Ali, Guleed Ahmned Hussein. 2018. Late Glacial and Deglacial Fluctuations of Mono Lake, California. Unpublished dissertation, Graduate School of Arts and Science, Columbia University.

Antevs, E. 1948. “Climatic Changes and Pre-white Man.” *University of Utah Bulletin* 38:168–191.

Arkush, Brooke S. 1995. *The Archaeology of CA-MNO-2122: A Study of Pre-Contact and Post-Contact Lifeways Among the Mono Basin Paiute.* Anthropological Records 31. University of California Press, Berkeley and Los Angeles.

Basgall, M.E. 1983. *Archaeology of the Forest Service Forty Site (CA-MNO-529), Mono County, California*. On file, U.S. Department of Agriculture, Inyo National Forest, Bishop, California.

_____. 1987. “Paleoindian Occupation in Central-Eastern California: the Komodo Site.” *Current Research in the Pleistocene* 4:50–54.

_____. 1988. Archaeology of the Komodo Site, an Early Holocene Occupation in Central-Eastern California. *Early Human Occupation in Far Western North America: The Clovis-Archaic Interface.* Edited by J.A. Willig, C.M. Aikins, and J.L. Fagan, pp. 103-119. Nevada State Anthropological Papers, 21, Carson City.

_____. 1989. “Obsidian Acquisition and Use in Prehistoric Central-eastern California,” in *Current Directions in California Obsidian Studies*, edited by R.E. Hughes, pp. 111–126. Contributions of the University of California Archaeological Research Facility 45, Berkeley.

_____. 1991. *The Archaeology of Nelson Basin and Adjacent Areas, Fort Irwin, San Bernardino County, California*. Submitted to U.S. Army Corps of Engineers, Los Angeles, California.

_____. 1998. *Phase II Evaluation of Archaeological Site CA-MNO-1977, on the Little Walker River, Mono County, California*. Archaeological Research Center, Technical Report 5. Institute of Archaeology and Cultural Studies, Department of Anthropology, California State University, Sacramento. Submitted to Sierra Environmental Analysis Branch Caltrans District 6, Fresno, California.

_____. 2009. “Understanding Pre-Newberry Prehistory in the Inyo-Mono Region.” *California Archaeology* 1(2):303-304.

Basgall, M.E., and M.A. Giambastiani. 1995. Prehistoric Use of a Marginal Environment: Continuity and Change in Occupation of the Volcanic Tablelands, Mono and Inyo Counties, California. Center for Archaeological Research at Davis Publications 12. University of California, Davis.

Basgall, M.E., and K.R. McGuire. 1988. *The Archaeology of CA-INY-30: Prehistoric Culture Change in the Southern Owens Valley, California*. Submitted to California Department of Transportation, Sacramento.

Bettinger, R.L. 1977. “Aboriginal Human Ecology in Owens Valley: Prehistoric Change in the Great Basin.” *American Antiquity* 42(1):3-17.

_____. 1981. *Archaeology of the Lee Vining Site, FS# 05-04-51-219 (CA-MNO-446), Mono County, California.* Department of Anthropology, University of California, Davis, and Far Western Anthropology Research Group, Inc., Davis, California. Submitted to U.S. Department of Agriculture Forest Service, Inyo National Forest, Bishop, California.

_____. 1982. Aboriginal Exchange and Territoriality in Owens Valley, California. In *Contexts for Prehistoric Exchange*, edited by J. Ericson and T. Earle. New York: Academic Press.

_____. 1989. “The Archaeology of Pinyon House, Two Eagles, and Crater Middens: Three Residential Sites in Owens Valley, Eastern California.” Anthropological Papers of the American Museum of Natural History 67, New York.

_____. 1999a. “From Traveler to Processor: Regional Trajectories of Hunter-Gatherer Sedentism in the Inyo-Mono Region, California.” In *Settlement Pattern Studies in the Americas: Fifty Years Since Viru*, edited by B.R. Billman and G.M. Feinman, pp. 39-55. Washington, D.C.: Smithsonian Institution Press.

_____. 1999b. “What Happened in the Medithermal.” In *Models for the Millennium: The Current Status of Great Basin Anthropology*, edited by C. Beck, pp. 62-74. Salt Lake City: University of Utah Press.

Bettinger, R. L., and M. A. Baumhoff. 1982. “The Numic Spread: Great Basin Cultures in Competition.” *American Antiquity* 47:485-503.

Bettinger, R. L., and T. F. King. 1971. “Interaction and Political Organization: A Theoretical Framework for Archaeology in Owens Valley, California.” *Annual Reports of the University of California Archaeological Survey* 13:139-150. Los Angeles.

Bettinger, R. L., and R. E. Taylor. 1974. “Suggested Revisions in Archaeological Sequences of the Great Basin in Interior Southern California.” *Nevada Archaeological Survey Research Papers* 5:1-26.

Bieling, D. G. 1992. Perspectives on Behavior Gained from Lithic Analysis and Archaeological Investigations Near Bridgeport, Mono County, California. Master’s thesis, Department of Cultural resources management, Sonoma State University, Rohnert Park, California.

Cain, Ella M. 1961. *The Story of Early Mono County. Its Settlers, Gold Rushes, Indians, Ghost Towns*. San Francisco: Fearon Publishers, Inc.

Carle, D., and D. Banta. 2008. *Images of America: Mono Lake Basin*. Charleston, South Carolina: Acadia Publishing.

Carpenter, Kimberley L. 2001. *Data Recovery Investigations at CA-MNO-891 and CA-MNO-2416/H.* Far Western Anthropological Research Group, Inc., Davis, California. Prepared for Caltrans District 9, Bishop, California.

