SOUTHERN CALIFORNIA EDISON

Lee Vining Hydroelectric Project

(FERC PROJECT NO. 1388)

FINAL LICENSE APPLICATION

VOLUME III

January 2025

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Lee Vining Hydroelectric Project
(FERC Project No. 1388)

Final License Application
Volume III

Southern California Edison
2244 Walnut Grove Avenue
Rosemead, CA 91770

January 2025

Support from:

Kleinschmidt

LIST OF EXHIBITS

Final Technical Reports

- WQ-1 Stream and Reservoir Water Quality
- AQ-1 Reservoir Fish Populations
- AQ-2 Stream Fish Populations
- AQ-3 Aquatic Habitat Mapping and Sediment Characterization
- AQ-4 Aquatic Invasive Plants
- AQ-5 Operations Model
- AQ-6 Lower Lee Vining Creek Channel Morphology
- TERR-1 General Botanical Resources Survey
- TERR-2 General Wildlife Resources Survey
- REC-1 Recreation Use Assessment
- REC-2 Existing Recreation Facilities Condition Assessment
- LAND-1 Project Lands and Roads
- LAND-2 Visual Resource Assessment

LEE VINING FINAL TECHNICAL REPORTS

Fifteen studies were developed in consultation with Stakeholders as part of the Lee Vining Project. Southern California Edison (SCE) worked with agencies and other Technical Work Group members to identify potential resource issues and data gaps, which formed the basis of the Final Technical Study Plans filed with the Federal Energy Regulatory Commission (FERC) on April 25, 2022 (SCE, 2022) and listed below.

1. Stream and Reservoir Water Quality (WQ-1)
2. Reservoir Fish Populations (AQ-1)
3. Stream Fish Populations (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 Resources Survey (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)

Studies were conducted between 2022 and 2024. Thirteen of the 15 Technical Reports[1] were distributed as drafts to Technical Working Groups on April 16, 2024, for a 60-day comment period. On May 14, 2024, SCE held a public meeting at the Lee Vining Community Center to discuss the draft reports and study findings to date. On June 12, 2024, at the end of the comment period, comments were received from U.S. Forest Service, U.S. Fish and Wildlife Service, California Department of Fish and Wildlife, State

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[1] REC-1 and TRI-1 were not complete at that time and were therefore not included in the April 2024 distribution.

Water Resources Control Board, and Mono Lake Committee, as shown in Table 2 of the Consultation Log, which is filed in Volume II of this Final License Application.

The REC-1 and TRI-1 Studies were still ongoing at the time of the Draft License Application. The REC-1 Draft Technical Report is included with this Final License Application. The TRI-1 Draft Technical Report is currently under review with Tribes and Inyo National Forest and will be filed with FERC later in 2025.

REFERENCES

SCE (Southern California Edison). 2022. *Final Technical Study Plans*. Lee Vining Hydroelectric Project, FERC Project No. 1388. April 25, 2022.

SOUTHERN CALIFORNIA EDISON
Lee Vining Hydroelectric Project
(FERC Project No. 1388)

STREAM AND RESERVOIR WATER QUALITY (WQ-1) FINAL TECHNICAL REPORT

SOUTHERN CALIFORNIA EDISON

Energy for What's Ahead

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Lee Vining Hydroelectric Project
(FERC Project No. 1388)

STREAM AND RESERVOIR WATER QUALITY (WQ-1) FINAL TECHNICAL REPORT

Southern California Edison
2244 Walnut Grove Avenue
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September 2024

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%	percent
°C	degrees Celsius
µg/g ww	microgram per gram wet weight
µS/cm	microSiemens per centimeter
A-COM	samples were run slightly out of hold time
Basin Plan	*Water Quality Control Plan for the Lahontan Region*
CalTrans	California Department of Transportation
CDFW	California Department of Fish and Wildlife
cfs	cubic feet per second
cfu	colony forming units
CMC	criterion maximum concentration
COLD	cold freshwater habitat
COMM	Commercial and Sportfishing
DLA	Draft License Application
DNQ	detected, not quantifiable
DO	dissolved oxygen
ELAP	Environmental Laboratory Accreditation
FERC	Federal Energy Regulatory Commission
g	gram
HT-1	sample was received outside the U.S. Environmental Protection Agency-recommended holding time
ID	identification
J	result is less than the reporting limit but greater than or equal to the detection limit, and the concentration is an approximate value
LADWP	Los Angeles Department of Water and Power
LRWQCB	Lahontan Region Water Quality Control Board
m	meter
MCL	maximum contaminant level
MDL	minimum detection limit
mg TAN/L	milligrams total ammonia nitrogen per liter
mg/L	milligrams per liter
mg-N/L	milligrams nitrogen per liter

mL	milliliters
MLC	Mono Lake Committee
mm	millimeter
MPN	most probable number
MUN	municipal and domestic supply
NA	not applicable
NOI	Notice of Intent
NTU	nephelometric turbidity unit
OEHHA	Office of Environmental Health Hazard Assessment
PAD	Pre-Application Document
PQL	practical quantification limit
Project	Lee Vining Hydroelectric Project (FERC Project No. 1388)
Q	Data qualified based on post-calibration checks. If turbidity measurements were less than zero, data were reported as zero
RL	reporting limit
s.u.	standard unit
sat	saturation
SCE	Southern California Edison
SMCL	secondary maximum contaminant level
SPWN	spawning, reproduction, and/or early development
SV	screening value
SWRCB	State Water Resource Control Board
TDS	total dissolved solids
TSS	total suspended solids
TWG	Technical Working Group
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
WARM	warm freshwater habitat
WQAA	Water Quality Assessment Area
YSI	Yellow Springs Instruments

1.0 INTRODUCTION

The Lee Vining Hydroelectric Project, Federal Energy Regulatory Commission (FERC) Project No. 1388 (Project), Water Quality Assessment Area (WQAA) includes the following waterbodies:

- Project reservoirs (Saddlebag Lake, Tioga Lake, and Ellery Lake);
- Project-affiliated stream reaches (upper Lee Vining Creek[1] and lower Lee Vining Creek[2]); and
- Glacier Creek between Tioga Dam and its confluence with Lee Vining Creek.

Project operations have the potential to alter water quality in Project reservoirs and affected stream reaches in ways that may affect fish or other aquatic species or fail to meet Lahontan Regional Water Quality Control Board water quality objectives for Project waters.

This technical report summarizes the results of the 2022 and 2023 water quality assessment. Results will be compared to the Lahontan Region Water Quality Control Board (LRWQCB) *Water Quality Control Plan for the Lahontan Region* (Basin Plan; LRWQCB, 2019) objectives and Office of Environmental Health Hazard Assessment (OEHHA) screening values in the Draft License Application (DLA).

1.1. EXISTING INFORMATION

Existing information on water quality within the Project Area is presented in Section 5.2.3 of the Pre-Application Document (PAD; SCE, 2021). Additional temperature and dissolved oxygen (DO) profiles collected in Project reservoirs during 2015, 2016, and 2017 (Cohen, 2019) were not available at the time of the PAD; they are provided in Appendix A of this report. 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). California State Water Resources Control Board (SWRCB) waived water quality certification prior to issuance of the 1997 license (FERC, 1997). No subsequent water quality monitoring was required by the 1997 license. Water quality certification was later issued by SWRCB in 2017 to address ongoing operation and maintenance 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 operation and maintenance activities (SWRCB, 2017). Within the WQAA, limited data were available regarding ammonia, biostimulatory substances, coliform bacteria, some chemical constituents, DO, pH, turbidity, and water temperature. Although the Lee Vining Creek watershed has a history of mining, no

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[1] Upper Lee Vining Creek is defined as Lee Vining Creek between Saddlebag Dam and Ellery Lake.

[2] Lower Lee Vining Creek is defined as Lee Vining Creek downstream of Rhinedollar Dam to the Los Angeles Department of Water and Power (LADWP) Lee Vining Creek Diversion Dam.

historical information regarding trace metals (e.g., mercury) or other mining-related water quality issues is available.

1.2. WATER QUALITY OBJECTIVES FROM THE WATER QUALITY CONTROL PLAN FOR THE LAHONTAN REGION

Federal water quality standards required by the Clean Water Act of 1970 are implemented under the authority of SWRCB and LRWQCB. The Basin Plan was revised in 2019 and sets forth water quality standards for waterbodies in the region including Lee Vining Creek and 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 address 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; water contact recreation; hydropower generation; navigation; water non-contact recreation; cold freshwater habitat; commercial and sportfishing; wildlife habitat; and spawning, reproduction, and/or early development. Additional beneficial uses listed in the Basin Plan include groundwater recharge and freshwater replenishment.

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 1.2-1. Additionally, under the State of California Antidegradation Policy (SWRCB Resolution Number 68–16), 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 1.2-1. Basin Plan Water Quality Objectives

Objective	**Criteria**
Ammonia	1-hour and 4-day unionized ammonia criteria are temperature- and pH-dependent.
Bacteria [a]	No Escherichia coli (*E. coli*) concentrations above a geometric mean of <100 cfu/100 mL of E. coli in five samples over 30 days, and a statistical threshold value of 320 cfu/100 mL not to be exceeded by more than 10 percent of the samples collected in a calendar month, calculated in a static manner.
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 Title 22 of the California Code of Regulations; and shall not contain concentrations of chemical constituents in amounts that adversely affect beneficial uses.

Objective	**Criteria**
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.
DO	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 percent 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.
Non-degradation 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 Section 64443 (Radioactivity) of Title 22 of the California Code of Regulations.
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 naturally high-quality waters, the concentration of settleable materials shall not be raised by more than 0.1 mL per liter.
Sport fish[b]	For waters that include beneficial uses COMM, WILD, and COLD, the mean methylmercury for the highest trophic level of fish shall not exceed 0.2 mg/kg fish tissue within a calendar year.
Suspended materials	For naturally high-quality waters, the concentration of total suspended materials shall not be altered to the extent that such alterations are discernible at the 10 percent 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 percent.

Source: LRWQCB, 2019

cfu = colony forming unit; COLD = cold freshwater habitat; DO = dissolved oxygen; LRWQCB = Lahontan Region Water Quality Control Board; MCL = maximum contaminant level; mg/L = milligrams per liter; mL = milliliter; MUN = municipal and domestic supply; SMCL = secondary maximum contaminant level; SPWN = spawning, reproduction, and/or early development; WARM = warm freshwater habitat

[a] The statewide amendment that modified the indicator bacteria to use an *E. coli* pathogen indicator and water quality objectives for the REC-1 beneficial use was adopted by the LRWQCB on June 28, 2023.

[b] Resolution 2017-0017, which includes new statewide numeric mercury objectives that protect the beneficial uses associated with the consumption of fish by both people and wildlife, was adopted by the SWRCB on June 28, 2023.

2.0 STUDY GOALS AND OBJECTIVES

The goal of this study is to characterize water quality in Project waters and assess consistency of Project reservoirs and Project-affected stream reaches with water quality objectives in the Basin Plan (LRWQCB, 2019).

2.1. STUDY AREA

The WQAA included Project reservoirs and selected sites within Project-affiliated stream reaches. Exact locations of the monitoring stations were determined in the field based on sampling suitability (i.e., well-mixed and deep enough for representative sampling) and accessibility. Site coordinates of sampling sites were documented with a handheld Global Positioning System unit, where possible. Established station locations were re-occupied during subsequent water quality monitoring efforts. Areas with unsafe access (very steep terrain or high streamflow) were specifically excluded. An overview of water quality, bacterial, turbidity, and fish tissue sampling locations within the WQAA is provided in Table 2.1-1 and shown on Figure 2.1-1.

Table 2.1-1. 2022 and 2023 Water Quality Sampling Site Descriptions, Site Identifications, and Study Components

General Site Description	Study Component			
	Stream and Reservoir Water Quality Sampling	Bacterial Sampling	Fish Tissue Mercury Sampling	Continuous Turbidity Monitoring
Lee Vining Creek Watershed				
Lee Vining Creek inflow to Saddlebag Lake	LV-1	--	--	LV-SIT[b]
Saddlebag Lake	LV-2	LV-B1	Reservoir Fish 2022 Study Sites [a]	--
Lee Vining Creek between Saddlebag Dam and its confluence with Slate Creek	LV-3	--	--	--
Lee Vining Creek between its confluence with Slate Creek and Glacier Creek	LV-4	--	--	--
Lee Vining Creek between its confluence with Glacier Creek and Ellery Lake	LV-5	--	--	--
Lee Vining Creek inflow to Ellery Lake	LV-6	--	--	--
Ellery Lake	LV-7	LV-B3	Reservoir Fish 2022 Study Sites [a]	--
Warren Creek upstream of its confluence with Lee Vining Creek	--	--	--	LV-WCT[b]
Lee Vining Creek immediately downstream of Poole Powerhouse	LV-8	--	--	--

General Site Description	**Study Component**			
	Stream and Reservoir Water Quality Sampling	**Bacterial Sampling**	**Fish Tissue Mercury Sampling**	**Continuous Turbidity Monitoring**
Lee Vining Creek 0.2 river mile downstream Poole Powerhouse	--	--	--	LVC-DSPP1
Lee Vining Creek 4.3 river miles downstream Poole Powerhouse near Lower Lee Vining Campground	--	--	--	LVC-DSPP2
Lee Vining Creek upstream of the LADWP Diversion Dam	LV-9	--	--	--
Glacier Creek Watershed				
Glacier Creek inflow to Tioga Lake	LV-10	--	--	LV-GCT[b]
Tioga Lake	LV-11	LV-B2	Reservoir Fish 2022 Study Sites [a]	--
Glacier Creek downstream of Tioga Dam	LV-12	--	--	--

LADWP = Los Angeles Department of Water and Power

[a] Section 2.0, *Study Objectives*, of the *Draft Technical Report Reservoir Fish Population (AQ-1)* (SCE, 2023a)

[b] Site added in 2023

Figure 2.1-1. Overview of Water Quality Study Sites.

3.0 METHODS

Study implementation generally followed the methods described in the *WQ-1 Stream and Reservoir Water Quality Technical Study Plan* (SCE, 2022), with the exceptions described below.

3.1. MODIFICATIONS TO METHODS

Five modifications to the methods outlined in the WQ-1 Final Technical Study Plan (SCE, 2022) were made in 2022 after it was filed in April:

1. During spring sampling (June 1, 2022), extensive ice cover on Saddlebag Lake prevented collection of parameter depth profiles at the location of maximum depth. Profiles were instead collected at the deepest location free of ice cover.

2. In situ turbidity was not measured during depth profile collection in summer 2022 due to equipment malfunction.

3. During summer sampling, analytical samples were not collected at depth from Saddlebag Lake and Tioga Lake because thermal stratification was considered too weak to merit additional chemical sampling at depth.

4. Continuous turbidity data loggers were not available for purchase (due to COVID-related supply chain issues) until late June 2022. As a result, turbidity loggers were installed early summer 2022, rather than spring. Turbidity loggers were redeployed after downloading data in October 2022 to characterize turbidity in Lee Vining Creek downstream of Poole Powerhouse through fall 2023. Both logger installations were moved slightly during redeployment to better withstand elevated spring flows.

5. All edible-sized[3] brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), and rainbow trout (*Oncorhynchus mykiss*) caught during reservoir fish sampling were processed and sent to the analytical laboratory for mercury tissue analysis. Fewer than nine edible-sized individuals of a given species were caught at Tioga Lake (rainbow trout) and Ellery Lake (brook trout, rainbow trout).

Four modifications to the methods outlined in the WQ-1 Final Technical Study Plan (SCE, 2022) were made in 2023:

1. Heavy snow accumulation during winter 2023 delayed spring sampling due to access constraints (e.g., road closures, frozen reservoirs) throughout the Lee Vining Creek and Glacier Creek watersheds. The first sampling effort was delayed until road access was re-established in July 2023. This first sampling effort was defined as spring based on environmental and limnological conditions, including above-average snowpack, snowmelt run-off, streamflows, and frozen reservoirs.

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[3] To develop fish consumption advisories, nine individuals greater than 200 millimeters total length were to be collected, as required by OEHHA (2022).

2. During the spring sampling effort (July 5 and 6, 2023), Saddlebag Lake, Tioga Lake, and two sites on Lee Vining Creek (LV-1 and LV-3) remained inaccessible due to extensive snow and ice cover; water quality data were not collected at these sites.

3. To assess background turbidity concentrations in the Lee Vining Creek and Glacier Creek watersheds, multi-parameter water quality instruments were installed at three locations: (1) Lee Vining Creek inflow to Saddlebag Lake, (2) Lee Vining Creek inflow to Tioga Lake, and (3) Warren Creek upstream of its confluence with Lee Vining Creek during the spring, summer, and fall sampling events in 2023.

4. Surface water grab samples for laboratory enumeration of *Escherichia coli* (*E. coli*) bacteria samples were collected during 2023 to determine compliance with an adopted amendment of the Basin Plan water quality objective for bacteria.

3.2. FIELD SAMPLING METHODS

3.2.1. STREAM AND RESERVOIR WATER QUALITY SAMPLING

Water quality sampling was performed at three reservoir and nine stream sites in 2022 and 2023 (Figure 2.1-1; Table 3.2-1). Water quality sampling site identification (ID), site description, location (latitude and longitude), and sampling dates are provided in Table 3.2-1.

In situ and analytical water quality parameters were collected at Project reservoirs and stream sites during the spring, summer, and fall 2022 and 2023 (Table 3.2-1). Surface water monitoring at riverine sites as well as vertical profile measurements at Project reservoirs included water temperature, DO, pH, and specific conductivity using a Yellow Springs Instrument (YSI) water quality meter (i.e., EXO 2, Pro DSS[4], or Pro Plus). Turbidity measurements at stream sites were made using a water quality meter or handheld turbidimeter (i.e., YSI EXO 2 or Hach 2100Q). Pre-sampling calibration and post-sampling checks were recorded on calibration logs (Appendix B).

Water quality grab samples were collected at Project reservoirs during vertical profile data collection. Surface samples were collected at reservoirs and stream sites during all sampling events at a depth of 0.2 meter. Deep reservoir samples were collected using a Van Dorn sampler deployed approximately halfway between the thermocline and reservoir bottom during 2022 and approximately 1 meter above the reservoir bottom during 2023. Based on weak thermal stratification observed in fall (October) 2022, deepwater grab samples were collected in Saddlebag Lake and Tioga Lake. During 2023, deepwater grab samples were collected at all accessible reservoirs during the spring, summer, and fall. Equipment blanks were collected during 2023 to evaluate potential contamination of samples from the sampling equipment using laboratory-provided distilled water.

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[4] Digital Sampling System

Table 3.2-1. Stream and Reservoir Water Quality Sampling Sites and Schedule

Site ID	Site Description	Waterbody Type	Location [a] (Latitude / Longitude)	Water Quality Sampling Dates					
				2022			2023		
				Spring	Summer	Fall	Spring [b]	Summer	Fall
Lee Vining Creek									
LV-1	Lee Vining Creek inflow to Saddlebag Lake	Stream	37.979087°N/ -119.284321°E	6/1	8/18	10/4	--[d]	8/31	10/12
LV-2	Saddlebag Lake[c]	Reservoir	37.968654°N/ -119.267788°E	6/1	8/18	10/4	--[d]	8/31	10/10
LV-3	Lee Vining Creek between Saddlebag Dam and its confluence with Slate Creek	Stream	37.964904°N/ -119.273738°E	5/31	8/18	10/4	-- [d]	8/29	10/9
LV-4	Lee Vining Creek between its confluence with Slate Creek and Glacier Creek	Stream	37.945418°N/ -119.259338°E	5/31	8/18	10/4	7/5	8/29	10/9
LV-5	Lee Vining Creek between its confluence with Glacier Creek and Ellery Lake	Stream	37.938537°N/ -119.248821°E	5/31	8/17	10/4	7/5	8/29	10/9
LV-6	Lee Vining Creek inflow to Ellery Lake	Stream	37.935497°N/ -119.235068°E	5/31	8/17	10/5	7/5	8/30	10/9
LV-7	Ellery Lake	Reservoir	37.935497°N/ -119.235068E	6/1	8/17	10/5	7/5	8/30	10/11
LV-8	Lee Vining Creek immediately downstream of Poole Powerhouse	Stream	37.944713°N/ -119.214702°E	5/31	8/17	10/5	7/6	8/30	10/9
LV-9	Lee Vining Creek upstream of the LADWP Diversion Dam	Stream	37.935977°N/ -119.137268°E	5/31	8/17	10/5	7/6	8/30	10/9
Glacier Creek									
LV-10	Glacier Creek inflow to Tioga Lake	Stream	37.920849°N/ -119.251679°E	6/1	8/17	10/5	7/6	8/30	10/10
LV-11	Tioga Lake	Reservoir	-37.926389° N/ -119.252667°E	5/31	8/17	10/5	-- [d]	8/29	10/11
LV-12	Glacier Creek downstream of Tioga Dam	Stream	37.928959°N/ -119.250728°E	5/31	8/17	10/5	7/5	8/29	10/9

-- = samples not collected/no data; ID = identification; LADWP = Los Angeles Department of Water and Power

[a] Datum: World Geodetic System 84

[b] The first sampling effort in July was defined as spring based on environmental and limnological conditions, including above-average snowpack, snowmelt run-off, streamflows, and frozen reservoirs.

[c] Frozen conditions on Saddlebag Lake during spring 2022 sampling made the maximum depth inaccessible. Spring samples were collected at 37.9701326 N, -119.2730728.

[d] Sample not collected during the 2023 spring sampling event due to extensive ice on the lake and deep snow on access roads.

3.2.2. Bacteriological Sampling

Surface water grab samples for bacterial enumeration were collected within a 30-day period near campgrounds at each of the three Project reservoirs: Saddlebag Lake, Ellery Lake, and Tioga Lake (Figure 2.1-1; Table 3.2-2). Samples were collected in laboratory supplied sterile bottles, immediately stored on ice at 4 degrees Celsius (°C) and transported to the Silver State Laboratory (Reno, Nevada) within an 8-hour hold time. In 2022, samples were collected on five dates and analyzed for fecal coliform. In 2023, six samples were collected and analyzed for fecal coliform and *E. coli*.

Table 3.2-2. Bacteriological Monitoring Locations

Site ID	Site Description	Location [a] Latitude/ Longitude	Sample Depth	Dates	
				2022	2023
Lee Vining Creek Watershed					
LV-B1	Saddlebag Lake near Saddlebag Campground	37.966672°N / -119.271688°E	Surface	9/15, 9/19, 9/20, 10/4, 10/5	8/24, 8/29 9/7, 9/14, 9/20, 9/26
LV-B3	Ellery Lake near Ellery Lake Campground	37.936735°N / -119.242401°E	Surface		
Glacier Creek Watershed					
LV-B2	Tioga Lake near Tioga Lake Campground	37.926997°N / -119.254323°E	Surface	9/15, 9/19, 9/20, 10/4, 10/5	8/24, 8/29 9/7, 9/14, 9/20, 9/26

ID = identification
[a] Datum: World Geodetic System 84

3.2.3. Turbidity Monitoring

To evaluate turbidity variations during hydro-resource optimization events, two continuous turbidity data loggers (RBRsolo Tu, RBR, Ottawa, Canada) were installed at two locations (Figure 2.1-1; Table 3.2-3) in Lee Vining Creek downstream of Poole Powerhouse on July 14, 2022. The loggers were installed in the stream channel at a location that was flowing and well-mixed. Loggers were factory-calibrated and programmed to record turbidity every 30 minutes. Loggers were redeployed on October 7, 2022, to a location more likely to withstand elevated spring flows. Spot measurements were made at the same location with a second, independently calibrated instrument (i.e., YSI EXO or Hach 2100Q); however, loggers were inaccessible during several extended periods due to snow and high run-off conditions. Periodic maintenance (e.g., sensor cleaning, data download) was performed as conditions allowed.

Table 3.2-3. Turbidity Monitoring Locations

Site ID	Site Description	Location [a] (Latitude/ Longitude)	Deployment Period	
			2022	2023
LVC-DSPP1	Lee Vining Creek 0.24 river mile downstream Poole Powerhouse [b]	37.944624°N / -119.211867°E	7/14–12/31	1/1–10/11
LVC-DSPP2	Lee Vining Creek 4.3 river miles downstream Poole Powerhouse near Lower Lee Vining Campground [b]	37.928425°N / -119.157087°E	7/14–12/31	1/1–10/11
LV-SIT	Lee Vining Creek inflow to Saddlebag Lake	37.979901°N / -119.285425°E	--[c]	7/4/–7/6, 8/30–9/3, 10/10–10/12
LV-WCT	Warren Creek upstream of its confluence with Lee Vining Creek	37.952261°N / -119.226192°E	--[c]	7/4–7/5, 8/28–8/30, 10/8–10/10
LV-GCT	Glacier Creek inflow to Tioga Lake	37.920850°N / -119.251320°E	--[c]	7/5/–7/6, 8/29–8/30, 10/8–10/10

-- = samples not collected/no data; ID = identification

[a] Datum: World Geodetic System 84

[b] Turbidity logger was relocated and secured to better withstand elevated spring flows on December 7, 2022. Deployment for LVC-DSPP1 location from July 15 to December 6, 2022, was at 37.94487°N, -119.21234°E and LVC-DSPP2 was at 37.93006°N, -119.16277°E.

[c] This monitoring location was added to the study in 2023; therefore, turbidity was not monitored at this location during 2022.

To assess natural background turbidity variations in Lee Vining Creek and Glacier Creek watersheds, continuously recording sondes (i.e., In situ Aquatroll 600 [spring and summer], YSI EXO [fall]) were deployed in 2023 at three locations upstream of the Project: (1) Lee Vining Creek inflow to Saddlebag Lake, (2) Glacier Creek inflow to Tioga Lake, and (3) Warren Creek upstream of its confluence with Lee Vining Creek (Figure 2.1-1; Table 3.2-3). Sondes were equipped with turbidity probes and deployed for 24- to 48-hour intervals during the 2023 spring, summer, and fall sampling events. Sondes were installed in the stream channel at a location that was flowing and well-mixed. The loggers recorded turbidity at 15- to 30-minute intervals. Turbidity probes were calibrated per manufacturer recommendations and verified with pre- and post-deployment checks. Spot measurements were made with a second, independently calibrated instrument (i.e., YSI EXO or Hach 2100Q) at the time of installation and removal of the sonde.

3.2.4. FISH TISSUE SAMPLING

Edible-sized fish were collected for mercury analysis at Saddlebag Lake (August 4), Tioga Lake (August 3), and Ellery Lake (August 2) in 2022 during implementation of Study AQ-1 (SCE, 2023a) (Table 2.1-1; Figure 2.1-1). Physical characteristics were recorded for each individual fish: weight, total length, fork length, and presence of any physical abnormalities. Each fish was individually tagged, wrapped in aluminum foil, placed in a labeled zipper-closure bag, and stored on dry ice at -20°C until transmittal to the Marine Pollution Studies Laboratory at Moss Landing Marine Laboratories (Moss Landing, California).

3.3. ANALYSIS

3.3.1. LABORATORY METHODS

Laboratory methods, detection limits, and reporting limits for general chemistry, nutrients, bacteria, and fish tissue mercury samples are identified in Table 3.3-1. California Laboratory Services (Rancho Cordova, California) analyzed general chemistry and nutrient samples, Silver State Laboratory (Reno, Nevada) analyzed bacteria samples, and Marine Pollution Studies Laboratory at Moss Landing Marine Laboratories (Moss Landing, California) analyzed fish tissue mercury samples.

Table 3.3-1. Analytical Parameters and Methods for the Water Quality Study

Parameter	Laboratory		
	Laboratory Method	Minimum Detection Limit or PQL	Reporting Limit
Basic Water Quality			
Total dissolved solids	SM 2540 C	5 mg/L	10 mg/L
Total suspended solids	SM 2540 D	2 mg/L	5 mg/L
Nutrients			
Nitrate-nitrite	USEPA 300.0	0.055 mg/L	0.4 mg/L
Ammonia as N	SM 4500-NH3F-J 2011	0.025 mg/L	0.1 mg/L
Total Kjeldahl nitrogen as N	SM 4500-NH3F-2011	0.04 mg/L	0.2 mg/L
Total phosphorous	SM 4500-PE	0.023 mg/L	0.05 mg/L
Orthophosphate	SM 4500-PE	0.0051 mg/L	0.15 mg/L
Bacteria			
Fecal Coliform	SM 9221 E, SM 9222 D [a]	1.8 MPN/100 mL, 2 cfu/100 mL	--
Escherichia coli (E. coli)	SM 9221 F	1.8 MPN/100 mL	--
Mercury in Fish Tissue			
Total mercury	USEPA method 7473	0.003 µg/g ww	0.010 µg/g ww

µg/g ww = microgram per gram wet weight; cfu = colony forming unit; mg/L = milligrams per liter; MPN = most probable number; PQL= practical quantification limit; USEPA = U.S. Environmental Protection Agency

[a] Two laboratory methods (SM 9221 E and SM 9222 D) were used to analyze fecal coliform samples due to laboratory error. The methods use two different mediums to estimate the number of bacteria in a water sample; method SM 9221 E (MPN/100 mL) uses a liquid medium, and method SM 9222 D (cfu/100 mL) uses a solid agar plate. For analysis, 1 MPN/100 mL is equivalent to 1 cfu/100 mL.

3.3.2. TURBIDITY MONITORING

Turbidity variations in response to hydro-resource optimization events were evaluated during summer low flow conditions in 2022; turbidity response to these events could not be evaluated in 2023 because record snow accumulation caused Ellery Lake to spill through July[5] and allowed continuous discharge through the powerhouse without any hydro-resource optimization. Turbidity data collected at Sites LVC-DSPP1 and LVC-DSPP2 were compared to discharge at the Poole Powerhouse Conduit Intake (U.S. Geological Survey gage 10287762).

Monitoring data from continuous turbidity loggers were plotted and reviewed for quality assurance. Data were designated as “qualified” or “rejected” based on known anomalous conditions of the loggers (e.g., periods of time turbidity loggers were out of water, periods when the loggers encased in ice, preventing independent spot checks) and when comparisons with spot measurement data indicated potential quality concerns. Data most representative of hydro-resource optimization conditions were identified at the beginning of the 2022 data record and during periods immediately following data downloads. Appendix C shows a comparison of in situ turbidity data collected prior to and after deployment, maintenance, or retrieval to spot measurement calibration readings.

4.0 STUDY RESULTS

4.1. WATER QUALITY

4.1.1. RESERVOIR WATER QUALITY

In situ and analytical water quality parameters were collected at three reservoirs (Saddlebag Lake, Ellery Lake, and Tioga Lake) during the spring (May/June), summer (July), and fall (October) of 2022 and 2023. Tabulated reservoir in situ data are provided in Appendix E. Analytical laboratory reports are provided in Appendix F.

4.1.1.1. Saddlebag Lake

SADDLEBAG LAKE—2022 RESULTS

Water temperature, DO, and pH exhibited seasonal variation in Saddlebag Lake (Figure 4.1-1). During the spring, extensive ice cover rendered the deepest area of the lake inaccessible, and in situ vertical profiles were measured at a location that was 5 meters deep. During the spring, water temperatures (4.2°C), DO (8.6 to 8.9 milligrams per liter [mg/L]), pH (6.5 to 6.7 standard units [s.u.]), specific conductivity (21 to 22 microSiemens

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[5] The period of record for 15-minute flow information at Pool Powerhouse Intake extended through July 2023 at the time of this reporting.

per centimeter [µS/cm]), and turbidity (0.4 to 0.5 nephelometric turbidity unit [NTU]) exhibited little variation with depth.

During the summer and fall, in situ parameters exhibited variation throughout the water column and thermal stratification was observed. Surface water temperatures were warmest during the summer (16.1°C), and bottom water temperatures were similar during the summer and fall (5.7°C). DO concentrations were less than 8 mg/L throughout the water column, except for an increase of DO (8.6 to 8.9 mg/L) in the metalimnion (10 to 17 meters) during the summer. During the fall, a chemocline[6] was observed, DO concentrations decreased between 15 to 23 meters, and hypoxic conditions (2 to 2.8 mg/L) were observed in the bottom 3 meters of the water column. Generally, pH concentrations were less than 7 s.u. During the summer, pH exhibited high variation between the surface (8 s.u.) and bottom (5.1 s.u.) of the water column. During the fall, pH (6.1 to 6.8 s.u.) exhibited less variation throughout the water column. Specific conductivity was low (20 to 34 µS/cm). During fall, a gradual increase in specific conductivity with depth was observed below the thermocline.

Total dissolved solids (TDS) were detected at low concentrations and total suspended solids (TSS) were below the laboratory detection limit in surface water grab samples collected during all seasons, as well as a deepwater (depth = 20 meters) sample collected during the fall (Table 4.1-1). Nitrate-nitrite and total Kjeldahl nitrogen were detected at low concentrations in surface waters during the spring, and ammonia and total Kjeldahl nitrogen were detected in surface and deep waters during the fall; total phosphorus and orthophosphate were below the laboratory detection limits (Table 4.1-2).

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[6] Chemocline refers to a vertical layer within a lake separating shallower and deeper waters with different properties, characterized by a gradient in DO, dissolved solids, or other chemical constituents.

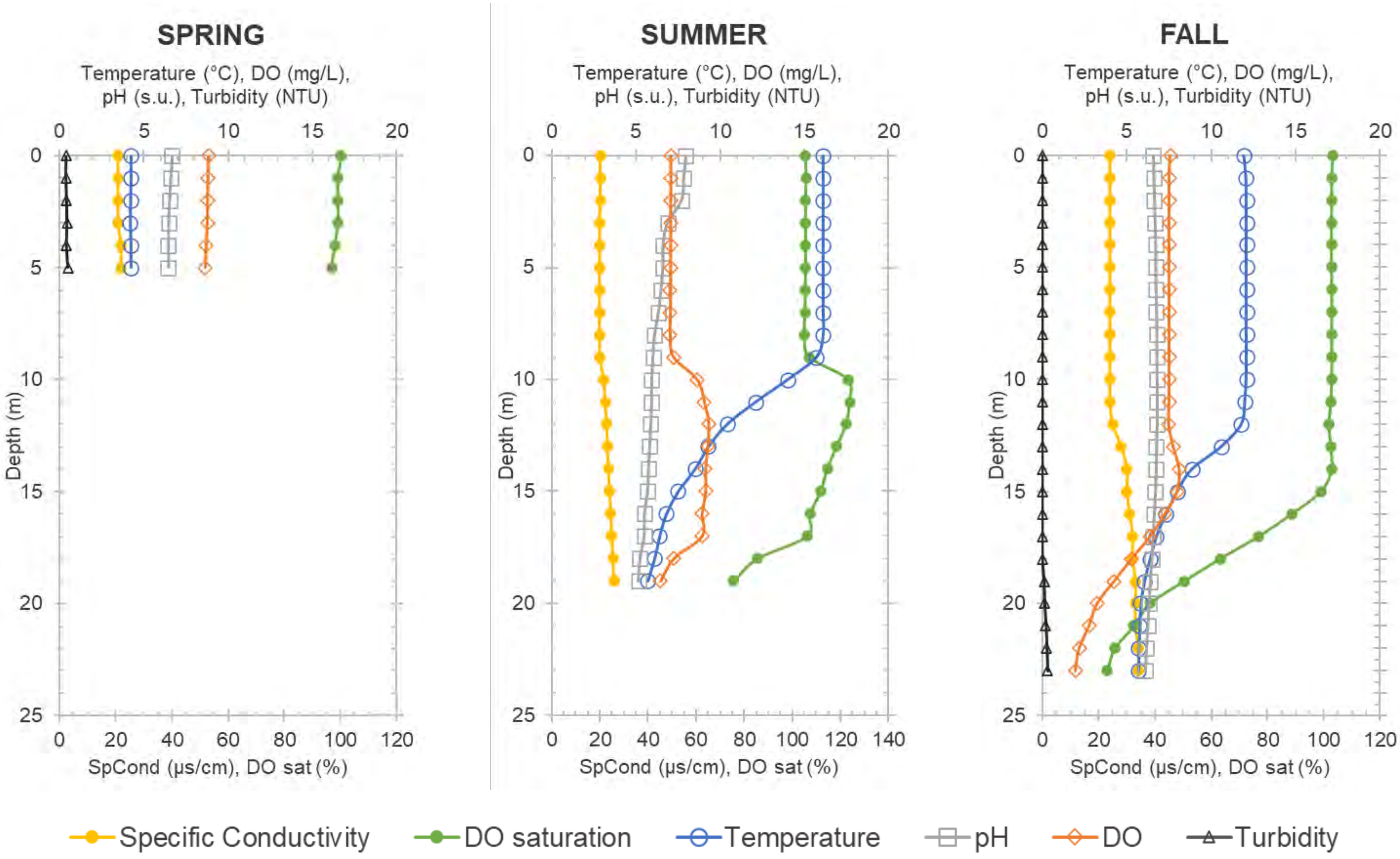

Figure 4.1-1. In Situ Water Quality Vertical Profiles Measured at Saddlebag Lake, 2022.

Table 4.1-1. Nutrient Results for Water Samples Collected at Reservoir and Stream Sites, 2022

Parameter			Nitrate+Nitrite-N (mg/L)			Ammonia-N (mg/L)			Total Kjeldahl Nitrogen (mg/L)			Total Phosphorus (mg/L)			Orthophosphate (mg/L)		
Site ID	**Site Description**	**Sample Depth**	**Spring**	**Summer**	**Fall**	**Spring**	**Summer**	**Fall**	**Spring**	**Summer**	**Fall**	**Spring**	**Summer**	**Fall**	**Spring**	**Summer**	**Fall**
Lee Vining Creek Watershed																	
LV-1	Lee Vining Creek inflow to Saddlebag Lake	Surface	0.12^{J}	<0.055	<0.055	<0.025	<0.025	0.073^{J}	0.065^{J}	0.25	0.19^{J}	<0.023	<0.023	<0.023	<0.0051^{HT-1}	<0.0051	<0.0051
LV-2	Saddlebag Lake	Surface	0.063^{J}	<0.055	<0.055	<0.025	<0.025	0.043^{J}	0.048^{J}	<0.040	0.34	<0.023	<0.023	<0.023	<0.0051^{HT-1}	<0.0051	<0.0051
		Deep	--	--	<0.055	--	--	0.033^{J}	--	--	0.17^{J}	--	--	<0.023	--	--	<0.0051
LV-3	Lee Vining Creek between Saddlebag Dam and its confluence with Slate Creek	Surface	0.075^{J}	<0.055	<0.055	0.036^{J}	<0.025	<0.025	0.057^{J}	<0.040	0.28	<0.023	<0.023	<0.023	0.026$^{A-COM, J}$	<0.0051	<0.0051
LV-4	Lee Vining Creek between its confluence with Slate Creek and Glacier Creek	Surface	0.077^{J}	<0.055	<0.055	0.038^{J}	<0.025	0.032^{J}	0.084^{J}	<0.040	0.19^{J}	<0.023	<0.023	<0.023	0.043$^{A-COM, J}$	<0.0051	<0.0051
LV-5	Lee Vining Creek between its confluence with Glacier Creek and Ellery Lake	Surface	0.076^{J}	0.055	<0.055	<0.025	0.034	0.026^{J}	0.081^{J}	0.46	0.34	<0.023	<0.023	<0.023	0.039$^{A-COM, J}$	0.051	<0.0051
LV-6	Lee Vining Creek inflow to Ellery Lake	Surface	0.074^{J}	0.057	<0.055	0.026^{J}	0.044	0.042^{J}	0.077^{J}	0.4	0.29	<0.023	<0.023	<0.023	0.006$^{A-COM, J}$	0.014	<0.0051
LV-7	Ellery Lake	Surface	0.062^{J}	<0.055	<0.055	<0.025	0.04	0.036^{J}	0.072^{J}	0.37	0.32	<0.023	<0.023	<0.023	<0.0051^{HT-1}	0.026	<0.0051
LV-8	Lee Vining Creek immediately downstream of Poole Powerhouse	Surface	0.065^{J}	<0.055	<0.055	<0.025	0.031	0.044^{J}	0.06^{J}	0.28	0.33	<0.023	<0.023	<0.023	0.018$^{A-COM, J}$	0.0099	0.027^{J}
LV-9	Lee Vining Creek upstream of the LADWP Diversion Dam	Surface	0.079^{J}	0.072	<0.055	<0.025	0.037	0.037^{J}	0.1^{J}	0.37	0.27	<0.023	<0.023	<0.023	<0.0051^{A-COM}	<0.0051	<0.0051
Glacier Creek Watershed																	
LV-10	Glacier Creek inflow to Tioga Lake	Surface	0.11^{J}	0.24	0.24	0.031^{J}	0.029	<0.025	0.11^{J}	0.21	0.25	<0.023	<0.023	<0.023	0.014^{J}	<0.0051	0.015^{J}
LV-11	Tioga Lake	Surface	0.087^{J}	0.057	<0.055	0.066^{J}	0.033	0.047^{J}	0.15^{J}	0.2	0.29	<0.023	<0.023	<0.023	0.026^{J}	0.0099	0.035^{J}
		Deep	--	--	<0.055	--	--	0.089^{J}	--	--	0.18^{J}	--	--	<0.023	--	--	<0.0051
LV-12	Glacier Creek downstream of Tioga Dam	Surface	0.082^{J}	<0.055	<0.055	0.054^{J}	<0.025	0.026^{J}	0.17^{J}	0.25	0.32	<0.023	<0.023	<0.023	0.018^{J}	0.034	0.011^{J}
Minimum Detection Limit			*0.055*	*0.055*	*0.055*	*0.025*	*0.025*	*0.025*	*0.04*	*0.04*	*0.04*	*0.023*	*0.023*	*0.023*	*0.0051*	*0.0051*	*0.0051*
Reporting Limit			*0.4*	*0.4*	*0.4*	*0.1*	*0.1*	*0.1*	*0.2*	*0.2*	*0.2*	*0.05*	*0.05*	*0.05*	*0.15*	*0.15*	*0.15*

-- = samples not collected, no data; A-COM = samples were run slightly out of hold time; HT-1 = sample was received outside the U.S. Environmental Protection Agency-recommended holding time; ID = identification; J = result is less than the reporting limit but greater than or equal to the detection limit, and the concentration is an approximate value; LADWP = Los Angeles Department of Water and Power; mg/L = milligrams per liter

Table 4.1-2. Basic Water Quality Results for Water Samples Collected at Reservoir and Stream Sites, 2022

Parameter			Total Dissolved Solids (mg/L)			Total Suspended Solids (mg/L)		
Site ID	**Site Description**	**Sample Depth**	**Spring**	**Summer**	**Fall**	**Spring**	**Summer**	**Fall**
Lee Vining Creek Watershed								
LV-1	Lee Vining Creek inflow to Saddlebag Lake	Surface	9^J	<10	16	<2.0	<2.0	<2.0
LV-2	Saddlebag Lake	Surface	21	14	14	<2.0	<2.0	<2.0
		Deep	--	--	29	--	--	<2.0
LV-3	Lee Vining Creek between Saddlebag Dam and its confluence with Slate Creek	Surface	15	14	20	<2.0	<2.0	<2.0
LV-4	Lee Vining Creek between its confluence with Slate Creek and Glacier Creek	Surface	12	15	23	<2.0	<2.0	<2.0
LV-5	Lee Vining Creek between its confluence with Glacier Creek and Ellery Lake	Surface	10	24	11	<2.0	<2.0	<2.0
LV-6	Lee Vining Creek inflow to Ellery Lake	Surface	15	25	26	<2.0	<2.0	<2.0
LV-7	Ellery Lake	Surface	12	18	25	<2.0	<2.0	<2.0
LV-8	Lee Vining Creek immediately downstream of Poole Powerhouse	Surface	21	18	38	<2.0	<2.0	<2.0
LV-9	Lee Vining Creek upstream of the LADWP Diversion Dam	Surface	23	34	44	<2.0	<2.0	<2.0
Glacier Creek Watershed								
LV-10	Glacier Creek inflow to Tioga Lake	Surface	23	36	43	<2.0	<2.0	<2.0
LV-11	Tioga Lake	Surface	17	21	34	<2.0	<2.0	<2.0
		Deep	--	--	39	--	--	2^J
LV-12	Glacier Creek downstream of Tioga Dam	Surface	22	20	35	<2.0	<2.0	<2.0
Minimum Detection Limit			*5*	*5*	*5*	*2*	*2*	*2*
Reporting Limit			*10*	*10*	*10*	*5*	*5*	*5*

-- = samples not collected/no data; ID = identification; J = result is less than the reporting limit but greater than or equal to the detection limit, and the concentration is an approximate value; LADWP = Los Angeles Department of Water and Power; mg/L = milligrams per liter

SADDLEBAG LAKE—2023 RESULTS

Seasonal variation was apparent in water temperature and DO vertical profiles measured in Saddlebag Lake during the summer and fall (Figure 4.1-2). During the spring, extensive ice cover and heavy snowpack on access roads rendered the lake inaccessible, so vertical profiles were not measured.