Chappell, M. 1947. “Early History of Mono County.” C*alifornia Historical Society Quarterly* 26(3): 233–248. Accessed: July 15, 2020. Available online: https://online.ucpress.edu/ch/article/26/3/233/27843/Early-History-of-Mono-County.

Clay, V., and J. King. 2019. *Cultural Resources Survey of 1,992 Acres in the Bodie Hills and Conway Summit Area, Mono County, California*. Far Western Anthropological Research Group, Inc., Davis, California. Submitted to BLM Bishop Field Office/Inyo National Forest, Bishop, California.

Coleman, Drew S., Walt Gray, and Allen F. Glazner. 2004. “Rethinking the Emplacement and Evolution of Zoned Plutons: Geochronologic Evidence for Incremental Assembly of the Tuolumne Intrusive Suite, California.” *Geology* 32(5):433–436.

Cooper, David J., Jessica D. Lundquist, John King, Allen Flint, Evan Wolf, Fred C. Lott, and James Roche. 2006. *Effects of Tioga Road on Hydrologic Processes and Lodgepole Pine Invasion into Tuolumne Meadows, Yosemite National Park*. Submitted to Division of Resources Management and Science USDI National Park Service, Yosemite National Park.

Costello, J., and J. Marvin. 1983. Archaeological Site Record for CA-MNO-2764H. Prepared for Caltrans District 9, Bishop, California.

Davis, Emma Lou.1965. “An Ethnography of the Kuzedika Paiute of Mono Lake, Mono County, California.” University of Utah Anthropological Papers 75: 1-56.

Davis-King, Shelly, and James B. Snyder. 2010. *The Silver Thread: Upper Tuolumne River American Indian Land Use in Yosemite National Park: Ethnographic Context for the Tuolumne Wild and Scenic River Comprehensive Management Plan and Environmental Impact Statement, Tuolumne County, California*. Submitted to USDI, National Park Service, Yosemite National Park, California.

Delacorte, M. G. 1990. *The Prehistory of Deep Springs Valley, Eastern California: Adaptive Variation in the Western Great Basin*. Ph.D. dissertation, Department of Anthropology, University of California, Davis.

_____. 1999. The Changing Role of Riverine Environments in the Prehistory of the Central-Western Great Basin: Data Recovery Excavations at Six Prehistoric Sites in Owens Valley, California. Far Western Anthropological Research Group, Inc., Davis, California. Submitted to Caltrans District 9, Bishop, California.

Delacorte, M. G., and K. R. McGuire. 1993. *Report of Archaeological Test Evaluations at Twenty-Three Sites in Owens Valley, California*. Far Western Anthropological Research Group, Inc., Davis, California. Far Western Anthropological Research Group, Inc., Davis, California. Submitted to Contel of California Inc., and the Department of Interior, Bureau of Land Management, California Desert District, Ridgecrest, California.

Delacorte, M. G., M. C. Hall, and M. E. Basgall. 1995. *Final Report on the Evaluation of Twelve Archaeological Sites in the Southern Owens Valley, Inyo County, California.* Far Western Anthropological Research Group, Inc., Davis, California. Submitted to Caltrans District 9, Bishop, California.

Diamond, Valerie H. and Hicks, Robert A. 1988. *Historic Overview of the Rush Creek and Lee Vining Creek Hydroelectric Projects*. Project Managers: Dorothea Theodoratus and Clinton M. Blount. Submitted to Southern California Edison Company, Rosemead, California, by Theodoratus Cultural Research, Inc., Fair Oaks, California. August.

Eerkens, Jelmer W., and Jerome H. King. 2002. *Phase II Archaeological Investigations for the Sherwin Summit Rehabilitation Project, U.S. Highway 395, Inyo and Mono Counties, California.* Far Western Anthropological Research Group, Inc., Davis, California. Prepared for Central California Cultural Resources Branch, Caltrans District 06, Fresno, California.

Elston, R. G., D. Zeanah, and B. Codding. 2014. “Living Outside the Box: An Updated Perspective on Diet Breadth and Sexual Division of Labor in the Prearchaic Great Basin.” *Quaternary International* 352:200–211.

Ericson, J. E. 1982. “Production for Obsidian Exchange in California*.”* In *Contexts for Prehistoric Exchange*, edited by J. E. Ericson and T. K. Earle, pp. 129-148. New York: Academic Press.

Fredrickson, D. A. 1991. *Archaeological Evaluation of CA-MNO-2456, -2488, and -564, near Bridgeport, Mono County, California*. Anthropological Studies Center, Sonoma State University Academic Foundation, Rohnert Park, California. Prepared for Caltrans District 9, Bishop, California.

_____. 1998. *An Archaeological Evaluation of CA-MNO-566 and -2466, Huntoon Valley, Mono County, California*. Anthropological Studies Center, Sonoma State University Academic Foundation, Rohnert Park, California. Submitted to the California Department of Transportation, District 9, Bishop, California.

Giambastiani, M. A. 1998. *Phase II Evaluation of Archaeological Site CA-MNO-3018, Near Sonora Pass, Mono County, California*. Archaeological Research Center Technical Report 4. Institute of Archaeology and Cultural Studies, Department of Anthropology. California State University, Sacramento. Submitted to Southern Sierra Environmental Analysis Brach, Caltrans District 6, Fresno, California.

Gillespie, Alan R., and Paul H. Zehfuss. 2004. “Glaciations of the Sierra Nevada, California, USA*.”* In *Quaternary Glaciations - Extent and Chronology, Part II: North America*, edited by J. Ehlers, and P.L. Gibbard. *Developments in Quaternary Sciences*, Vol. 2 (Part B): 51–62. Amsterdam: Elsevier Science. Accessed: August 2020. Available online: https://doi.org/10.1016/S1571-0866(04)80185-4.

Gilreath, A. J. 1995. *Archaeological Evaluations of Thirteen Sites for the Ash Creek Project, Inyo County, California*. Far Western Anthropological Research Group, Inc., Davis, California. Submitted to California Department of Transportation, District 9, Bishop, California.

Gilreath, A. J., and W. R. Hildebrandt. 1997. *Prehistoric Use of the Coso Volcanic Field.* Contributions to the University of California Archaeological Research Facility, No. 56. Berkeley.

_____. 2011. Current Perspectives on the Production and Conveyance of Coso Obsidian*.* In *Perspectives on Prehistoric Trade and Exchange in California and the Great Basin*, edited by R. E. Hughes, pp. 171-188. Salt Lake: University of Utah Press. City.

Goldberg, S. K., E. J. Skinner, and J. F. Burton. 1990. *Archaeological Investigations at Sites CA-MNO-574, -577, -578, and -833: Stoneworking in Mono County, California*. Infotec Research, Inc., Sonora, California. Submitted to Caltrans, District 9, Bishop California.

Gualtieri, K. 1988. Lee Vining Creek and Rush Creek Hydroelectric Project (OHP Ref. No. FERC821004D and FERC880816A), Letter concurring with NRHP eligibility evaluations, September 19,1988. Letter on file, California State Office of Historic Preservation, Sacramento, California.

_____. 1990. Lee Vining Creek Hydroelectric Project (OHP Ref. No. FERC821004D), Lundy Hydroelectric Project (OHP Ref. No. FERC831003B), and Rush Creek Hydroelectric Project (OHP Ref. No. FERC880816A). Letter concurring with NRHP eligibility evaluations, February 6, 1990. Letter on file, California State Office of Historic Preservation, Sacramento, California.

Halford, F. K. 1998. Archaeology and Environment on the Dry Lakes Plateau, Bodie Hills, California: Hunter-Gatherer Coping Strategies for Holocene Environmental Variability. Unpublished Master's thesis, University of Nevada, Reno.

_____. 2001. "New Evidence for Early Holocene Acquisition and Production of Bodie Hills Obsidian." *Society for California Archaeology Newsletter* 35(1):32-37.

_____. 2008. The Coleville and Bodie Hills NRCS Soil Inventory, Walker and Bridgeport, California: A Reevaluation of the Bodie Hills Obsidian Source (CA-MNO-4527) and its Spatial and Chronological Use. Prepared for US Department of Interior, Bureau of Land Management, Bishop, California.

Hall, M. C. 1980. *Surface Archaeology of the Bodie Hills Geothermal Area, Mono County, California: A Cultural Resources Inventory*. Submitted to Bureau of Land Management, Bakersfield, California.

_____. 1983. Late Holocene Hunter-Gatherers and Volcanism in the Long Valley-Mono Basin Region: Prehistoric Culture Change in the Eastern Sierra Nevada. Ph.D. Dissertation, Department of Anthropology, University of California, Riverside.

_____. 1990. The OXBOW Archaeological Incident: Investigations at Twenty-three Locations Between Owens Valley, Eastern California, and Walker Basin, Southwestern Nevada. Archaeological Research Services, Inc., Virginia City, Nevada. Submitted to Oxbow Geothermal Company, Reno, Nevada.

Hodelka, Bailee N., Michael M. McGlue, Susan Zimmerman, Guleed Ali, and Irene Tunno. 2020. "Paleoproduction and Environmental Change at Mono Lake (eastern Sierra Nevada) during the Pleistocene-Holocene Transition." *Palaeogeography, Palaeoclimatology, Palaeoecology* 543.

Hull, Kathleen L., R.W. Bevill, W. G. Spaulding, and M. R. Hale. 1995. *Archaeological Site Subsurface Survey, Test Excavations, and Data-Recovery Excavations for the Tuolumne Meadows Sewer Replacement Project in Tuolumne Meadows, Yosemite National Park, California.* Yosemite Research Center Publications in Anthropology 14. Yosemite Research Center, Yosemite National Park, National Park Service.

Jackson, R. J. 1985. *An Archaeological Survey of the Wet, Antelope, Railroad, and Ford Timber Sale Compartments in the Inyo National Forest.* Submitted to U.S.

Department of Agriculture Forest Service, Inyo National Forest, Bishop, California.

Jenkins, D. L., and C. N. Warren. 1984. "Obsidian Hydration and the Pinto Chronology in the Mojave Desert." *Journal of California and Great Basin Anthropology* 6(1):44-60.

King, J. H., W. R. Hildebrandt, and J. Rosenthal. 2011. "Evaluating Alternative Models for the Conveyance of Bodie Hills Obsidian into Central California*."* In *Perspectives on Prehistoric Trade and Exchange in California and the Great Basin*, edited by R. E. Hughes, pp.148-170. Salt Lake City: University of Utah Press.

Lehmann, S. 1989. *Summary Report for the Historical Investigation of Water Rights for Rush Creek and Lee Vining Creek*. Prepared for Southern California Edison Company, Rosemead, California.

McGuire, Kelly R. 1994. *Archaeological Resources Evaluation at CA-MNO-2743, CA-MNO-2744, CA-MNO-2747, and CA-MNO-2763H, Mono County, California.* Far Western Anthropological Research Group, Inc., Davis, California. Prepared for Caltrans Office of Environmental Analysis, Sacramento.