Thermal stratification was observed during the summer and fall 2023. Surface water temperatures were warmer during the summer (13.2°C) than the fall (9.6°C), and bottom temperatures were similar between the summer (4.3°C) and the fall (4.6°C). The thermocline decreased in depth from 6 meters during the summer to 13 meters during the fall. DO was between 7.8 mg/L to 9.7 mg/L (99.9 to 109 percent) in the upper 15 meters of the water column. A chemocline was observed during the spring and fall; DO concentrations increased in the metalimnion and decreased below 15 meters. Minimum DO concentrations (3.4 to 3.5 mg/L, 38 to 39 percent) were measured at the sediment-water interface. pH ranged from 5.1 to 7.3 s.u. and decreased with reservoir depth. During the summer, pH decreased by 0.8 s.u. in the 2 meters below the thermocline. Specific conductivity was low (18 to 30 µS/cm) in both seasons; below the thermocline, gradual increases were observed with depth. Lake water was consistently clear; the maximum turbidity concentration was 0.63 NTU.

In grab samples collected at the surface and deepwater during the summer and fall, TDS were detected at low concentrations (Table 4.1-3). TSS were below the method detection limit, except for the deepwater sample collected during the summer, which was detected at low concentrations. Nitrate-nitrite, total ammonia, total Kjeldahl nitrogen, and orthophosphate were detected at low concentrations in at least one sample collected per season; total phosphorus was below the detection limit (Table 4.1-4).

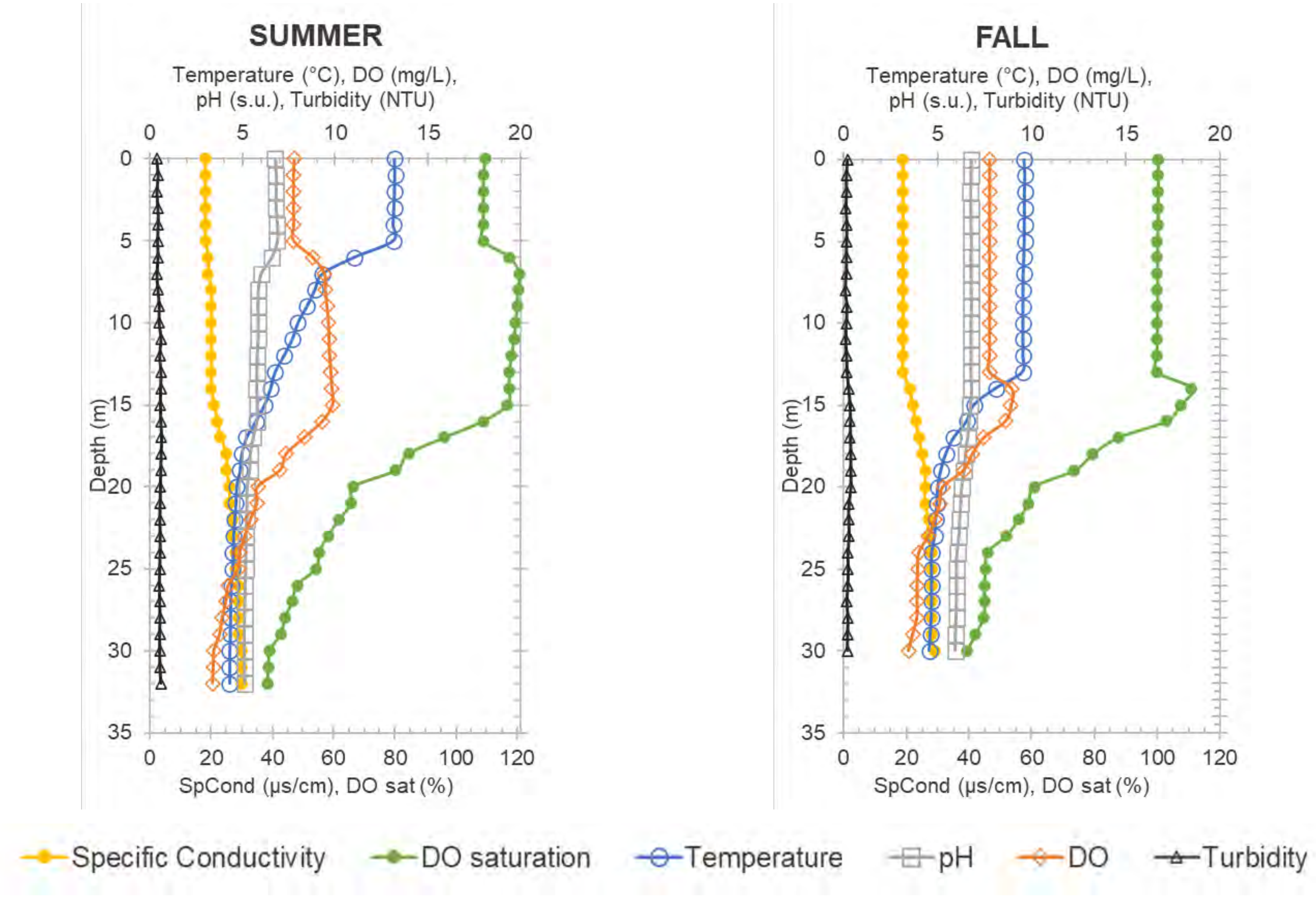

Figure 4.1-2. In Situ Water Quality Vertical Profiles Measured at Saddlebag Lake, 2023.

Table 4.1-3. Nutrient Results for Water Samples Collected at Reservoir and Stream Sites, 2023

Parameter			Nitrate+Nitrite-N (mg/L)			Total Ammonia-N (mg/L)			Total Kjeldahl Nitrogen (mg/L)			Total Phosphorus (mg/L)			Orthophosphate (mg/L)		
Location	**Site ID**	**Sample Depth**	**Spring**	**Summer**	**Fall**	**Spring**	**Summer**	**Fall**	**Spring**	**Summer**	**Fall**	**Spring**	**Summer**	**Fall**	**Spring**	**Summer**	**Fall**
Lee Vining Creek Watershed																	
Lee Vining Creek inflow to Saddlebag Lake	LV-1	Surface	--	<0.055	<0.055	--	0.031^{J}	<0.025	--	0.11^{J}	0.22	--	<0.023	<0.023	--	0.04^{J}	<0.0051
Saddlebag Lake	LV-2	Surface	--	<0.055	<0.055	--	0.067^{J}	<0.025	--	0.085^{J}	0.12^{J}	--	<0.023	<0.023	--	0.019^{J}	0.020^{J}
		Deep	--	0.073^{J}	0.059^{J}	--	0.031^{J}	0.026^{J}	--	0.071^{J}	0.15^{J}	--	<0.023	<0.023	--	<0.0051	0.024^{J}
Lee Vining Creek between Saddlebag Dam and its confluence with Slate Creek	LV-3	Surface	--	<0.055	0.075^{J}	--	<0.025	<0.025	--	0.23	0.10^{J}	--	<0.023	<0.023	--	<0.0051	<0.0051
Lee Vining Creek between its confluence with Slate Creek and Glacier Creek	LV-4	Surface	<0.055	<0.055	0.078^{J}	0.038^{J}	<0.025	<0.025	0.14^{J}	0.2	0.12^{J}	<0.023	<0.023	<0.023	<0.0051	<0.0051	0.028^{J}
Lee Vining Creek between its confluence with Glacier Creek and Ellery Lake	LV-5	Surface	<0.055	<0.055	0.10^{J}	0.045^{J}	<0.025	<0.025	0.10^{J}	<0.040	0.081^{J}	<0.023	<0.023	<0.023	0.04^{J}	<0.0051	<0.0051
Lee Vining Creek inflow to Ellery Lake	LV-6	Surface	<0.055	<0.055	0.08^{J}	<0.025	<0.025	<0.025	<0.040	<0.040	0.099^{J}	<0.023	<0.023	<0.023	<0.0051	<0.0051	0.016^{J}
Ellery Lake	LV-7	Surface	<0.055	<0.055	<0.055	<0.025	<0.025	<0.025	<0.040	<0.040	<0.040	<0.023	<0.023	<0.023	<0.0051	<0.0051	<0.0051
		Deep	<0.055	<0.055	<0.055	<0.025	<0.025	<0.025	0.25	<0.040	<0.040	<0.023	<0.023	<0.023	<0.0051	<0.0051	<0.0051
Lee Vining Creek immediately downstream of Poole Powerhouse	LV-8	Surface	<0.055	<0.055	0.077^{J}	0.03^{J}	<0.025	0.038^{J}	0.081^{J}	<0.040	0.10^{J}	<0.023	<0.023	<0.023	0.0066^{J}	<0.0051	0.020^{J}
Lee Vining Creek upstream of the LADWP Diversion Dam	LV-9	Surface	<0.055	<0.055	0.13^{J}	0.031^{J}	<0.025	<0.025	0.065^{J}	0.27	0.26	<0.023	<0.023	<0.023	0.023^{J}	<0.0051	<0.0051
Glacier Creek Watershed																	
Glacier Creek inflow to Tioga Lake	LV-10	Surface	0.071^{J}	<0.055	0.16^{J}	0.033^{J}	<0.025	0.026^{J}	<0.040	<0.040	0.14^{J}	<0.023	<0.023	<0.023	0.011^{J}	<0.0051	0.028^{J}
Tioga Lake	LV-11	Surface	--	<0.055	<0.055	--	<0.025	<0.025	--	0.3	0.31	--	<0.023	<0.023	--	<0.0051$^{\text{HT-B2}}$	<0.0051
		Deep	--	<0.055	<0.055	--	0.12	<0.025	--	0.28	<0.040	--	<0.023	<0.023	--	<0.0051$^{\text{HT-B2}}$	<0.0051
Glacier Creek downstream of Tioga Dam	LV-12	Surface	<0.055	<0.055	0.075^{J}	0.043	<0.025	<0.025	0.14^{J}	<0.040	0.12^{J}	<0.023	<0.023	<0.023	<0.0051	<0.0051	<0.0051
Minimum Detection Limit			*0.055*			*0.025*			*0.04*			*0.023*			*0.0051*		
Reporting Limit			*0.4*			*0.1*			*0.2*			*0.05*			*0.15*		

-- = samples not collected, no data; HT-B2 = samples run outside the holding time; ID = identification; J = result is less than the reporting limit but greater than or equal to the detection limit, and the concentration is an approximate value; LADWP = Los Angeles Department of Water and Power; mg/L = milligrams per liter

Table 4.1-4. Basic Water Quality Results for Water Samples Collected at Reservoir and Stream Sites, 2023

Parameter	**Total Dissolved Solids (mg/L)**	**Total Suspended Solids (mg/L)**						
Location	**Site ID**	**Sample Depth**	**Spring**	**Summer**	**Fall**	**Spring**	**Summer**	**Fall)**
Lee Vining Creek Watershed								
Lee Vining Creek inflow to Saddlebag Lake	LV-1	Surface	--	<5	13	--	2.0^{J}	<2.0
Saddlebag Lake	LV-2	Surface	--	8.0^{J}	19	--	<2.0	<2.0
		Deep	--	25	21	--	3.8^{J}	<2.0
Lee Vining Creek between Saddlebag Dam and its confluence with Slate Creek	LV-3	Surface	--	13	14	--	<2.0	<2.0
Lee Vining Creek between its confluence with Slate Creek and Glacier Creek	LV-4	Surface	13	12	17	<2.0	<2.0	<2.0
Lee Vining Creek between its confluence with Glacier Creek and Ellery Lake	LV-5	Surface	10	20	28	<2.0	<2.0	<2.0
Lee Vining Creek inflow to Ellery Lake	LV-6	Surface	18	28	22	<2.0	<2.0	<2.0
Ellery Lake	LV-7	Surface	18	12	20	<2.0	<2.0	<2.0
		Deep	16	12	20	<2.0	<2.0	<2.0
Lee Vining Creek immediately downstream of Poole Powerhouse	LV-8	Surface	11	<5	19	<2.0	<2.0	<2.0
Lee Vining Creek upstream of the LADWP Diversion Dam	LV-9	Surface	14	31	38	4.5^{J}	4.5	<2.0
Glacier Creek Watershed								
Glacier Creek inflow to Tioga Lake	LV-10	Surface	22	37	22	4.0^{J}	<2.0	<2.0
Tioga Lake	LV-11	Surface	--	20	21	--	<2.0	<2.0
		Deep	--	15	25	--	<2.0	6
Glacier Creek downstream of Tioga Dam	LV-12	Surface	12	24	27	<2.0	<2.0	<2.0
Minimum Detection Limit	*5*	*2*						
Reporting Limit	*10*	*5*						

-- = samples not collected/no data; ID = identification; LADWP = Los Angeles Department of Water and Power; mg/L = milligrams per liter

4.1.1.2. Ellery Lake

ELLERY LAKE—2022 RESULTS

Water quality conditions in Ellery Lake exhibited little seasonal variation (Figure 4.1-3). In situ parameters were uniform throughout the shallow (3 to 4 meters) water column. Neither a thermocline nor chemocline were observable. DO concentrations in Ellery Lake were highest during the spring (8.6 to 8.9 mg/L) and lowest during the summer (7.0 to 7.1 mg/L) when water temperatures were coolest (7.4 to 7.5°C) and warmest (16.4 to 16.8 C), respectively. Measured pH was 6.9 to 7.6 s.u. and highest during the summer. Specific conductivity (19 to 33 µS/cm) was low during all seasons. Turbidity was low during the spring (0.3 to 0.4 NTU).

In surface water grab samples, TDS were detected at low concentrations and TSS were below the laboratory detection limit (Table 4.1-1). Nutrient concentrations in surface water samples varied between seasons (Table 4.1-2). Nitrate-nitrite was detected at low concentrations during the spring, ammonia during the summer and fall, total Kjeldahl nitrogen during all seasons, and orthophosphate during the summer. Total phosphorus was below the laboratory detection limits during all seasons.

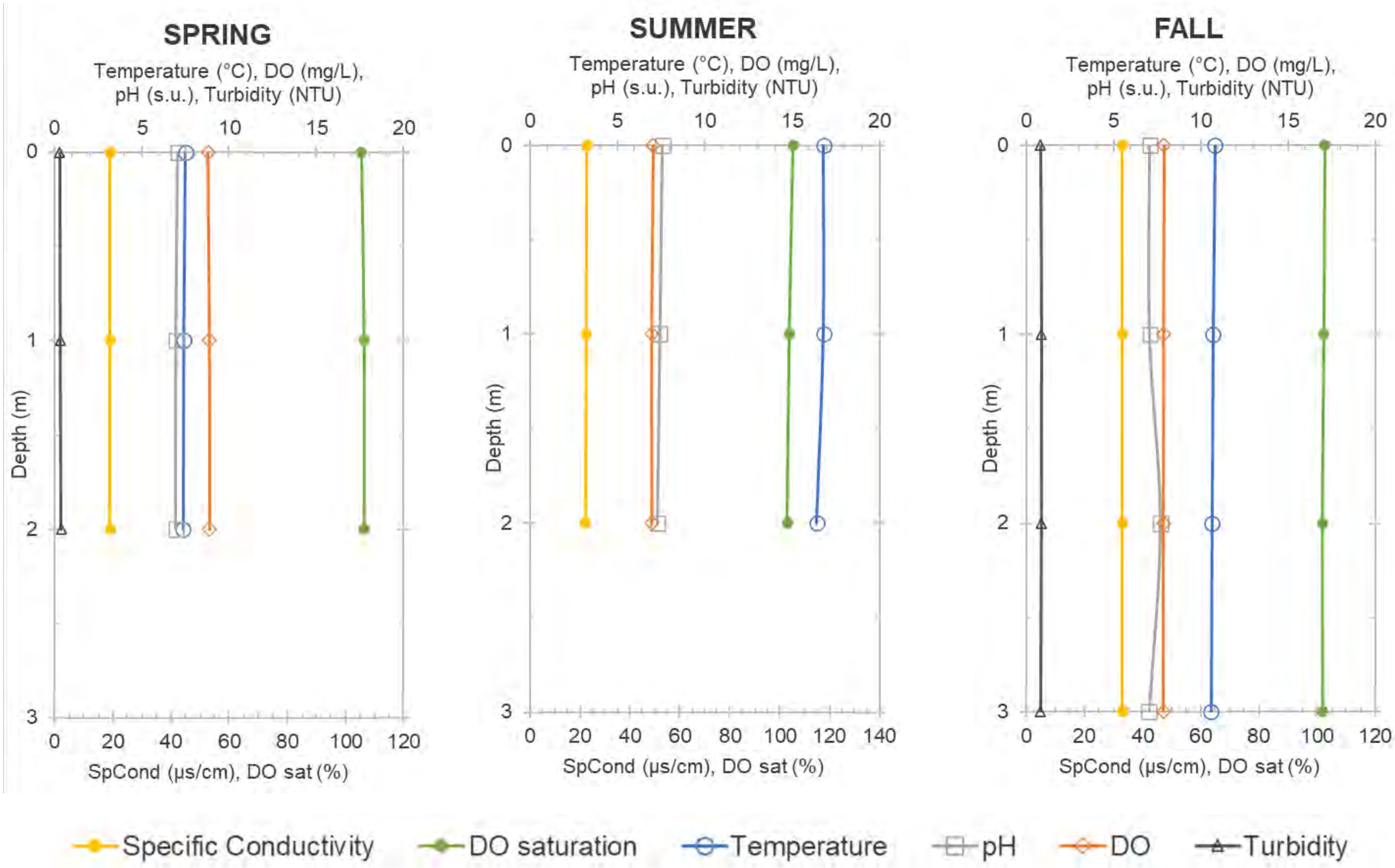

Figure 4.1-3. In Situ Water Quality Vertical Profiles Measured at Ellery Lake, 2022.

ELLERY LAKE—2023 RESULTS

In situ parameters generally exhibited little variation throughout the shallow (3 meter) water column (Figure 4.1-4). Seasonal variation was observed in temperature, specific conductivity, and DO.

During the spring and summer, temperatures gradually decreased with depth. Surface waters in the spring (6.5°C) were approximately 2°C warmer than the rest of the water column (4.6°C to 4.8°C). Summer temperatures ranged from 9.2°C at the surface to 8.6°C at the bottom. During the fall, water temperatures were similar throughout the water column (6.6°C to 6.8°C). DO was greater than 8 mg/L (greater than 99 percent). DO concentrations were similar throughout the water column during the spring and summer. During the fall, the DO concentration measured at the surface (9.4 mg/L; 110 percent) was higher than the rest of the water column (8.4 to 8.6 mg/L; 99 to 101 percent). pH was lowest during the spring (5.9 to 6.2 s.u.) and was otherwise generally neutral (6.9 to 7.3 s.u.). Specific conductivity (16 to 23 µS/cm) was low during all seasons. Turbidity was low throughout all sampling events, with a maximum reading of 0.61 NTU.

TDS were detected at low levels in both the surface and deepwater samples collected at Ellery Lake during the spring, summer, and fall (Table 4.1-3). TSS were below the detection limit in Ellery Lake. Total Kjeldahl nitrogen was detected at low levels in the deep sample collected during the spring (Table 4.1-4). No other nutrients were measured at levels exceeding the method detection limit.

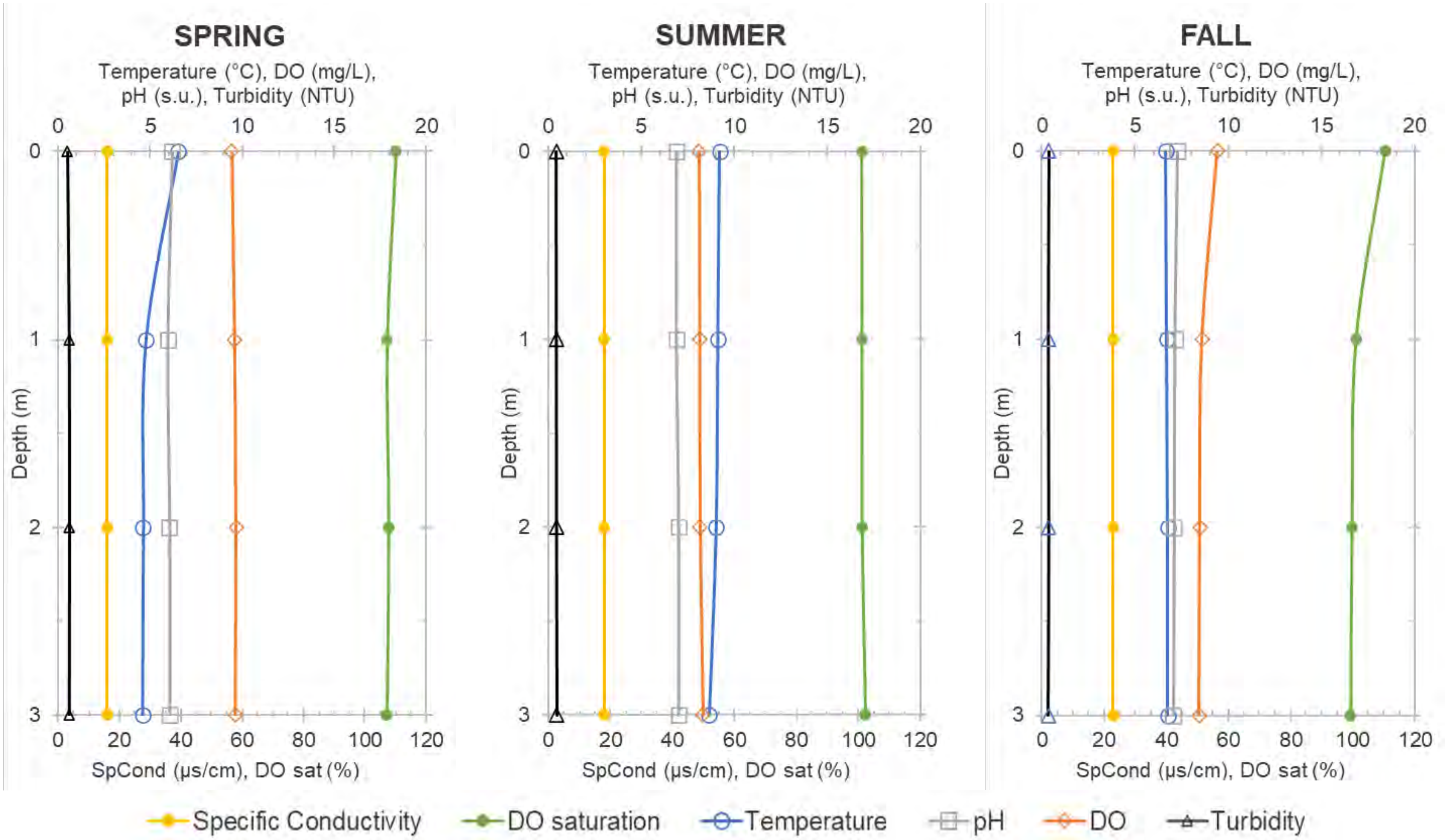

Figure 4.1-4. In Situ Water Quality Vertical Profiles Measured at Ellery Lake, 2023.

4.1.1.3. Tioga Lake

TIOGA LAKE—2022 RESULTS

Water temperature, DO, and pH exhibited seasonal variation in Tioga Lake (Figure 4.1-5). During the spring, water temperatures (5.1 to 5.8°C), DO (7.8 to 8.3 mg/L), pH (6.4 to 6.8 s.u.), specific conductivity (23 µS/cm), and turbidity (0.5 to 0.6 NTU) exhibited little variation with depth.

During the summer and fall, in situ parameters exhibited variation throughout the water column. Thermal stratification was observed; surface water temperatures were warmest during the summer (16.3°C) and bottom water temperatures were similar during the summer and fall (approximately 7°C). DO concentrations were generally less than or equal to 8 mg/L throughout the water column, except for an increase of DO (7.8 to 8.6 mg/L) in the metalimnion (8 to 12 meters) during the summer. A chemocline was observed at approximately 12 meters from the surface and hypoxic conditions (less than 3 mg/L) were observed. Anoxia (less than 0.5 mg/L) was observed in the bottom 4 meters of the water column during the fall. pH exhibited high variation between the surface (summer = 7.9 s.u. and fall = 7.8 s.u.) and bottom (summer = 5.5 s.u. and fall = 6.2 s.u.) of the water column. Specific conductivity was low (23 to 42 µS/cm), with some variation with depth below the thermocline.

In surface water grab samples collected during all seasons and a deepwater (depth = 18 meters) sample collected during the fall, TDS were detected at low concentrations and TSS were at or below the laboratory detection limits (Table 4.1-1). Total Kjeldahl nitrogen, ammonia, and orthophosphate were detected during all seasons; nitrate was detected during the spring and summer; and total phosphorus was below the laboratory detection limits during all seasons (Table 4.1-2).

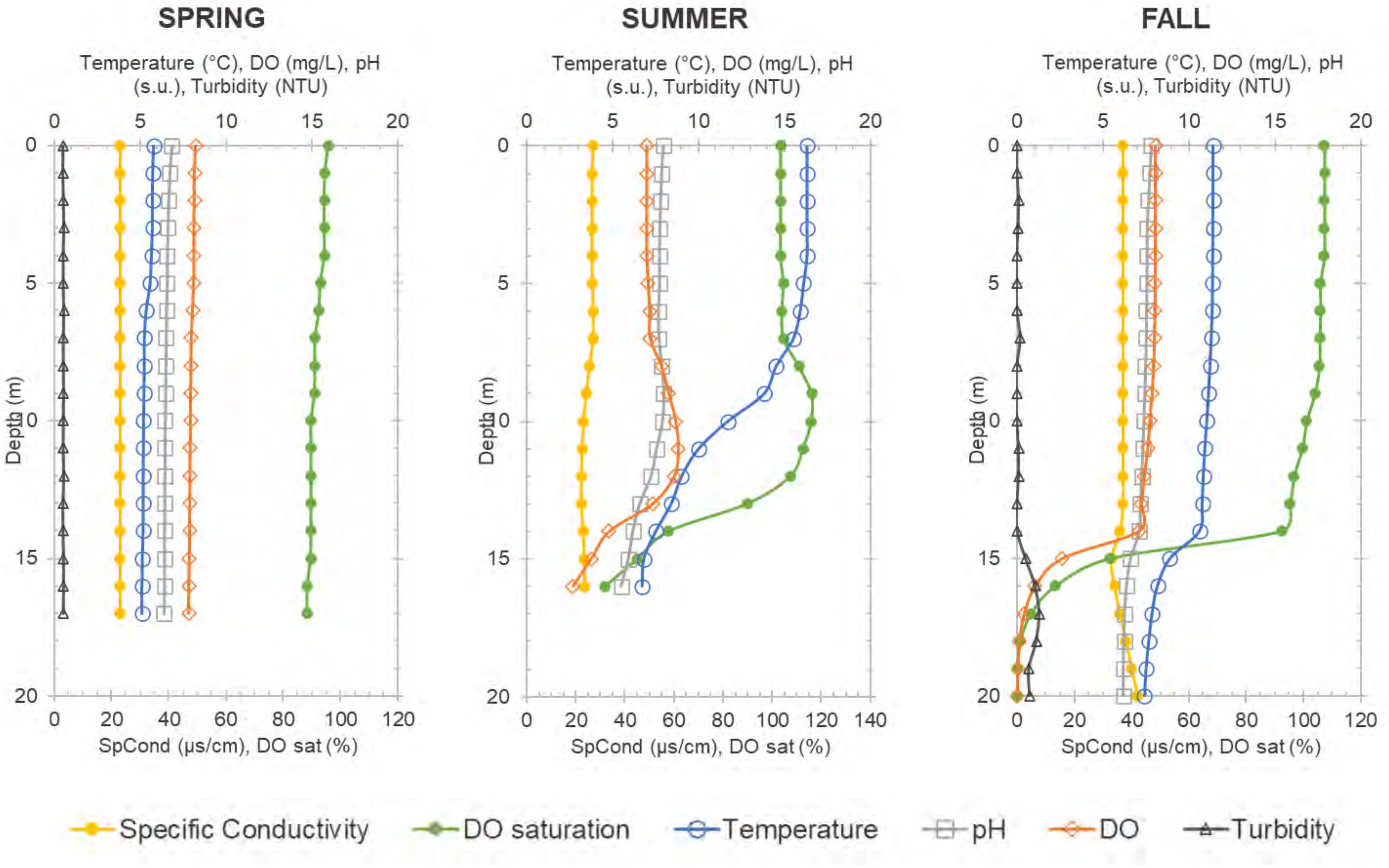

Figure 4.1-5. In Situ Water Quality Vertical Profiles Measured at Tioga Lake, 2022.

TIOGA LAKE—2023 RESULTS

Seasonal variation was apparent in water temperature and DO vertical profiles measured at Tioga Lake during the summer and fall (Figure 4.1-6). During the spring, extensive ice cover and a heavy snowpack on access roads rendered the lake inaccessible, so vertical profiles were not measured.

Thermal stratification was observed during the summer and fall sampling events. The thermocline decreased in depth from 10 meters during the summer to 15 meters during the fall. Surface water temperatures decreased from 10.9°C during the summer to 8.1°C during the fall, while deepwater temperatures increased slightly from a minimum of 4.6°C during the summer to 5.3°C during the fall. A chemocline was observed at approximately the same depth as the thermocline during the spring and fall. DO concentrations were similar throughout the epilimnion during the summer (7.8 to 8.0 mg/L or 101 to 103 percent) and fall (7.4 to 8.4 mg/L or 90 to 102 percent). Below the thermocline, DO decreased with depth and reached hypoxic levels (less than 2 mg/L) in the lowest 4 to 5 meters of the profiles. Anoxia (less than 0.5 mg/L) was observed at the sediment-water interface during the fall. pH decreased with depth with a maximum of 6.9 s.u. near the surface to a minimum of 5.1 s.u. in the hypolimnion. Specific conductivity was low (23 to 32 µS/cm) during both seasons. Turbidity was generally low (less than 1 NTU) with a small increase in the lowest 4 meters of the lake to a maximum of 1.43 NTU during the fall.

TDS were detected at low concentrations in grab samples taken at the surface and bottom of the lake during the summer and fall (Table 4.1-3). TSS were below the method detection limit, except for the deep sample collected during the fall, where a low-level detection was reported. Low-level detections of total ammonia and total Kjeldahl nitrogen were found in the bottom sample collected during the summer (Table 4.1-4). Total Kjeldahl nitrogen was detected at low levels at the surface of Tioga Lake in both the summer and fall.

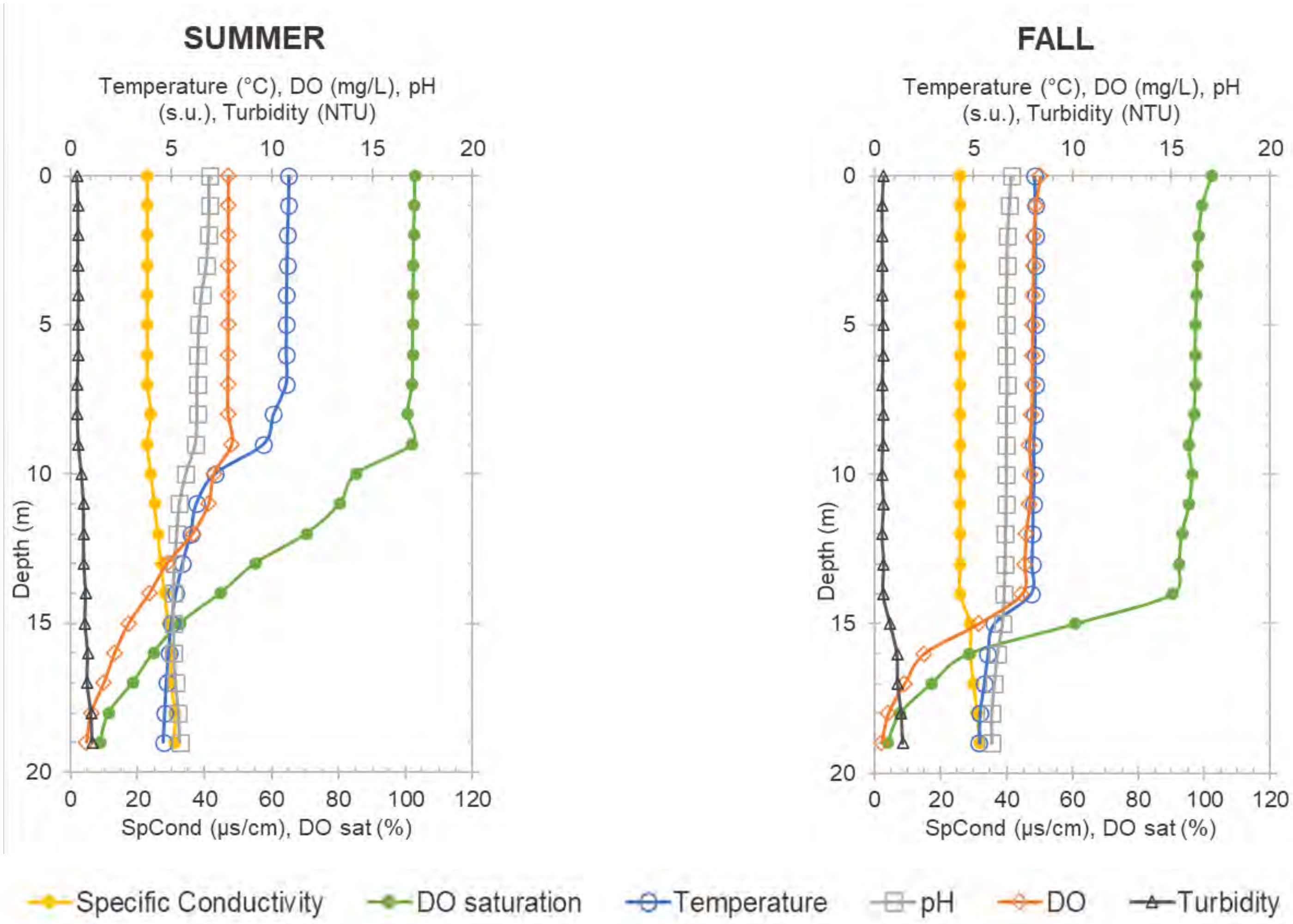

Figure 4.1-6. In Situ Water Quality Vertical Profiles Measured at Tioga Lake, 2023.

4.1.2. STREAM WATER QUALITY

In situ and analytical water quality parameters were collected at seven sites in Lee Vining Creek and two sites in Glacier Creek during the spring (May/June), summer (July), and fall (October) of 2022 and 2023.

4.1.2.1. Lee Vining Creek

Across both study years, in situ water quality was generally similar across stream sampling sites and exhibited some seasonal variability (Table 4.1-5 and Table 4.1-6). Water temperatures in Lee Vining Creek were coldest during the spring and warmest during the summer. DO concentrations were generally higher during the cool spring months and lower during the summer months when water temperatures were warmer.

LEE VINING CREEK—2022 RESULTS

During the first study season, pH exhibited seasonal variation and was higher during the summer. Specific conductivity was low throughout Lee Vining Creek (18 to 59 µS/cm), and concentrations at the inlet to Saddlebag Lake (Site LV-1) were considerably lower than other sites (8 to 11 µS/cm). Turbidity was low during the spring throughout the Lee Vining Creek watershed.

TDS in Lee Vining Creek surface water grab samples were detected in low concentrations at all sites (Table 4.1-2). TDS were generally lower at sites upstream of Saddlebag Lake and Ellery Lake compared with sites downstream of Ellery Lake. Turbidity was highest during the spring at samples collected upstream of the Los Angeles Department of Water and Power (LADWP) Diversion Dam (Site LV-9). TSS were below the laboratory detection limit at all sites during all seasons.

Nutrient concentrations were generally low and exhibited some seasonal variability (Table 4.1-1). Nitrate-nitrite and orthophosphate were detected at more sites at generally higher concentrations during the spring and below the detection limit during the fall, except for orthophosphate immediately downstream of Poole Powerhouse (Site LV-8). Ammonia was detected at three sites during the spring and all sites during the fall. Total Kjeldahl nitrogen was detected at all sites during all seasons, except summer samples collected between Saddlebag Dam and its confluence with Slate Creek (Site LV-3) and between its confluence with Slate Creek and Glacier Creek (Site L-4) during the summer. Total phosphorus was below the laboratory detection limits.