Mensing, Scott A., Jeremy Smith, Kelly Burkle Norman, and Marie Allan. 2008. "Extended Drought in the Great Basin of Western North America in the Last Two Millennia Reconstructed from Pollen Records." *Quaternary International* 188:79-89.

Montague, S. T. 1996. *The Dana Meadows Archaeological Testing Project, Yosemite National Park, Tuolumne County, California*. Yosemite Research Center Publications in Anthropology No. 19, Yosemite National Park.

_____. 2010. *High-Elevation Prehistoric Land Use in the Central Sierra Nevada, Yosemite National Park, California*. Master of Arts Thesis. Department of Anthropology, University of Nevada, Reno.

Moratto, M. J. 1999. "Culture Chronology 1: The Regional Data." In *Archaeological Synthesis and Research Design. Yosemite National Park, California*, edited by Kathleen L. Hull and Michael J. Moratto, pp 65-120. USDI National Park Service, Yosemite Research Center, Publications in Anthropology 21, Yosemite National Park.

Nixon, R., and G. Pacheco. 2018. *Cultural Resource Inventory Report for TRR GO 131-D Evaluation Project Along the Lee Vining-Poole 115-kV Transmission Line, Inyo National Forest, Mono County, California (USFS ARPA Permit# LVD18031)*. Prepared for Southern California Edison Company, Rosemead, California.

Noble, D. G. 1992. *Archaeological Excavations at CA-MNO-2213, On Highway 395 at Fales Hot Springs, Mono County, California*. Far Western Anthropological

Research Group, Inc., Davis, California. Prepared for Caltrans District 9, Bishop, California.

Overly, S. A. 2002. Phase III Data Recovery at CA-MNO-3018 Near Sonora Pass, Mono County, California: High Altitude Archaeology on the East Slope of the Sierra Nevada. Archaeological Research Center, Department of Anthropology, California State University, Sacramento. Prepared for Caltrans, District 9, Bishop, California.

_____. 2004. *Below the Crest: Excavation of CA-MNO-3494 at Sonora Pass, Mono County, California*. Archaeological Research Center, Department of Anthropology, California State University, Sacramento. Prepared for Caltrans, District 9, Bishop, California.

Parr, R. 2010. *Cultural Resource Assessment for The Southern California Edison Company Saddle Bag Dam Geomembrane Liner Installation Project, Inyo National Forest, Mono County, California.* Prepared for Southern California Edison Company, Rosemead, California.

Peak, A. S. 1975. *Archaeological Investigations in Inyo and Mono Counties, California.* Master's thesis, Department of Anthropology, California State University, Sacramento.

Rosenthal, J. 2012. *Prehistoric Land Use and Settlement Systems in Yosemite National Park: A View from Crane Flat.* Far Western Anthropological Research Group, Inc., Davis, California. Yosemite National Park, California. Publications in Anthropology No. 39.

San Francisco Bulletin. 1858. Exploring and Gold Prospecting Expedition to Mono and Owen's Lakes. August 27. San Francisco.

Selters, A. 2012. *Images of America: Inyo National Forest*. Charleston, South Carolina: Acadia Publishing.

Spaulding, Geoffrey W. 1999. "Paleoenvironmental Studies." In *Archaeological Synthesis and Research Design, Yosemite National Park, California*, edited by Michael J. Moratto, pp. 29-64. Publications in Anthropology No. 21, Yosemite Research Center. INFOTEC Research, Inc., and Dames & Moore, Las Vegas, Nevada.

Stevens, N., and M. Lenzi. 2015. *Archaeological Survey of 1,000 Acres on the Marine Corps Mountain Warfare Training Center near Bridgeport, Mono County, California*. Far Western Anthropological Research Group, Inc., Davis, California. Prepared for Naval Facilities Engineering Command, Southwest Division, San Diego, California.

Stevens, N.E., M. Lenzi, and V. Clay. 2015. *Testing of 21 Archaeological Sites on the Marine Corps Mountain Warfare Training Center near Bridgeport, Mono County,* *California*. Far Western Anthropological Research Group, Inc., Davis, California. Prepared for Naval Facilities Engineering Command, Southwest Division, San Diego, California.

Stine, Scott. 1994. "Extreme and Persistent Drought in California and Patagonia During Mediaeval Time." *Nature*, 369: 546-549.

Switalski, H., and A. Bardlsey. 2011. *Archaeological Survey Report and Historic Resource Evaluation for The Rhinedollar (Overhead) 12kV Distribution Circuit Rebuild Project (6085-4800, 8-4816), Lee Vining Creek Hydroelectric System, Inyo National Forest, Mono County, California*. Prepared for Southern California Edison Company, Rosemead, California.

Switalski H. and S. Hutmacher. 2010. *Heritage Resources Inventory Report for The Southern California Edison Company's Replacement of Two Deteriorated Pole Structures on The Control-Morgan-Plant 2 55kV Transmission Line (4770-0355) and Two H-Frame Structures on The Lee Vining-Poole 115kV Transmission Line (4750-1957), Inyo National Forest, Between Bishop and Lee Vining, Inyo and Mono Counties, California. (ARR No. R2010-0504-01456).* Prepared for Southern California Edison Company, Rosemead, California.

Taylor, T. 1998. *Archaeological Survey and Assessment Report Eastside Hydro Gaging Station Automation Project Rush Creek and Lee Vining Creek Hydroelectric System Mono Basin, Mono County, California.* Prepared for Southern California Edison Company, Rosemead, California.

Theodoratus, D. 1984. *Cultural Resources Overview of the Southern Sierra Nevada: An Ethnographic, Linguistic, Archaeological, and Historic Study of the Sierra National Forest, Sequoia National Forest, and Bakersfield District of the Bureau of Land Management*. United States Department of Agriculture, Bishop, California.

Thomas, D. H. 1981. "How to Classify the Projectile Points from Monitor Valley, Nevada." *Journal of California and Great Basin Anthropology* 3(1):7-43.

Trexler, K. 1980. Tioga Road: A History 1883-1961. First Published 1961, Revised 1975; 1980.Yosemite Association in Cooperation with the National Park Service, Yosemite National Park, California.

Warren, C. N., and R. H. Crabtree. 1986. "Prehistory of the Southwestern Area." In *Great Basin*, edited by W. L. d'Azevedo, pp. 183-193. Handbook of North American Indians. Vol. 11, W. C. S. general editor. Washington, D.C.: Smithsonian Institution.

White, D. 1983. *Historic and Archaeological Preservation Plan for Eastern Sierra Hydroelectric Projects in Mono and Inyo Counties, California: Lundy (FERC 1390), Lee Vining Creek (FERC 1388), Rush Creek (FERC 1389), and Bishop*

Creek (FERC 1394). Prepared for Southern California Edison Company, Rosemead, California.

_____. 1985a. *Results of the 1984 Field Season, Cultural Resources Survey, for the Historic and Archaeological Preservation Plan for Eastern Sierra Hydroelectric Projects, In Mono and Inyo Counties, California: Lundy (FERC Project 1390), Lee Vining Creek (FERC Project 1388, Rush Creek (FERC Project 1389), and Bishop Creek (FERC Project 1394).* Prepared for Southern California Edison Company, Rosemead, California.

_____. 1985b. *Results of the 1985 Field Season, Cultural Resources Survey, for the Historic and Archaeological Preservation Plan for Eastern Sierra Hydroelectric Projects, In Mono and Inyo Counties, California: Lee Vining Creek (FERC Project 1388) and Rush Creek (FERC Project 1389).* Prepared for Southern California Edison Company, Rosemead, California.

_____. 1988. *Guide to Areas Surveyed for the Historic and Archaeological Preservation Plan for Eastern Sierra Hydroelectric Projects in Mono and Inyo Counties, California: Lundy (FERC Project 1390), Lee Vining Creek (FERC Project 1388), Rush Creek (FERC Project 1389), and Bishop Creek (FERC Project 1394).* Prepared for Southern California Edison Company, Rosemead, California.

_____. 1990. *Management Plan for Historic and Archaeological Resources Associated with the Lee Vining Creek Hydroelectric Project (FERC Project No. 1388), Mono County, California.* Prepared for Southern California Edison Company, Rosemead, California.

Wickstrom, Brian P., and R. Jackson. 1993. *Archaeological Resources Evaluation at CA-MNO-891, CA-MNO-2678, and CA-MNO-2679, Mono County, California.* BioSystems Analysis, Inc., Santa Cruz, California. Prepared for Caltrans District 9, Bishop, California.

Williams, J., and R. Hicks. 1989. *Evaluation of the Historic Resources of The Lee Vining Creek (FERC Project 1388) and Rush Creek (FERC Project 1389) Hydro Electric Systems, Mono County, California.* Prepared for Southern California Edison Company, Rosemead, California. Prepared for Southern California Edison Company, Rosemead, California.

Woolfenden, W., and P. Conners. 2007. A Thematic Evaluation of Pack Stations in the Eastern Sierra Nevada Operating on the Inyo and Sierra National Forests, California HRR #R2003050400816. Prepared for Inyo and Sierra National Forests, California.

York, A. 1990. *An Evaluation of Twenty-One Archaeological Sites on the Lee Vining Creek, Rush Creek, and Lundy Hydroelectric Projects, Mono and Inyo Counties, California.* Prepared for Southern California Edison Company, Rosemead, California.

7.5.12. TRIBAL RESOURCES

Benson, H.C. 1897. *Yosemite National Park*. 10¾" x 13¾", scale 1 inch=4 miles. Yosemite Archive, El Portal, California.

Bishop Paiute Tribe. 2021. About the Bishop Paiute Tribe. Accessed: April 16, 2021. Available online: http://www.bishoppaiutetribe.com/about-us.html.

Blaver, Richard. 2001. Notes on Interview regarding Kutzadikaa Culture and Tribal Recognition, his parents, and other memories about Lee Vining. On file, Davis-King & Associates Archive, Standard, California.

Bridgeport Indian Colony. 2012. Home Page: Brief history & Mission Statement. Accessed: April 16, 2021. Available online: http://www.bridgeportindiancolony.com/.

Brooks, George R. 1977. *The Southwest Expedition of Jedediah S. Smith: His Personal Account of the Journey to California, 1826-1827*. Glendale, California: Arthur H. Clark Company.

Cain, Ella M. 1956. *The Story of Bodie*. San Francisco: Fearon Publishers, Inc.

_____. 1961. *The Story of Early Mono County. Its Settlers, Gold Rushes, Indians, Ghost Towns*. San Francisco: Fearon Publishers, Inc.

California (State Geological Survey). 1873. *Topographical Map of Central California Together with a Part of Nevada*, Sheet IV. 25¾" x 24¼", scale 1"=6 miles. Julius Bien, New York.

Clayton, J.E. 1861. *Map of Esmeralda and Mono.* Bancroft Library, University of California, Berkeley.

Committee on Natural Resources. 2012. *Bridgeport Indian Colony Land Trust, Health, and Economic Development Act of 2012*. H. Rept. 112-611. 12th Congress (2011-2012).

Davis, Emma Lou. n.d. Studies in the Region of Mono Lake, Mono County, California. Manuscript, University of California, Los Angeles.