Table 4.1-5. In Situ Water Quality Parameters Measured at Stream Sites in Spring, Summer, and Fall 2022

Parameter			**Water** Temperature (°C)			DO (mg/L)			DO (% saturation)			pH (s.u.)			Specific Conductivity (µS/cm)			Turbidity (NTU)		
Site ID	**Location**	**Sample Depth**	**Spring**	**Summer**	**Fall**	**Spring**	**Summer**	**Fall**	**Spring**	**Summer**	**Fall**	**Spring**	**Summer**	**Fall**	**Spring**	**Summer**	**Fall**	**Spring**	**Summer** [a]	**Fall**
Lee Vining Creek Watershed																				
LV-1	Lee Vining Creek inflow to Saddlebag Lake	Surface	5.9	16.9	9.3	9.0	6.8	8.1	106	104	104	6.9	8.7	6.7	9	8	11	0.84	--	0^{Q}
LV-3	Lee Vining Creek between Saddlebag Dam and its confluence with Slate Creek	Surface	4.1	16.1	12.3	9.0	6.9	7.4	101	103	102	6.8	7.6	6.7	23	21	25	0.66	--	0.02^{Q}
LV-4	Lee Vining Creek between its confluence with Slate Creek and Glacier Creek	Surface	2.5	18.4	13.5	9.8	6.7	7.5	103	103	104	6.7	7.1	6.8	18	19	25	0.36	--	0^{Q}
LV-5	Lee Vining Creek between its confluence with Glacier Creek and Ellery Lake	Surface	1.9	14.8	12.9	10.0	7.3	7.6	104	104	104	6.8	7.4	6.7	20	27	38	0.40	--	0.04^{Q}
LV-6	Lee Vining Creek inflow to Ellery Lake	Surface	2.1	14.2	12.7	9.9	7.3	7.8	103	103	106	7.0	7.4	7.0	21	20	39	0.34	--	4.1^{Q}
LV-8	Lee Vining Creek immediately downstream of Poole Powerhouse	Surface	5.5	16.8	10.7	9.0	7.5	8.4	96	104	102	7.0	7.4	7.1	29	24	34	0.32	--	0.3^{Q}
LV-9	Lee Vining Creek upstream of the LADWP Diversion Dam	Surface	4.8	13.6	10.5	9.9	8.5	9.0	101	108	106	7.3	7.9	7.4	35	41	59	0.68	--	2.6^{Q}
Glacier Creek Watershed																				
LV-10	Glacier Creek inflow to Tioga Lake	Surface	7.6	16.0	4.9	8.7	6.9	9.2	105	101	104	7.2	8.3	6.7	29	26	58	0.24	--	0.4^{Q}
LV-12	Glacier Creek downstream of Tioga Dam	Surface	6.0	10.8	11.7	8.4	7.4	8.0	97	97	107	6.8	7.1	7.2	23	38	37	0.53	--	0.3^{Q}

% = percent; °C = degrees Celsius; µS/cm = microSiemens per centimeter; DO = dissolved oxygen; ID = identification; mg/L = milligrams per liter; NTU = nephelometric turbidity units; Q = Data qualified based on post-calibration checks. If turbidity measurements were less than zero, data were reported as zero; s.u. = standard units

[a] Turbidity not measured during the summer due to a probe malfunction.

Table 4.1-6. In Situ Water Quality Parameters Measured at Stream Sites in Spring, Summer, and Fall 2023

Parameter			**Water Temperature (°C)**			**DO (mg/L)**			**DO (% saturation)**			**pH (s.u.)**			**Specific Conductivity (µS/cm)**			**Turbidity (NTU)**		
Site ID	**Location**	**Sample Depth**	**Spring**	**Summer**	**Fall**	**Spring**	**Summer**	**Fall**	**Spring**	**Summer**	**Fall**	**Spring**	**Summer**	**Fall**	**Spring**	**Summer**	**Fall**	**Spring**	**Summer**	**Fall**
Lee Vining Creek Watershed																				
LV-1	Lee Vining Creek inflow to Saddlebag Lake	Surface	--	12.1	5.5	--	7.6^{Q}	8.5	--	104^{Q}	99	--	6.0	7.2	--	7	9	--	1.1	0.42
LV-3	Lee Vining Creek between Saddlebag Dam and its confluence with Slate Creek	Surface	--	11.6	9.8	--	8.2^{Q1}	8.0	--	107^{Q1}	103	--	6.6	7.3	--	18	19	--	0.5	0.35
LV-4	Lee Vining Creek between its confluence with Slate Creek and Glacier Creek	Surface	3.3	8.4	9.8	10.9	8.8^{Q1}	8.1	115	103^{Q1}	102	7.0	6.5	7.2	16	14	18	0.49	0.35	0.35
LV-5	Lee Vining Creek between its confluence with Glacier Creek and Ellery Lake	Surface	4.3	10	8.1	10.7	8.6^{Q1}	8.3	116	103^{Q1}	102	7.1	6.6	7.3	16	17	24	0.49	0.29	0.41
LV-6	Lee Vining Creek inflow to Ellery Lake	Surface	5.4	11.7	7.9	9.3	8.0	8.4	106	103	102	6.5	6.9	7.4	16	17	22	0.53	0.31	0.32
LV-8	Lee Vining Creek immediately downstream of Poole Powerhouse	Surface	5.1	12.7	9.1	9.7	8.1	8.8	103	101	103	6.7	7.1	7.3	17	18	24	0.73	0.36	0.40
LV-9	Lee Vining Creek upstream of the LADWP Diversion Dam	Surface	7.5	8.9	7.1	9.3	9.2	9.5	103	102	103	6.9	7.3	7.6	25	36	49	1.7	0.81	0.63
Glacier Creek Watershed																				
LV-10	Glacier Creek inflow to Tioga Lake	Surface	3.7	6.3	2.6	9.3	9.2	9.3	103	105	99	6.6	6.8	7.5	18	31	37	0.64	0.23	0.33
LV-12	Glacier Creek downstream of Tioga Dam	Surface	3.2	13.4	9.6	10.7	7.6^{Q1}	8.2	113	101^{Q1}	104	6.6	7.0	7.2	16	23	25	0.5	0.34	0.40

-- = measurements not collected/no data; % = percent; µS/cm = microsiemens per centimeter; °C = degrees Celsius; DO = dissolved oxygen; ID = identification; mg/L = milligrams per liter; NTU = nephelometric turbidity units; s.u. = standard units; Q =Data qualified. Post-sampling calibration check values not recorded; Q1= DO concentrations were corrected based on post-calibration checks

LEE VINING CREEK—2023 RESULTS

During the second study season, pH exhibited seasonal variation and was higher during the fall than during the spring and summer. Specific conductivity was low throughout Lee Vining Creek (7 to 49 µS/cm); concentrations at the inlet to Saddlebag Lake (Site LV-1) were considerably lower than other sites (7 to 9 µS/cm). Turbidity was low (less than 2 NTU) throughout all sampling events in the Lee Vining Creek watershed.

TDS exhibited seasonal variability and were generally highest during the fall (Table 4.1-3). TSS were at or below the method detection limit at all sites, except upstream of the LADWP Diversion Dam during the spring and summer.

Nutrient concentrations were generally low and exhibited some seasonal variability (Table 4.1-4). Nitrate-nitrite concentrations were higher during the fall; total ammonia concentrations were generally higher during the spring; total Kjeldahl nitrogen concentrations were similar during all seasons; and orthophosphate concentrations were generally lower during the summer. Total phosphorus was below the detection limit.

4.1.2.2. Glacier Creek

Across both study years, in situ water quality in Glacier Creek was generally similar across stream sampling sites and exhibited some seasonal variability (Table 4.1-5 and Table 4.1-6). During 2022 and 2023, specific conductivity, turbidity, TDS, TSS, and nutrient concentrations were low (Table 4.1-1, Table 4.1-2, Table 4.1-3, and Table 4.1-4).

GLACIER CREEK—2022 RESULTS

Water temperatures in Glacier Creek were coldest during the spring and warmest during the summer. Water temperatures were generally higher at the Glacier Creek inflow to Tioga Lake (Site LV-10) than downstream of Tioga Dam (Site LV-12). DO concentrations were generally higher during the cool winter months and lower during the summer months when water temperatures were warmest. pH was variable and ranged from 6.7 to 8.3 s.u.

Nutrient concentrations were low but exhibited some variability by parameter (Table 4.1-2). Total Kjeldahl nitrogen, ammonia, and orthophosphate were generally similar upstream and downstream of Tioga Lake. Nitrate-nitrite concentrations were highest during the summer and fall at the site upstream of Tioga Lake (Site LV-10). Total phosphorus was below the laboratory detection limits.

GLACIER CREEK—2023 RESULTS

Water temperatures in Glacier Creek were warmest during the summer. DO concentrations were similar across seasons at the inflow to Tioga Lake; downstream of Tioga Dam, DO was highest during the spring when water temperatures were cool. pH was highest during the fall and lower during the spring and summer. Specific conductivity (16 to 37 µS/cm) and turbidity (0.23 to 0.64 NTU) were low.

Nutrient concentrations were generally low but exhibited some variability by parameter (Table 4.1-4). All nutrient concentrations were below the method detection limit in samples collected during the summer. Nutrient concentrations were generally higher during spring and fall at the site upstream of Tioga Lake (Site LV-10).

4.2. BACTERIA

4.2.1. 2022 RESULTS

Saddlebag Lake, Ellery Lake, and Tioga Lake generally showed low levels of fecal coliform in surface water grab samples collected between September 15 and October 5, 2022. Fecal coliform densities were less than or equal to 20 cfu/100 mL except for samples collected at all sites on September 15, 2022 (49 to 350 most probable number [MPN]/100 mL) (Table 4.2-1). The log mean of bacterial density for the five replicate samples ranged from 4 cfu/100 mL (Site LV-B2) to 6.9 cfu/100 mL (Site LV-B3) (Table 4.2-1). Laboratory reports are provided in Appendix G.

Table 4.2-1. Fecal Coliform Bacteriological Sampling Results, 2022

Parameter		**Fecal Coliform (2022)** [a]					
Site ID	**Site Description**	**cfu/100 mL**					
		9/15[b]	**9/20**	**9/21**	**10/4**	**10/5**	**Log Mean** [c,d]
LV-B1	Saddlebag Lake near Saddlebag Campground	350	<2	<2	6	<2	4.6
LV-B2	Tioga Lake near Tioga Lake Campground	540	<2	<2	<2	<2	4.0
LV-B3	Ellery Lake near Ellery Lake Campground	49	4	20	<2	<2	6.9
	PQL	*1.8*	*2*	*2*	*2*	*2*	*na*

cfu/100 mL = number of colony forming units per 100 milliliters; ID = identification; MPN/100 mL= most probable number per 100 milliliters; na = not applicable; PQL = practical quantification limit

[a] Two laboratory methods (SM 9221 E and SM 9222 D) were used to analyze bacteria samples due to laboratory error. The methods use different mediums to estimate the number of bacteria in a water sample; method SM 9221 E (MPN/100 mL) uses a liquid medium and method SM9222 D (cfu/100 mL) uses a solid agar plate. For analysis, 1 MPN/100 mL is equivalent to 1 cfu/100 mL.

[b] Laboratory results were reported as MPN/100 mL.

[c] For samples that results were below the detection limit, values that were half of the PQL were used for analysis.

[d] A logarithmic or "log mean" was calculated by converting each data point into its log, calculating the mean of these values, and then taking the anti-log of this log-transformed average.

4.2.2. 2023 RESULTS

4.2.2.1. Fecal Coliform

Saddlebag Lake, Ellery Lake, and Tioga Lake showed low levels of fecal coliform during the sampling period between August 24 and September 26, 2023. Fecal coliform values were less than or equal to 2 cfu/100 mL in all samples collected (Table 4.2-2). The calculated log mean of fecal coliform densities of the six replicate samples at all three sites was less than the practical quantification limit (1.8 cfu/100 mL). Laboratory reports are provided in Appendix G.

Table 4.2-2. Fecal Coliform Bacteriological Sampling Results, 2023

Parameter		Fecal Coliform (2023) [a]						
Site ID	Site Description	cfu/100 mL						
		8/24	8/29 [b]	9/7	9/14 [b]	9/20 [b]	9/26 [b]	Log Mean [c,d]
LV-B1	Saddlebag Lake near Saddlebag Campground	<2	<1.8	<2	<1.8	<1.8	<1.8	<1.8
LV-B2	Tioga Lake near Tioga Lake Campground	<2	<1.8	<2	<1.8	<1.8	<1.8	<1.8
LV-B3	Ellery Lake near Ellery Lake Campground	<2	<1.8	<2	<1.8	2	<1.8	<1.8
	PQL	*2*	*1.8*	*2*	*1.8*	*1.8*	*1.8*	*NA*

cfu/100 mL = number of colony forming units per 100 milliliters; ID = identification; MPN/100 mL= most probable number per 100 milliliters; NA = not applicable; PQL = practical quantification limit

[a] Two laboratory methods (SM 9221 E and SM 9222 D) were used to analyze bacteria samples due to laboratory error. The methods use different mediums to estimate the number of bacteria in a water sample; method SM 9221 E (MPN/100 mL) uses a liquid medium and method. SM9222 D (cfu/100 mL) uses a solid agar plate. For analysis, 1 MPN/100 mL is equivalent to 1 cfu/100 mL.

[b] Laboratory results were reported as MPN/100 mL.

[c] For samples that results were below the detection limit, values that were half of the PQL were used for analysis.

[d] A logarithmic or "log mean" was calculated by converting each data point into its log, calculating the mean of these values, and then taking the anti-log of this log-transformed average.

4.2.2.2. E. coli

Saddlebag Lake, Ellery Lake, and Tioga Lake showed low levels of *E. coli* during the sampling period between August 24 and September 26, 2023. *E. coli* values were less than the practical quantification limit (1.8 MPN/100 mL) in all samples collected (Table 4.2-3). Laboratory reports are provided in Appendix G.

Table 4.2-3. *Escherichia coli* Bacteriological Sampling Results, 2023

Parameter		***Escherichia coli* (2023)**						
Site ID	**Site Description**	**MPN/100 mL**						
		8/24	**8/29**	**9/7**	**9/14**	**9/20**	**9/26**	**Log Mean [a,b]**
LV-B1	Saddlebag Lake near Saddlebag Campground	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	0.9
LV-B2	Tioga Lake near Tioga Lake Campground	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	0.9
LV-B3	Ellery Lake near Ellery Lake Campground	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	0.9
	PQL	*1.8*	*1.8*	*1.8*	*1.8*	*1.8*	*1.8*	*NA*

ID = identification; MPN/100 mL= most probable number per 100 milliliters; NA = not applicable; PQL = practical quantification limit

[a] For samples that results were below the detection limit, values that were half of the PQL were used for analysis.

[b] A logarithmic or "log mean" was calculated by converting each data point into its log, then calculating the mean of these values, then taking the anti-log of this log-transformed average.

4.3. TURBIDITY

Turbidity in Lee Vining Creek downstream of Poole Powerhouse was highly variable throughout 2022 and 2023 monitoring periods. During July 2022, approximately 24 hydro-optimization events were evaluated. At Site LVC-DSPP1, 0.2 river mile downstream of Poole Powerhouse, baseline[7] turbidity levels of approximately 0.5 to 1 NTU were generally observed with increases to approximately 2 NTU during periods of hydro-resource optimization (Figure 4.3-1; Appendix D). At Site LVC-DSPP2, 4.3 river miles downstream of Poole Powerhouse, baseline turbidity levels of 0.5 to 1.5 NTU were observed with increases to approximately 3.5 NTU on average during periods of hydro-resource optimization (Figure 4.3-2; Appendix D).

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[7] Periods immediately before and after hydro-resource optimization events occurred.

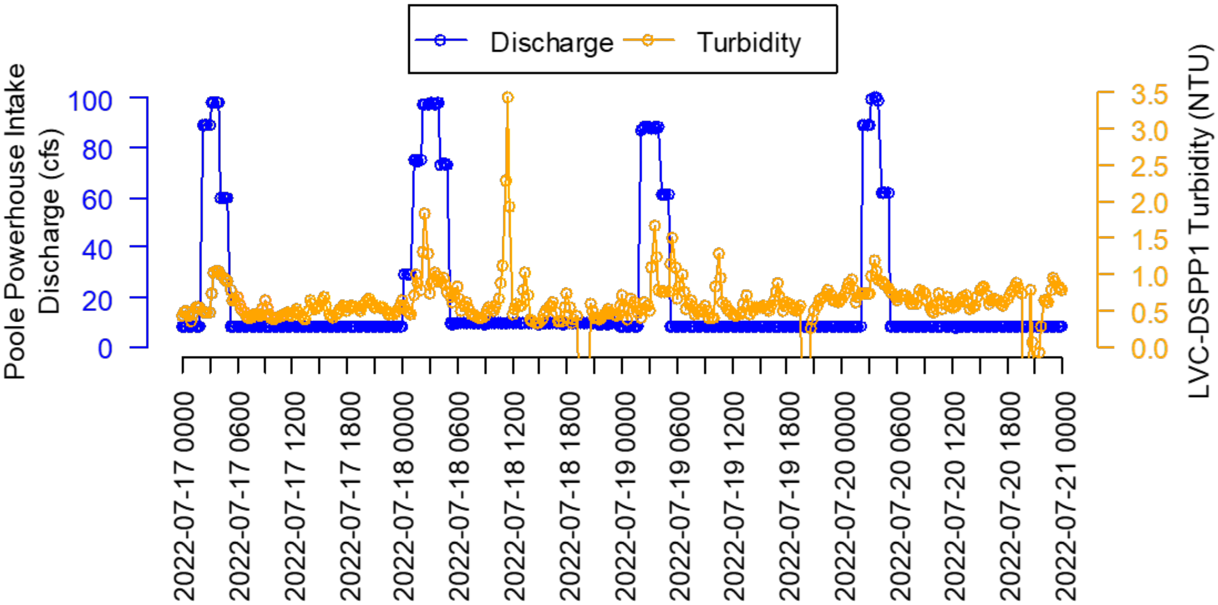

Figure 4.3-1. Continuous Turbidity within Lee Vining Creek downstream of Poole Powerhouse (Site LVC-DSPP1) During Hydro-Resource Optimization, July 2022.

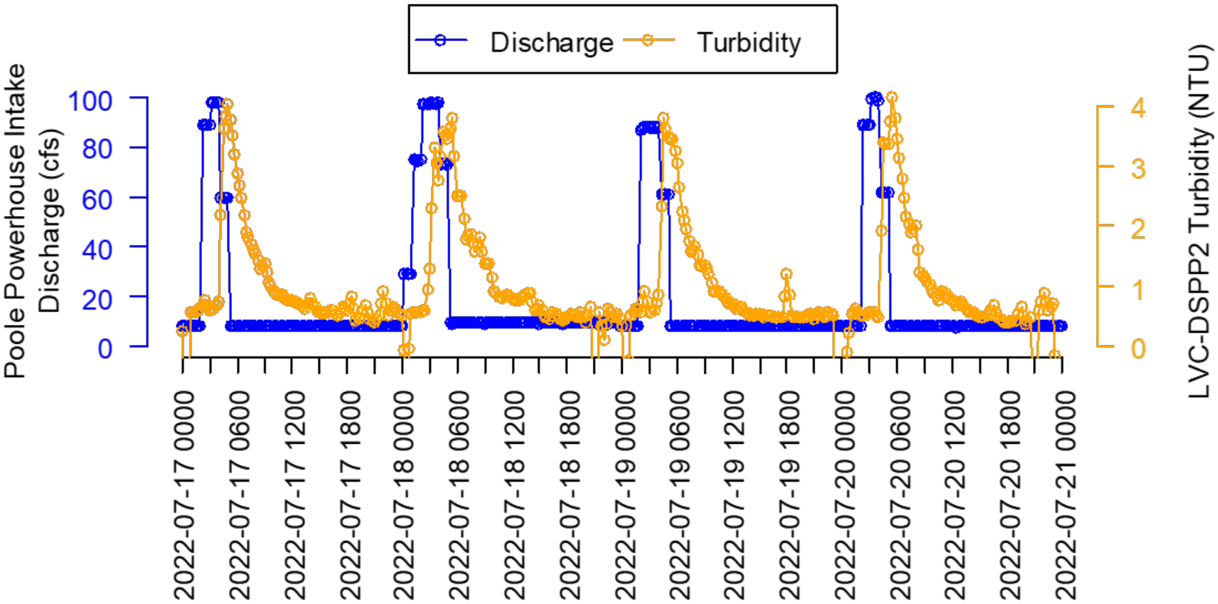

Figure 4.3-2. Continuous Turbidity within Lee Vining Creek near Lee Vining Campground (Site LVC-DSPP2) During Hydro-Resource Optimization, July 2022.

During 2023, prolonged periods of high flows and high turbidity were observed in Lee Vining Creek downstream of Poole Powerhouse. At Site LVC-DSPP1, turbidity ranged from approximately zero to 50 NTU, with peak turbidity occurring in June (Figure 4.3-3; Appendix D). At Site LVC-DSPP2, turbidity ranged from approximately zero to 100 NTU, with peak turbidity occurring in June and July (Figure 4.3-4; Appendix D).

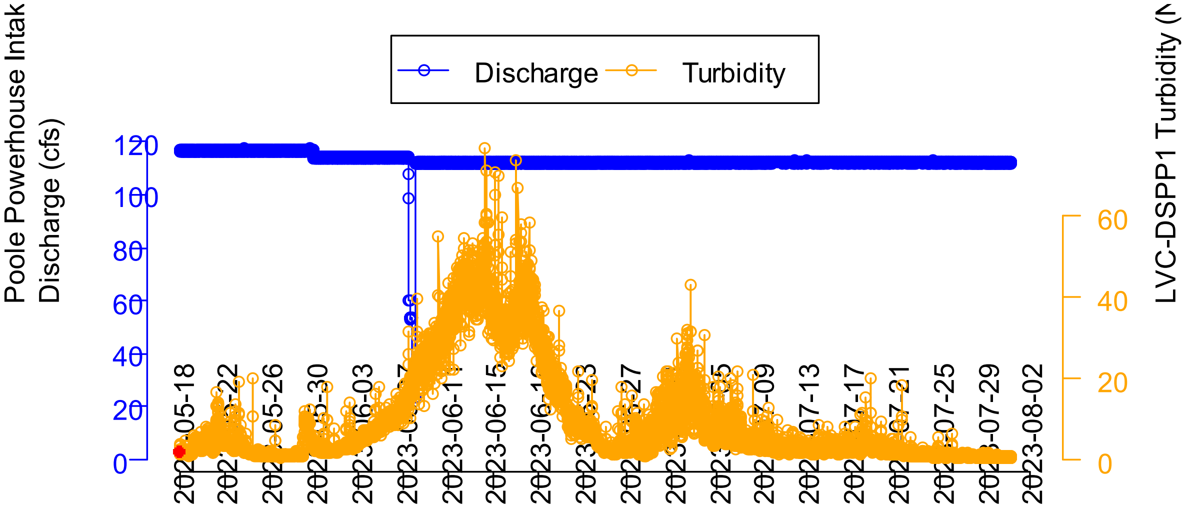

Figure 4.3-3. Turbidity in Lee Vining Creek Downstream of Poole Powerhouse (Site LVC-DSPP1) during Run-off Events Between May and early August, 2023.

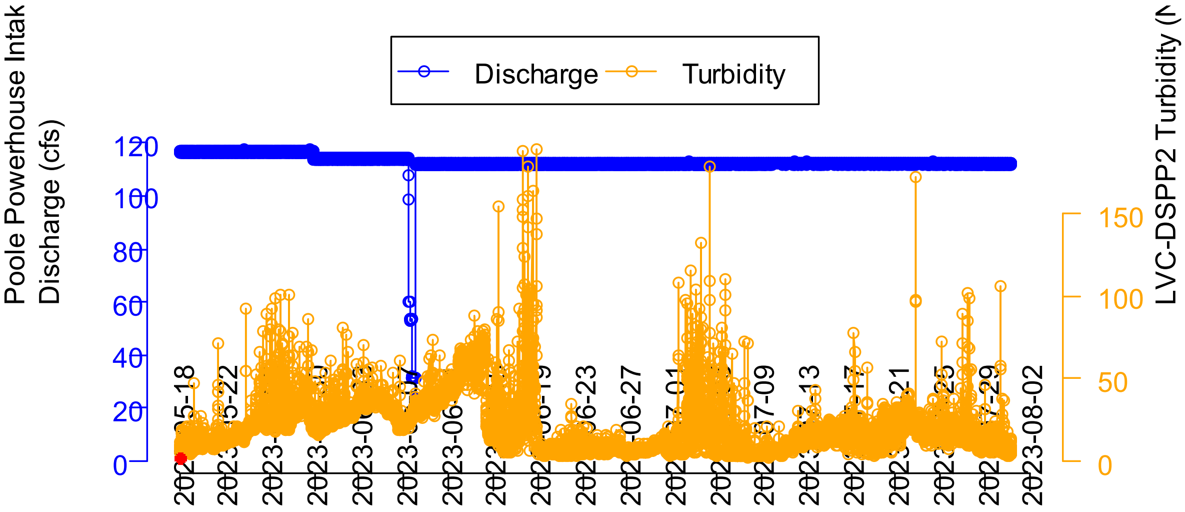

Figure 4.3-4. Turbidity in Lee Vining Creek Near Lee Vining Campground (Site LVC-DSPP2) During Run-off Events Between May and Early August, 2023.

Natural background turbidity varied seasonally during 2023. All background monitoring locations (Site LVC-WCT, Site LV-SIT, and Site LV-GCT) were generally characterized by elevated turbidity and high run-off conditions during the July and August, followed by uniformly lower turbidity levels during October as snowmelt run-off receded (Figure 4.3-5). Turbidity in Warren Creek (Site LV-WCT) during July generally ranged from 100 to 150 NTU and temporarily exceeded 400 NTU; during August, turbidity varied from 5 to 13 NTU; and during October, turbidity ranged from zero to 1 NTU. Turbidity measured in the Lee Vining Creek inflow to Saddlebag Lake (Site LV-SIT) during July was generally low (zero to 1 NTU); during August,[8] turbidity varied from zero to 30 NTU; and during October, turbidity returned to very low levels (zero to 1 NTU). Turbidity measured in Glacier Creek inflow to Tioga Lake (Site LV-GCT) was generally lower than the other monitoring sites, with turbidity ranging from zero to 4 NTU, zero to 12 NTU, and zero to 1 NTU during July, August, and October, respectively.

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[8] Data are qualified due to potential equipment malfunction and/or equipment fouling. Difference between turbidity readings and spot checks measurements indicate fouling.

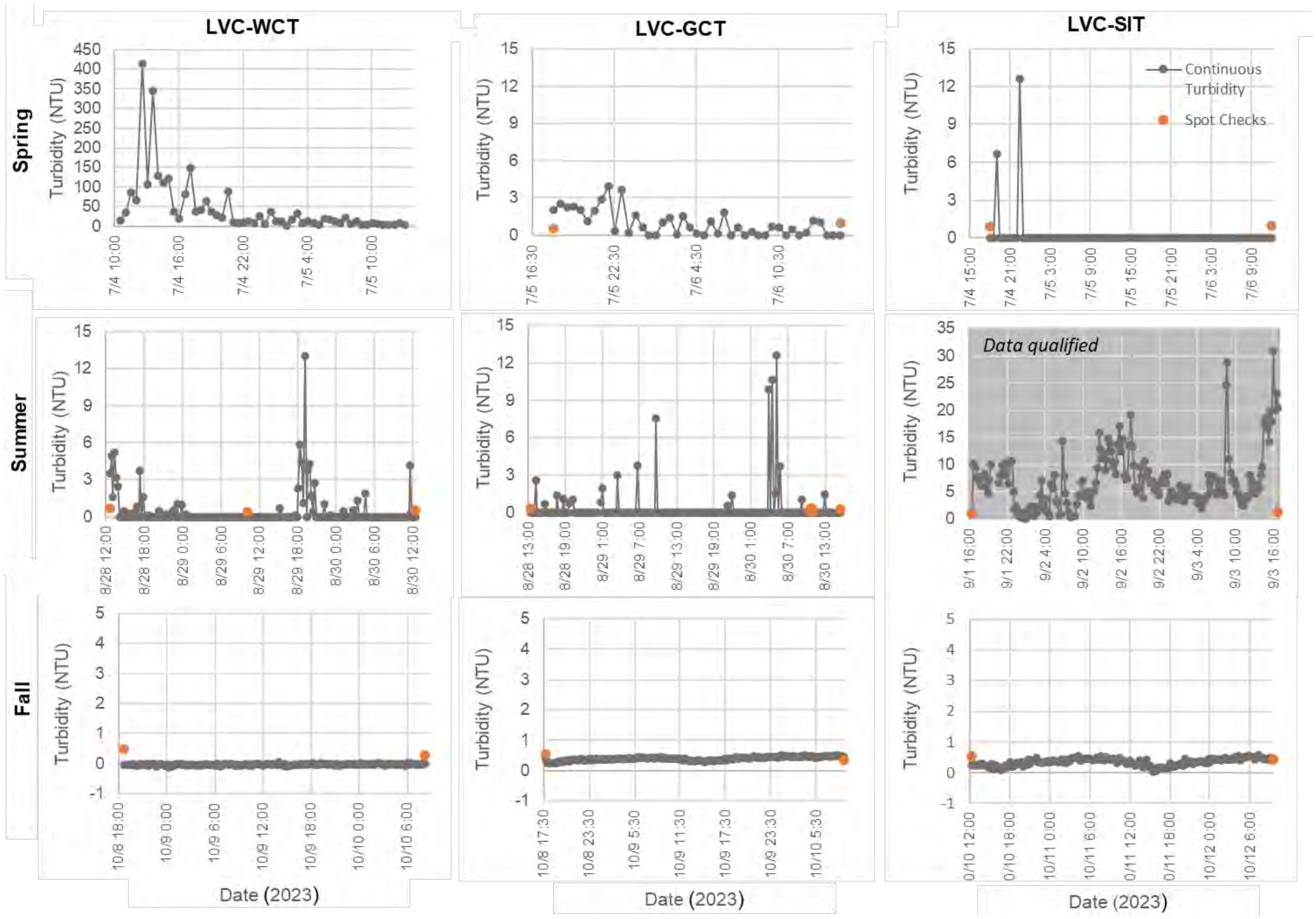

Figure 4.3-5. Background Turbidity in Lee Vining Creek Tributaries, 2023.

4.4. MERCURY IN FISH TISSUE

Fish of edible size were collected (n=42) from Saddlebag, Tioga, and Ellery Lakes and analyzed for total mercury in August 2022. Three species were captured: brown trout, rainbow trout, and brook trout. Details of all fish captured are presented in the *Draft Technical Report Reservoir Fish Population (AQ-1)* (SCE, 2023a) and summarized in Appendix H. Mercury in fish tissue and physical characteristics of fish captured in Project reservoirs are summarized in Table 4.4-1. Figure 4.4-1 shows a comparison of mercury concentrations in fish tissue with the total length of captured fish. Mercury concentrations and physical characteristic (i.e., total length, fork length, and weight) results by individual fish are tabulated in Appendix H.

Mercury concentrations in fish tissue were lowest in Ellery Lake and greatest in Saddlebag Lake (Table 4.4-1; Figure 4.4-1). Mercury concentrations in all sizes of brook trout, brown trout, and rainbow trout were low (0.009 to 0.022 microgram per gram wet weight [µg/g ww]) in Ellery Lake. In Tioga Lake, mercury concentrations in brook trout were generally greater than in rainbow trout. In Saddlebag and Tioga Lakes, mercury concentrations in brook trout generally increased when the total length of fish was longer. The highest mercury concentrations were measured in large brook trout captured in Tioga Lake and Saddlebag Lake.

Table 4.4-1. Summary of Mercury in Fish Tissue and Physical Characteristics of Fish Analyzed in Project Reservoirs, August 2022

Reservoir	Trout Species	Total Number of Fish	Total Mercury (µg/g ww)		Total Length (mm)	
			Mean	Range	Mean	Range
Saddlebag Lake	Brook	9	0.121	0.028–0.308	291	265–334
	All	*9*	*0.121*	*0.028–0.308*	*291*	*265–334*
Tioga Lake	Brook	9	0.062	0.034–0.093	248	218–275
	Rainbow	8	0.048	0.041–0.065	317	234–440
	All	*17*	*0.056*	*0.034–0.093*	*280*	*218–440*
Ellery Lake	Brook	5	0.013	0.009–0.016	293	253–324
	Brown	9	0.017	0.014–0.022	272	205–300
	Rainbow	2	0.016	0.012–0.020	268	235–301
	All	*16*	*0.015*	*0.009–0.022*	*278*	*205–324*
All Reservoirs	*All*	*42*	*0.054*	*0.009–0.308*	*282*	*205–440*

µg/g ww = microgram per gram wet weight; mm = millimeter

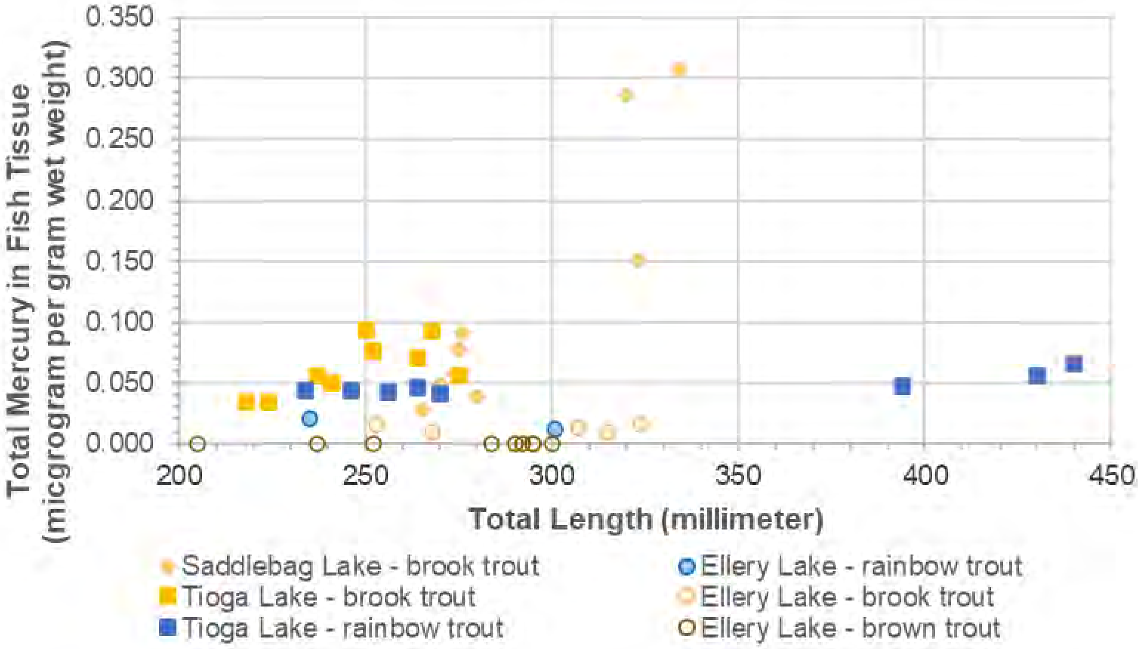

Figure 4.4-1. Mercury in Individual Fish Tissue by Total Length.

5.0 CONSULTATION SUMMARY

In preparation to file the PAD and Notice of Intent (NOI), Southern California Edison (SCE) hosted Aquatic Resources Technical Working Group (TWG) meetings on January 25, February 22, March 29, and May 24, 2021, which resulted in study requests from Stakeholders to address questions regarding stream and reservoir water quality. These TWG meetings resulted in study requests from Stakeholders to address questions regarding aquatic habitat and sediment characteristics. Notes and materials from these meetings are available on SCE's Project website (www.sce.com/leevining).

SCE filed draft Study Plans with the PAD and NOI on August 12, 2021, to address issues discussed with the TWG. The Stakeholder comment period ended on January 18, 2022, for the Study Plans, PAD, and NOI. SCE reviewed all comments received and drafted Revised Technical Study Plans, which were distributed to the TWGs on February 18, 2022, for another 30-day review period. Initial study results were provided to relicensing Stakeholders on February 1, 2023. Preliminary data collected in this study was analyzed and a Draft Technical Report was produced and distributed to Stakeholders for review for a 60-day review in September 2023. All comments received related to the WQ-1 Progress Report and 2022 Draft Technical Report are included in Table 5.1-1.

Draft Technical Reports were distributed to TWGs on April 16, 2024, for a 60-day comment period. On May 14, 2024, SCE held a public meeting at the Lee Vining Community Center to discuss the draft reports and study findings to date. On June 12, 2024, at the end of the comment period, comments were received from USFS, USFWS, CDFW, SWRCB, and MLC. Responses to Stakeholder comments on the 2023 Draft Technical Report are included in Table 1-1 in Volume III of the DLA.

Table 5.1-1. Consultation Summary - Response to Comments

Comment Number	Entity	Date/Forum	Comment	SCE Response
1	CDFW	2/22/2023 Comments on 2022 Progress Report	CDFW does not believe that one year of turbidity logging is sufficient to capture a representative picture of the turbidity in the Lee Vining Creek system. Since turbidity loggers were not installed until summer of 2022, please retain the existing turbidity logger for at least one more year to ensure SCE obtains data for spring and to help detect any turbidity differences between years.	Consistent with the WQ-1 Study Plan, SCE proposes to monitor the following water quality study components in 2023 (the second year of data collection): • Reservoir profiles (DO, temperature, pH, specific conductivity, turbidity); • Reservoir and stream water quality sampling (in situ; TDS, TSS, ammonium, nitrate, and orthophosphate, total phosphorus); and • Bacterial sampling and hydro-resource optimization turbidity monitoring. • Results are provided in this Draft WQ-1 Technical Report, Section 4.3, *Turbidity*.
2	CDFW	2/22/2023 Comments on 2022 Progress Report	CDFW recommends SCE manage the Projects operations in a way that allow for elements of the natural flow regime (e.g., pulse flows, baseflows recession flows) to perform distinct ecological and geomorphic functions and provide for specific life history and habitat needs of fish and wildlife species. Input and movement of sediment through river systems during peak flow events is an import ecological and geomorphic function and it is well documented that dams impede and remove sediment from impacted stream reaches downstream of the dams. Reintroduction of the removed sediment into the sediment-starved stream system during peak flow events is a potential solution. However, to implement such protection, mitigation, and enhancement (PME) measures, turbidity levels in the replenished stream system need to remain within the Lahontan Regional Water Quality Control Boards' (LRWQCB) Basin Plan standards. Thus, data on the background turbidity or natural turbidity of the system is required for LRWQCB	SCE is not proposing changes to operations. Additionally, any changes made would be susceptible to the recreation management requirements in the existing license. The Lee Vining Creek system is a granitic system with limited sediment throughout. To date, SCE and their operations team have not noted any significant sediment deposits behind the dams. It is also worth noting that the reservoirs are drained each year per the existing license requirements, thus reducing additional potential for sediment trapping. First-year study results from 2022 included in the WQ-1 Interim Technical Report (SCE, 2023b) indicated turbidity at inflow locations and throughout the FERC Project Area is very low. Snow accumulation will likely prevent site access during spring 2023 run-off; water quality data will be collected and spot measurements will be collected as conditions and access allow in addition

Comment Number	Entity	Date/Forum	Comment	SCE Response
			to determine if reintroduction of sediment into the system would violate the basin plan. To obtain this background turbidity data, CDFW recommends that SCE install turbidity loggers in locations in the stream system that allow for collection of the systems background turbidity. The 2023 anticipated large spring runoff would be a good time to acquire turbidity data during a higher turbidity year.	to the already planned sampling effort, to enable point comparisons to continuous data collected at downstream locations. Results are provided in this Draft WQ-1 Technical Report, Section 4.3, *Turbidity*.
3	CDFW	2/22/2023 Comments on 2022 Progress Report	Why did SCE not conduct In situ turbidity sampling? Will SCE conduct in situ turbidity sampling in 2023?	Turbidity was not collected during summer 2022 because of probe malfunction in the field. SCE conducted in situ turbidity monitoring in 2023. Results are provided in this Draft WQ-1 Technical Report, Section 4.3, *Turbidity*.
4	CDFW	2/22/2023 Comments on 2022 Progress Report	How could measuring the depth profiles at the deepest ice-free location, rather than maximum depth, affect the results or interpretation?	As demonstrated by profiles provided in the Progress Report (SCE, 2023c), water quality conditions are uniform with depth during spring. Thermal stratification may change oxidation/reduction conditions and affect nutrient and metal speciation at depth. Because no stratification was present in Saddlebag Lake in spring, results obtained at shallower depths are sufficient to characterize unsampled (hypolimnetic) portions of Saddlebag Lake.
5	CDFW	2/22/2023 Comments on 2022 Progress Report	Why did SCE not collect analytical samples at depth from Saddlebag Lake and Tioga Lake when the reservoirs were stratified? What does SCE intend to do if the lakes cannot be sampled in 2023?	Thermal stratification was not evident in the field; therefore, the field team only collected samples at the surface, consistent with the Study Plan. SCE will collect samples at depth during 2023 water quality sampling at all Project reservoirs.
6	CDFW	2/22/2023 Comments on 2022 Progress Report	Why was water temperature not collected in stream reaches?	In situ and analytical water quality parameters, including water temperature, were collected at all Project reservoirs and stream study sites in spring, summer, and fall. Results were described in the WQ-1 Interim Technical Report (SCE, 2023b).