_____. 1962. “Hunter-Gatherers of Mono Lake.” *Masterkey* 36(1): 23-28.

_____. 1963. “The Desert Culture of the Western Great Basin: A Lifeway of Seasonal Transhumance.” *American Antiquity* 29: 202-212.

_____. 1965. “An Ethnography of the Kuzedika Paiute of Mono Lake, Mono County, California.” *University of Utah Anthropological Papers* 75: 1-56.

Davis-King, Shelly. 2007. T*he Land Where the Unabiya Hungalelti, Me-Wu, and Tövusidökadö Pozidadikadi Meet: Native American Background Research for the United States Marine Corps Mountain Warfare Training Center Mono County, California*. Draft report submitted to United States Marine Corps Base Camp Pendleton, Camp Pendleton, California.

_____. 2010. *Amid the Sagebrush Plain, Atop the Lofty Peaks: Native American History in Mono County, California*. Submitted to California Department of Transportation, District 9, Bishop, California.

Davis-King, Shelly, and James B. Snyder. 2010. *The Silver Thread: Upper Tuolumne River American Indian Land Use in Yosemite National Park: Ethnographic Context for the Tuolumne Wild and Scenic River Comprehensive Management Plan and Environmental Impact Statement, Tuolumne County, California*. Submitted to USDI, National Park Service, Yosemite National Park, California.

DeGroot, Henry. 1863. *DeGroot's Map of Nevada Territory Exhibiting a Portion of Southern Oregon & Eastern California*. Warren Holt, San Francisco.

Farley, Minard H. 1861. *Newly Discovered Tramontane Silver Mines in Southern California and Western New Mexico*. 1 inch=18 miles. Warren Holt, San Francisco.

Fletcher F.N. 1924. Eastbound Route of Jedediah S. Smith 1827. *California Historical Society Quarterly* January 2(4):344-349.

Fletcher, Thomas Christopher. 1982. The Mono Basin in the Nineteenth Century: Discovery, Settlement, Land Use. Master's Thesis, Department of Geography, University of California, Berkeley.

_____. 1987. *Paiute, Prospector, Pioneer. A History of the Bodie-Mono Lake Area in the Nineteenth Century*. Lee Vining, California: Artemisia Press.

Fowler, Catherine S., Compiler and Editor. 1989. *Willard Z. Park's Ethnographic Notes on the Northern Paiute of Western Nevada, 1933-1944*. Volume I. University of Utah Anthropological Papers 114. Salt Lake City.

Fowler, Catherine S., and S. Liljeblad. 1986. Northern Paiute. In *Handbook of North American Indians, Volume 11: Great Basin*, edited by Warren L. d'Azevedo, pp. 435–465. Washington, D.C.: Smithsonian Institution.

Giles, Eugene. n.d. Frederick Seymour Hulse, February 11, 1906-May 16, 1990. Biographical Memoirs, National Academy of Sciences. Accessed: August 18, 2020. Available online: http://stills.nap.edu/html/biomems/fhulse.html.

Hoffmann, Charles F., and J. T. Gardner. 1868. *Map of a Portion of the Sierra Nevada Adjacent to the Yosemite Valley. From Surveys 1863-1867*. 20⅜" x 30", scale 1 inch=2 miles. Geological Survey of California, Sacramento.

Huber, N. King, Paul C. Bateman, and Clyde Wahrhaftig. 1989. *Geologic Map of Yosemite National Park and Vicinity, California.* Department of the Interior, U.S. Geological Survey Map I-1874 scale 1:125,000, Washington, D.C. Accessed: June 2021. Available online: https://pubs.usgs.gov/imap/i1874/.

Hulse, Frederick S. n.d. [1930s] Lee Vining Paiute Ethnographic Notes. CU-23.1, 149. Manuscript on file, Bancroft Library, University of California, Berkeley.

Inyo National Forest, n.d. Land Status Book. Inyo National Forest, Bishop, California.

Johnson, Willard D. 1887. *Hydrographic Basin of Lake Mono*. 14" x 11¼", scale 1:250,000. On file, Davis-King & Associates, Standard, California.

Kelsey, C.E. 1909. Schedule Showing Non-Reservation Indians in Northern California, 1905-1906. Bureau of Indian Affairs Box RG 79, 034 File 5340-1909, National Archives and Records Administration, San Bruno, California.

Kroeber, Alfred L. 1916. California Place Names of Indian Origin. *University of California Publications in American Archaeology and Ethnology* 12(2):31-69. Berkeley.

LeConte, Joseph N. 1893. *Map of a Portion of the Sierra Nevada Adjacent to the Yosemite and Hetch Hetchy Valleys*. Sierra Club Publication No. 4. 19" x 33½", scale 1 inch=4 miles. Sierra Club, San Francisco.

LeConte, J.N., with Theodore Solomons, Lil A. Winchell, Bolton Coit Brown, and N.F. McClure. 1896. *Map of the Sierra Nevada Mountains of Central California January, 1896*. 38" x 38", scale 1 inch=4 miles. Publication of the Sierra Club No. 12. Sierra Club, San Francisco.

McClure, N.F. 1895. *Map of The Yosemite National Park Prepared for the Use of U.S. Troops, February, 1895*, 16 5/8" x 19½", scale 1 inch=2 miles. Yosemite National Park.

_____. 1896. *Map of The Yosemite National Park Prepared for the Use of U.S. Troops, March, 1896*, 18" x 21½", scale 1 inch=2½ miles. Accessed: August 13, 2020. Available online: https://www.raremaps.com/gallery/detail/25474/map-of-the-yosemite-national-park-prepared-for-use-of-us-t-us-government.