Comment Number	Entity	Date/Forum	Comment	SCE Response
7	CDFW	2/22/2023 Comments on 2022 Progress Report	Please include a discussion in the Progress Report on why data (e.g., pH, temperature, and specific conductivity) varies between reservoirs. For example, why does specific conductance increase at Saddlebag Lake when the depth is greater than three meters?	The intention of the Progress Report (SCE, 2023c) was to update Stakeholders on the progress of each study at that time. Findings from 2022 and 2023 data collection are presented in this Draft WQ-1 Technical Report. In addition to stratification effects upon atmospheric exchanges at the water surface, a number of factors may affect variations of in situ water quality between reservoirs and inflowing waters at differing times of the year. Interpretation of results and potential Project effects will be described in the DLA.
8	CDFW	2/22/2023 Comments on 2022 Progress Report	Please include the Target Reporting Limit (for the basin plan) in the Progress Report. Currently, the Progress Report only includes laboratory reporting (RL) and laboratory detection limit (DL).	Target Reporting Limits (numerical water quality objectives), as presented in the Basin Plan (LRWQCB, 2019), are included in this Draft WQ-1 Technical Report (Table 1.2.-1). A comparison of study results to Basin Plan (LRWQCB, 2019) objectives will be included in the DLA.
9	CDFW	2/22/2023 Comments on 2022 Progress Report	Please include graphs in the Progress Report comparing each water quality parameter at all the reservoir locations.	A summary of 2022 and 2023 water quality data collection at all reservoir locations is included in this Draft WQ-1 Technical Report.
10	CDFW	2/22/2023 Comments on 2022 Progress Report	Many of the orthophosphate samples were received by the analytical laboratory outside of the Environmental Protection Agency (EPA) recommended holding time of the samples. Does SCE plan to retake these samples?	Spring samples were qualified due to shipping times outside of Licensee control. Samples were overnight shipped from Mammoth Lakes to the lab on the day of the collection immediately following sampling. Orthophosphate holding times during summer and fall were sufficient, and the same lab was used during spring, summer, and fall sampling. SCE does not currently intend to retake these samples.
11	CDFW	2/22/2023 Comments on 2022 Progress Report	Please make the temperature and dissolved oxygen (DO) profiles collected in Project reservoirs in 2015, 2016, and 2017 available to the TWG members.	2015, 2016, and 2017 reservoir profile data from Cohen (2019) will be summarized in the Final WQ-1 Technical Report.

Comment Number	Entity	Date/Forum	Comment	SCE Response
12	CDFW	2/22/2023 Comments on 2022 Progress Report	Please provide all preliminary data provided in the PAD in the Progress Report (e.g., links or attachments).	Data presented in the PAD will be incorporated into the Final Technical Reports as appropriate.
13	CDFW	2/22/2023 Comments on 2022 Progress Report	In the Progress Report, please address that DO in Project reservoirs and in Project-affected streams exceeded the published limits for water quality objectives in the LRWQCB Basin Plan.	A comparison of monitoring results to the Basin Plan (LRWQCB, 2019) objectives will be provided in the DLA. In general, due to site elevations and high temperatures during summer and fall, DO concentrations in Project reservoirs, Project-affected stream reaches, and reservoir inflow locations are near or below minimum water quality objectives both above and below Project reservoirs.
14	CDFW	11/22/2023 Comments on 2022 Draft Technical Report	CDFW staff look forward to reviewing and discussing the hydro-resource optimization turbidity monitoring data. Please make the data available to TWG members in .xlsx or .csv format.	Noted, thank you.
15	CDFW	11/22/2023 Comments on 2022 Draft Technical Report	Question: What parameters for thermal stratification were used to determine that thermal stratification was too weak to warrant sample collection at depth? Question: Was continuous water temperature collected in stream reaches?	Temperature change per unit depth was used to determine thermal stratification in Project reservoirs. During summer 2022 sampling at Saddlebag Lake, the field crew observed a gradual change in water temperature and a slight change in DO with depth, which suggested that strata were beginning to form in the lake but had not fully separated (i.e., stratified). Consistent with the Study Plan and based on the DO metrics, field crew did not collect a nutrient sample at depth in the summer. However, a sample was collected in the fall when stratification was evident in both water temperature and DO conditions. Collection of continuous water temperature was not included in the WQ-1 Study Plan. Reservoir water temperature profiles and spot measurements of water temperature at stream sites were collected.

Comment Number	**Entity**	**Date/Forum**	**Comment**	**SCE Response**
				This Draft WQ-1 Technical Report includes these descriptions.
16	CDFW	11/22/2023 Comments on 2022 Draft Technical Report	Comment: Please include what types of water quality sensors/sondes were used to collect in situ water quality parameters. Question: What was the calibration protocol used for the water quality sondes? Please include a summary of the calibration dates and results or a log of the calibrations performed as an appendix.	Sonde models used during 2022 and 2023 sampling included the YSI Exo, YSI Pro DSS, YSI Pro Plus, and In situ Aquatroll 600. This information is included in Section 3.2, *Field Sampling Methods*, of this report. Calibration protocols are discussed in the SCE response to Comment 29. This information is included in this Draft WQ-1 Technical Report.
17	CDFW	11/13/2023 Comments on 2022 Draft Technical Report	Question: What was the calibration protocol used for the turbidity loggers? Please include a summary of the calibration dates and results or a log of the calibrations performed as an appendix.	YSI sondes were calibrated per manufacturer recommendations. Post-calibration and post-deployment values were checked after each monitoring day. Post-calibration and post-monitoring values were compared to standards to determine the accuracy of measurements. Calibration logs were not a deliverable specified in the Study Plan; however, available calibration logs are provided as Appendix A to this Draft WQ-1 Technical Report.
18	CDFW	11/13/2023 Comments on 2022 Draft Technical Report	Comment: Please include a discussion in the Final Technical Report on why data (e.g., pH, temperature, and specific conductivity) varies between reservoirs and sampling sites.	Results and general patterns in measured water quality during 2022 and 2023 sampling are described in this Draft WQ-1 Technical Report, Section 4.0, *Study Results*. Spatial and temporal patterns related to Project Operations will be discussed in the DLA.
19	CDFW	11/13/2023 Comments on 2022 Draft Technical Report	Comment: Table 4.1-1 has a reference error. Please correct in the final draft.	Noted, thank you. The reference has been fixed in this Draft WQ-1 Technical Report.

Comment Number	**Entity**	**Date/Forum**	**Comment**	**SCE Response**
20	CDFW	11/13/2023 Comments on 2022 Draft Technical Report	Question: Many of the orthophosphate samples were received by the analytical laboratory outside of the Environmental Protection Agency (EPA) recommended holding time of the samples. Does SCE plan to retake these samples? If not, please include a rationale for this decision.	Samples were run out of hold time during the spring of 2022 due to delays in the FedEx shipment to the laboratory, and this delay was not communicated to the team from the lab in a timely manner. Additional orthophosphate samples were collected in 2023. The low orthophosphate concentrations suggest low nutrient (i.e., oligotrophic) conditions and no additional sampling is planned.
21	CDFW	11/13/2023 Comments on 2022 Draft Technical Report	CDFW requests the following spatial data be provided as shapefiles or geodatabase: Sampling sites for water quality, bacterial, turbidity and fish tissue sampling	Data is being provided with the distribution of this Draft WQ-1 Technical Report.
22	SWRCB	11/22/2023 Comments on 2022 Draft Technical Report	Reference errors are present in the Stream and Reservoir Water Quality Study for the Lee Vining Hydroelectric Project (i.e., under Section 4.1.2 Stream Water Quality). Please resolve these issues prior to the finalizing the study report.	Noted, thank you. The references have been fixed in this Draft WQ-1 Technical Report.
23	SWRCB	11/22/2023 Comments on 2022 Draft Technical Report	Saddlebag and Tioga lakes pH data collected in 2022 recorded minimum summer pH values of 5.1 and 5.5, respectively. By contrast, summer pH values reported at site LV-1 (Lee Vining Creek Inflow to Saddlebag Lake) and site LV-10 (Glacier Creek Inflow to Tioga Lake) were 8.7 and 8.3, respectively. The Water Quality Control Plan for the Lahontan Region (Basin Plan) pH objective states that: "In fresh waters with designated beneficial uses of COLD[1] or WARM[2], changes in normal ambient pH levels shall not exceed 0.5 pH units." Lee Vining Creek upstream of the Los Angeles Department of Water and Power (LADWP) diversion includes COLD as a beneficial use. <u>Data collected in 2023 will help inform to what extent low pH values recorded in Saddlebag and Tioga lakes is an ongoing condition, and how protection, mitigation, and</u>	Variation in pH are likely due to the low buffering capacity characteristic of headwater reaches in granitic watersheds, whereby the relatively low weathering rates of the predominant geology (i.e., granite) results in low alkalinity, low hardness, and low conductivity making the waters susceptible to changes in pH. These changes are naturally occurring and may include decreases in pH when naturally acidic inputs occur, such as snow melt, rainfall, and tannins from surrounding vegetation; and increases in pH when phytoplankton or other primary producers are present and photosynthesizing (i.e., reducing the carbon dioxide in the water and lowering the pH). Potential effects of Project operations will be evaluated in the DLA.

Comment Number	Entity	Date/Forum	Comment	SCE Response
			<u>enhancement (PM&E) measures could be applied, as applicable, to address low pH values.</u> [1] Cold Freshwater Habitat is defined as beneficial uses of waters that support cold water ecosystems, including, but not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates. [2] Warm Freshwater Habitat is defined as beneficial uses of water that support warm water ecosystems including, but not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.	
24	SWRCB	11/22/2023 Comments on 2022 Draft Technical Report	Dissolved oxygen concentrations collected in the bottom six meters of both Saddlebag and Tioga lakes were less than 80 percent saturation in fall 2022. In Tioga Lake, dissolved oxygen reached a minimum of 32 percent (2.7 milligrams per liter [mg/L]) in summer, and a minimum of 0 percent (0 mg/L) in fall. The Basin Plan objective for dissolved oxygen states: “The dissolved oxygen concentration, as percent saturation, shall not be depressed by more than 10 percent, nor shall the minimum dissolved oxygen concentration be less than 80 percent saturation.” The Basin Plan further states for waters with beneficial uses of COLD with SPWN[3] (such as Lee Vining Creek), the following additional criteria are applicable: - a 7 Day Mean concentration of 9.5 mg/L, and - a 1 Day Minimum of 8.0 mg/L. <u>To better inform potential PM&E measures, SCE should consider collecting additional dissolved oxygen data to determine the spatial extent within Tioga and Saddlebag lakes where low dissolved oxygen values are occurring, and if Tioga and Saddlebag lakes are providing adequate water quality to support designated beneficial uses.</u> [3] Spawning, Reproduction, and Development is defined	Reservoir profiles collected in 2015, 2016, 2017, 2022, and 2023 indicate DO concentrations in the epilimnion and metalimnion are consistently above 80% saturation and provide adequate DO to beneficial uses. In reservoirs, low DO occurring in the hypolimnion is associated with microbial decomposition of algal detritus from the epilimnion or algal and bacterial respiration at depth. Hypolimnetic depletion of oxygen in reservoirs is a naturally occurring phenomenon in most temperate lakes even with moderate levels of algal productivity (Horne and Goldman 1994). Additional discussion of DO as it relates to Project operations will be included in the DLA.

Comment Number	**Entity**	**Date/Forum**	**Comment**	**SCE Response**
			as beneficial uses of water that support high quality aquatic habitat necessary for reproduction and early development of fish and wildlife.	
25	SWRCB	11/22/2023 Comments on 2022 Draft Technical Report	Fecal coliform bacteria data collected in 2022 ranged from 49 to 540 most probable number per 100 milliliters (MPN/100 mL) on a single sampling date. The Basin Plan objective for fecal coliform states that "The fecal coliform concentration during any 30-day period shall not exceed a log mean of 20/100 mL, nor shall more than 10 percent of all samples collected during any 30-day period exceed 40/100mL." <u>Data collected in 2023 will help inform under what conditions and how often these values occur and may also inform PM&Es associated with Project recreational activities.</u>	Fecal coliform bacteria data collected during 2023 ranged from <1.8 to 2 most probable number per 100 milliliters (MPN/100mL) on a single sampling date. This WQ-1 Technical Report includes the results.
26	SWRCB	11/22/2023 Comments on 2022 Draft Technical Report	State Water Board staff look forward to reviewing and discussing the hydroresource optimization event turbidity monitoring data as it becomes available. We recommend including the data in .xlsx or .csv format for simplified sharing and review by interested stakeholders.	Noted, thank you.

CalTrans = California Department of Transportation; CDFW = California Department of Fish and Wildlife; COLD = cold freshwater habitat; COMM = Commercial and Sportfishing; DLA = Draft License Application; DO = dissolved oxygen; ELAP = Environmental Laboratory Accreditation; FERC = Federal Energy Regulatory Commission; LRWQCB = Lahontan Region Water Quality Control Board; mg/L = milligrams per liter; MLC = Mono Lake Committee; PAD = Pre-Application Document; PME/PM&E = protection, mitigation, and enhancement; SCE = Southern California Edison; SPWN = spawning, reproduction, and/or early development; SWRCB = State Water Resources Control Board; TWG = Technical Working Group; USFS = U.S. Forest Service; WARM = warm freshwater habitat

6.0 REFERENCES

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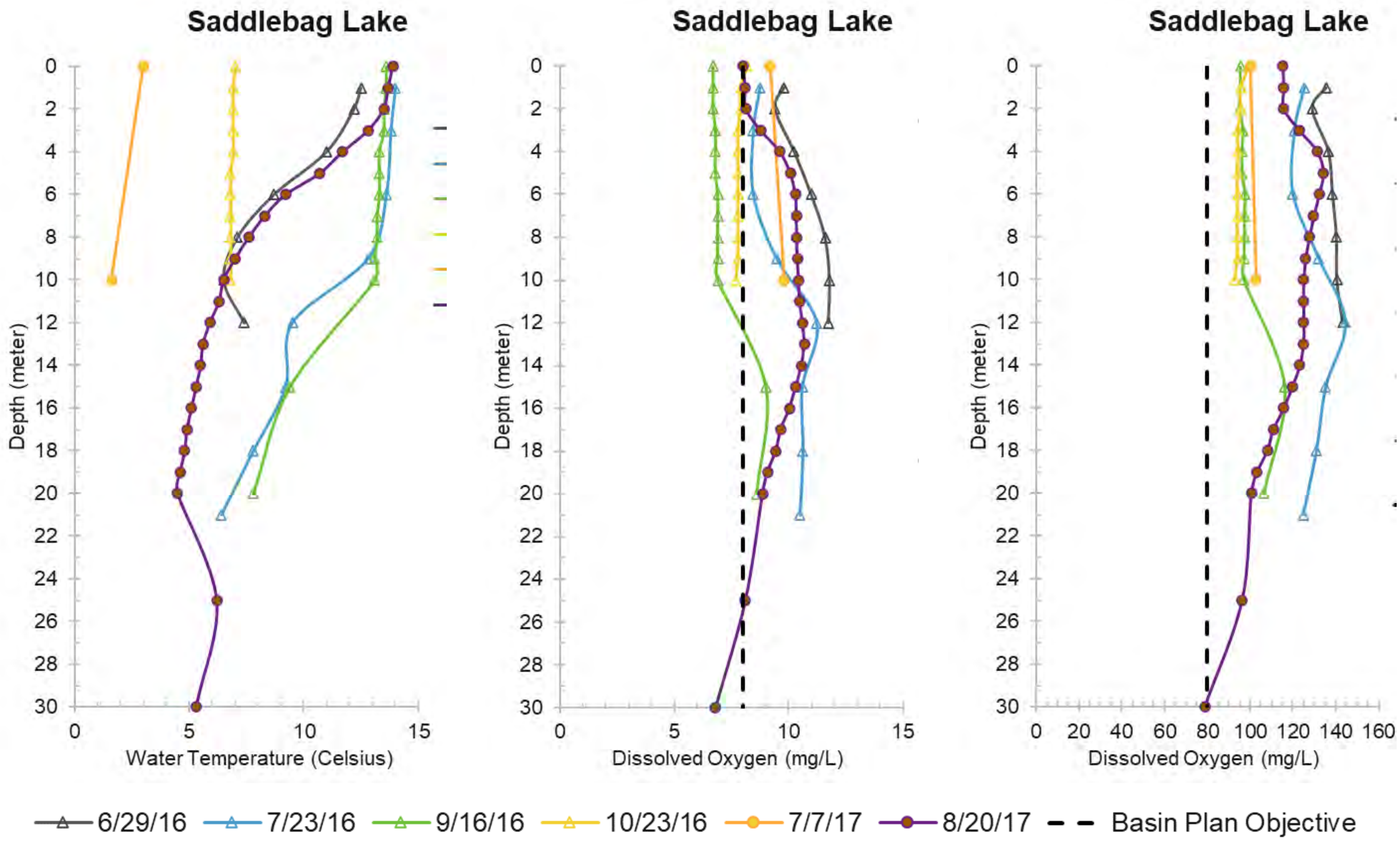
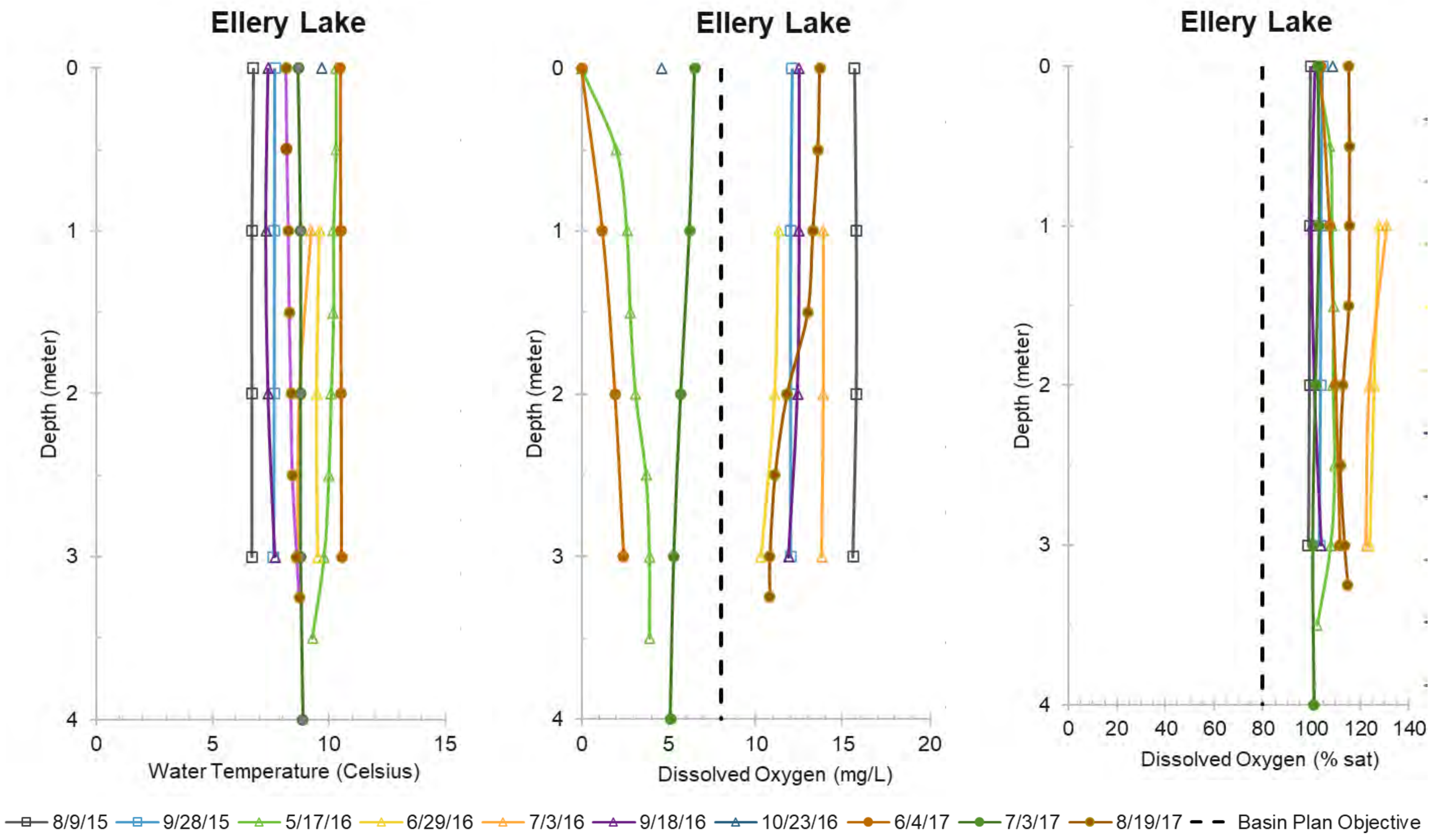
APPENDIX A
RESERVOIR WATER TEMPERATURE AND DISSOLVED OXYGEN VERTICAL PROFILE DATA (2015–2017)



Source: Cohen, 2019

Basin Plan minimum water quality objective is indicated by vertical black dashed line.

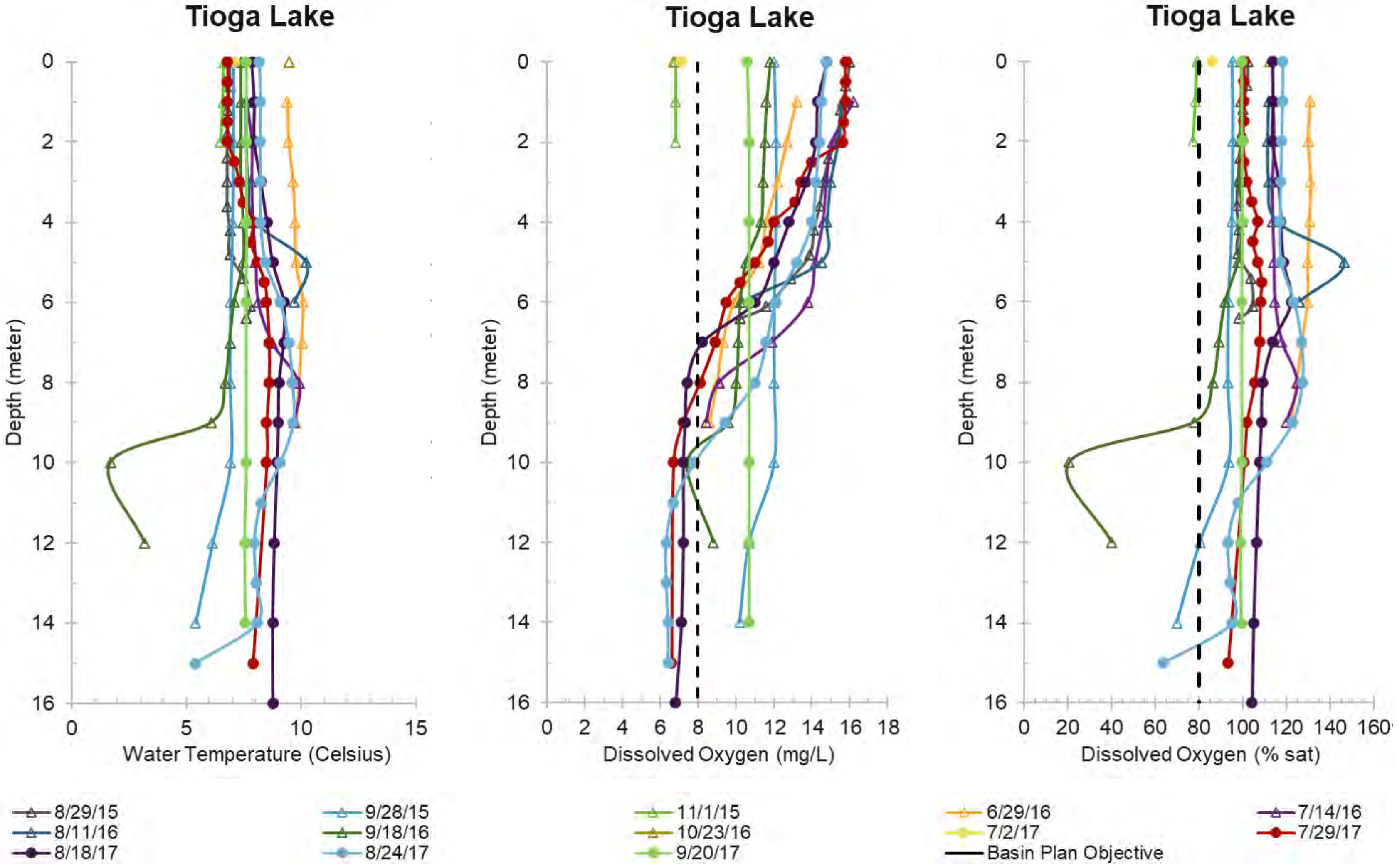
Figure A-1. Saddlebag Lake Water Temperature and Dissolved Oxygen Turbidity Vertical Profiles, 2016–2017.



Source: Cohen, 2019

Basin Plan minimum water quality objective is indicated by vertical black dashed line.

Figure A-2. Ellery Lake Water Temperature and Dissolved Oxygen Turbidity Vertical Profiles, 2016–2017.



Source: Cohen, 2019

Basin Plan minimum water quality objective is indicated by vertical black dashed line.

Figure A-3. Tioga Lake Water Temperature and Dissolved Oxygen Turbidity Vertical Profiles, 2016–2017.

Table A-1. Water Temperature and Dissolved Oxygen Data Collected at Saddlebag Lake During 2015–2017

Date	Depth (meter)	Water Temperature (°C)	DO (mg/L)	DO (% Saturation)
6/29/2016	1.0	12.5	9.8	136
6/29/2016	2.0	12.2	9.4	129
6/29/2016	4.0	11.0	10.2	137
6/29/2016	6.0	8.7	11.0	139
6/29/2016	8.0	7.1	11.6	140
6/29/2016	10.0	6.5	11.8	141
6/29/2016	12.0	7.4	11.8	143
7/23/2016	1.0	14.0	8.7	125
7/23/2016	3.0	13.8	8.5	121
7/23/2016	6.0	13.6	8.5	120
7/23/2016	9.0	12.8	9.5	132
7/23/2016	12.0	9.5	11.2	144
7/23/2016	15.0	9.2	10.6	135
7/23/2016	18.0	7.8	10.6	131
7/23/2016	21.0	6.4	10.5	125
9/16/2016	0.0	13.6	6.7	96
9/16/2016	1.0	13.6	6.7	96
9/16/2016	2.0	13.5	6.7	95
9/16/2016	3.0	13.5	6.8	97
9/16/2016	4.0	13.3	6.8	96
9/16/2016	5.0	13.3	6.8	96
9/16/2016	6.0	13.3	6.9	98
9/16/2016	7.0	13.2	6.9	98
9/16/2016	8.0	13.2	6.9	98
9/16/2016	9.0	13.1	6.9	97
9/16/2016	10.0	13.1	6.9	97
9/16/2016	15.0	9.4	9.0	116
9/16/2016	20.0	7.8	8.6	106
10/23/2016	0.0	7.0	8.2	99
10/23/2016	1.0	6.9	7.9	96
10/23/2016	2.0	6.9	7.9	96
10/23/2016	3.0	6.9	7.8	94
10/23/2016	4.0	6.9	7.8	94
10/23/2016	5.0	6.8	7.8	94
10/23/2016	6.0	6.8	7.8	94
10/23/2016	7.0	6.8	7.8	94

Date	Depth (meter)	Water Temperature (°C)	DO (mg/L)	DO (% Saturation)
10/23/2016	8.0	6.8	7.8	94
10/23/2016	9.0	6.8	7.8	94
10/23/2016	10.0	6.8	7.7	93
7/7/2017	0.0	3.0	9.2	100
7/7/2017	10.0	1.6	9.8	103
8/20/2017	0.0	13.9	8.0	115
8/20/2017	1.0	13.7	8.1	116
8/20/2017	2.0	13.5	8.1	116
8/20/2017	3.0	12.8	8.8	123
8/20/2017	4.0	11.7	9.6	131
8/20/2017	5.0	10.7	10.1	134
8/20/2017	6.0	9.2	10.3	132
8/20/2017	7.0	8.3	10.4	130
8/20/2017	8.0	7.6	10.4	128
8/20/2017	9.0	7.0	10.4	126
8/20/2017	10.0	6.5	10.5	125
8/20/2017	11.0	6.3	10.5	125
8/20/2017	12.0	5.9	10.6	125
8/20/2017	13.0	5.6	10.7	125
8/20/2017	14.0	5.5	10.6	123
8/20/2017	15.0	5.3	10.3	120
8/20/2017	16.0	5.1	10.0	116
8/20/2017	17.0	4.9	9.7	111
8/20/2017	18.0	4.8	9.4	108
8/20/2017	19.0	4.6	9.1	103
8/20/2017	20.0	4.5	8.9	101
8/20/2017	25.0	6.2	8.1	96
8/20/2017	30.0	5.3	6.8	79

Source: Cohen, 2019

% = percent; °C = degrees Celsius; DO = dissolved oxygen; mg/L = milligrams per liter

Table A-2. Water Temperature and Dissolved Oxygen Data Collected at Ellery Lake, 2015–2017

Date	Depth (meter)	Water Temperature (°C)	DO (mg/L)	DO (% Saturation)
8/9/2015	0.0	6.8	15.7	100
8/9/2015	1.0	6.7	15.8	99
8/9/2015	2.0	6.7	15.8	99
8/9/2015	3.0	6.7	15.6	99
9/28/2015	0.0	7.7	12.1	104
9/28/2015	1.0	7.7	12.0	104
9/28/2015	2.0	7.7	12.0	104
9/28/2015	3.0	7.6	12.0	103
5/17/2016	0.0	10.3	0.0	102
5/17/2016	0.5	10.3	2.0	108
5/17/2016	1.0	10.2	2.6	108
5/17/2016	1.5	10.2	2.8	109
5/17/2016	2.0	10.1	3.1	109
5/17/2016	2.5	10.0	3.7	109
5/17/2016	3.0	9.8	3.9	108
5/17/2016	3.5	9.3	3.9	102
6/29/2016	1.0	9.6	11.3	128
6/29/2016	2.0	9.5	11.1	126
6/29/2016	3.0	9.5	10.3	124
7/23/2016	1.0	9.2	13.9	131
7/23/2016	2.0	8.7	13.9	124
7/23/2016	3.0	8.7	13.8	122
9/18/2016	0.0	7.4	12.5	101
9/18/2016	1.0	7.3	12.5	100
9/18/2016	2.0	7.4	12.4	101
9/18/2016	3.0	7.7	11.9	104
10/23/2016	0.0	9.7	4.6	109
6/4/2017	0.0	10.5	0.0	104
6/4/2017	1.0	10.5	1.2	107
6/4/2017	2.0	10.6	1.9	110
6/4/2017	3.0	10.6	2.4	112
7/3/2017	0.0	8.7	6.5	103
7/3/2017	1.0	8.8	6.2	103
7/3/2017	2.0	8.8	5.7	102
7/3/2017	3.0	8.8	5.3	101
7/3/2017	4.0	8.9	5.1	101

Date	Depth (meter)	Water Temperature (°C)	DO (mg/L)	DO (% Saturation)
8/19/2017	0.0	8.2	13.7	115
8/19/2017	0.5	8.2	13.6	115
8/19/2017	1.0	8.3	13.3	115
8/19/2017	1.5	8.3	13.0	115
8/19/2017	2.0	8.4	11.8	113
8/19/2017	2.5	8.4	11.1	112
8/19/2017	3.0	8.6	10.8	113
8/19/2017	3.3	8.7	10.8	115

Source: Cohen, 2019

% = percent; °C = degrees Celsius; DO = dissolved oxygen; mg/L = milligrams per liter

Table A-3. Water Temperature and Dissolved Oxygen Data Collected at Tioga Lake, 2015–2017

Date	Depth (meter)	Water Temperature (°C)	DO (mg/L)	DO (% Saturation)
8/9/2015	0.0	6.9	16.0	103
8/9/2015	0.6	6.9	15.8	102
8/9/2015	1.2	6.8	15.5	100
8/9/2015	1.8	6.8	15.4	100
8/9/2015	2.4	6.8	14.9	99
8/9/2015	3.0	6.8	14.6	98
8/9/2015	3.6	6.8	14.4	97
8/9/2015	4.2	6.9	14.1	98
8/9/2015	4.8	6.9	13.9	98
8/9/2015	5.4	7.5	12.9	104
8/9/2015	6.1	7.8	11.6	105
8/9/2015	6.4	7.6	10.2	98
9/28/2015	0.0	7.1	12.0	95
9/28/2015	2.0	7.1	12.1	96
9/28/2015	4.0	7.0	12.1	95
9/28/2015	6.0	6.9	12.0	94
9/28/2015	8.0	6.9	12.0	93
9/28/2015	10.0	6.9	12.0	94
9/28/2015	12.0	6.1	10.7	80
9/28/2015	14.0	5.4	10.2	70
11/1/2015	0.0	6.7	6.8	79
11/1/2015	1.0	6.6	6.8	78
11/1/2015	2.0	6.5	6.8	77

Date	Depth (meter)	Water Temperature (°C)	DO (mg/L)	DO (% Saturation)
6/29/2016	1.0	9.4	13.2	131
6/29/2016	2.0	9.5	12.7	130
6/29/2016	3.0	9.7	12.2	131
6/29/2016	4.0	9.7	11.6	131
6/29/2016	5.0	9.8	11.2	130
6/29/2016	6.0	10.1	9.9	130
6/29/2016	7.0	10.0	9.3	127
6/29/2016	8.0	9.9	9.0	125
6/29/2016	9.0	9.8	8.6	122
7/14/2016	1.0	7.6	16.2	114
7/14/2016	2.0	7.9	15.1	114
7/14/2016	3.0	7.9	14.8	113
7/14/2016	4.0	7.9	14.6	114
7/14/2016	5.0	8.0	14.2	114
7/14/2016	6.0	8.1	13.8	115
7/14/2016	7.0	8.7	11.9	118
7/14/2016	8.0	9.9	9.1	125
7/14/2016	9.0	9.7	8.4	120
8/11/2016	1.0	7.6	15.6	112
8/11/2016	2.0	7.6	15.4	111
8/11/2016	3.0	7.7	15.0	112
8/11/2016	4.0	8.0	14.8	116
8/11/2016	5.0	10.2	14.5	146
8/11/2016	6.0	9.7	10.3	126
9/18/2016	0.0	7.4	11.8	100
9/18/2016	1.0	7.4	11.6	99
9/18/2016	2.0	7.4	11.5	99
9/18/2016	3.0	7.4	11.4	99
9/18/2016	4.0	7.5	11.3	100
9/18/2016	5.0	7.5	10.5	98
9/18/2016	6.0	7.1	10.2	92
9/18/2016	7.0	6.9	10.1	89
9/18/2016	8.0	6.7	10.0	86
9/18/2016	9.0	6.1	9.6	78
9/18/2016	10.0	1.7	7.4	21
9/18/2016	12.0	3.2	8.8	40
10/23/2016	0.0	9.5	6.7	113
7/2/2017	0.0	7.1	7.5	86

Date	Depth (meter)	Water Temperature (°C)	DO (mg/L)	DO (% Saturation)
7/29/2017	0.0	6.8	15.8	101
7/29/2017	0.5	6.8	15.8	101
7/29/2017	1.0	6.8	15.8	101
7/29/2017	1.5	6.8	15.7	100
7/29/2017	2.0	6.8	15.6	100
7/29/2017	2.5	7.1	14.0	101
7/29/2017	3.0	7.3	13.4	102
7/29/2017	3.5	7.5	13.1	104
7/29/2017	4.0	7.9	12.0	107
7/29/2017	4.5	7.8	11.7	105
7/29/2017	5.0	8.1	11.0	107
7/29/2017	5.5	8.4	10.2	109
7/29/2017	6.0	8.5	9.5	108
7/29/2017	7.0	8.6	8.9	108
7/29/2017	8.0	8.6	8.1	106
7/29/2017	9.0	8.5	7.2	102
7/29/2017	10.0	8.5	6.7	101
7/29/2017	15.0	7.9	6.6	93
8/18/2017	0.0	7.9	14.8	114
8/18/2017	1.0	8.0	14.3	114
8/18/2017	2.0	8.0	14.2	114
8/18/2017	3.0	8.3	13.7	116
8/18/2017	4.0	8.5	12.8	118
8/18/2017	5.0	8.8	12.0	119
8/18/2017	6.0	9.3	11.0	122
8/18/2017	7.0	9.3	8.2	114
8/18/2017	8.0	9.1	7.4	109
8/18/2017	9.0	9.0	7.3	109
8/18/2017	10.0	9.0	7.2	108
8/18/2017	12.0	8.9	7.2	106
8/18/2017	14.0	8.8	7.1	105
8/18/2017	16.0	8.8	6.8	104
8/24/2017	0.0	8.2	14.8	118
8/24/2017	1.0	8.2	14.5	118
8/24/2017	2.0	8.2	14.4	118
8/24/2017	3.0	8.2	14.2	117
8/24/2017	4.0	8.2	14.0	117
8/24/2017	5.0	8.4	13.2	118

Date	Depth (meter)	Water Temperature (°C)	DO (mg/L)	DO (% Saturation)
8/24/2017	6.0	9.1	12.1	123
8/24/2017	7.0	9.5	11.6	127
8/24/2017	8.0	9.6	11.0	127
8/24/2017	9.0	9.7	9.4	123
8/24/2017	10.0	9.1	7.8	111
8/24/2017	11.0	8.3	6.7	98
8/24/2017	12.0	8.0	6.3	93
8/24/2017	13.0	8.0	6.3	94
8/24/2017	14.0	8.1	6.4	95
8/24/2017	15.0	5.4	6.4	64
9/20/2017	0.0	7.6	10.6	100
9/20/2017	2.0	7.6	10.7	100
9/20/2017	4.0	7.6	10.7	100
9/20/2017	6.0	7.6	10.7	100
9/20/2017	10.0	7.6	10.7	100
9/20/2017	12.0	7.6	10.7	99
9/20/2017	14.0	7.6	10.7	100

Source: Cohen, 2019

% = percent; °C = degrees Celsius; DO = dissolved oxygen; mg/L = milligrams per liter

APPENDIX B
IN SITU CALIBRATION LOGS

2022
YSI CALIBRATION LOGS

Stillwater Sciences

Water Quality EXO Sonde Calibration Log

Project: 856.01 Lee Vining Water Quality

Unit ID: Exo 2 5645

Sampling Event Date(s): 10/4/2022 – 10/5/2022

PRE-SAMPLING CALIBRATION

Date and time 10/4/22 05:45 Name AXK

Parameter	**Std. Value**	**Std. Temp (^{0}C)**	**Pre-Cal Value**	**Post-Cal Value**	**Notes**
Conductivity (uS/cm @ 25^{o}C)	1,000	19.2	894	1,000	
	1,413	19.2	1,409	1,413	
DO (%)	76.5	18.4	78.2	76.3	Baro= 580 mmHg
DO (mg/L)*	7.12	18.4	7.03	7.05	*Check solubility table**
pH	pH4	15.1	4.63	4.00	
	pH 7	15.1	7.56	7.00	
	pH 10	15.1	10.26	10.00	
Turbidity	0.0	19.1	-2.05	0.0	
	12.4	19.1	27.0	12.4	

POST-SAMPLING CALIBRATION CHECK

Date and time ____________ Name ____________

Parameter	**Std. Value**	**Std. Temp (^{0}C)**	**Post-Sampling Value**	**Re-Cal** Yes or No?	**Post-Cal Value**	**Diff.**	**MQO Code[1]**	**Notes**
Conductivity (uS/cm @ 25^{o}C)	1,000	18.9	985	No	--	1.5%	A	
	1,413	18.4	1,370	No	--	3.0%	A	
DO (%)	76.5	22.4	75.9	No	--	0.8%	A	Baro ~580 mmHg
*DO (mg/L)	6.57	22.4	6.59	No	--	0.3%	A	*Check solubility table**
pH	pH 4	17.4	3.89	No	--	0.11	A	
	pH 7	17.	6.99	No	--	0.01	A	
	pH 10	19.3	10.08	No	--	0.08	A	
Turbidity	0.0	17.9	0.25	No	--	--	R	
	12.4	17.7	5.77	Yes	--	53.5%	R	

[1] See Table 1

Table 1: Measurement Quality Objectives – comparisons are between Post-sampling Value and Post-calibration Value

Parameter	**Units**	**Accept**	**Qualify**	**Reject**
Dissolved oxygen	% saturation	≤ 5%	> 5% and ≤ 10%	> 10%
Conductivity	uS/cm	≤ 5%	> 5% and ≤ 15%	> 15%
pH	s.u.	≤ 0.2	> 0.2 and ≤ 0.5	> 0.5
Turbidity	NTU	≤ 5%	> 5% and ≤ 10%	> 10%

Water Quality EXO Sonde Calibration Log

Project: 856.01 Lee Vining Water Quality

Unit ID: Exo 2 5645

Sampling Event Date(s): 10/4/2022 – 10/5/2022

PRE-SAMPLING CALIBRATION

Date and time 10/5/22 08:00 Name AXK

Parameter	**Std. Value**	**Std. Temp (^{0}C)**	**Pre-Cal Value**	**Post-Cal Value**	**Notes**
Conductivity (uS/cm @ 25^{o}C)	1,000	14.5	895	1,000	
	1,413	13.9	1,387	1,413	
DO (%)	70-71%	14.4	71.6	71.0	Baro=~580 mmHg
DO (mg/L)*	<8.00	14.4	7.35	7.32	*Check solubility table**
pH	pH4	10.4	3.64	4.00	
	pH 7	9.7	6.81	7.00	
	pH 10	10.6	10.15	10.00	
Turbidity	0.0	12.0	1.38	0.0	
	12.4	12.0	6.87	12.4	

POST-SAMPLING CALIBRATION CHECK

Date and time 10/5/22 16:30 Name AXK

Parameter	**Std. Value**	**Std. Temp (^{0}C)**	**Post-Sampling Value**	**Re-Cal** Yes or No?	**Post-Cal Value**	**Diff.**	**MQO Code[1]**	**Notes**
Conductivity (uS/cm @ 25^{o}C)	1,000	18.2	1,108	No	--	10.8%	Q	
	1,413	18.1	1,556	No	--	10%	Q	
DO (%)	77 %	20.9	75.9	No	--	1.4	A	Baro ~580 mmHg
*DO (mg/L)	6.77	20.9	6.78	No	--	0.1%	A	*Check solubility table**
pH	pH 4	18.3	4.19	No	--	0.19	A	
	pH 7	17.6	7.01	No	--	0.01	A	
	pH 10	17.6	9.94	No	--	0.06	A	
Turbidity	0.0	17.7	0.35	No	--	--	R	
	12.4	18.2	18.2	Yes	--	46.8%	R	

[1] See Table 1

Table 1: Measurement Quality Objectives – comparisons are between Post-sampling Value and Post-calibration Value

Parameter	**Units**	**Accept**	**Qualify**	**Reject**
Dissolved oxygen	% saturation	≤ 5%	> 5% and ≤ 10%	> 10%
Conductivity	uS/cm	≤ 5%	> 5% and ≤ 15%	> 15%
pH	s.u.	≤ 0.2	> 0.2 and ≤ 0.5	> 0.5
Turbidity	NTU	≤ 5%	> 5% and ≤ 10%	> 10%

2023
YSI CALIBRATION LOGS

Stillwater Sciences

Water Quality Calibration Log

Project: LV WQ-1 Year 2 2023

Unit ID: YSI Exo 2 (SWS)

Sampling Event Date(s): 7/5/23

PRE-SAMPLING CALIBRATION

Date and time 7/5/23 8:15 Name AFH

Parameter	**Std. Value**	**Std. Temp (^{0}C)**	**Pre-Cal Value**	**Post-Cal Value**	**Notes**
Conductivity (uS/cm @ 25^{o}C)	1,000	17.5	997	1,000	
	1,413	18.6	1,406	--	
DO (%)	~71	20.3	71.3	71.2	Baro= 541.3 mmHg (at Ellery)
DO (mg/L)*	~6.4	20.4	6.41	--	*Check solubility table**
pH	pH4	17.8	4.17	4.00	
	pH 7	18.9	7.15	7.03	
	pH 10	19.4	10.17	10.07	
Turbidity	0	19.1	0.02	0.00	
	12.4	19.3	12.19	12.40	

POST-SAMPLING CALIBRATION CHECK

Date and time 7/5/23 17:15 Name AFH

Parameter	**Std. Value**	**Std. Temp (^{0}C)**	**Post-Sampling Value**	**Re-Cal** Yes or No?	**Post-Cal Value**	**Diff.**	**MQO Code[1]**	**Notes**
Conductivity (uS/cm @ 25^{o}C)	1,000	22.4	1,000	No	--	0.0%	A	
	1,413	22.7	1,345	No	--	4.3%	A	
DO (%)	~75	25.1	75.4	No	--	0.5%	A	Baro =569.8 mmgHg
*DO (mg/L)	~6.15	25.1	6.22	No	--	1.1%	A	*Check solubility table**
pH	pH 4	23.6	4.05	No	--	0.05	A	
	pH 7	23.6	6.88	No	--	0.15	A	
	pH 10	24.0	9.98	No	--	0.09	A	
Turbidity	0	27.3	-0.13	No	--	--	--	
	12.4	27.4	12.38	No	--	0.2%	A	

[1] See Table 1

Table 1: Measurement Quality Objectives – comparisons are between Post-sampling Value and Post-calibration Value

Parameter	Units	Accept	Qualify	Reject
Dissolved oxygen	% saturation	≤ 5%	> 5% and ≤ 10%	> 10%
Conductivity	uS/cm	≤ 5%	> 5% and ≤ 15%	> 15%
pH	s.u.	≤ 0.2	> 0.2 and ≤ 0.5	> 0.5
Turbidity	NTU	≤ 5%	> 5% and ≤ 10%	> 10%

Stillwater Sciences

Water Quality Calibration Log

Project: Lee Vining WQ-1 Year 2 2023

Unit ID: YSI EXO

Sampling Event Date(s): 7/6/23

PRE-SAMPLING CALIBRATION

Date and time 7/6/23 08:27 Name AFH

Parameter	**Std. Value**	**Std. Temp (^{0}C)**	**Pre-Cal Value**	**Post-Cal Value**	**Notes**
Conductivity (uS/cm @ 25^{o}C)	1,000	19.8	988	1,000	
	1,413	19.6	1,413	--	
DO (%)	71	20.2	70.9	71.0	Baro= 539.5 mmHg
DO (mg/L)*	~6.35	20.6	6.38	--	*Check solubility table**
pH	pH4	19.5	4.01	4.00	
	pH 7	19.8	6.90	7.02	
	pH 10	20.0	9.99	10.06	
Turbidity	0.00	18.8	-0.03	0.00	
	12.4	19.2	12.43	12.40	

POST-SAMPLING CALIBRATION CHECK

Date and time 7/6/23 18:17 Name AFH

Parameter	**Std. Value**	**Std. Temp (^{0}C)**	**Post-Sampling Value**	**Re-Cal** Yes or No?	**Post-Cal Value**	**Diff.**	**MQO Code**[1]	**Notes**
Conductivity (uS/cm @ 25^{o}C)	1,000	23.3	1,015	No	--	1.5%	A	
	1,413	23.9	1,402	No	--	0.8%	A	
DO (%)	~74.5	29.3	73.9	No	--	1.3%	A	Baro = 567.5 mmHg
*DO (mg/L)	~5.6	29.2	5.66	--	--	1.1%	A	*Check solubility table**
pH	pH 4	22.6	4.12	No	--	0.12	A	
	pH 7	23.2	7.00	No	--	0.02	A	
	pH 10	22.0	10.11	No	--	0.05	A	
Turbidity	0.00	24.2	-0.09	No	--	--	--	
	12.4	23.2	12.32	No	--	0.9%	A	

[1] See Table 1

Table 1: Measurement Quality Objectives – comparisons are between Post-sampling Value and Post-calibration Value

Parameter	**Units**	**Accept**	**Qualify**	**Reject**
Dissolved oxygen	% saturation	≤ 5%	> 5% and ≤ 10%	> 10%
Conductivity	uS/cm	≤ 5%	> 5% and ≤ 15%	> 15%
pH	s.u.	≤ 0.2	> 0.2 and ≤ 0.5	> 0.5
Turbidity	NTU	≤ 5%	> 5% and ≤ 10%	> 10%

Water Quality EXO Sonde Calibration Log

Project: LV WQ-1 Year 2 2023

Unit ID: YSI Pro Plus (Davis)

Sampling Event Date(s): 7/4/23

PRE-SAMPLING CALIBRATION

Date and time 7/4/23 Name AFH

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Conductivity (uS/cm @ 25°C)	1,000	24.3	992	1,000	
	1,413	23.4	1,403	--	
DO (%)	~100	23.6	96.6	100.1	Baro= 550.9 mmHg *(Localized DO)*
DO (mg/L)*	~6.1	23.8	6.14	6.39	*Check solubility table**
pH	pH4	24.7	4.17	4.01	
	pH 7	25.6	7.09	7.03	
	pH 10	25.5	9.99	10.00	
Turbidity	Turbidity collected using Hach				

POST-SAMPLING CALIBRATION CHECK

Date and time 7/5/23 08:11 Name MAM

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	Diff.	MQO Code[1]	Notes
Conductivity (uS/cm @ 25°C)	1,000	18.2	999	No	--	0.1%	A	
	1,413	19.6	1,409	No	--	0.4%	A	
DO (%)	~100	29.7	92.3	No	--	3%	A	Baro= 550.9 mmHg *(Localized DO)*
*DO (mg/L)	5.4	29.7	5.60	No	--	2%	A	*Check solubility table**
pH	pH 4	17.8	3.96	No	--	0.05	A	
	pH 7	18.6	6.99	No	--	0.04	A	
	pH 10	18.8	10.02	No	--	0.02	A	
Turbidity	Turbidity collected using Hach							

[1] See Table 1

Table 1: Measurement Quality Objectives – comparisons are between Post-sampling Value and Post-calibration Value

Parameter	Units	Accept	Qualify	Reject
Dissolved oxygen	% saturation	≤ 5%	> 5% and ≤ 10%	> 10%
Conductivity	uS/cm	≤ 5%	> 5% and ≤ 15%	> 15%
pH	s.u.	≤ 0.2	> 0.2 and ≤ 0.5	> 0.5
Turbidity	NTU	≤ 5%	> 5% and ≤ 10%	> 10%

Water Quality Calibration Log

Project: Lee Vining WQ-1

Unit ID: Davis YSI Pro Plus

Sampling Event Date(s): 7/5/23

PRE-SAMPLING CALIBRATION

Date and time 7/5/23 08:11 Name MAM

Parameter	**Std. Value**	**Std. Temp (^{0}C)**	**Pre-Cal Value**	**Post-Cal Value**	**Notes**
Conductivity (uS/cm @ 25°C)	1,000	18.2	999	1,000	
	1,413	19.6	1,409	1,413	
DO (%)	~100	25.7	92.3	100.7	Baro= 541.5 mmHg *(Localized DO)*
DO (mg/L)*	~5.8	25.7	5.60	5.99	*Check solubility table**
pH	pH4	17.8	3.96	4.00	
	pH 7	18.6	6.99	6.99	
	pH 10	18.8	10.02	10.07	
Turbidity	--	--	--	--	
	--	--	--	--	

POST-SAMPLING CALIBRATION CHECK

Date and time 7/5/23 17:15 Name MAM

Parameter	**Std. Value**	**Std. Temp (^{0}C)**	**Post-Sampling Value**	**Re-Cal** Yes or No?	**Post-Cal Value**	**Diff.**	**MQO Code[1]**	**Notes**
Conductivity (uS/cm @ 25°C)	1,000	22.4	1,002	No	--	0.2%	A	
	1,413	23.2	1,402	No	--	0.8%	A	
DO (%)	~100	28.4	98.9	No	--	1%	A	Baro = 541.5 mmgHg *(Localized DO)*
*DO (mg/L)	5.5	28.4	5.77	No	--	5%	A	*Check solubility table**
pH	pH 4	24.1	4.04	No	--	0.04	A	
	pH 7	24.4	6.99	No	--	0.00	A	
	pH 10	23.2	10.03	No	--	0.04	A	
Turbidity	--	--	--	--	--	--	--	
	--	--	--	--	--	--	--	

[1] See Table 1

Table 1: Measurement Quality Objectives – comparisons are between Post-sampling Value and Post-calibration Value

Parameter	**Units**	**Accept**	**Qualify**	**Reject**
Dissolved oxygen	% saturation	≤ 5%	> 5% and ≤ 10%	> 10%
Conductivity	uS/cm	≤ 5%	> 5% and ≤ 15%	> 15%
pH	s.u.	≤ 0.2	> 0.2 and ≤ 0.5	> 0.5
Turbidity	NTU	≤ 5%	> 5% and ≤ 10%	> 10%

Water Quality Calibration Log

Project: Lee Vining WQ Year 2

Unit ID: Davis YSI Pro Plus

Sampling Event Date(s): 7/6/23

PRE-SAMPLING CALIBRATION

Date and time 7/6/23 08:27 Name MAM

Parameter	**Std. Value**	**Std. Temp (⁰C)**	**Pre-Cal Value**	**Post-Cal Value**	**Notes**
Conductivity (uS/cm @ 25oC)	1,000	19.9	997	1,000	
	1,413	19.6	1,400	1,413	
DO (%)	~100	20.5	102.5	100.0	Baro= 539.7mmHg *(Localized DO)*
DO (mg/L)*	~6.35	20.5	6.54	6.39	*Check solubility table**
pH	pH4	20.6	4.02	4.00	
	pH 7	19.5	7.00	7.01	
	pH 10	20.1	10.01	10.04	
Turbidity	--	--	--	--	
	--	--	--	--	

POST-SAMPLING CALIBRATION CHECK

Date and time 7/6/23 18:17 Name MAM

Parameter	**Std. Value**	**Std. Temp (⁰C)**	**Post-Sampling Value**	**Re-Cal** Yes or No?	**Post-Cal Value**	**Diff.**	**MQO Code¹**	**Notes**
Conductivity (uS/cm @ 25oC)	1,000	24.1	1,041	No	--	4.1%	A	
	1,413	23.4	1,400	No	--	0.9%	A	
DO (%)	100.3	25.6	99.1	No	--	1%	A	Baro 567.5 *(Localized DO)*
*DO (mg/L)	6.03	25.6	6.05	No	--	0.3%	A	*Check solubility table**
pH	pH 4	22.5	3.97	No	--	0.03	A	
	pH 7	22.6	6.90	No	--	0.11	A	
	pH 10	23.0	9.99	No	--	0.05	A	
Turbidity	--	--	--	--	--	--	--	
	--	--	--	--	--	--	--	

¹ See Table 1

Table 1: Measurement Quality Objectives – comparisons are between Post-sampling Value and Post-calibration Value

Parameter	Units	Accept	Qualify	Reject
Dissolved oxygen	% saturation	≤ 5%	> 5% and ≤ 10%	> 10%
Conductivity	uS/cm	≤ 5%	> 5% and ≤ 15%	> 15%
pH	s.u.	≤ 0.2	> 0.2 and ≤ 0.5	> 0.5
Turbidity	NTU	≤ 5%	> 5% and ≤ 10%	> 10%

Water Quality Calibration Log

Project: LVC WQ-1 Year 2

Unit ID: YSI Pro Plus Davis

Sampling Event Date(s): 8/29/2023

PRE-SAMPLING CALIBRATION

Date and time 8/28 20:40 Name Cooper Walton

Parameter	**Std. Value**	**Std. Temp (°C)**	**Pre-Cal Value**	**Post-Cal Value**	**Notes**
Conductivity (uS/cm @ 25°C)	1,000	23.9	1,005	999	
	1,413	23.9	1399	1,413	
DO (%)	~100	28.3	98.0	100.0	Baro= 531.1 mmHg (localized DO)
DO (mg/L)*	~5.4	28.3	5.39	5.54	*Check solubility table**
pH	pH4	19.4	4.09	4.00	
	pH 7	19.6	7.02	7.04	
	pH 10	19.6	9.99	10.06	
Turbidity	Turbidity collected with Hach				

POST-SAMPLING CALIBRATION CHECK

Date and time 8/29 19:00 Name MAM/EFA

Parameter	**Std. Value**	**Std. Temp (°C)**	**Post-Sampling Value**	**Re-Cal** Yes or No?	**Post-Cal Value**	**Diff.**	**MQO Code**¹	**Notes**
Conductivity (uS/cm @ 25°C)	1,000	23.3	1022	No	--	2.30%	A	
	1,413	23.3	1382	No	--	2.19%	A	
DO (%)	100	19.7	120.4	No	--	20%	R*	Baro 589.9 (localized DO)
*DO (mg/L)	7.05	19.7	8.53	No	--	20%	R*	*Check solubility table**
pH	pH 4	23.3	4.00	No	--	0.00	A	
	pH 7	23.4	6.95	No	--	0.09	A	
	pH 10	23.6	10.04	No	--	0.02	A	
Turbidity	Turbidity collected with Hach							

¹ See Table 1

*Data corrected based on post-sampling data.

Table 1: Measurement Quality Objectives – comparisons are between Post-sampling Value and Post-calibration Value

Parameter	**Units**	**Accept**	**Qualify**	**Reject**
Dissolved oxygen	% saturation	≤ 5%	> 5% and ≤ 10%	> 10%
Conductivity	uS/cm	≤ 5%	> 5% and ≤ 15%	> 15%
pH	s.u.	≤ 0.2	> 0.2 and ≤ 0.5	> 0.5
Turbidity	NTU	≤ 5%	> 5% and ≤ 10%	> 10%

Water Quality Calibration Log

Project: LVC WQ-1 Year 2

Unit ID: YSI Pro Plus Davis

Sampling Event Date(s): 8/30/2023

PRE-SAMPLING CALIBRATION

Date and time 8/29 19:00 Name MAM/EFA

Parameter	Std. Value	Std. Temp (^{0}C)	Pre-Cal Value	Post-Cal Value	Notes
Conductivity (uS/cm @ 25^{o}C)	1,000	23.3	1022	1001	
	1,413	23.3	1382	--	
DO (%)	~100	19.7	120.2	99.8	Baro=589.9 mmHg (localized DO)
DO (mg/L)*	~7.05	19.7	8.56	7.10	*Check solubility table**
pH	pH4	23.5	4.00	4.02	
	pH 7	23.4	6.95	7.05	
	pH 10	23.4	10.04	10.03	
Turbidity	Turbidity collected with Hach				

POST-SAMPLING CALIBRATION CHECK

Date and time 8/30 17:00 Name EFA

Parameter	Std. Value	Std. Temp (^{0}C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	Diff.	MQO Code[1]	Notes
Conductivity (uS/cm @ 25^{o}C)	1,000	22.7	989	No	--	1.20%	A	
	1,413	22.3	1380	No	--	0.14%	A	
DO (%)	~100	19.0	102.2	No	--	2%	A	Baro=589.9 mmHg (localized DO)
*DO (mg/L)	7.16	19.0	7.09	No	--	1%	A	*Check solubility table**
pH	pH 4	22.5	4.07	No	--	0.05	A	
	pH 7	22.7	7.02	No	--	0.03	A	
	pH 10	22.4	10.02	No	--	0.01	A	
Turbidity	Turbidity collected with Hach							

[1] See Table 1

Table 1: Measurement Quality Objectives – comparisons are between Post-sampling Value and Post-calibration Value

Parameter	Units	Accept	Qualify	Reject
Dissolved oxygen	% saturation	≤ 5%	> 5% and ≤ 10%	> 10%
Conductivity	uS/cm	≤ 5%	> 5% and ≤ 15%	> 15%
pH	s.u.	≤ 0.2	> 0.2 and ≤ 0.5	> 0.5
Turbidity	NTU	≤ 5%	> 5% and ≤ 10%	> 10%

Water Quality Calibration Log

Project: LVC WQ-1 Year 2

Unit ID: Davis Exo

Sampling Event Date(s): 8/31/2023

PRE-SAMPLING CALIBRATION

Date and time 8/30 18:00 Name MTS/EFA

Parameter	**Std. Value**	**Std. Temp (⁰C)**	**Pre-Cal Value**	**Post-Cal Value**	**Notes**
Conductivity (uS/cm @ 25°C)	1,000	22.6	999	1000	
	1,413	22.4	1350	--	
DO (%)	~	18.1	69.0	69.4	Baro=527.6 mmHg
DO (mg/L)*	6.5	18.1	6.56	--	*Check solubility table**
pH	pH4	22.2	4.07	4.00	
	pH 7	21.8	7.00	7.00	
	pH 10	22.7	10.03	10.00	
Turbidity	0.0	21.3	-1.36	0.00	
	14.4	21.2	13.0	14.4	

POST-SAMPLING CALIBRATION CHECK

Date and time 8/31 19:40 Name MAM

Parameter	**Std. Value**	**Std. Temp (⁰C)**	**Post-Sampling Value**	**Re-Cal** Yes or No?	**Post-Cal Value**	**Diff.**	**MQO Code**[1]	**Notes**
Conductivity (uS/cm @ 25°C)	1,000	21.8	997	No	--	0.30%	A	
	1,413	21.4	1394	No	--	3.11%	A	
DO (%)				No	--		Q	Not recorded
*DO (mg/L)				No	--		Q	Not recorded
pH	pH 4	22.5	3.96	No	--	0.04	A	
	pH 7	22.2	6.96	No	--	0.04	A	
	pH 10	22.5	9.97	No	--	0.03	A	
Turbidity	0.0	21.0	0.00	No	--	0.00%	A	
	14.4	20.2	14.40	No	--	0.00%	A	

[1] See Table 1

Table 1: Measurement Quality Objectives – comparisons are between Post-sampling Value and Post-calibration Value

Parameter	**Units**	**Accept**	**Qualify**	**Reject**
Dissolved oxygen	% saturation	≤ 5%	> 5% and ≤ 10%	> 10%
Conductivity	uS/cm	≤ 5%	> 5% and ≤ 15%	> 15%
pH	s.u.	≤ 0.2	> 0.2 and ≤ 0.5	> 0.5
Turbidity	NTU	≤ 5%	> 5% and ≤ 10%	> 10%

Stillwater Sciences

Water Quality Calibration Log

Project: LV WQ-1 Year 2

Unit ID: Davis Exo

Sampling Event Date(s): 9/4/2023

PRE-SAMPLING CALIBRATION

Date and time 9/4 06:45 Name MAM

Parameter	**Std. Value**	**Std. Temp (^{0}C)**	**Pre-Cal Value**	**Post-Cal Value**	**Notes**
Conductivity (uS/cm @ 25^{o}C)	1,000	19.032	1019	1000	
	1,413	18.638	1389	--	
DO (%)	**~70.5**	15.125	70.6	70.5	Baro= 535.6 mmHg
DO (mg/L)*	**~7.05**	15.151	7.09	--	*Check solubility table**
pH	pH4	17.8	3.96	4.01	
	pH 7	19.1	7.01	7.03	
	pH 10	19.2	10.00	10.07	
Turbidity	0.0	17.9	0.00	0.00	
	14.4	17.7	13.41	14.40	Used new standard

POST-SAMPLING CALIBRATION CHECK

Date and time 9/4 Name MAM/AFH

Parameter	**Std. Value**	**Std. Temp (^{0}C)**	**Post-Sampling Value**	**Re-Cal** Yes or No?	**Post-Cal Value**	**Diff.**	**MQO Code[1]**	**Notes**
Conductivity (uS/cm @ 25^{o}C)	1,000	18.6	993	No	--	0.7%	A	
	1,413	18.3	1386	No	--	0.2%	A	
DO (%)	~71	13.5	74.3	No	--	4.6%	A	Baro 538.4
*DO (mg/L)	~7.34	13.5	7.74	No	--	5.4%	Q	*Check solubility table**
pH	pH 4	17.9	4.14	No	--	0.13	A	
	pH 7	17.9	7.15	No	--	0.12	A	
	pH 10	17.9	10.15	No	--	0.08	A	
Turbidity	0.0	17.6	0.03	No	--	--	--	
	14.4	17.8	15.51	No	--	7.7%	Q	

[1] See Table 1

Table 1: Measurement Quality Objectives – comparisons are between Post-sampling Value and Post-calibration Value

Parameter	Units	Accept	Qualify	Reject
Dissolved oxygen	% saturation	≤ 5%	> 5% and ≤ 10%	> 10%
Conductivity	uS/cm	≤ 5%	> 5% and ≤ 15%	> 15%
pH	s.u.	≤ 0.2	> 0.2 and ≤ 0.5	> 0.5
Turbidity	NTU	≤ 5%	> 5% and ≤ 10%	> 10%

Water Quality Calibration Log

Project: Lee Vining WQ

Unit ID: Exo 2s

Sampling Event Date(s): 10/9/2023

PRE-SAMPLING CALIBRATION

Date and time 10/8 20:40 Name MTS

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Conductivity (uS/cm @ 25°C)	1,000	22.4	982	1,000	
	1,413	22.1	1,410	--	
DO (%)	~75.4	16.6	76.1	75.4	Baro= 573.4 mmHg
DO (mg/L)*	~7.3	16.6	7.36	--	*Check solubility table**
pH	pH4	21.5	4.01	4.00	
	pH 7	22.4	6.98	7.00	
	pH 10	22.2	10.01	10.00	
Turbidity	--	--	--	--	
	--	--	--	--	

POST-SAMPLING CALIBRATION CHECK

Date and time 15:00 10/9 Name MTS

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	Diff.	MQO Code[1]	Notes
Conductivity (uS/cm @ 25°C)	1,000	18.7	998	No	--	0.2%	A	
	1,413	18.5	1,408	No	--	0.1%	A	
DO (%)	~75	16.4	74.8	No	--	0.3%	A	Baro 568.0
*DO (mg/L)	~7.2	16.4	7.30	No	--	1.4%	A	*Check solubility table**
pH	pH 4	18.3	4.12	No	--	0.12	A	
	pH 7	18.5	7.04	No	--	0.04	A	
	pH 10	18.5	10.09	No	--	0.09	A	
Turbidity	--	--	--	--	--	--	--	
	--	--	--	--	--	--	--	

[1] See Table 1

Table 1: Measurement Quality Objectives – comparisons are between Post-sampling Value and Post-calibration Value

Parameter	Units	Accept	Qualify	Reject
Dissolved oxygen	% saturation	≤ 5%	> 5% and ≤ 10%	> 10%
Conductivity	uS/cm	≤ 5%	> 5% and ≤ 15%	> 15%
pH	s.u.	≤ 0.2	> 0.2 and ≤ 0.5	> 0.5
Turbidity	NTU	≤ 5%	> 5% and ≤ 10%	> 10%

Water Quality Calibration Log

Project: Lee Vining WQ

Unit ID: Exo 2s

Sampling Event Date(s): 10/10/23

PRE-SAMPLING CALIBRATION

Date and time 10/9 20:00 Name MTS/JCA

Parameter	Std. Value	Std. Temp (^{0}C)	Pre-Cal Value	Post-Cal Value	Notes
Conductivity (uS/cm @ 25°C)	1,000	19.2	1,026	1,000	
	1,413	18.7	1,372	--	
DO (%)	~70	18.5	69.5	70	Baro= 532.1 mmHg
DO (mg/L)*	~6.4	19.3	6.44	--	*Check solubility table**
pH	pH4	19.8	3.95	4.00	
	pH 7	18.8	6.97	7.00	
	pH 10	19.0	10.03	10.00	
Turbidity	--	--	--	--	
	--	--	--	--	

POST-SAMPLING CALIBRATION CHECK

Date and time 10/10 20:00 Name MTS

Parameter	Std. Value	Std. Temp (^{0}C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	Diff.	MQO Code[1]	Notes
Conductivity (uS/cm @ 25°C)	1,000	19.1	1,003	No	--	0.3%	A	
	1,413	19.2	1,375	No	--	0.2%	A	
DO (%)	74.2	19.5	73.9	No	--	0.4%	A	Baro 563.7
*DO (mg/L)	~6.77	19.5	6.79	No	--	0.3%	A	*Check solubility table**
pH	pH 4	19.5	4.05	No	--	0.05	A	
	pH 7	19.1	7.02	No	--	0.02	A	
	pH 10	19.2	10.11	No	--	0.11	A	
Turbidity	--	--	--	--	--	--	--	
	--	--	--	--	--	--	--	

[1] See Table 1

Table 1: Measurement Quality Objectives – comparisons are between Post-sampling Value and Post-calibration Value

Parameter	Units	Accept	Qualify	Reject
Dissolved oxygen	% saturation	≤ 5%	> 5% and ≤ 10%	> 10%
Conductivity	uS/cm	≤ 5%	> 5% and ≤ 15%	> 15%
pH	s.u.	≤ 0.2	> 0.2 and ≤ 0.5	> 0.5
Turbidity	NTU	≤ 5%	> 5% and ≤ 10%	> 10%

Water Quality Calibration Log

Project: Lee Vining WQ

Unit ID: YSI Exo 2s

Sampling Event Date(s): 10/12/23

PRE-SAMPLING CALIBRATION

Date and time 10/11/23 19:30 Name Elliott Allen

Parameter	Std. Value	Std. Temp (⁰C)	Pre-Cal Value	Post-Cal Value	Notes
Conductivity (uS/cm @ 25oC)	1,000	19.8	998	1,000	
	1,413	19.8	1,364	--	
DO (%)	~69.5	19.5	71.9	68.9	Baro= 528 mmHg
DO (mg/L)*	--	--	--	--	*Check solubility table**
pH	pH4	19.5	4.06	4.00	
	pH 7	19.5	7.01	7.00	
	pH 10	19.7	10.10	10.00	
Turbidity	--	--	--	--	
	--	--	--	--	

POST-SAMPLING CALIBRATION CHECK

Date and time 10/12/23 11:00 Name Elliott Allen

Parameter	Std. Value	Std. Temp (⁰C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	Diff.	MQO Code[1]	Notes
Conductivity (uS/cm @ 25oC)	1,000	14.7	1,002	No	--	0.2%	A	
	1,413	14.5	1,392	No	--	2.1%	A	
DO (%)	~69	13.4	70.23	No	--	1.8%	A	Baro 523.5
*DO (mg/L)	~7.2		7.23	No	--	0.4%	A	*Check solubility table**
pH	pH 4	17.6	4.13	No	--	0.13	A	
	pH 7	17.0	7.13	No	--	0.13	A	
	pH 10	17.1	10.06	No	--	0.06	A	
Turbidity	--	--	--	--	--	--	--	
	--	--	--	--	--	--	--	

[1] See Table 1

Table 1: Measurement Quality Objectives – comparisons are between Post-sampling Value and Post-calibration Value

Parameter	Units	Accept	Qualify	Reject
Dissolved oxygen	% saturation	≤ 5%	> 5% and ≤ 10%	> 10%
Conductivity	uS/cm	≤ 5%	> 5% and ≤ 15%	> 15%
pH	s.u.	≤ 0.2	> 0.2 and ≤ 0.5	> 0.5
Turbidity	NTU	≤ 5%	> 5% and ≤ 10%	> 10%

Water Quality Calibration Log

Project: Lee Vining WQ-1

Unit ID: YSI Exo 2

Sampling Event Date(s): 10/10/23

PRE-SAMPLING CALIBRATION

Date and time 10/10 09:30 Name Elliott Allen

Parameter	Std. Value	Std. Temp (^{0}C)	Pre-Cal Value	Post-Cal Value	Notes
Conductivity (uS/cm @ 25^{o}C)	1,000	11.9	1,009	1,000	
	1,413	--	1,390	--	
DO (%)	~69	12.5	70.1	68.9	Baro= 523.9 mmHg
DO (mg/L)*	--	12.5	7.24	--	*Check solubility table**
pH	pH4	12.6	4.00	4.00	
	pH 7	12.9	6.96	7.00	
	pH 10	12.9	10.01	10.00	
Turbidity	0.0	14.1	-0.19	0.0	
	12.4	14.1	12.5	12.4	

POST-SAMPLING CALIBRATION CHECK

Date and time 10/10 20:30 Name MTS

Parameter	Std. Value	Std. Temp (^{0}C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	Diff.	MQO Code[1]	Notes
Conductivity (uS/cm @ 25^{o}C)	1,000	19.0	995	Yes	1,000	0.0%	A	
	1,413	19.9	1,370	--	--	1.4%	A	
DO (%)	74.2	19.9	71.1	No	--	4.2%	A	Baro 563.6
*DO (mg/L)	~6.65	19.9	6.87	No	--	3.3%	A	*Check solubility table**
pH	pH 4	19.6	3.99	Yes	4.00	0.01	A	
	pH 7	19.4	6.96	Yes	7.00	0.04	A	
	pH 10	19.3	9.89	Yes	10.00	0.11	A	
Turbidity	0.0	18.8	-0.13	Yes	0.00	--	--	
	12.4	18.8	11.95	Yes	12.4	3.6%	A	

[1] See Table 1

Table 1: Measurement Quality Objectives – comparisons are between Post-sampling Value and Post-calibration Value

Parameter	Units	Accept	Qualify	Reject
Dissolved oxygen	% saturation	≤ 5%	> 5% and ≤ 10%	> 10%
Conductivity	uS/cm	≤ 5%	> 5% and ≤ 15%	> 15%
pH	s.u.	≤ 0.2	> 0.2 and ≤ 0.5	> 0.5
Turbidity	NTU	≤ 5%	> 5% and ≤ 10%	> 10%

Water Quality Calibration Log

Project: Lee Vining WQ

Unit ID: Exo 2

Sampling Event Date(s): 10/11/2023

PRE-SAMPLING CALIBRATION

Date and time 10/10 20:30 Name MTS

Parameter	**Std. Value**	**Std. Temp (^{0}C)**	**Pre-Cal Value**	**Post-Cal Value**	**Notes**
Conductivity (uS/cm @ 25^{o}C)	1,000	19.0	995	1,000	
	1,413	19.9	1,370	--	
DO (%)	--	5.4	67.7	70.0	Baro=532.8 mmHg
DO (mg/L)*	--	--	--	--	*Check solubility table**
pH	pH4	19.6	3.99	4.00	
	pH 7	19.4	6.96	7.00	
	pH 10	19.3	9.89	10.00	
Turbidity	0	18.8	-0.13	0.00	
	12.4	18.8	11.95	12.4	

POST-SAMPLING CALIBRATION CHECK

Date and time 10/11 and 10/12 Name Elliott Allen

Parameter	**Std. Value**	**Std. Temp (^{0}C)**	**Post-Sampling Value**	**Re-Cal** Yes or No?	**Post-Cal Value**	**Diff.**	**MQO Code**[1]	**Notes**
Conductivity (uS/cm @ 25^{o}C)	1,000	--	1,019	No	--	1.9%	A	
	1,413	--	1,487	No	--	8.5%	Q	
DO (%)	~74	--	74.8	No	--	1.1%	A	Baro 564.3
*DO (mg/L)	--	--	8.08	No	--	--	--	*Check solubility table**
pH	pH 4	--	4.15	No	--	0.15	A	
	pH 7	--	7.06	No	--	0.06	A	
	pH 10	--	10.04	No	--	0.04	A	
Turbidity	0	--	0.08	No	--	--	--	
	12.4	--	12.58	No	--	1.5%	A	

[1] See Table 1

Table 1: Measurement Quality Objectives – comparisons are between Post-sampling Value and Post-calibration Value

Parameter	**Units**	**Accept**	**Qualify**	**Reject**
Dissolved oxygen	% saturation	≤ 5%	> 5% and ≤ 10%	> 10%
Conductivity	uS/cm	≤ 5%	> 5% and ≤ 15%	> 15%
pH	s.u.	≤ 0.2	> 0.2 and ≤ 0.5	> 0.5
Turbidity	NTU	≤ 5%	> 5% and ≤ 10%	> 10%

APPENDIX C
TURBIDITY MONITORING QUALITY ASSURANCE

Table C-1. Quality Assurance Comparisons of In Situ Turbidity Data with Spot Check Measurements

Monitoring Period	Site ID	Site Description	Date	Activity	Turbidity (NTU)		
					Pre-Maintenance, or Retrieval	Post-Maintenance, or Deployment	Field Spot Checks
Long-term (2023–2024)	LVC-DSPP1	Lee Vining Creek 0.24 river mile downstream Poole Powerhouse	7/14/2022	Deployment	--	0.4	--
			10/6/2022	Maintenance	8.4	0.4	0.7
			10/7/2022	Relocation	--	--	N/A
			12/15/2022	Maintenance	18.6	0.8	0.5
			5/18/2023	Maintenance	38.8	2.0	1.3
			9/4/2023	Maintenance	4.7	0.2	--
			10/11/2023	Maintenance	14.1	--	--
	LVC-DSPP2	Lee Vining Creek 4.3 river miles downstream Poole Powerhouse near Lower Lee Vining Campground	7/14/2022	Deployment	--	0.5	--
			10/6/2022	Maintenance	1.3	1.3	0.51
			10/7/2022	Relocation	--	--	N/A
			12/15/2022	Spot Check	2.2	--	1.5
			5/18/2023	Maintenance	8.5	13.7	2.3
			9/4/2023	Maintenance	0.9	1.9	--
			10/11/2023	Retrieval	0.7	--	--
Short-term (24–48 hour)	LV-SIT	Lee Vining Creek inflow to Saddlebag Lake	7/4/2023	Deployment	--	0	0.9
			7/6/2023	Retrieval	0	--	1.0
			9/1/2023	Deployment [a]	--	0.9	1.1
			9/3/2023	Retrieval [a]	20.4	--	1.3
			10/10/2023	Deployment	--	0.3	0.5
			10/12/2023	Retrieval	0.5	--	0.4

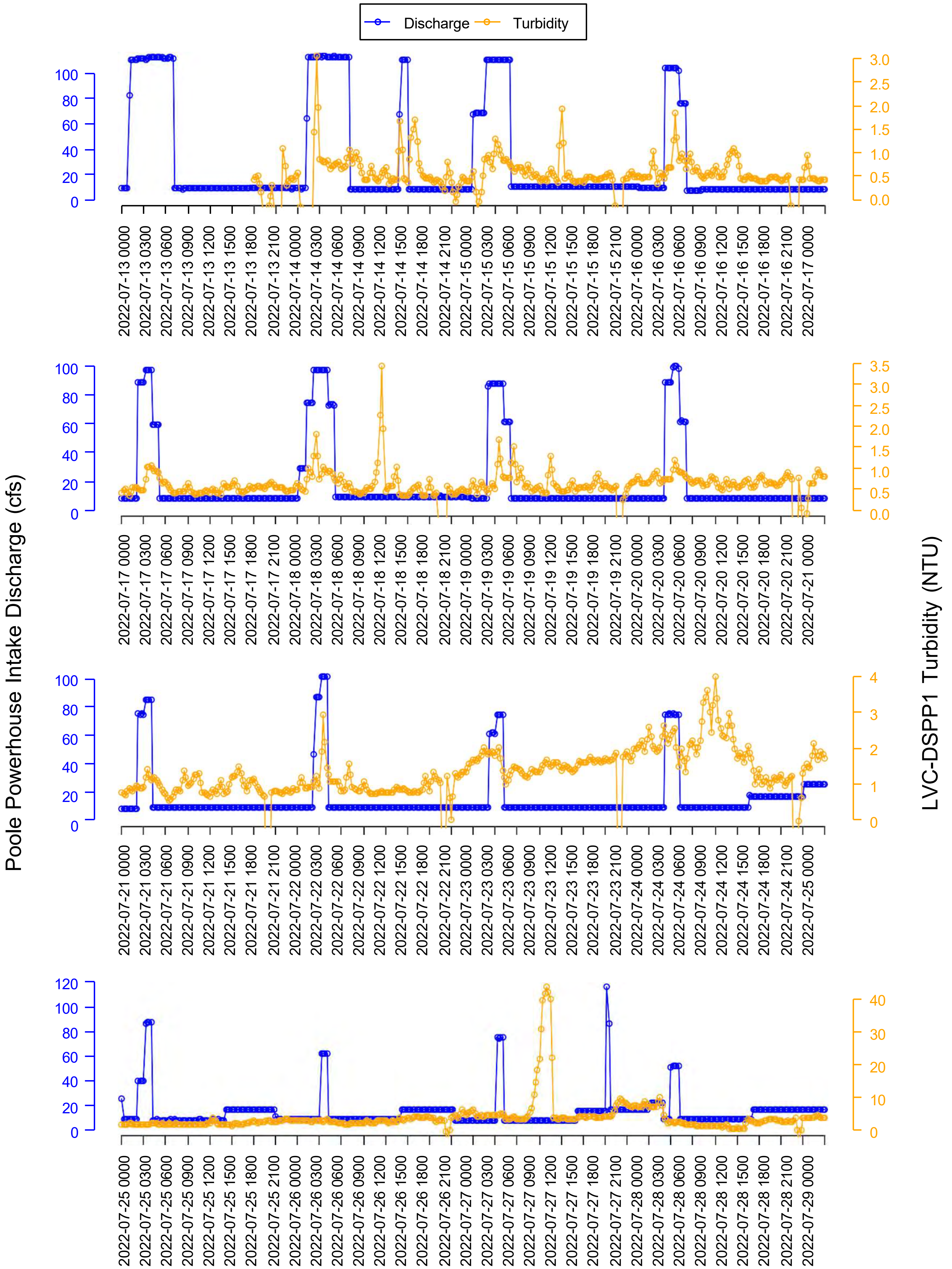
Monitoring Period	**Site ID**	**Site Description**	**Date**	**Activity**	**Turbidity (NTU)**		
					Pre-Maintenance, or Retrieval	**Post-Maintenance, or Deployment**	**Field Spot Checks**
	LV-WCT	Warren Creek upstream of its confluence with Lee Vining Creek	7/4/2023	Deployment	--	15.8	1.8
			7/5/2023	Retrieval	3.2	--	1.9
			8/28/2023	Deployment	--	3.5	0.7
			8/30/2023	Spot check	0.0	--	0.4
			8/30/2023	Retrieval	0.0	--	0.6
			10/8/2023	Deployment	--	-0.1	0.5
			10/10/2023	Retrieval	0.0	--	0.3
	LVC-GCT	Glacier Creek inflow to Tioga Lake	7/5/2023	Deployment	--	2.1	0.6
			7/6/2023	Retrieval	0.0	--	1.0
			8/28/2002	Deployment	--	0.0	0.3
			8/29/2023	Spot check	0.0	--	0.4
			8/30/2023	Spot check	0.0	--	0.2
			8/30/2023	Retrieval	0.0	--	0.3
			10/8/2023	Deployment	--	0.4	0.6
			10/10/2023	Retrieval	0.5	--	0.3

-- = samples not collected/no data; ID = identification; NTU = nephelometric turbidity units

[a] In situ data for the deployment are qualified due to potential equipment malfunction and/or equipment fouling. The difference between in situ turbidity readings and spot checks measurements indicate fouling.