Merriam, C. Hart. n.d. 1898-1938. Journals [California] of C. Hart Merriam. Manuscript Division. Library of Congress, Washington, D.C.

_____. 1955. *Studies of California Indians*. Berkeley: University of California Press.

_____. 1966. *Ethnographic Notes on California Indian Tribes*, edited by R. F. Heizer Parts 1 and 2, University of California, Archaeological Survey Records 68 (1, 2). Berkeley.

Muir, John. 1890a. *Map of Proposed Yosemite National Park Region*. 10" x 12½", scale about 1 inch=3 miles. Bancroft Library, University of California, Berkeley.

_____. 1890b. *Map of Proposed Boundary of Yosemite National Park*, 4⅜" x 5¼", scale 1¼"=10 miles. Bancroft Library, University of California, Berkeley.

Munz, Philip A. 1959. *A California Flora*. Berkeley and Los Angeles: University of California Press.

NAHC (Native American Heritage Commission). 2020. Letter dated July 27 Re: Native American Tribal Consultation, Pursuant to the Assembly Bill 52 (AB 52), Amendments to the California Environmental Quality Act (CEQA) (Chapter 532, Statutes of 2014), Public Resources Code Sections 5097.94 (m), 21073, 21074, 21080.3.1, 21080.3.2, 21082.3, 21083.09, 21084.2 and 21084.3, Lee Vining Hydroelectric Project, Mono County.

OIA (Office of Indian Affairs). 1930. Mono County Indian Census Roll of Reservation Indians of the Sacramento Agency. On file, Bureau of Indian Affairs archive, National Archives and Records Administration, San Bruno, California.

_____. 1940. Census of the California--Mono County Reservation Indian Roll of the Carson Jurisdiction. On file, Bureau of Indian Affairs archive, National Archives and Records Administration, San Bruno, California.

_____. 1941. Census of the Non-Reservation--Mono County Indian Roll of the Carson Jurisdiction. On file, Bureau of Indian Affairs archive, National Archives and Records Administration, San Bruno, California.

_____. 1943. Mono County Indian Census Roll of Non-Reservation Indians of the Carson Jurisdiction. On file, Bureau of Indian Affairs archive, National Archives and Records Administration, San Bruno, California.

Paden, Irene D., and Margaret E. Schlichtmann. 1955. *The Big Oak Flat Road. An Account of Freighting from Stockton to Yosemite Valley*. San Francisco, California [no publisher listed].

Park, Willard Z. 1933-1940. Paviotso Field Notes. On file, Special Collections 96-05 Box 1, File 96-05, University of Nevada, Reno, Nevada.

Powers, Stephen. 1976. *Tribes of California*. Reprinted from the 1877 edition of *Contributions to North American Ethnology, Volume III*. Berkeley and Los Angeles: University of California Press.

Sada, Donald. 2000. Native Fishes. In *Sierra East. Edge of the Great Basin*, edited by Genny Smith, pp 246-264. California Natural History Guides. Los Angeles, and London: University of California Press, Berkeley.

San Francisco Bulletin. 1858. Exploring and Gold Prospecting Expedition to Mono and Owen's Lakes. August 27. San Francisco.

Steward, Julian H. 1933. *Ethnography of the Owens Valley Paiute*. University of California Publications in American Archaeology and Ethnology 33: 233-350.

_____. 1938. *Basin-Plateau Aboriginal Sociopolitical Groups*. Smithsonian Institution Bureau of American Ethnology Bulletin 120. Washington, D.C. (Facsimile Reprint, 1997. The University of Utah Press, Salt Lake City).

Stewart, George W. 1962. *The California Trail*. New York: McGraw-Hill Book Company.

Storer, Tracy I., and Robert L. Usinger. 1964. *Sierra Nevada Natural History: An Illustrated Handbook*. 2nd Edition. Berkeley: University of California Press.

Sullivan, Maurice S. 1934. *The Travels of Jedediah Smith. A Documentary Outline Including the Journal of the Great American Pathfinder*. Santa Ana, California: Fine Arts Press.

Taylor, Thomas T. 1998. *Archaeological Survey & Assessment Report East Side Hydro Gaging Station Automation Project Rush Creek and Lee Vining Creek Hydroelectric Systems Mono Basin, Mono County, California*., Rosemead, California: Southern California Edison Company.

Trask, John B. 1853. *Topographical Map of the Mineral Districts of California*. 17¼" x 23½", scale 1 inch=20 miles. Britton & Rey, San Francisco.

Walker River Paiute Tribe. 2021. The Walker River Paiute Tribe. Homepage. Accessed: April 16, 2021. Available online: https://www.wrpt.org/agai-dicutta-numu/.

Wheeler, George M. 1880. *Wheeler Survey Expeditions of 1878, 1879. Geographical Surveys West of the 100th Meridian*, Atlas Sheet 56(D). 18" x 22½", scale 1 inch=4 miles or 1:253,440. U.S. Army, Corps of Engineers. On file, Yosemite Research Library, Yosemite National Park.

White, David R.M. 1983. *Historic and Archaeological Preservation Plan for Eastern Sierra Hydroelectric Projects in Mono and Inyo Counties, California: Lundy (FERC 1390), Lee Vining Creek (FERC 1388); Rush Creek (FERC 1389), and Bishop Creek (FERC 1394)*. Southern California Edison Company, Rosemead California.

_____. 1985. *Results of the 1984 Field Season, Cultural Resources Survey for the Historic and Archaeological Preservation Plan For Eastern Sierra Hydroelectric Projects in Mono and Inyo Counties, California: Lundy (FERC Project 1390), Lee Vining Creek (FERC Project 1388), Rush Creek (FERC Project 1389), and Bishop Creek (FERC Project 1394)*. Southern California Edison Company, Rosemead, California.

_____. 1990. *Management Plan for Historic and Archaeological Resources Associated with the Lee Vining Creek Hydroelectric Project (FERC Project No. 1388), Mono County, California*. Southern California Edison Company, Rosemead, California.

7.5.13. SOCIOECONOMIC RESOURCES

CEDD (California Employment Development Department). 2021a. Mono County Profile. Accessed: June 23, 2021. Available online: https://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/localAreaProfileQSResults.asp?selectedarea=Mono+County&selectedindex=26&menuChoice=localAreaPro&state=true&geogArea=0604000051&countyName=.

_____. 2021b. Local Area Unemployment Statistics (LAUS) for California Areas: Annual Average. Accessed: April 22, 2021. Available online: https://data.edd.ca.gov/en/Labor-Force-and-Unemployment-Rates/Local-Area-Unemployment-Statistics-LAUS-for-Califo/53ai-w4j9.

Data USA. 2021a. Lee Vining, CA. Accessed: April 16, 2021. Available online: https://datausa.io/profile/geo/lee-vining-ca/.

_____. 2021b. Mono County, CA. Accessed: April 22, 2021. Available online: https://datausa.io/profile/geo/mono-county-ca/.

MRLC Consortium (Multi-Resolution Land Characteristic Consortium). 2016. Multi-Resolution Land Characteristics Consortium. Accessed: August 2020. Available online: https://www.mrlc.gov.

U.S. Census Bureau. 2019a. ACS Demographic and Housing Estimates: Lee Vining, California. Accessed: April 22, 2021. Available online: https://data.census.gov/cedsci/table?q=Lee%20Vining,%20California&g=1600000US0640998&tid=ACSDP5Y2019.DP05&hidePreview=false.

_____. 2019b. ACS Demographic and Housing Estimates: California. Accessed: April 22, 2021. Available online: https://data.census.gov/cedsci/table?q=California%20population&g=1600000US0640998&tid=ACSDP5Y2019.DP05&hidePreview=false.

_____. 2019c. ACS Demographic and Housing Estimates: Mono County, California. Accessed: April 22, 2021. Available online: https://data.census.gov/cedsci/table?q=Mono County, California&g=1600000US0640998&tid=ACSST5Y2019.S0101&hidePreview=false.

_____. 2019d. Quick Facts: Mono County, California. Accessed: April 22, 2021. Available online: https://www.census.gov/quickfacts/monocountycalifornia.

_____. 2019e. Quick Facts: California. Accessed: April 22, 2021. Available online: https://www.census.gov/quickfacts/CA.

_____. 2019f. Benton CDP Income and Poverty. Accessed: April 23, 2021. Available online: https://data.census.gov/cedsci/table?q=Benton%20CDP%20Income%20and%20Poverty&tid=ACSST5Y2019.S1901.

_____. 2019g. June Lake CDP Income and Poverty. Accessed: April 23, 2021. Available online: https://data.census.gov/cedsci/table?q=June%20Lake%20CDP%20Income%20and%20Poverty&tid=ACSST5Y2019.S1901.

_____. 2019h. Swall Meadows CDP Income and Poverty. Accessed: April 23, 2021. Available online: https://data.census.gov/cedsci/table?q=Swall%20Meadows%20CDP%20Income%20and%20Poverty&tid=ACSST5Y2019.S1901.

_____. 2019i. Chalfant CDP Income and Poverty. Accessed: April 23, 2021. Available online: https://data.census.gov/cedsci/table?q=Chalfant%20CDP%20Income%20and%20Poverty&tid=ACSST5Y2019.S1901.

_____. 2019j. Sunny Slopes CDP Income and Poverty. Accessed: April 23, 2021. Available online: https://data.census.gov/cedsci/table?q=Sunny%20Slopes%20CDP%20Income%20and%20Poverty&tid=ACSST5Y2019.S1901.

_____. 2019k. Crowley Lake CDP Income and Poverty. Accessed: April 23, 2021. Available online: https://data.census.gov/cedsci/table?q=Crowley%20Lake%20CDP%20Income%20and%20Poverty&tid=ACSST5Y2018.S1901.

_____. 2019l. Walker CDP Income and Poverty. Accessed: April 23, 2021. Available online: https://data.census.gov/cedsci/table?q=Walker%20CDP%20Income%20and%20Poverty&tid=ACSST5Y2019.S1901.

_____. 2019m. Mammoth Lakes CDP Income and Poverty. Accessed: April 23, 2021. Available online: https://data.census.gov/cedsci/table?q=Mammoth%20Lakes%20Income%20and%20Poverty&tid=ACSST5Y2019.S1901.

USFS (U.S. Forest Service). 2019. *Land Management Plan for the Inyo National Forest. Fresno, Inyo, Madera, Mono and Tulare Counties, California; Esmeralda and Mineral Counties, Nevada*. R5-MB-323a. Pacific Southwest Region. September. Accessed: August 24, 2020. Available online: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd664404.pdf.

7.6. SECTION 6.0

FERC (Federal Energy Regulatory Commission). 2020. *List of Comprehensive Plans*. July. Accessed: April 30, 2021. Available online: https://www.ferc.gov/sites/default/files/2020-07/ListofComprehensivePlans.pdf.

Zale, A.V, D.L. Parrish, and T.M. Sutton. 2013. *Fisheries Techniques*. Third Edition. Bethesda (Maryland): American Fisheries Society.

Page Intentionally Left Blank