APPENDIX D
HYDRO-RESOURCE OPTIMIZATION EVENT TURBIDITY DATA

Site LVC-DSPP1


Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP1 Turbidity (NTU)
0
20
40
60
80
100
0.0
0.5
1.0
1.5
2.0
2.5
3.0
2022-07-13 0000
2022-07-13 0300
2022-07-13 0600
2022-07-13 0900
2022-07-13 1200
2022-07-13 1500
2022-07-13 1800
2022-07-13 2100
2022-07-14 0000
2022-07-14 0300
2022-07-14 0600
2022-07-14 0900
2022-07-14 1200
2022-07-14 1500
2022-07-14 1800
2022-07-14 2100
2022-07-15 0000
2022-07-15 0300
2022-07-15 0600
2022-07-15 0900
2022-07-15 1200
2022-07-15 1500
2022-07-15 1800
2022-07-15 2100
2022-07-16 0000
2022-07-16 0300
2022-07-16 0600
2022-07-16 0900
2022-07-16 1200
2022-07-16 1500
2022-07-16 1800
2022-07-16 2100
2022-07-17 0000
0
20
40
60
80
100
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
2022-07-17 0000
2022-07-17 0300
2022-07-17 0600
2022-07-17 0900
2022-07-17 1200
2022-07-17 1500
2022-07-17 1800
2022-07-17 2100
2022-07-18 0000
2022-07-18 0300
2022-07-18 0600
2022-07-18 0900
2022-07-18 1200
2022-07-18 1500
2022-07-18 1800
2022-07-18 2100
2022-07-19 0000
2022-07-19 0300
2022-07-19 0600
2022-07-19 0900
2022-07-19 1200
2022-07-19 1500
2022-07-19 1800
2022-07-19 2100
2022-07-20 0000
2022-07-20 0300
2022-07-20 0600
2022-07-20 0900
2022-07-20 1200
2022-07-20 1500
2022-07-20 1800
2022-07-20 2100
2022-07-21 0000
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20
40
60
80
100
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1
2
3
4
2022-07-21 0000
2022-07-21 0300
2022-07-21 0600
2022-07-21 0900
2022-07-21 1200
2022-07-21 1500
2022-07-21 1800
2022-07-21 2100
2022-07-22 0000
2022-07-22 0300
2022-07-22 0600
2022-07-22 0900
2022-07-22 1200
2022-07-22 1500
2022-07-22 1800
2022-07-22 2100
2022-07-23 0000
2022-07-23 0300
2022-07-23 0600
2022-07-23 0900
2022-07-23 1200
2022-07-23 1500
2022-07-23 1800
2022-07-23 2100
2022-07-24 0000
2022-07-24 0300
2022-07-24 0600
2022-07-24 0900
2022-07-24 1200
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2022-07-24 1800
2022-07-24 2100
2022-07-25 0000
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2022-07-25 0000
2022-07-25 0300
2022-07-25 0600
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2022-07-25 1500
2022-07-25 1800
2022-07-25 2100
2022-07-26 0000
2022-07-26 0300
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2022-07-26 2100
2022-07-27 0000
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2022-07-27 2100
2022-07-28 0000
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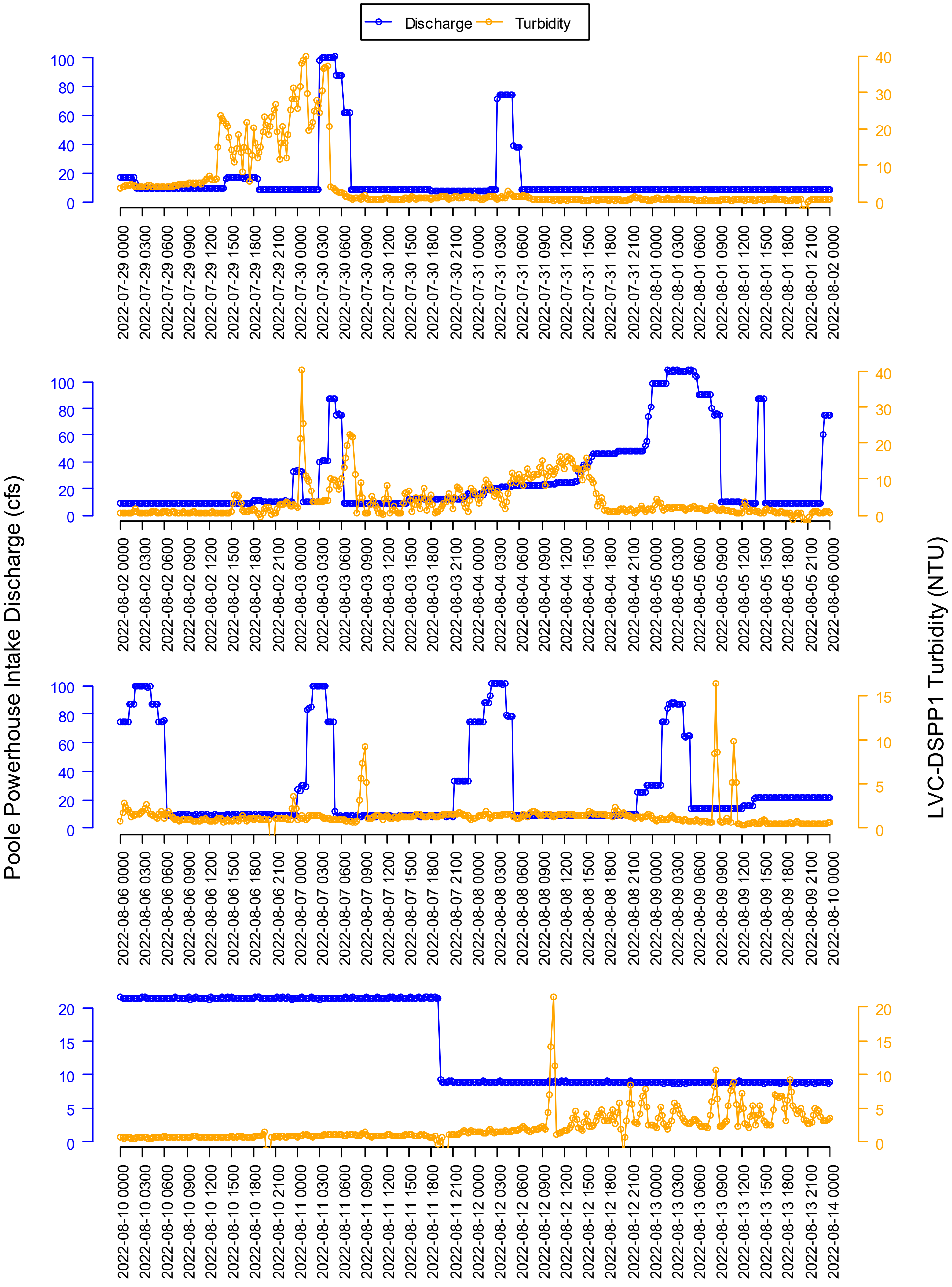
2022-07-28 2100
2022-07-29 0000


Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP1 Turbidity (NTU)
0
20
40
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2022-07-29 0000
2022-07-29 0300
2022-07-29 0600
2022-07-29 0900
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2022-07-29 1500
2022-07-29 1800
2022-07-29 2100
2022-07-30 0000
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2022-08-02 0000
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2022-08-02 0000
2022-08-02 0300
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2022-08-05 2100
2022-08-06 0000
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2022-08-06 2100
2022-08-07 0000
2022-08-07 0300
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2022-08-07 0900
2022-08-07 1200
2022-08-07 1500
2022-08-07 1800
2022-08-07 2100
2022-08-08 0000
2022-08-08 0300
2022-08-08 0600
2022-08-08 0900
2022-08-08 1200
2022-08-08 1500
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2022-08-08 2100
2022-08-09 0000
2022-08-09 0300
2022-08-09 0600
2022-08-09 0900
2022-08-09 1200
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2022-08-09 2100
2022-08-10 0000
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2022-08-10 0000
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2022-08-11 0900
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2022-08-11 1500
2022-08-11 1800
2022-08-11 2100
2022-08-12 0000
2022-08-12 0300
2022-08-12 0600
2022-08-12 0900
2022-08-12 1200
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2022-08-12 1800
2022-08-12 2100
2022-08-13 0000
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2022-08-13 0600
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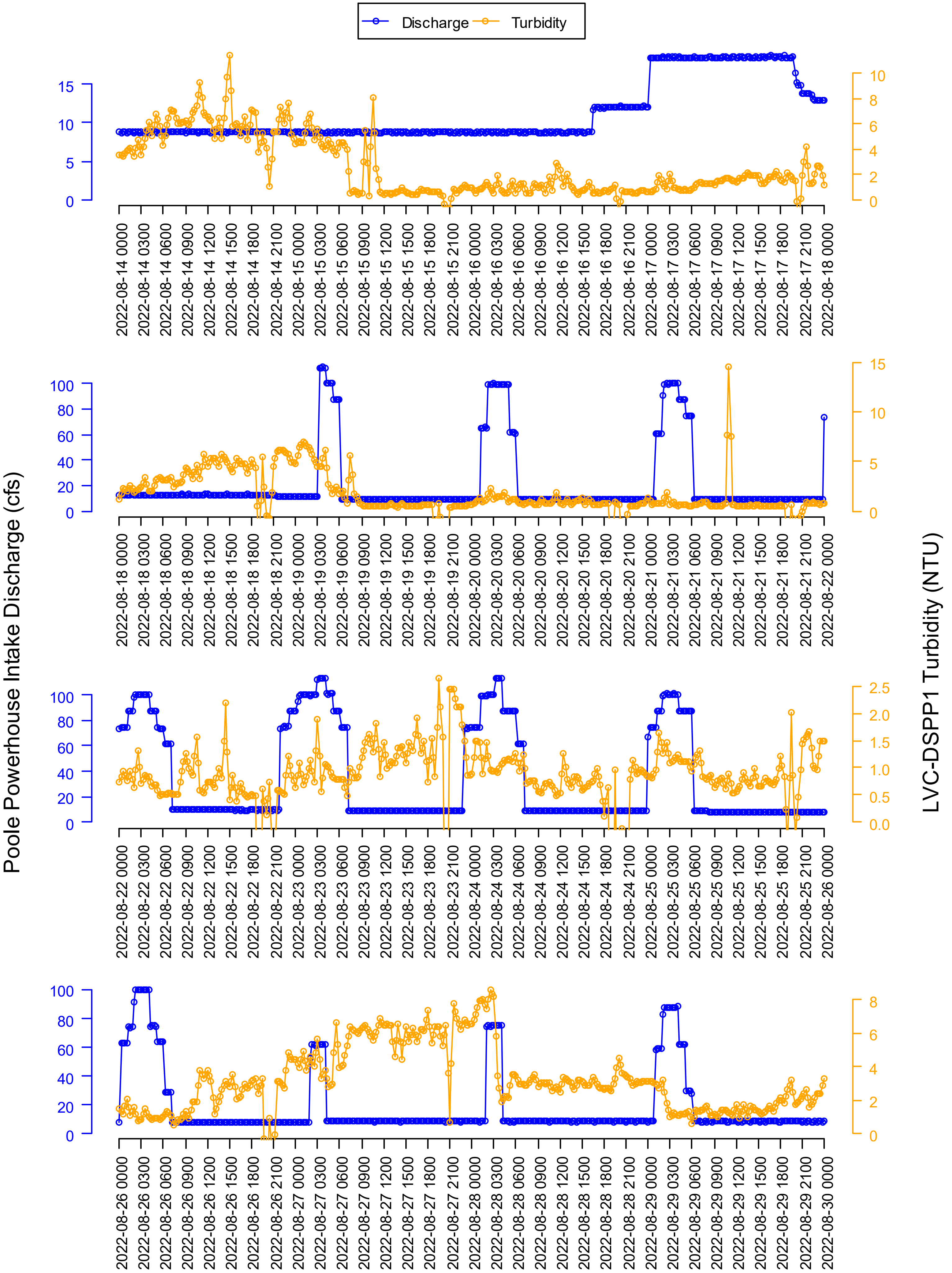
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP1 Turbidity (NTU)
0
5
10
15
0
2
4
6
8
10
2022-08-14 0000
2022-08-14 0300
2022-08-14 0600
2022-08-14 0900
2022-08-14 1200
2022-08-14 1500
2022-08-14 1800
2022-08-14 2100
2022-08-15 0000
2022-08-15 0300
2022-08-15 0600
2022-08-15 0900
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2022-08-15 2100
2022-08-16 0000
2022-08-16 0300
2022-08-16 0600
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2022-08-16 1200
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2022-08-16 2100
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2022-08-17 2100
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2022-08-18 1800
2022-08-18 2100
2022-08-19 0000
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2022-08-21 0000
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2022-08-21 2100
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2022-08-24 0000
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2022-08-24 0900
2022-08-24 1200
2022-08-24 1500
2022-08-24 1800
2022-08-24 2100
2022-08-25 0000
2022-08-25 0300
2022-08-25 0600
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2022-08-26 2100
2022-08-27 0000
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2022-08-27 1800
2022-08-27 2100
2022-08-28 0000
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2022-08-28 0600
2022-08-28 0900
2022-08-28 1200
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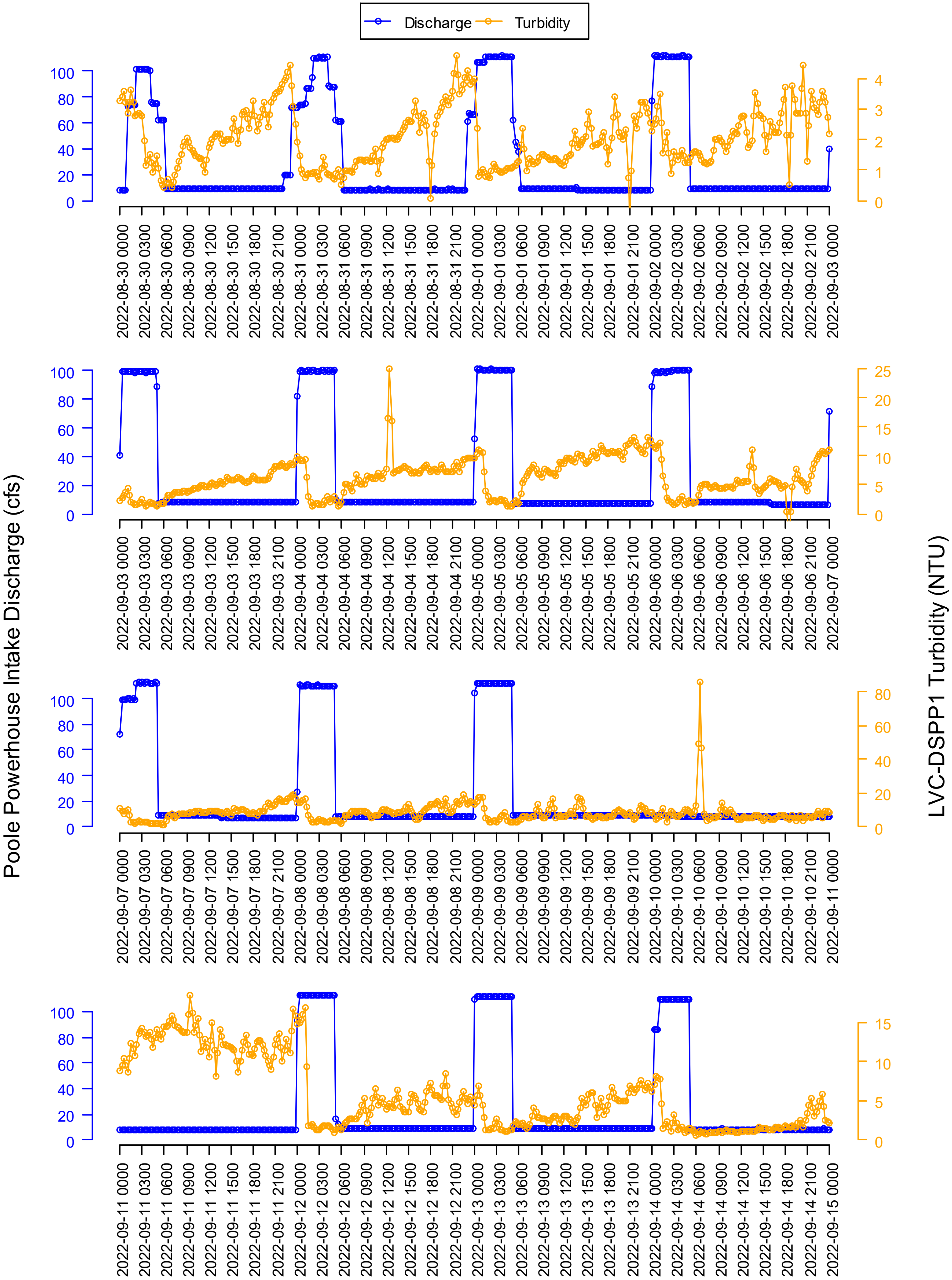
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP1 Turbidity (NTU)
0
20
40
60
80
100
0
1
2
3
4
2022-08-30 0000
2022-08-30 0300
2022-08-30 0600
2022-08-30 0900
2022-08-30 1200
2022-08-30 1500
2022-08-30 1800
2022-08-30 2100
2022-08-31 0000
2022-08-31 0300
2022-08-31 0600
2022-08-31 0900
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2022-08-31 2100
2022-09-01 0000
2022-09-01 0300
2022-09-01 0600
2022-09-01 0900
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2022-09-01 1500
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2022-09-01 2100
2022-09-02 0000
2022-09-02 0300
2022-09-02 0600
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2022-09-02 1200
2022-09-02 1500
2022-09-02 1800
2022-09-02 2100
2022-09-03 0000
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2022-09-03 0000
2022-09-03 0300
2022-09-03 0600
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2022-09-07 0000
2022-09-07 0300
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2022-09-07 1500
2022-09-07 1800
2022-09-07 2100
2022-09-08 0000
2022-09-08 0300
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2022-09-08 1200
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2022-09-08 2100
2022-09-09 0000
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2022-09-10 0600
2022-09-10 0900
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2022-09-10 2100
2022-09-11 0000
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2022-09-13 1200
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2022-09-14 0600
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2022-09-14 1800
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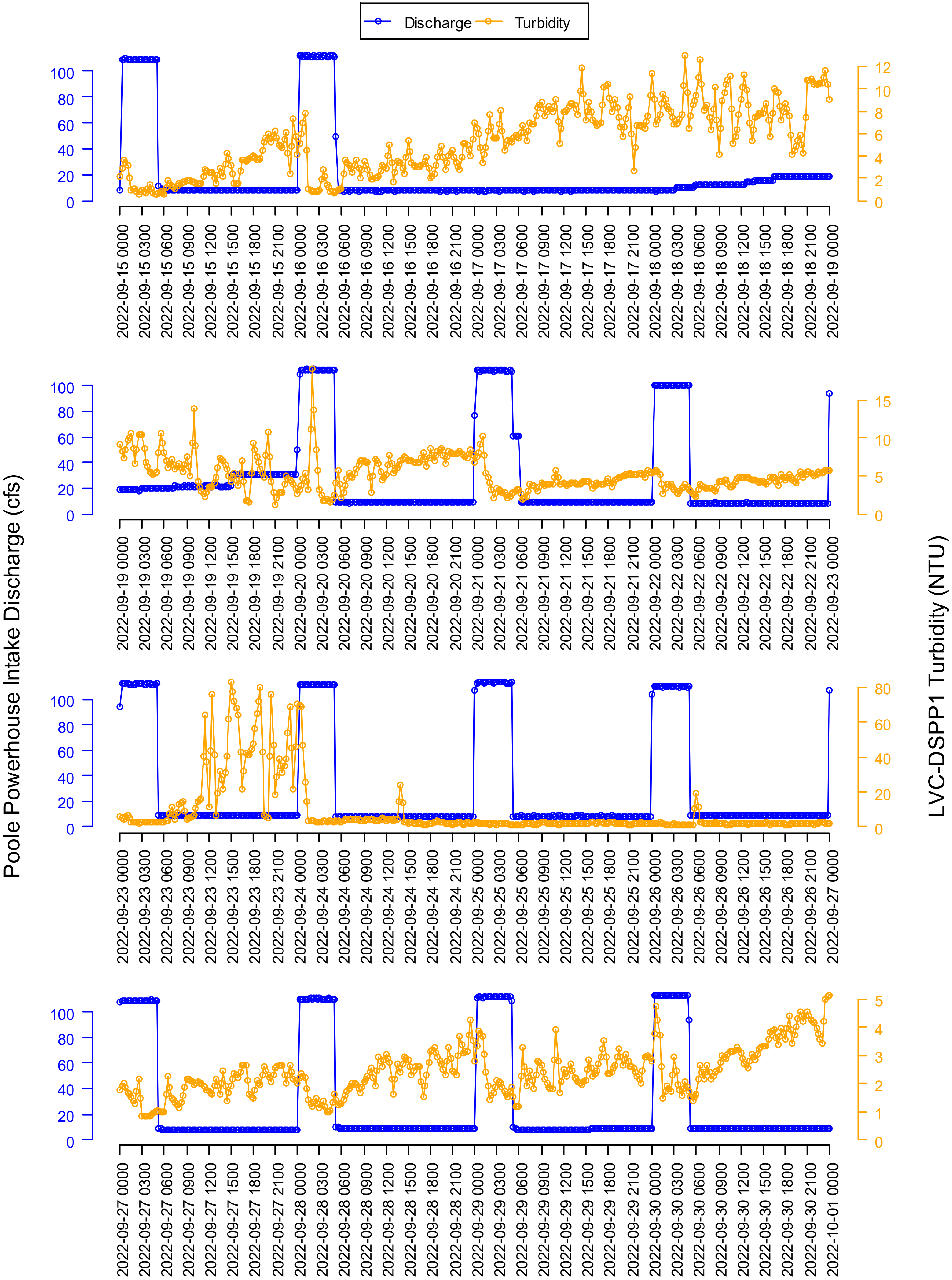
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP1 Turbidity (NTU)
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60
80
100
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2022-09-15 0600
2022-09-15 0900
2022-09-15 1200
2022-09-15 1500
2022-09-15 1800
2022-09-15 2100
2022-09-16 0000
2022-09-16 0300
2022-09-16 0600
2022-09-16 0900
2022-09-16 1200
2022-09-16 1500
2022-09-16 1800
2022-09-16 2100
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2022-09-17 0300
2022-09-17 0600
2022-09-17 0900
2022-09-17 1200
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2022-09-17 2100
2022-09-18 0000
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2022-09-18 0600
2022-09-18 0900
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2022-09-18 1800
2022-09-18 2100
2022-09-19 0000
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2022-09-19 0300
2022-09-19 0600
2022-09-19 0900
2022-09-19 1200
2022-09-19 1500
2022-09-19 1800
2022-09-19 2100
2022-09-20 0000
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2022-09-20 0600
2022-09-20 0900
2022-09-20 1200
2022-09-20 1500
2022-09-20 1800
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2022-09-21 0600
2022-09-21 0900
2022-09-21 1200
2022-09-21 1500
2022-09-21 1800
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2022-09-22 0600
2022-09-22 0900
2022-09-22 1200
2022-09-22 1500
2022-09-22 1800
2022-09-22 2100
2022-09-23 0000
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2022-09-23 0600
2022-09-23 0900
2022-09-23 1200
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2022-09-23 1800
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2022-09-24 0900
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2022-09-25 0900
2022-09-25 1200
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2022-09-25 1800
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2022-09-26 0900
2022-09-26 1200
2022-09-26 1500
2022-09-26 1800
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2022-09-27 0600
2022-09-27 0900
2022-09-27 1200
2022-09-27 1500
2022-09-27 1800
2022-09-27 2100
2022-09-28 0000
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2022-09-28 0600
2022-09-28 0900
2022-09-28 1200
2022-09-28 1500
2022-09-28 1800
2022-09-28 2100
2022-09-29 0000
2022-09-29 0300
2022-09-29 0600
2022-09-29 0900
2022-09-29 1200
2022-09-29 1500
2022-09-29 1800
2022-09-29 2100
2022-09-30 0000
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2022-09-30 0600
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2022-09-30 1200
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2022-09-30 1800
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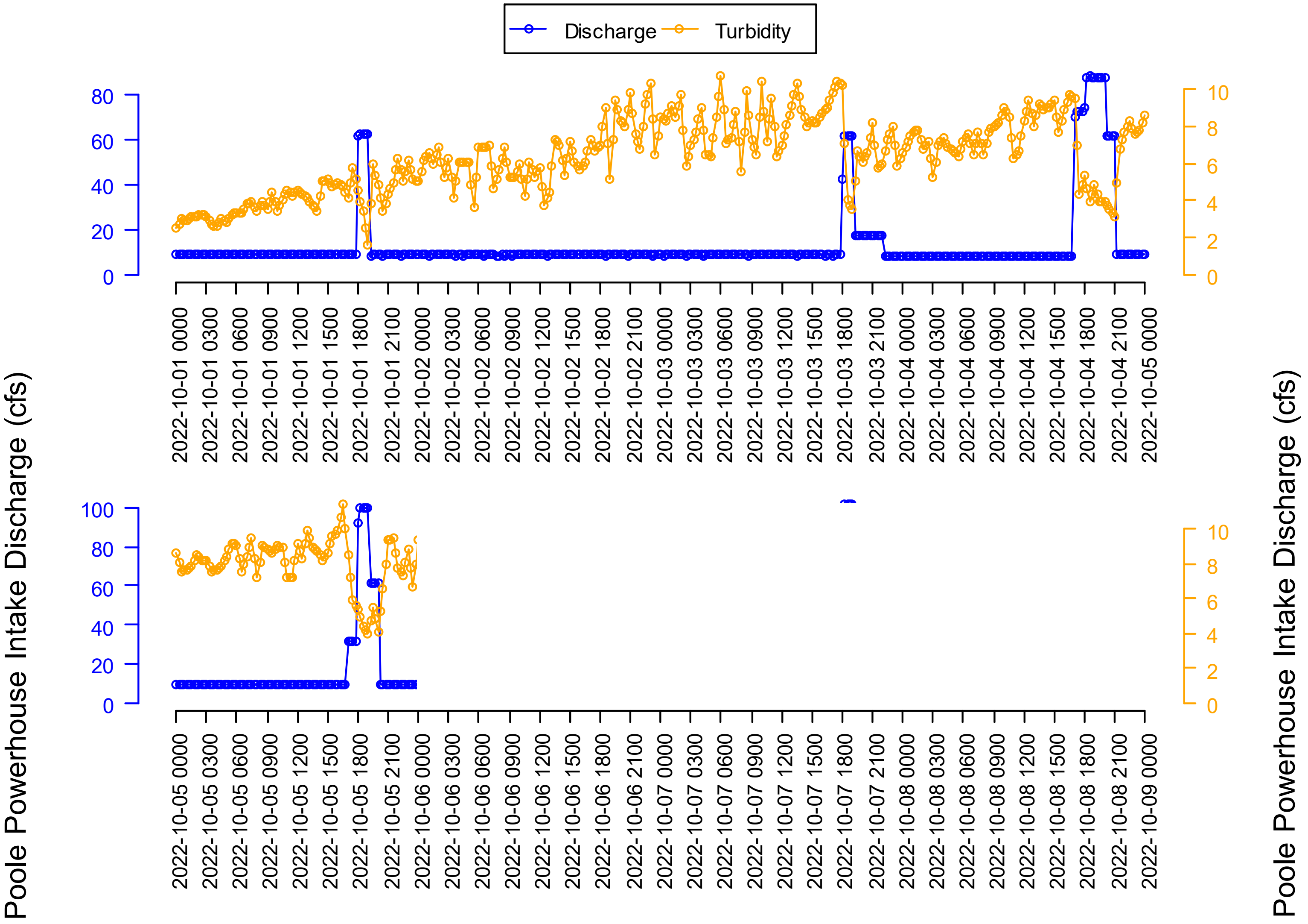
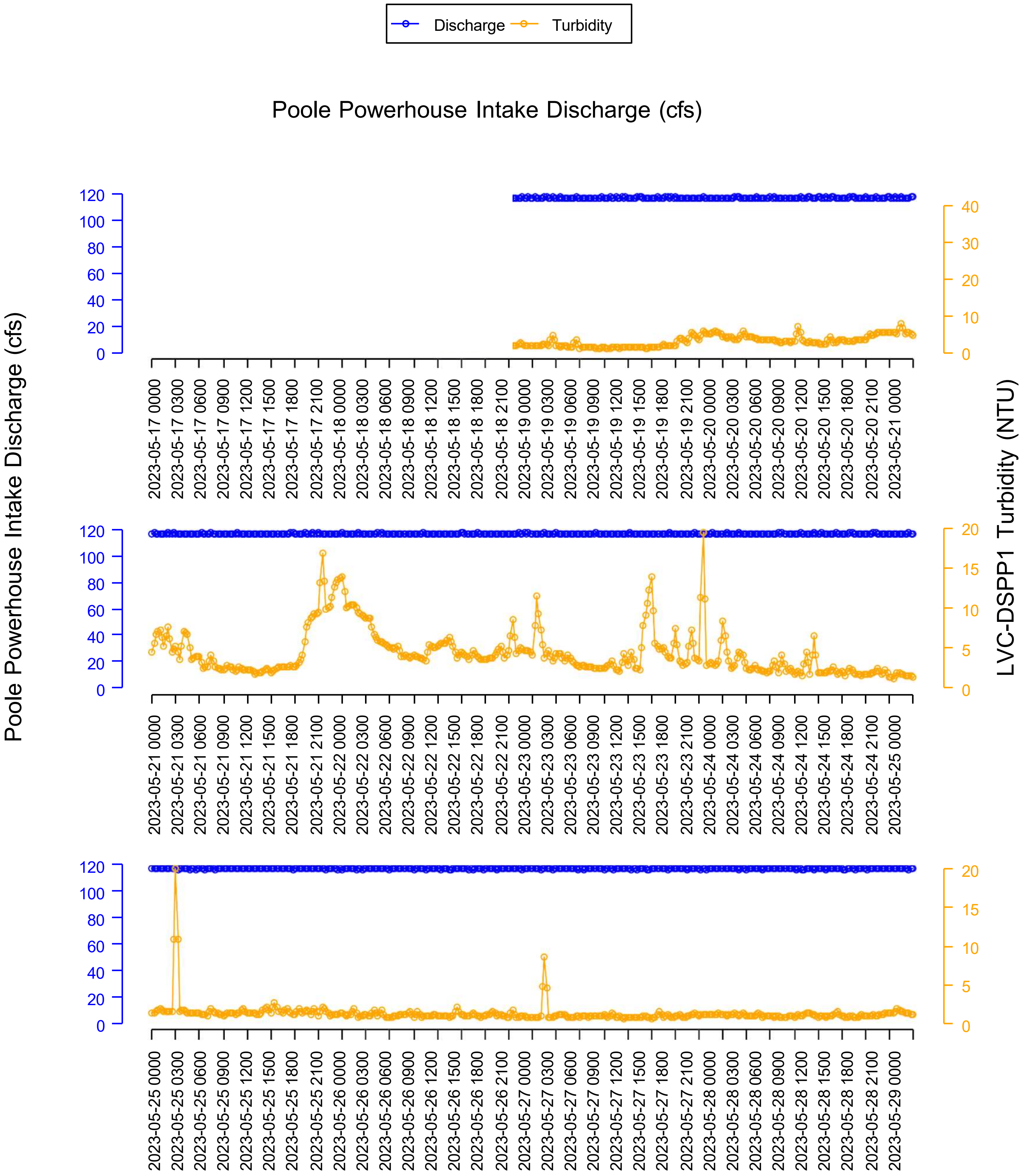
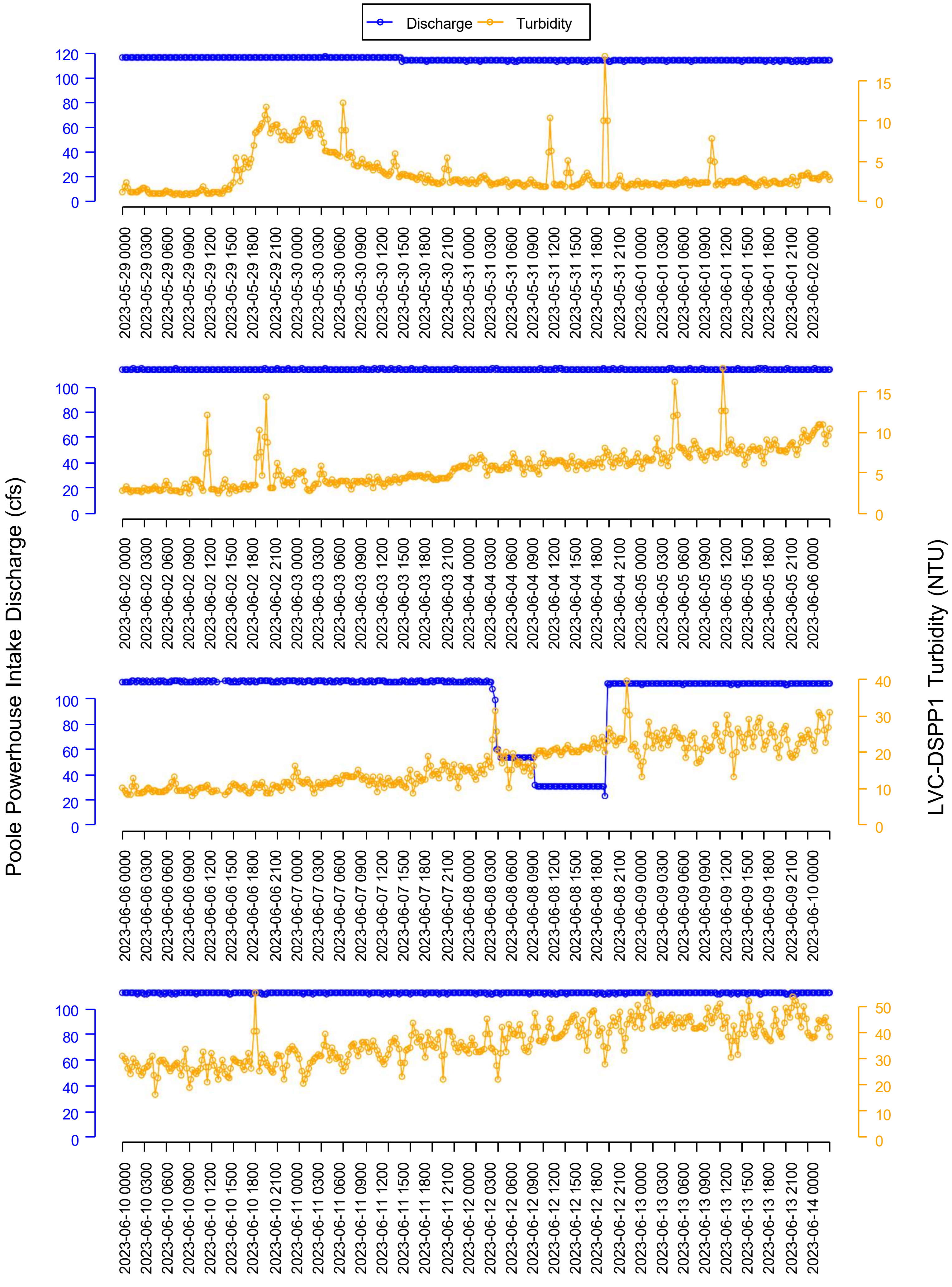


Turbidity data collected between October 5, 2022 through May 18, 2023 were rejected during quality assurance evaluations.


Poole Powerhouse Intake Discharge (cfs)



Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP1 Turbidity (NTU)
0
20
40
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80
100
120
0
5
10
15
2023-05-29 0000
2023-05-29 0300
2023-05-29 0600
2023-05-29 0900
2023-05-29 1200
2023-05-29 1500
2023-05-29 1800
2023-05-29 2100
2023-05-30 0000
2023-05-30 0300
2023-05-30 0600
2023-05-30 0900
2023-05-30 1200
2023-05-30 1500
2023-05-30 1800
2023-05-30 2100
2023-05-31 0000
2023-05-31 0300
2023-05-31 0600
2023-05-31 0900
2023-05-31 1200
2023-05-31 1500
2023-05-31 1800
2023-05-31 2100
2023-06-01 0000
2023-06-01 0300
2023-06-01 0600
2023-06-01 0900
2023-06-01 1200
2023-06-01 1500
2023-06-01 1800
2023-06-01 2100
2023-06-02 0000
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2023-06-02 0000
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2023-06-02 0600
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2023-06-02 1200
2023-06-02 1500
2023-06-02 1800
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2023-06-03 0000
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2023-06-03 0600
2023-06-03 0900
2023-06-03 1200
2023-06-03 1500
2023-06-03 1800
2023-06-03 2100
2023-06-04 0000
2023-06-04 0300
2023-06-04 0600
2023-06-04 0900
2023-06-04 1200
2023-06-04 1500
2023-06-04 1800
2023-06-04 2100
2023-06-05 0000
2023-06-05 0300
2023-06-05 0600
2023-06-05 0900
2023-06-05 1200
2023-06-05 1500
2023-06-05 1800
2023-06-05 2100
2023-06-06 0000
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2023-06-06 0000
2023-06-06 0300
2023-06-06 0600
2023-06-06 0900
2023-06-06 1200
2023-06-06 1500
2023-06-06 1800
2023-06-06 2100
2023-06-07 0000
2023-06-07 0300
2023-06-07 0600
2023-06-07 0900
2023-06-07 1200
2023-06-07 1500
2023-06-07 1800
2023-06-07 2100
2023-06-08 0000
2023-06-08 0300
2023-06-08 0600
2023-06-08 0900
2023-06-08 1200
2023-06-08 1500
2023-06-08 1800
2023-06-08 2100
2023-06-09 0000
2023-06-09 0300
2023-06-09 0600
2023-06-09 0900
2023-06-09 1200
2023-06-09 1500
2023-06-09 1800
2023-06-09 2100
2023-06-10 0000
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50
2023-06-10 0000
2023-06-10 0300
2023-06-10 0600
2023-06-10 0900
2023-06-10 1200
2023-06-10 1500
2023-06-10 1800
2023-06-10 2100
2023-06-11 0000
2023-06-11 0300
2023-06-11 0600
2023-06-11 0900
2023-06-11 1200
2023-06-11 1500
2023-06-11 1800
2023-06-11 2100
2023-06-12 0000
2023-06-12 0300
2023-06-12 0600
2023-06-12 0900
2023-06-12 1200
2023-06-12 1500
2023-06-12 1800
2023-06-12 2100
2023-06-13 0000
2023-06-13 0300
2023-06-13 0600
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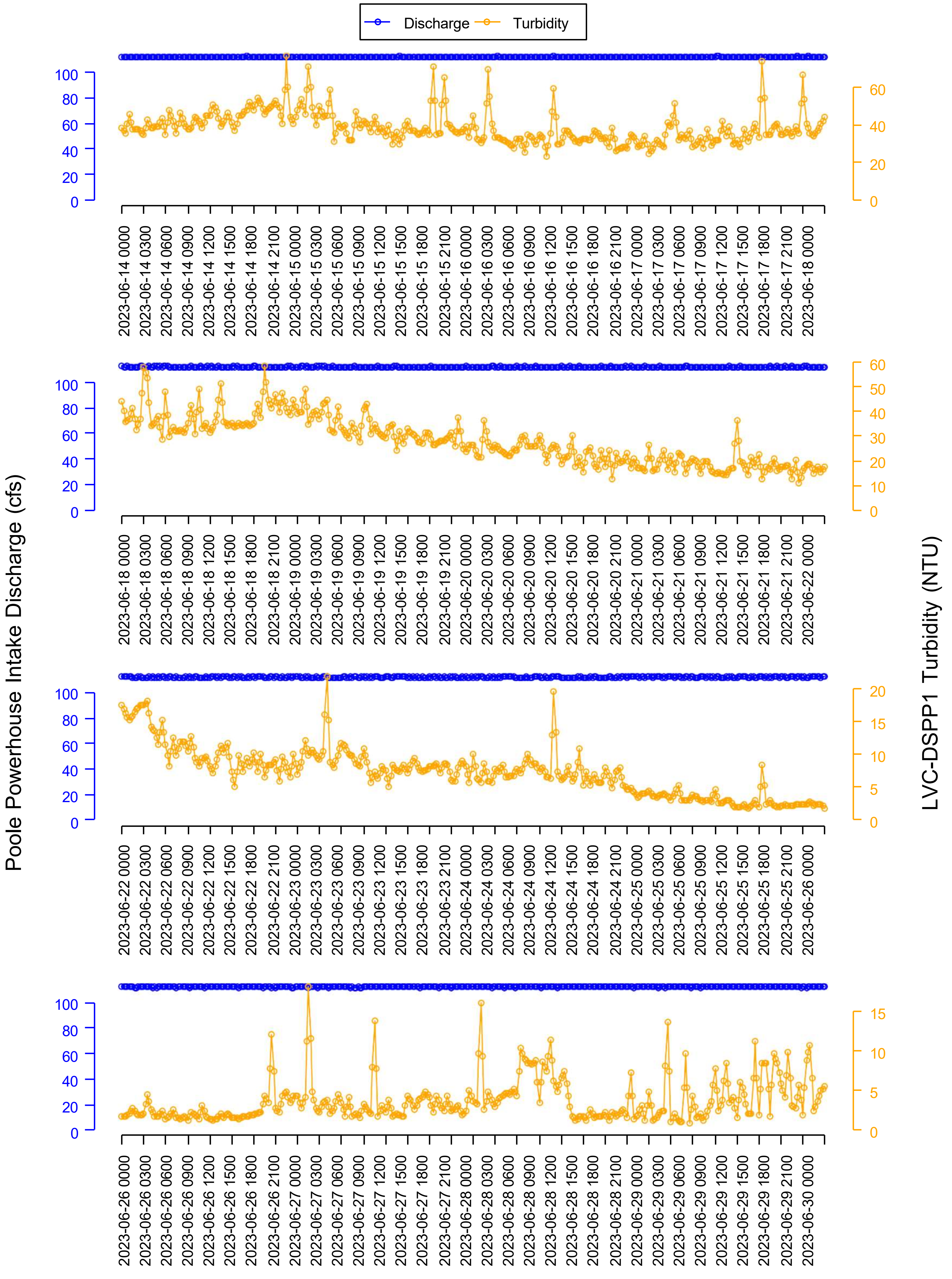

Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP1 Turbidity (NTU)
0
20
40
60
80
100
0
20
40
60
0
10
20
30
40
50
60
0
5
10
15
20
0
5
10
15
2023-06-14 0000
2023-06-14 0300
2023-06-14 0600
2023-06-14 0900
2023-06-14 1200
2023-06-14 1500
2023-06-14 1800
2023-06-14 2100
2023-06-15 0000
2023-06-15 0300
2023-06-15 0600
2023-06-15 0900
2023-06-15 1200
2023-06-15 1500
2023-06-15 1800
2023-06-15 2100
2023-06-16 0000
2023-06-16 0300
2023-06-16 0600
2023-06-16 0900
2023-06-16 1200
2023-06-16 1500
2023-06-16 1800
2023-06-16 2100
2023-06-17 0000
2023-06-17 0300
2023-06-17 0600
2023-06-17 0900
2023-06-17 1200
2023-06-17 1500
2023-06-17 1800
2023-06-17 2100
2023-06-18 0000
2023-06-18 0300
2023-06-18 0600
2023-06-18 0900
2023-06-18 1200
2023-06-18 1500
2023-06-18 1800
2023-06-18 2100
2023-06-19 0000
2023-06-19 0300
2023-06-19 0600
2023-06-19 0900
2023-06-19 1200
2023-06-19 1500
2023-06-19 1800
2023-06-19 2100
2023-06-20 0000
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2023-06-20 0600
2023-06-20 0900
2023-06-20 1200
2023-06-20 1500
2023-06-20 1800
2023-06-20 2100
2023-06-21 0000
2023-06-21 0300
2023-06-21 0600
2023-06-21 0900
2023-06-21 1200
2023-06-21 1500
2023-06-21 1800
2023-06-21 2100
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2023-06-22 0600
2023-06-22 0900
2023-06-22 1200
2023-06-22 1500
2023-06-22 1800
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2023-06-23 0600
2023-06-23 0900
2023-06-23 1200
2023-06-23 1500
2023-06-23 1800
2023-06-23 2100
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2023-06-24 0600
2023-06-24 0900
2023-06-24 1200
2023-06-24 1500
2023-06-24 1800
2023-06-24 2100
2023-06-25 0000
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2023-06-25 0600
2023-06-25 0900
2023-06-25 1200
2023-06-25 1500
2023-06-25 1800
2023-06-25 2100
2023-06-26 0000
2023-06-26 0300
2023-06-26 0600
2023-06-26 0900
2023-06-26 1200
2023-06-26 1500
2023-06-26 1800
2023-06-26 2100
2023-06-27 0000
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2023-06-27 0600
2023-06-27 0900
2023-06-27 1200
2023-06-27 1500
2023-06-27 1800
2023-06-27 2100
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2023-06-28 0600
2023-06-28 0900
2023-06-28 1200
2023-06-28 1500
2023-06-28 1800
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2023-06-29 0000
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2023-06-29 0600
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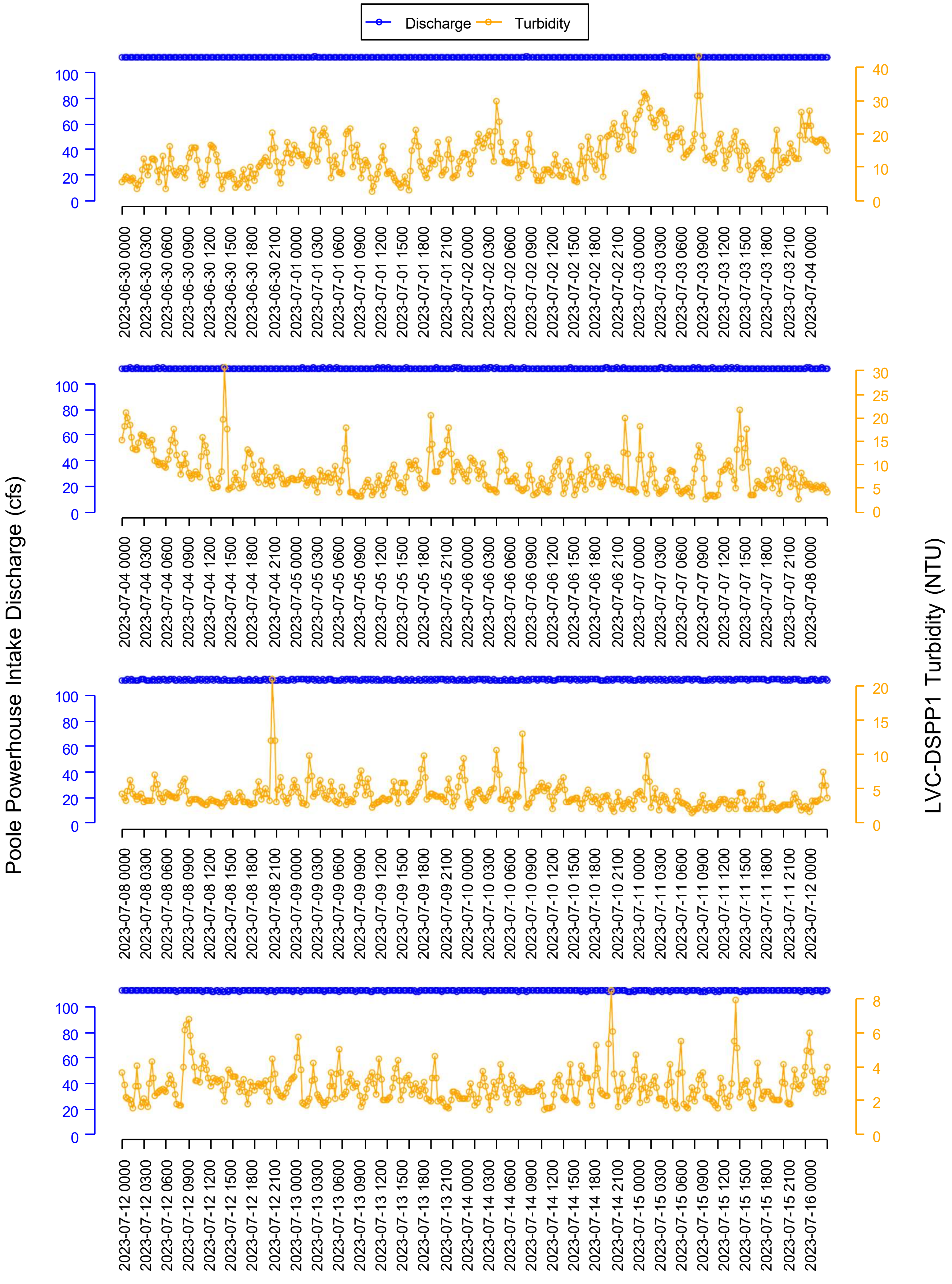

Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP1 Turbidity (NTU)
0
20
40
60
80
100
0
10
20
30
40
2023-06-30 0000
2023-06-30 0300
2023-06-30 0600
2023-06-30 0900
2023-06-30 1200
2023-06-30 1500
2023-06-30 1800
2023-06-30 2100
2023-07-01 0000
2023-07-01 0300
2023-07-01 0600
2023-07-01 0900
2023-07-01 1200
2023-07-01 1500
2023-07-01 1800
2023-07-01 2100
2023-07-02 0000
2023-07-02 0300
2023-07-02 0600
2023-07-02 0900
2023-07-02 1200
2023-07-02 1500
2023-07-02 1800
2023-07-02 2100
2023-07-03 0000
2023-07-03 0300
2023-07-03 0600
2023-07-03 0900
2023-07-03 1200
2023-07-03 1500
2023-07-03 1800
2023-07-03 2100
2023-07-04 0000
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2023-07-04 0000
2023-07-04 0300
2023-07-04 0600
2023-07-04 0900
2023-07-04 1200
2023-07-04 1500
2023-07-04 1800
2023-07-04 2100
2023-07-05 0000
2023-07-05 0300
2023-07-05 0600
2023-07-05 0900
2023-07-05 1200
2023-07-05 1500
2023-07-05 1800
2023-07-05 2100
2023-07-06 0000
2023-07-06 0300
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2023-07-06 0900
2023-07-06 1200
2023-07-06 1500
2023-07-06 1800
2023-07-06 2100
2023-07-07 0000
2023-07-07 0300
2023-07-07 0600
2023-07-07 0900
2023-07-07 1200
2023-07-07 1500
2023-07-07 1800
2023-07-07 2100
2023-07-08 0000
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2023-07-08 0000
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2023-07-08 0600
2023-07-08 0900
2023-07-08 1200
2023-07-08 1500
2023-07-08 1800
2023-07-08 2100
2023-07-09 0000
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2023-07-09 0600
2023-07-09 0900
2023-07-09 1200
2023-07-09 1500
2023-07-09 1800
2023-07-09 2100
2023-07-10 0000
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2023-07-10 0600
2023-07-10 0900
2023-07-10 1200
2023-07-10 1500
2023-07-10 1800
2023-07-10 2100
2023-07-11 0000
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2023-07-11 0600
2023-07-11 0900
2023-07-11 1200
2023-07-11 1500
2023-07-11 1800
2023-07-11 2100
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2023-07-12 0600
2023-07-12 0900
2023-07-12 1200
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2023-07-12 1800
2023-07-12 2100
2023-07-13 0000
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2023-07-13 0600
2023-07-13 0900
2023-07-13 1200
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2023-07-13 2100
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2023-07-14 0600
2023-07-14 0900
2023-07-14 1200
2023-07-14 1500
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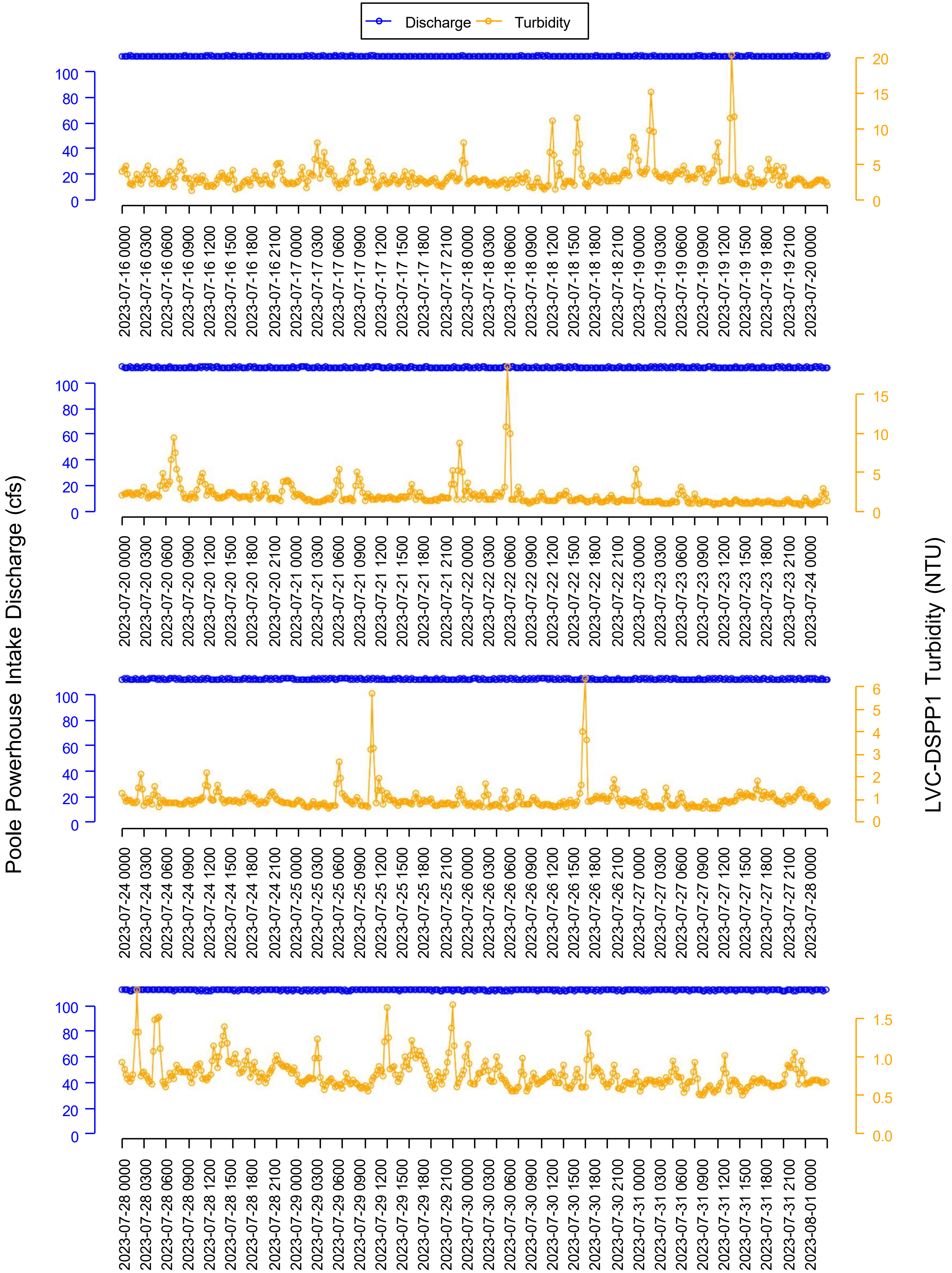

Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP1 Turbidity (NTU)
0
20
40
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2023-07-16 0000
2023-07-16 0300
2023-07-16 0600
2023-07-16 0900
2023-07-16 1200
2023-07-16 1500
2023-07-16 1800
2023-07-16 2100
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2023-07-17 0600
2023-07-17 0900
2023-07-17 1200
2023-07-17 1500
2023-07-17 1800
2023-07-17 2100
2023-07-18 0000
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2023-07-18 0600
2023-07-18 0900
2023-07-18 1200
2023-07-18 1500
2023-07-18 1800
2023-07-18 2100
2023-07-19 0000
2023-07-19 0300
2023-07-19 0600
2023-07-19 0900
2023-07-19 1200
2023-07-19 1500
2023-07-19 1800
2023-07-19 2100
2023-07-20 0000
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2023-07-20 0000
2023-07-20 0300
2023-07-20 0600
2023-07-20 0900
2023-07-20 1200
2023-07-20 1500
2023-07-20 1800
2023-07-20 2100
2023-07-21 0000
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2023-07-21 0600
2023-07-21 0900
2023-07-21 1200
2023-07-21 1500
2023-07-21 1800
2023-07-21 2100
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2023-07-22 0600
2023-07-22 0900
2023-07-22 1200
2023-07-22 1500
2023-07-22 1800
2023-07-22 2100
2023-07-23 0000
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2023-07-23 0600
2023-07-23 0900
2023-07-23 1200
2023-07-23 1500
2023-07-23 1800
2023-07-23 2100
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2023-07-24 0000
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2023-07-24 0600
2023-07-24 0900
2023-07-24 1200
2023-07-24 1500
2023-07-24 1800
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2023-07-25 0000
2023-07-25 0300
2023-07-25 0600
2023-07-25 0900
2023-07-25 1200
2023-07-25 1500
2023-07-25 1800
2023-07-25 2100
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2023-07-26 0600
2023-07-26 0900
2023-07-26 1200
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2023-07-27 0600
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2023-07-27 1200
2023-07-27 1500
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1.5
2023-07-28 0000
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2023-07-28 0600
2023-07-28 0900
2023-07-28 1200
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2023-07-28 1800
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2023-07-29 0000
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2023-07-29 0600
2023-07-29 0900
2023-07-29 1200
2023-07-29 1500
2023-07-29 1800
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2023-07-30 0000
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2023-07-30 0600
2023-07-30 0900
2023-07-30 1200
2023-07-30 1500
2023-07-30 1800
2023-07-30 2100
2023-07-31 0000
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2023-07-31 0600
2023-07-31 0900
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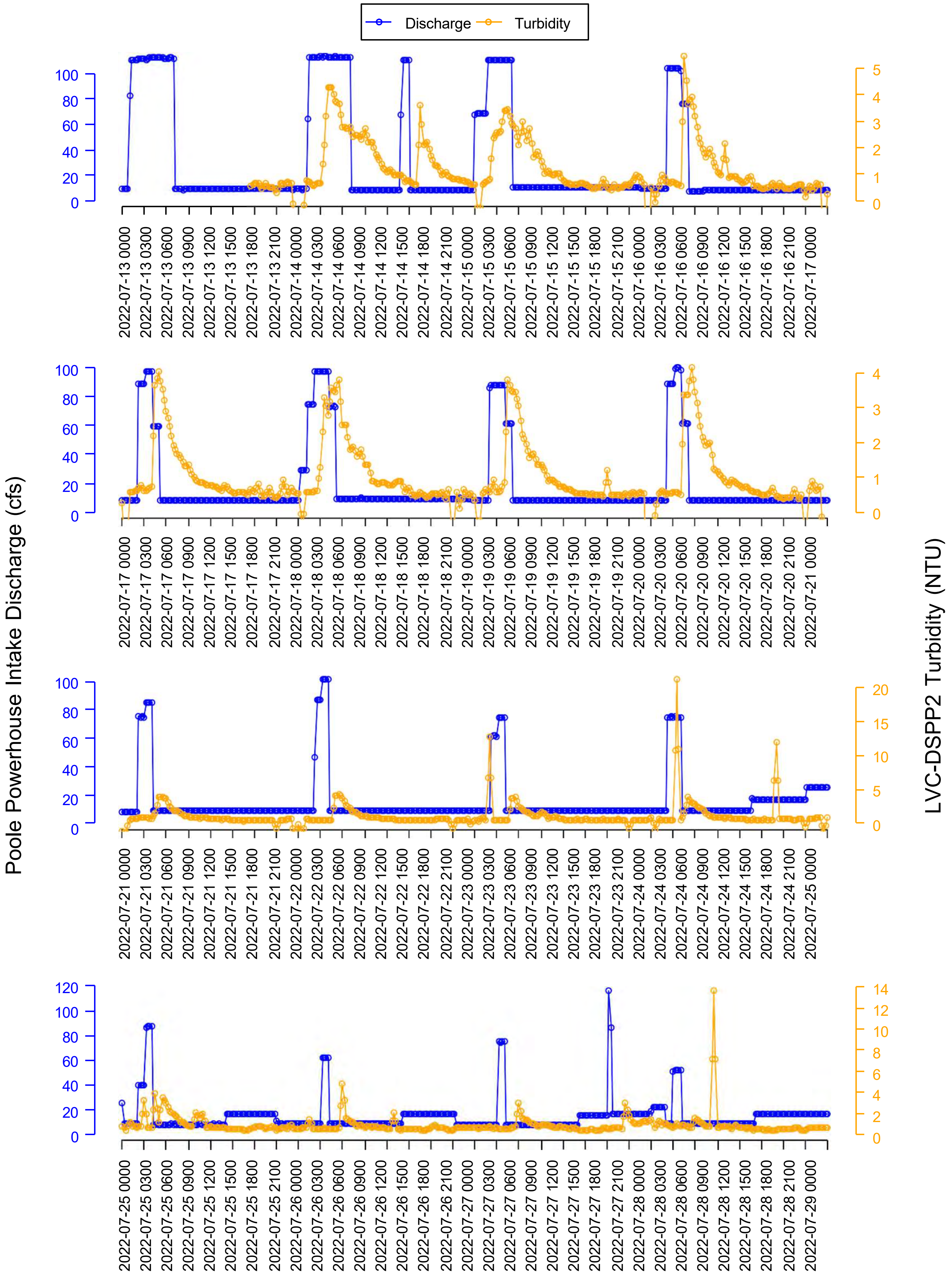
Site LVC-DSPP2


Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
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40
60
80
100
0
1
2
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4
5
2022-07-13 0000
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2022-07-13 0600
2022-07-13 0900
2022-07-13 1200
2022-07-13 1500
2022-07-13 1800
2022-07-13 2100
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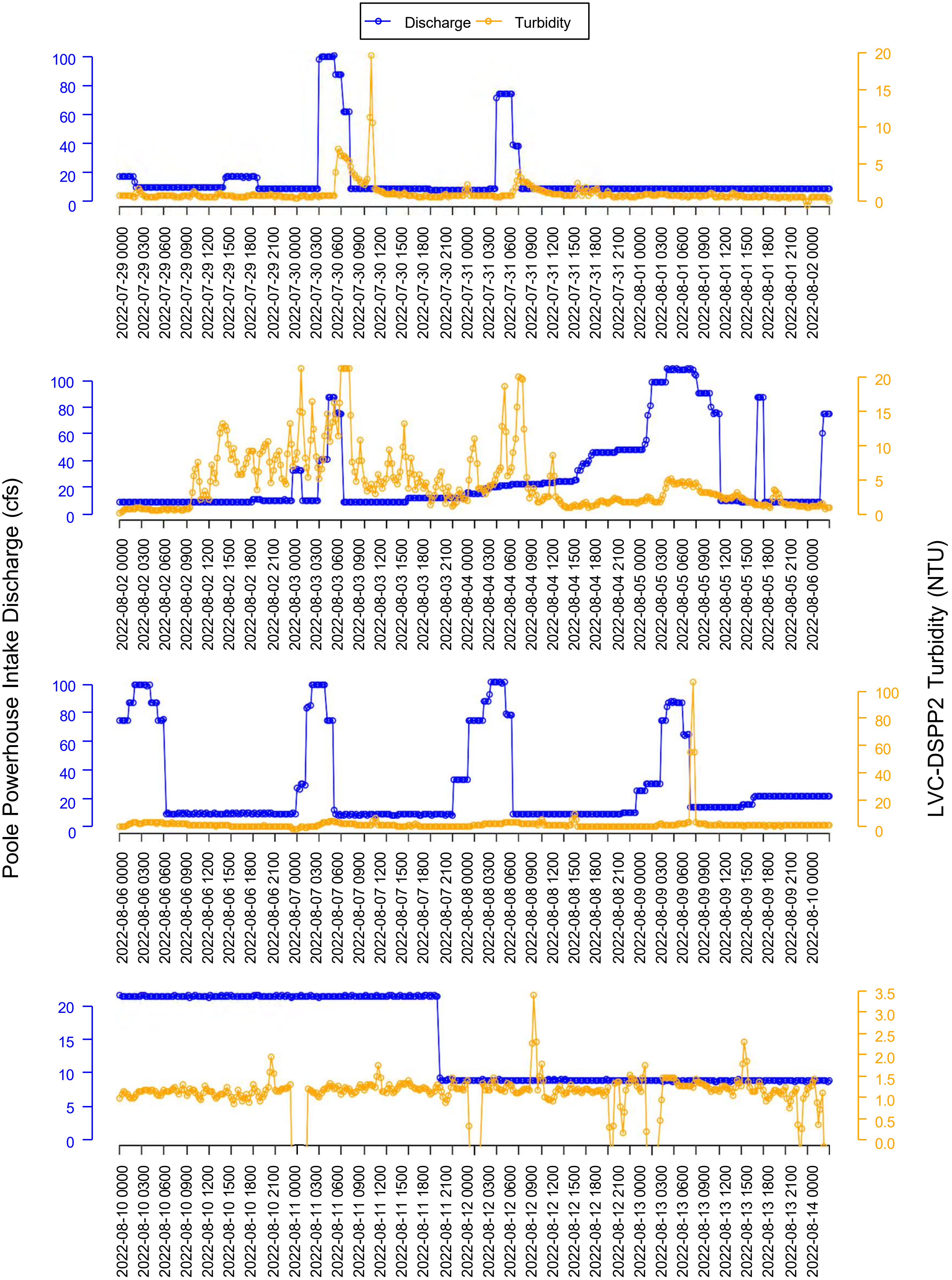
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Poole Powerhouse Intake Discharge (cfs)
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2022-08-12 0600
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2022-08-12 1200
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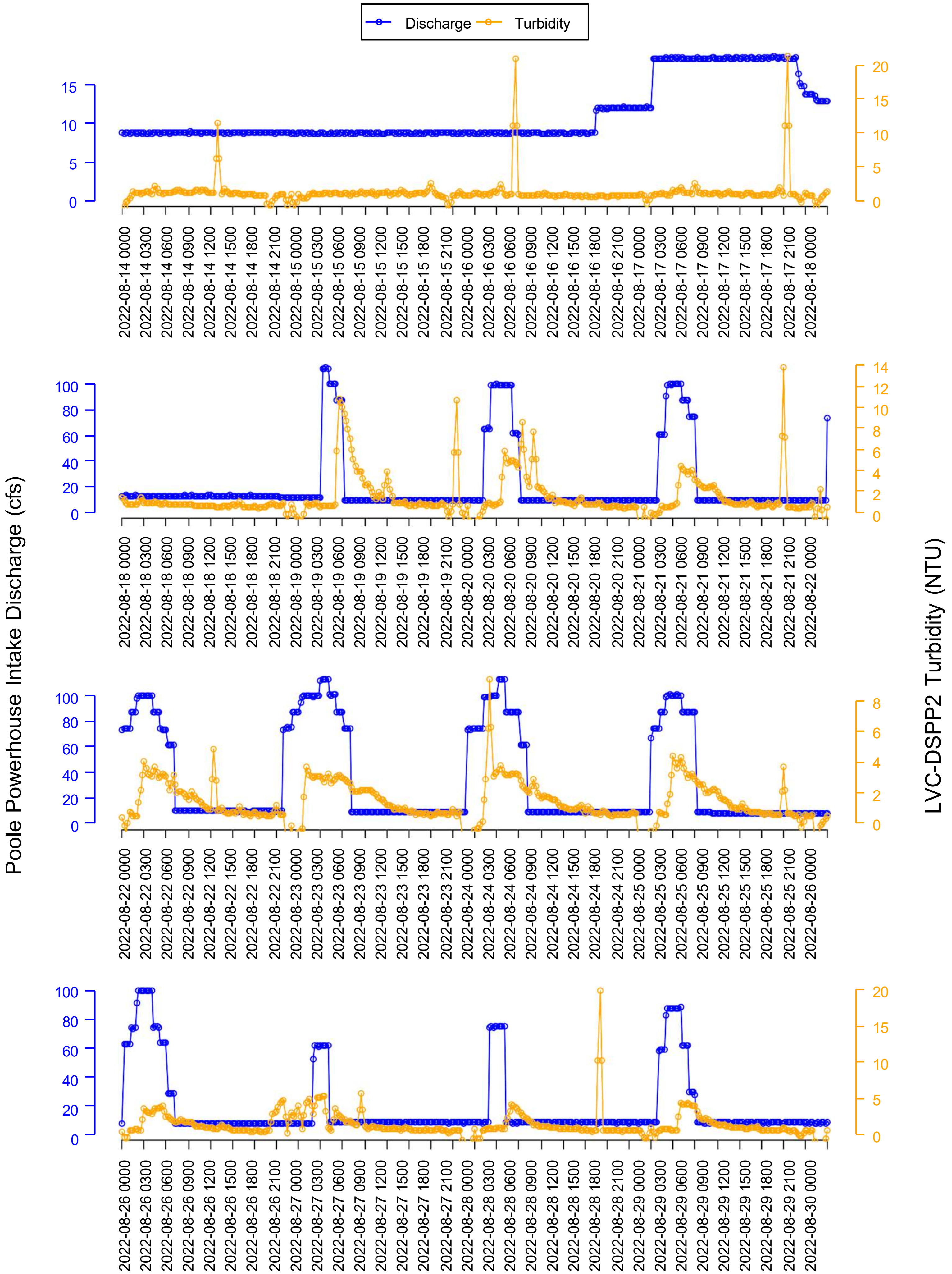
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Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
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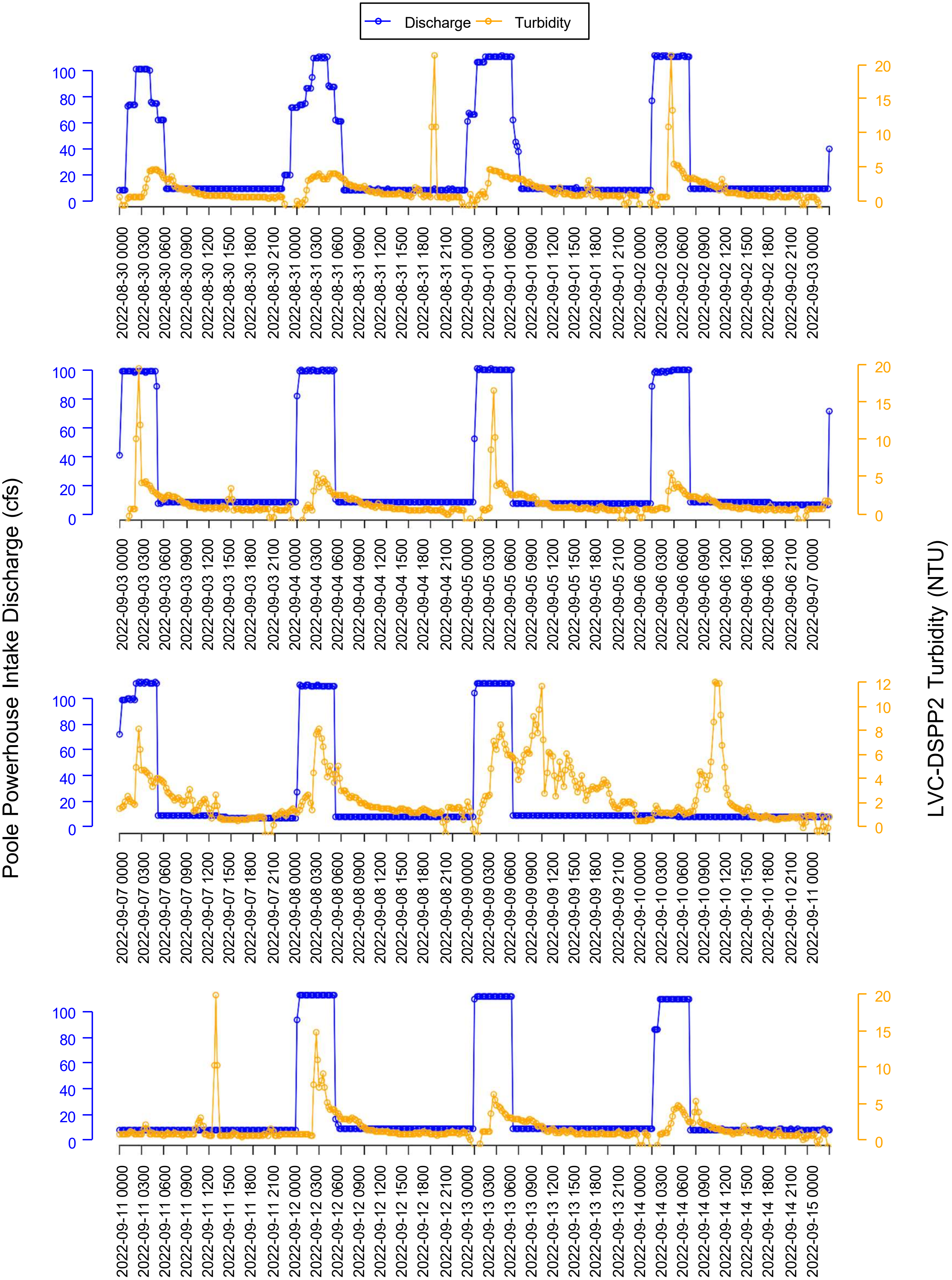
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
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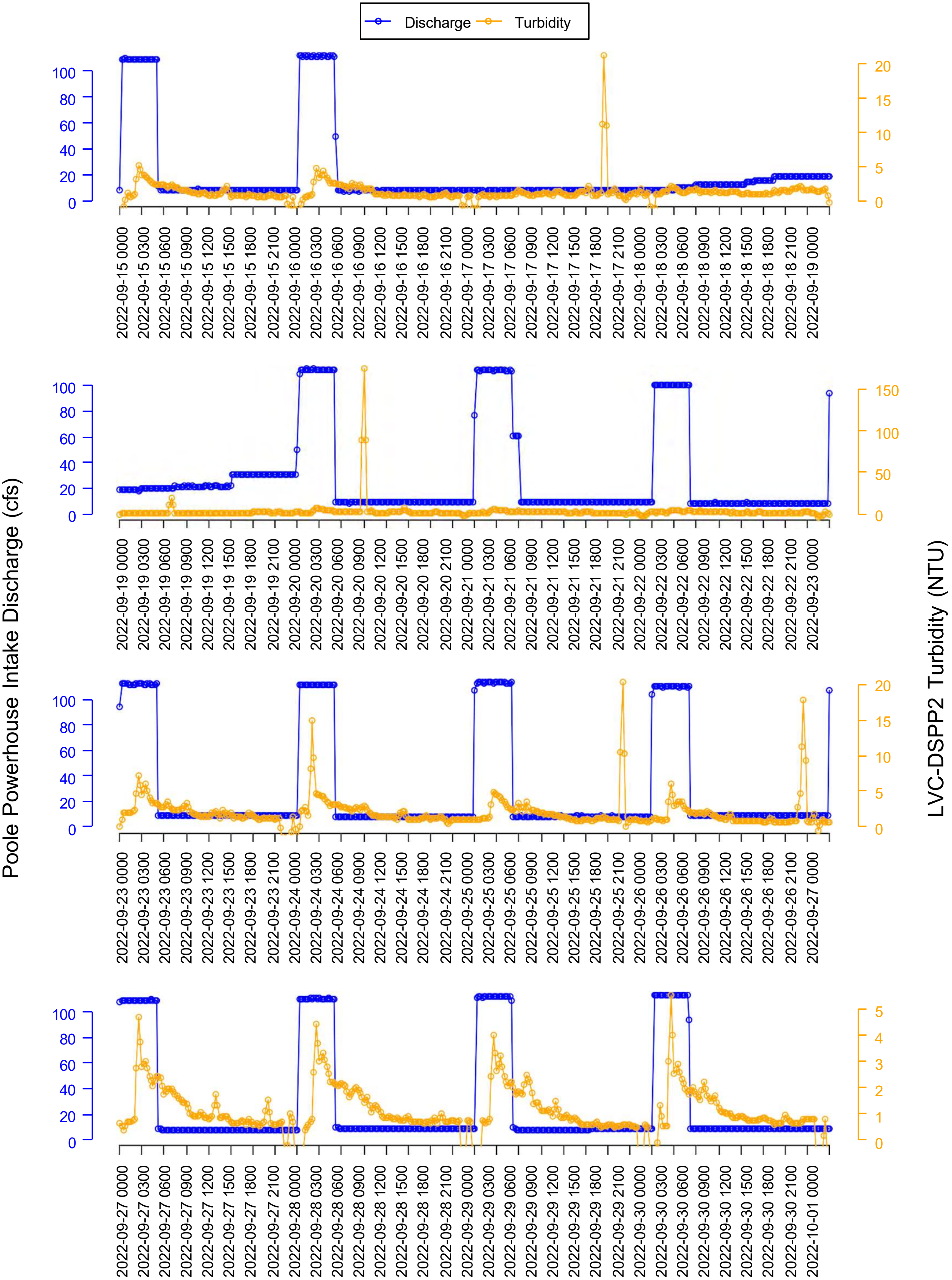
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
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2022-09-16 1200
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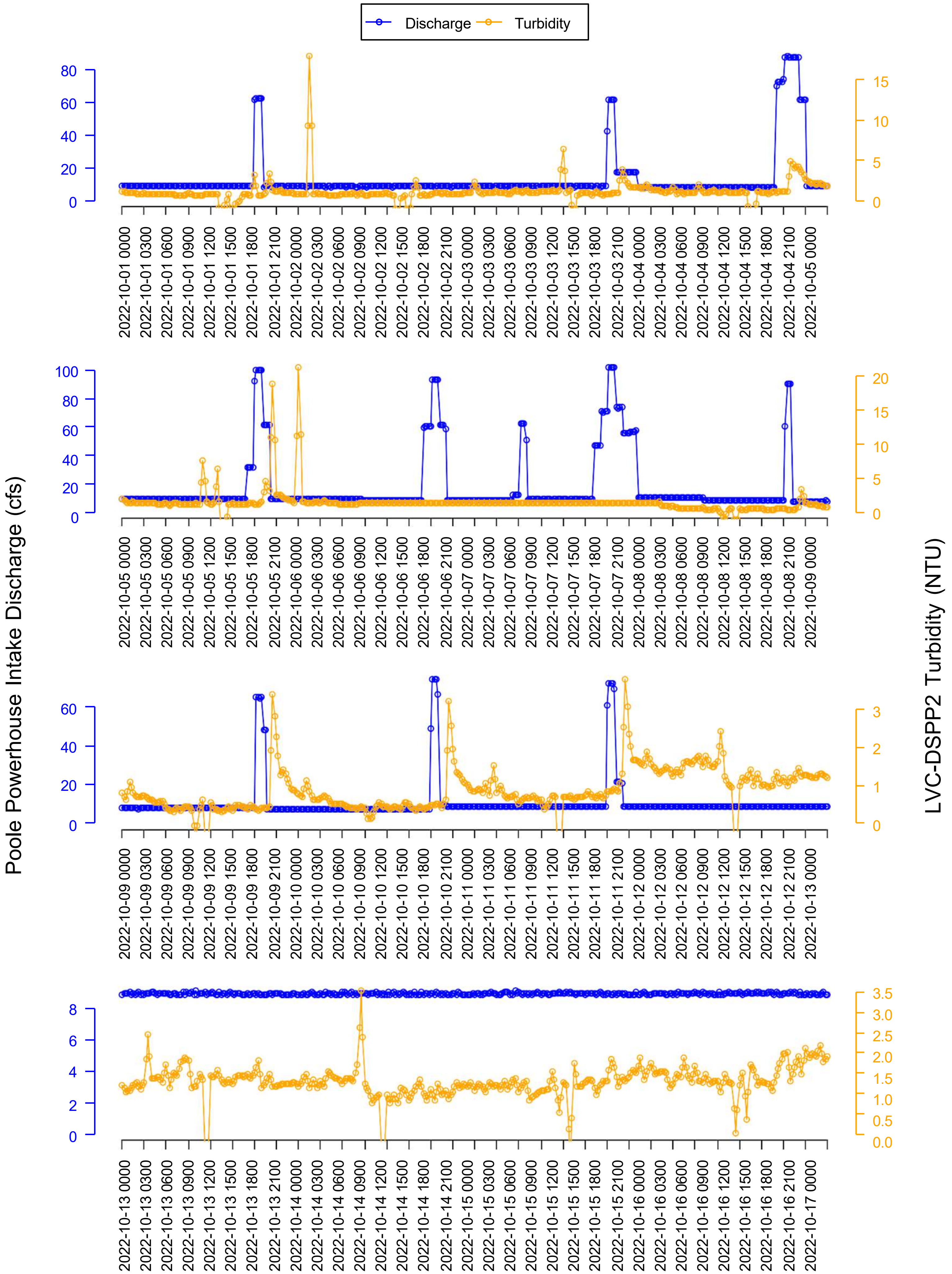
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
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2022-10-10 1800
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2022-10-12 1200
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2022-10-13 1800
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2022-10-14 0900
2022-10-14 1200
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2022-10-15 0600
2022-10-15 0900
2022-10-15 1200
2022-10-15 1500
2022-10-15 1800
2022-10-15 2100
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2022-10-16 0600
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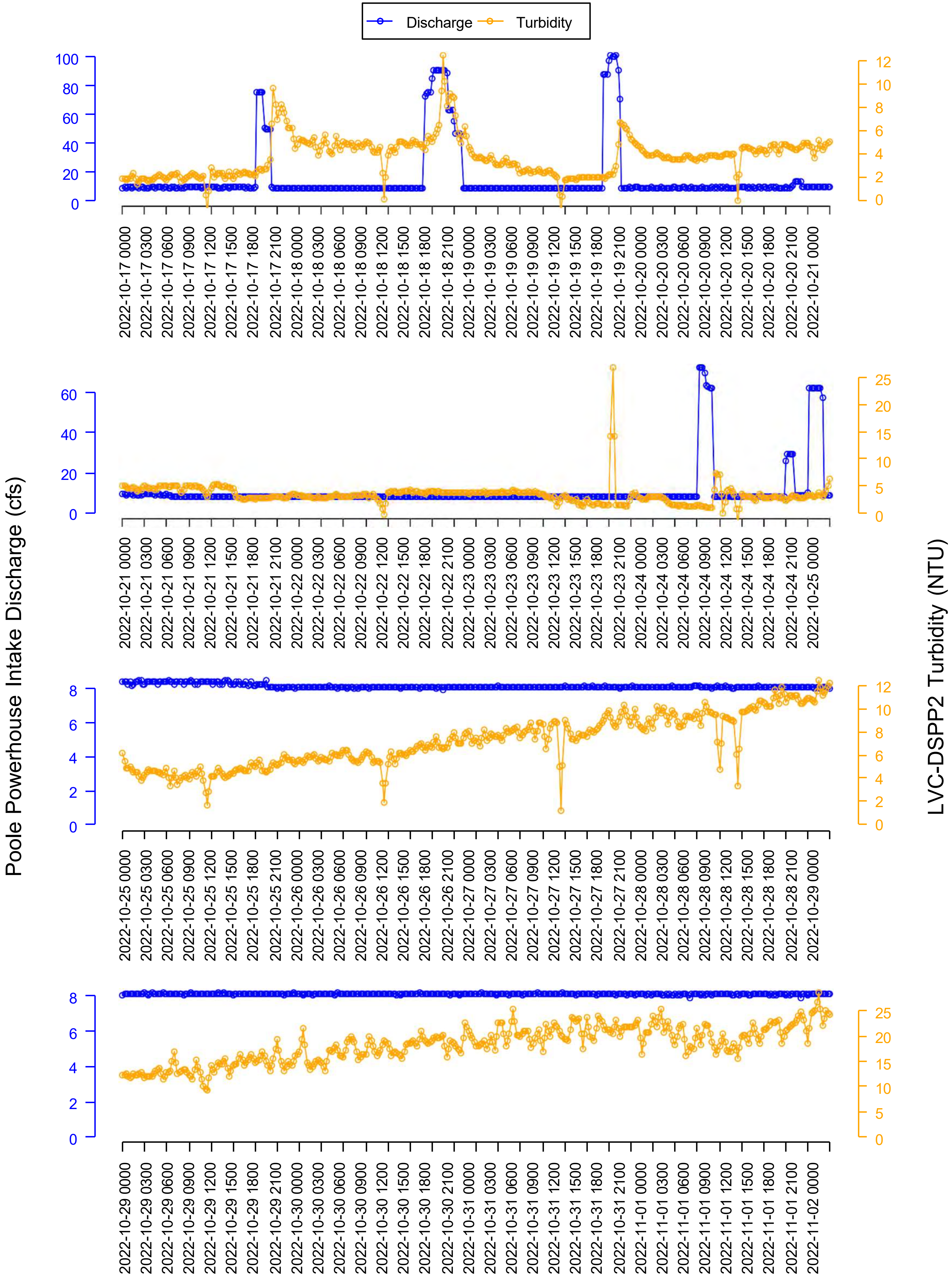
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
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2022-10-18 0900
2022-10-18 1200
2022-10-18 1500
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2022-10-19 0600
2022-10-19 0900
2022-10-19 1200
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2022-10-19 1800
2022-10-19 2100
2022-10-20 0000
2022-10-20 0300
2022-10-20 0600
2022-10-20 0900
2022-10-20 1200
2022-10-20 1500
2022-10-20 1800
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2022-10-21 0600
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2022-10-21 1200
2022-10-21 1500
2022-10-21 1800
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2022-10-22 0600
2022-10-22 0900
2022-10-22 1200
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2022-10-22 1800
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2022-10-23 0600
2022-10-23 0900
2022-10-23 1200
2022-10-23 1500
2022-10-23 1800
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2022-10-24 0600
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2022-10-28 1200
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2022-10-30 0600
2022-10-30 0900
2022-10-30 1200
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2022-10-30 1800
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2022-10-31 0600
2022-10-31 0900
2022-10-31 1200
2022-10-31 1500
2022-10-31 1800
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2022-11-01 0600
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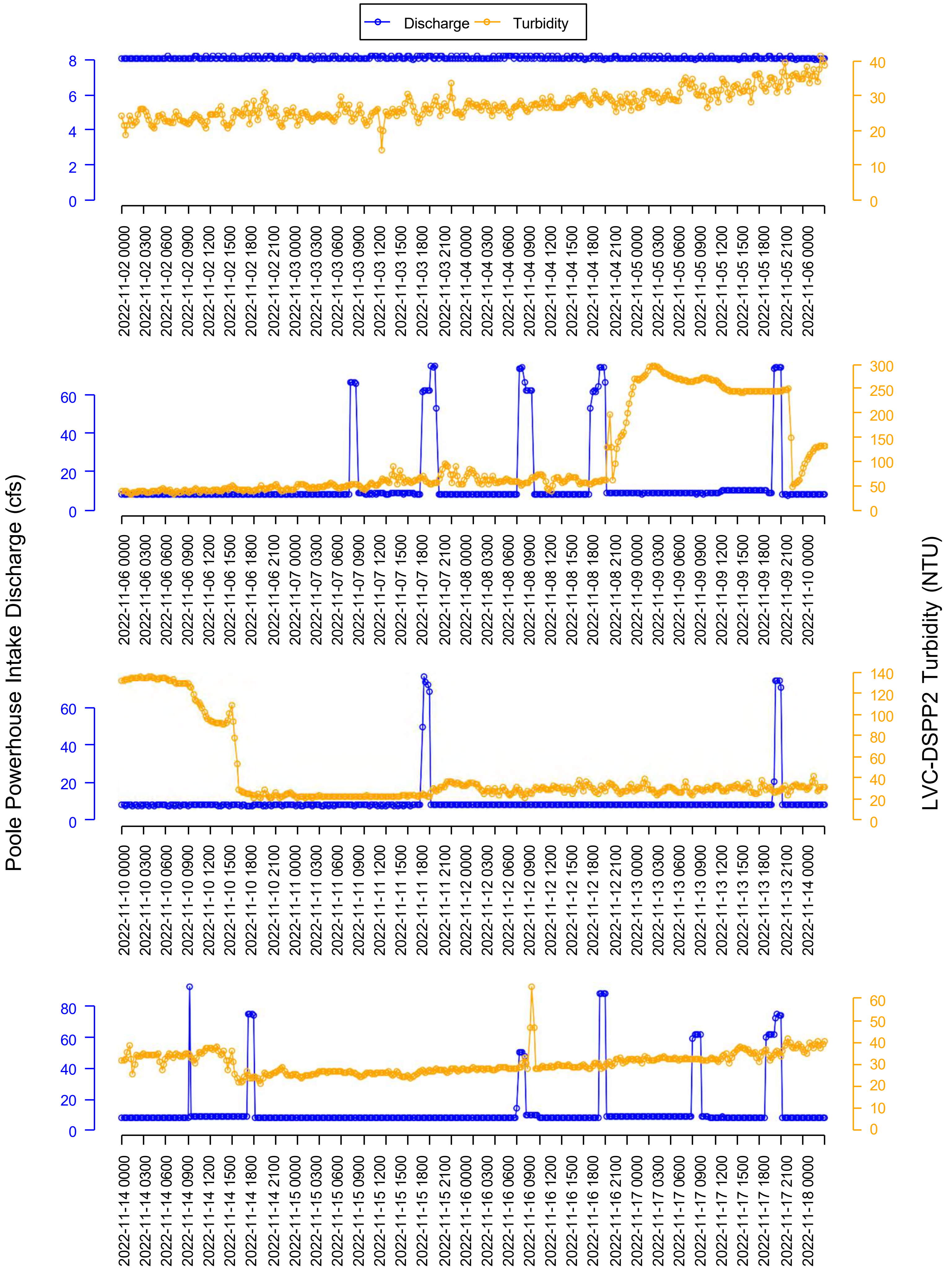
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
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2022-11-03 0900
2022-11-03 1200
2022-11-03 1500
2022-11-03 1800
2022-11-03 2100
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2022-11-04 0600
2022-11-04 0900
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2022-11-05 0000
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2022-11-06 1500
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2022-11-07 0600
2022-11-07 0900
2022-11-07 1200
2022-11-07 1500
2022-11-07 1800
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2022-11-08 0600
2022-11-08 0900
2022-11-08 1200
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2022-11-08 1800
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2022-11-09 0600
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2022-11-09 1200
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2022-11-09 1800
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2022-11-12 1500
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2022-11-13 0600
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2022-11-14 0900
2022-11-14 1200
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2022-11-15 0600
2022-11-15 0900
2022-11-15 1200
2022-11-15 1500
2022-11-15 1800
2022-11-15 2100
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2022-11-16 0600
2022-11-16 0900
2022-11-16 1200
2022-11-16 1500
2022-11-16 1800
2022-11-16 2100
2022-11-17 0000
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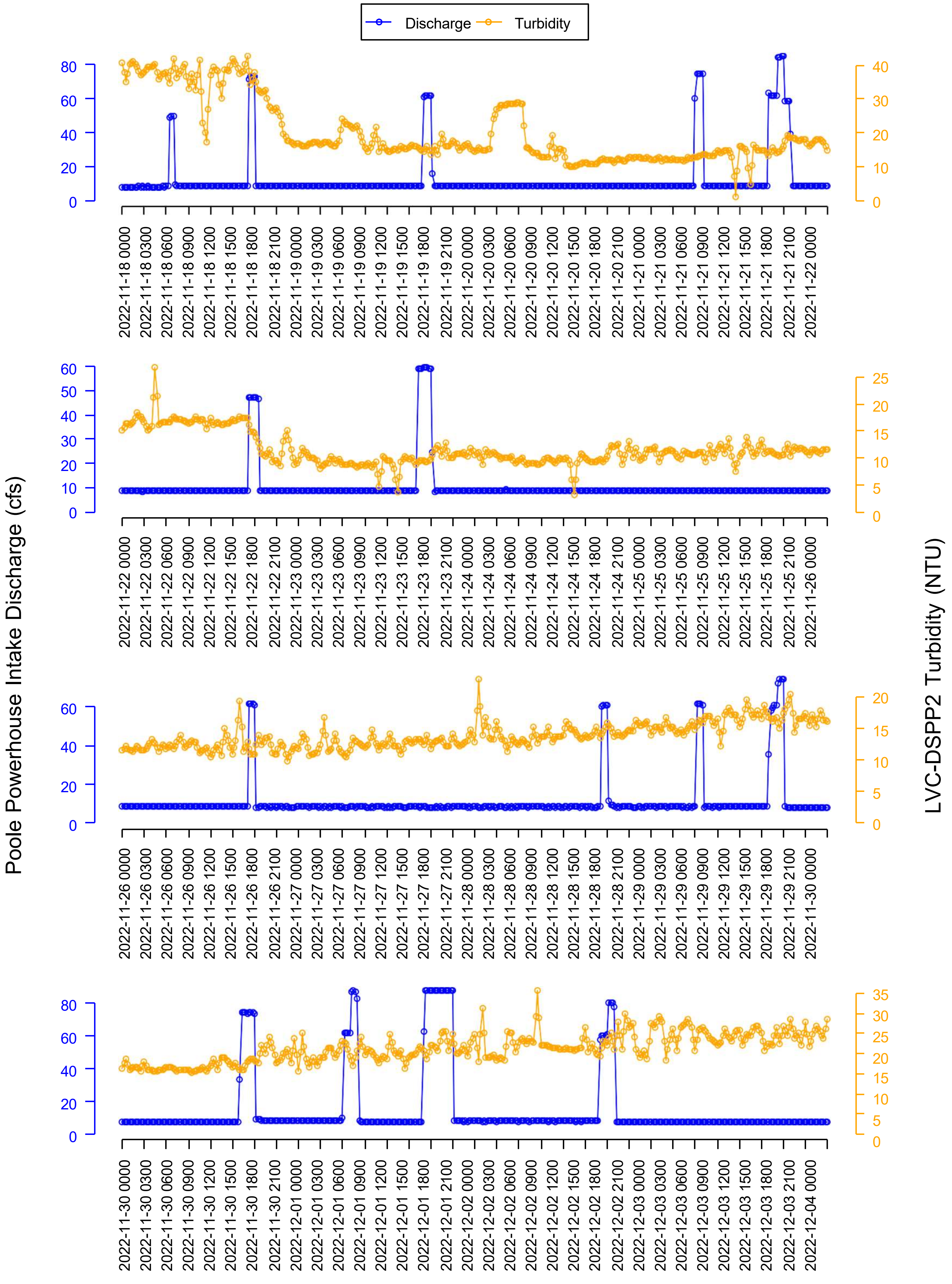
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
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2022-11-18 0600
2022-11-18 0900
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2022-11-18 1500
2022-11-18 1800
2022-11-18 2100
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2022-11-19 0600
2022-11-19 0900
2022-11-19 1200
2022-11-19 1500
2022-11-19 1800
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2022-11-21 2100
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2022-11-22 0600
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2022-11-22 1800
2022-11-22 2100
2022-11-23 0000
2022-11-23 0300
2022-11-23 0600
2022-11-23 0900
2022-11-23 1200
2022-11-23 1500
2022-11-23 1800
2022-11-23 2100
2022-11-24 0000
2022-11-24 0300
2022-11-24 0600
2022-11-24 0900
2022-11-24 1200
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2022-11-24 1800
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2022-11-25 2100
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2022-11-27 0600
2022-11-27 0900
2022-11-27 1200
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2022-11-28 1200
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2022-11-29 1200
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2022-12-02 0900
2022-12-02 1200
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2022-12-02 1800
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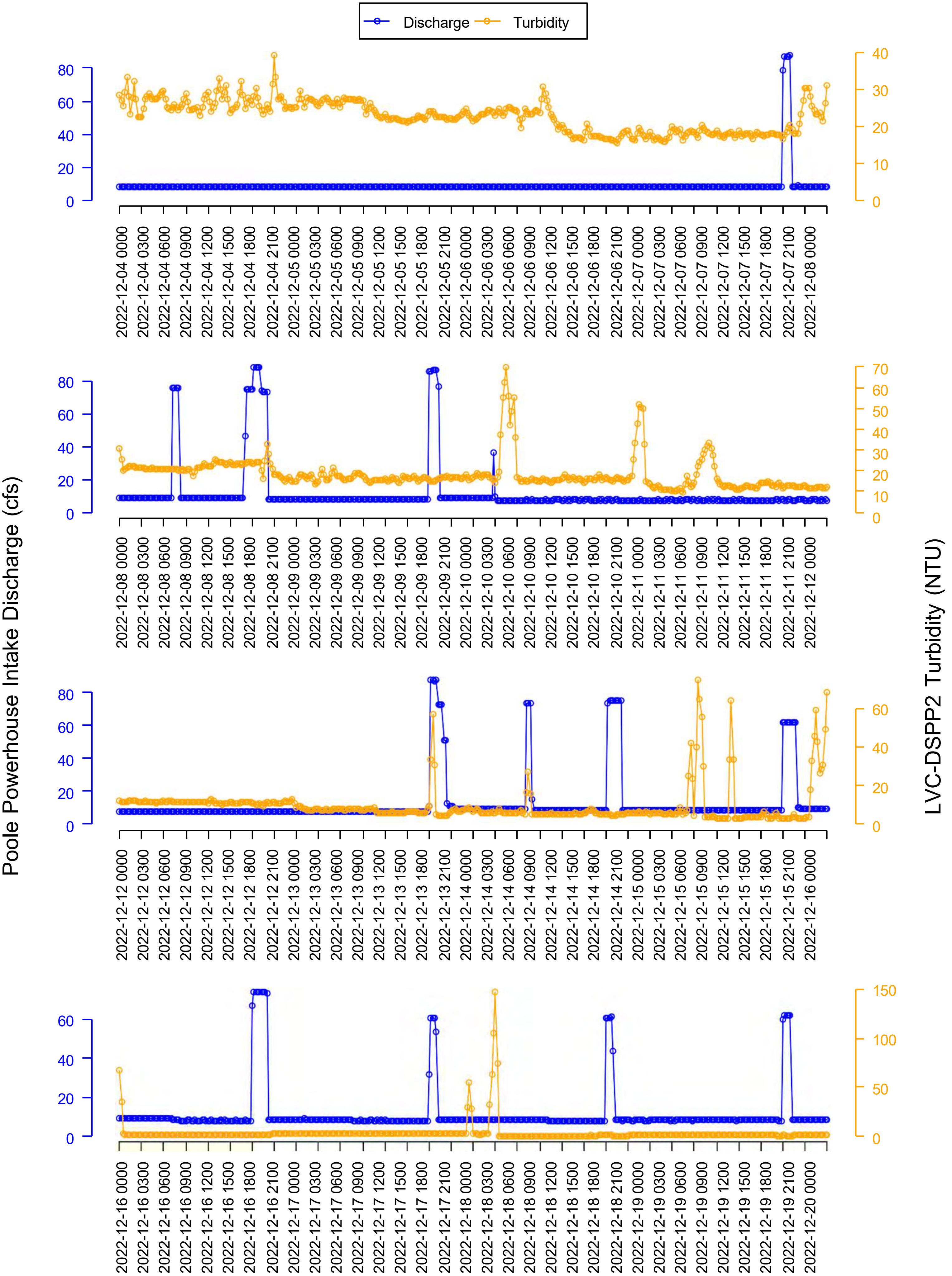
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
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2022-12-04 0600
2022-12-04 0900
2022-12-04 1200
2022-12-04 1500
2022-12-04 1800
2022-12-04 2100
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2022-12-05 0600
2022-12-05 0900
2022-12-05 1200
2022-12-05 1500
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2022-12-06 0600
2022-12-06 0900
2022-12-06 1200
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2022-12-06 1800
2022-12-06 2100
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2022-12-07 0600
2022-12-07 0900
2022-12-07 1200
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2022-12-07 1800
2022-12-07 2100
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2022-12-11 0900
2022-12-11 1200
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2022-12-13 1200
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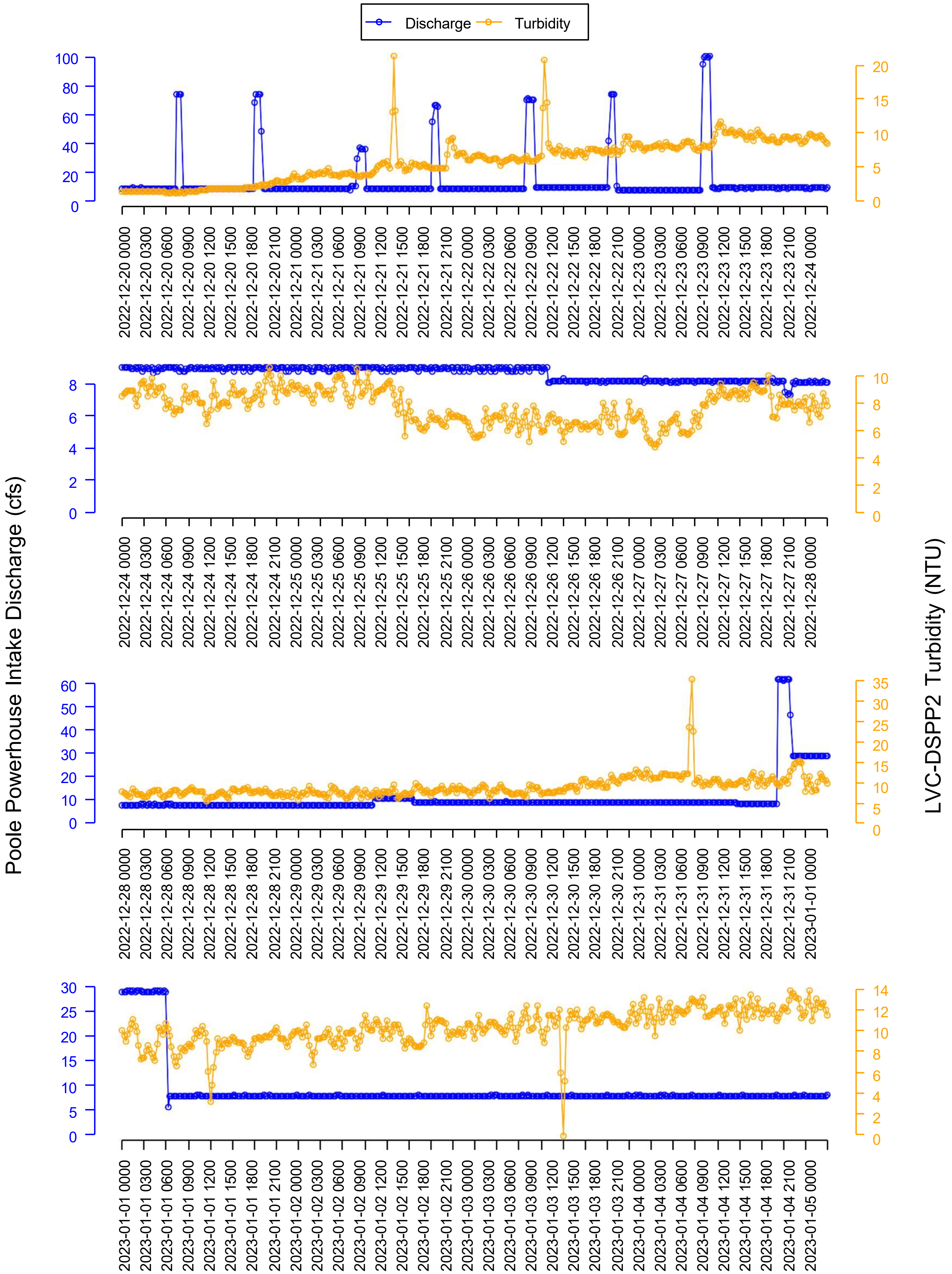
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
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2023-01-03 0600
2023-01-03 0900
2023-01-03 1200
2023-01-03 1500
2023-01-03 1800
2023-01-03 2100
2023-01-04 0000
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2023-01-04 0600
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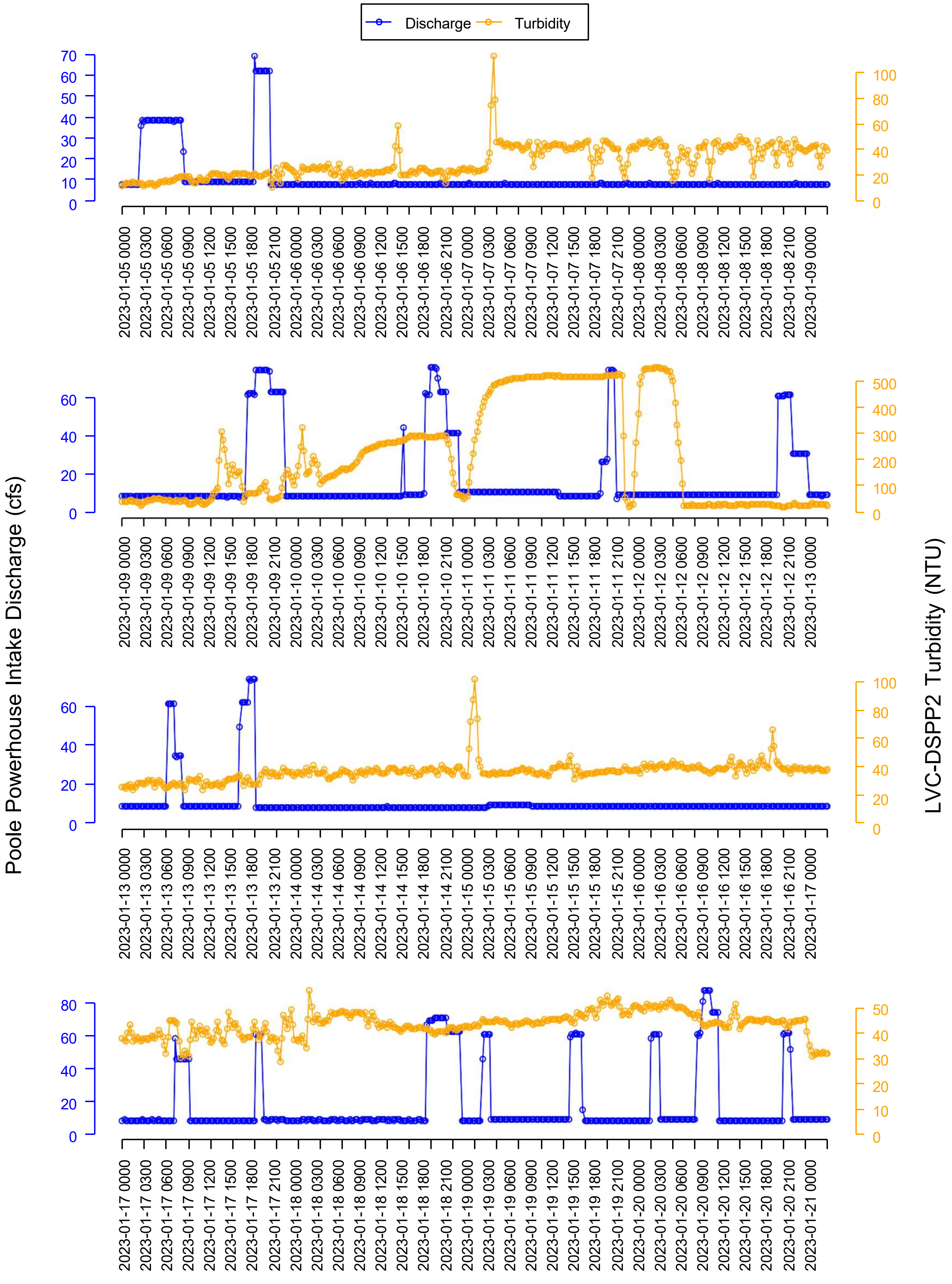
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
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0
20
40
60
80
100
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2023-01-05 0600
2023-01-05 0900
2023-01-05 1200
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2023-01-05 1800
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2023-01-06 0600
2023-01-06 0900
2023-01-06 1200
2023-01-06 1500
2023-01-06 1800
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2023-01-07 0600
2023-01-07 0900
2023-01-07 1200
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2023-01-07 1800
2023-01-07 2100
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2023-01-08 1200
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2023-01-08 2100
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2023-01-09 0000
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2023-01-09 0600
2023-01-09 0900
2023-01-09 1200
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2023-01-10 1200
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2023-01-17 1200
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2023-01-17 1800
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2023-01-19 0600
2023-01-19 0900
2023-01-19 1200
2023-01-19 1500
2023-01-19 1800
2023-01-19 2100
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2023-01-20 0300
2023-01-20 0600
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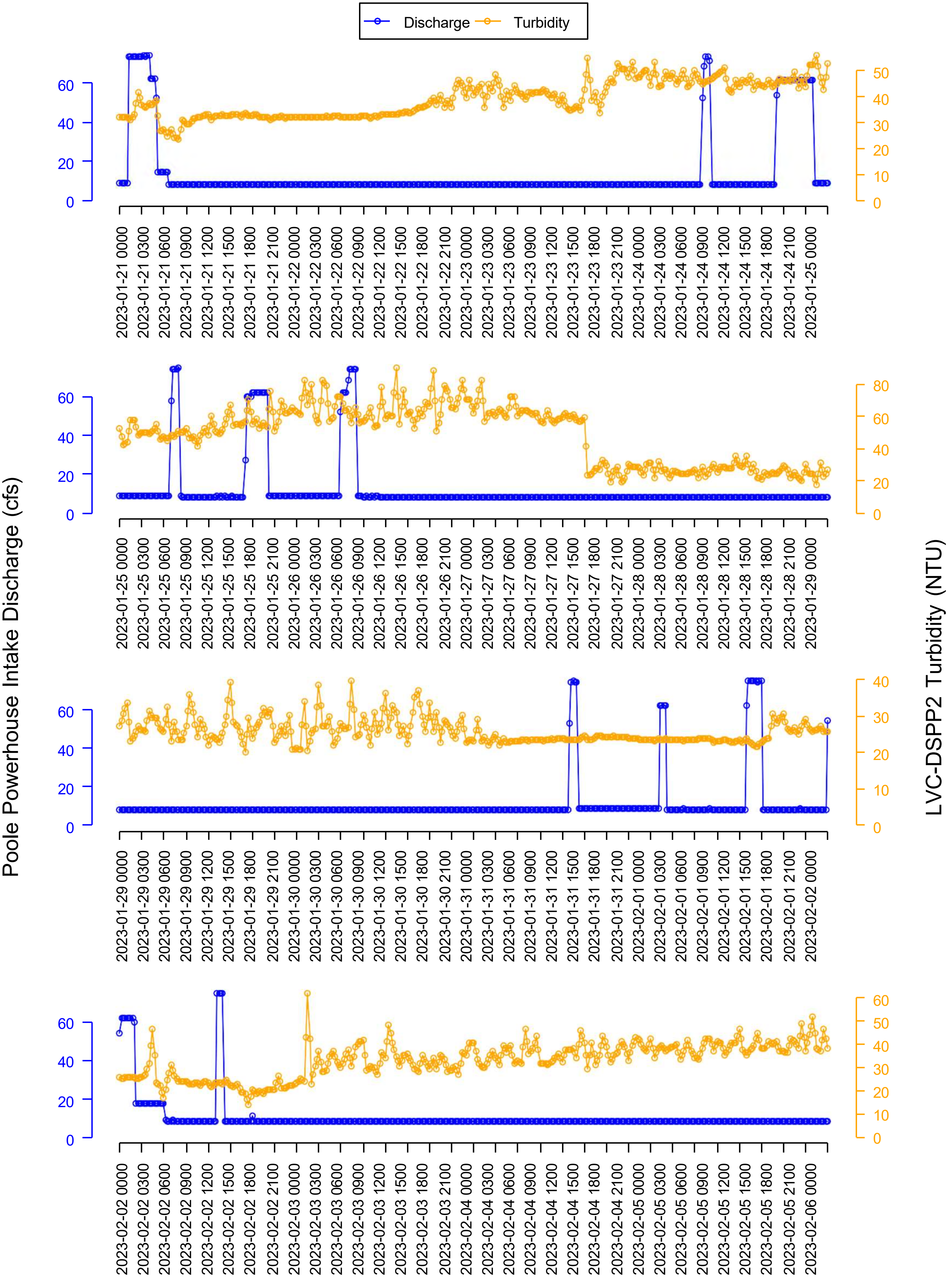
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
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2023-01-21 0900
2023-01-21 1200
2023-01-21 1500
2023-01-21 1800
2023-01-21 2100
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2023-01-22 0600
2023-01-22 0900
2023-01-22 1200
2023-01-22 1500
2023-01-22 1800
2023-01-22 2100
2023-01-23 0000
2023-01-23 0300
2023-01-23 0600
2023-01-23 0900
2023-01-23 1200
2023-01-23 1500
2023-01-23 1800
2023-01-23 2100
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2023-01-24 0600
2023-01-24 0900
2023-01-24 1200
2023-01-24 1500
2023-01-24 1800
2023-01-24 2100
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2023-01-25 0000
2023-01-25 0300
2023-01-25 0600
2023-01-25 0900
2023-01-25 1200
2023-01-25 1500
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2023-01-26 0600
2023-01-26 0900
2023-01-26 1200
2023-01-26 1500
2023-01-26 1800
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2023-01-27 0600
2023-01-27 0900
2023-01-27 1200
2023-01-27 1500
2023-01-27 1800
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2023-01-28 0600
2023-01-28 0900
2023-01-28 1200
2023-01-28 1500
2023-01-28 1800
2023-01-28 2100
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2023-01-29 0600
2023-01-29 0900
2023-01-29 1200
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2023-01-30 1200
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2023-01-31 1200
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2023-01-31 1800
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2023-02-01 1200
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2023-02-01 1800
2023-02-01 2100
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2023-02-02 0600
2023-02-02 0900
2023-02-02 1200
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2023-02-03 1200
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2023-02-04 0600
2023-02-04 0900
2023-02-04 1200
2023-02-04 1500
2023-02-04 1800
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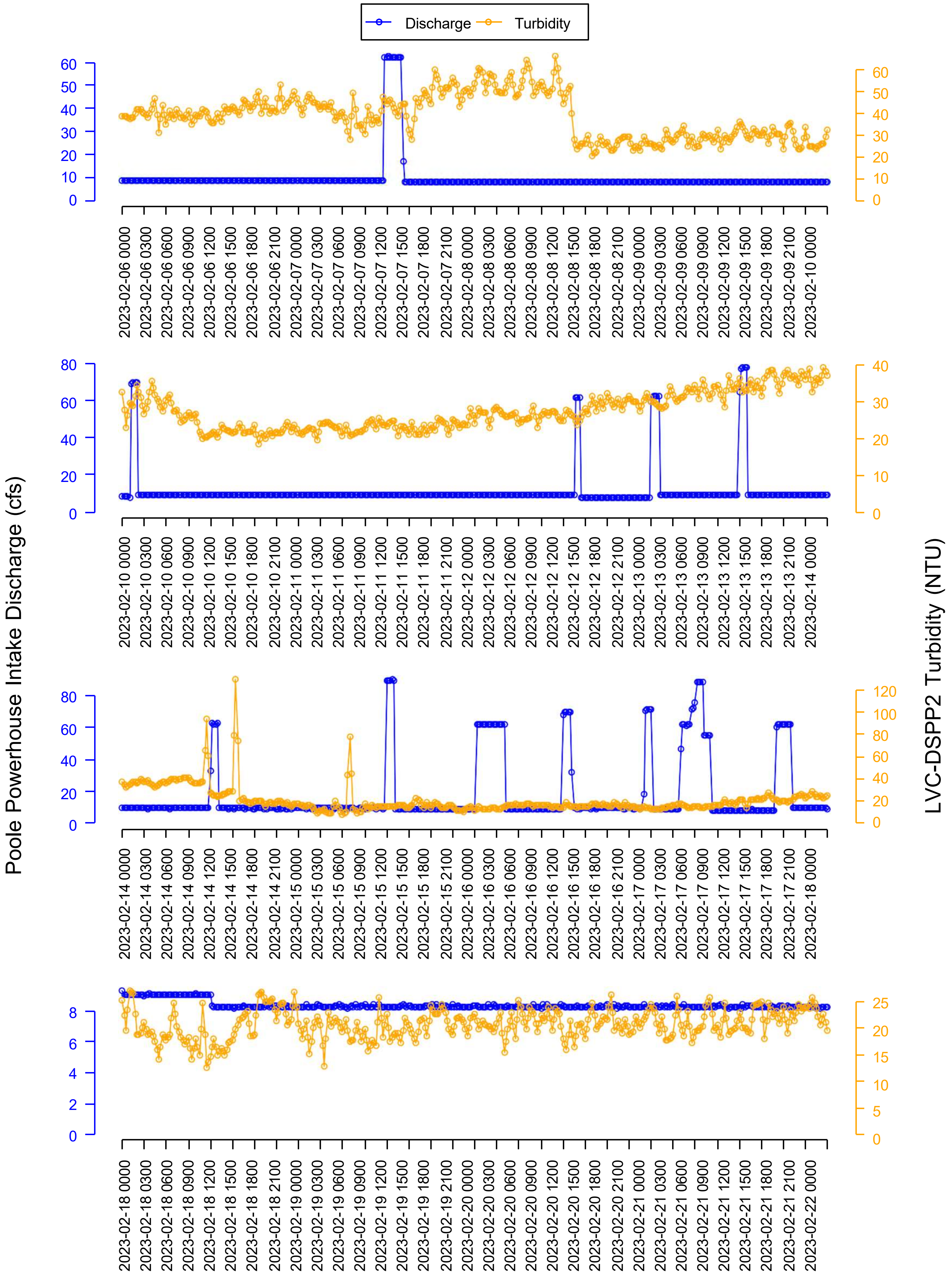
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
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2023-02-06 0600
2023-02-06 0900
2023-02-06 1200
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2023-02-06 1800
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2023-02-07 0600
2023-02-07 0900
2023-02-07 1200
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2023-02-07 1800
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2023-02-08 0600
2023-02-08 0900
2023-02-08 1200
2023-02-08 1500
2023-02-08 1800
2023-02-08 2100
2023-02-09 0000
2023-02-09 0300
2023-02-09 0600
2023-02-09 0900
2023-02-09 1200
2023-02-09 1500
2023-02-09 1800
2023-02-09 2100
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2023-02-10 0000
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2023-02-10 0600
2023-02-10 0900
2023-02-10 1200
2023-02-10 1500
2023-02-10 1800
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2023-02-11 0600
2023-02-11 0900
2023-02-11 1200
2023-02-11 1500
2023-02-11 1800
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2023-02-12 0600
2023-02-12 0900
2023-02-12 1200
2023-02-12 1500
2023-02-12 1800
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2023-02-13 0600
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2023-02-13 1200
2023-02-13 1500
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100
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2023-02-14 1200
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2023-02-15 0600
2023-02-15 0900
2023-02-15 1200
2023-02-15 1500
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2023-02-17 1200
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2023-02-19 1200
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2023-02-20 1200
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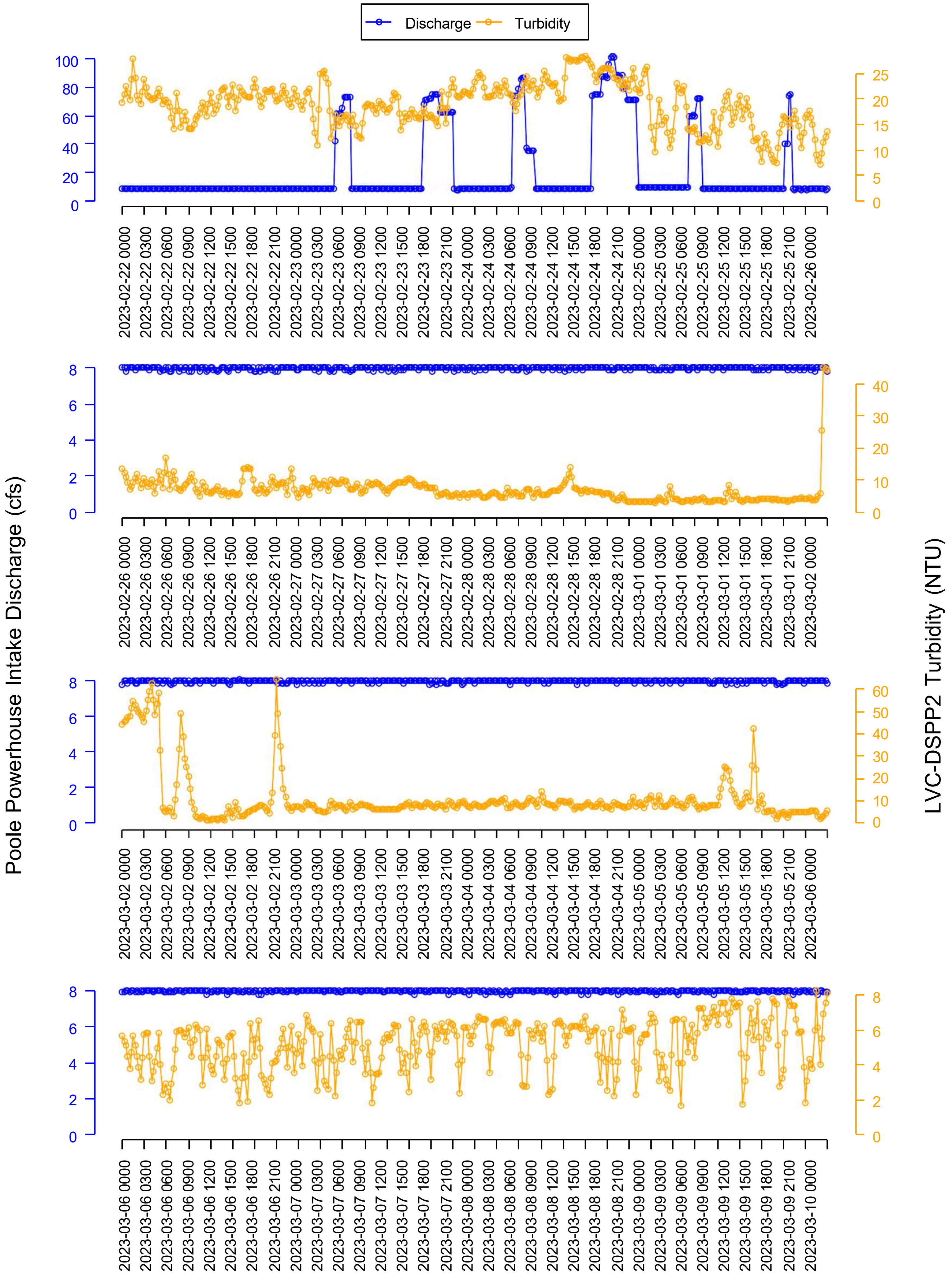
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
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40
60
80
100
0
5
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15
20
25
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2023-02-22 0600
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2023-02-22 1200
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2023-02-22 1800
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2023-02-23 0600
2023-02-23 0900
2023-02-23 1200
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2023-02-23 1800
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2023-02-24 0600
2023-02-24 0900
2023-02-24 1200
2023-02-24 1500
2023-02-24 1800
2023-02-24 2100
2023-02-25 0000
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2023-02-25 0600
2023-02-25 0900
2023-02-25 1200
2023-02-25 1500
2023-02-25 1800
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2023-02-26 0600
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2023-02-27 0600
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2023-02-27 1800
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2023-02-28 0600
2023-02-28 0900
2023-02-28 1200
2023-02-28 1500
2023-02-28 1800
2023-02-28 2100
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2023-03-01 1200
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2023-03-02 0600
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2023-03-02 1200
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2023-03-02 1800
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2023-03-03 0000
2023-03-03 0300
2023-03-03 0600
2023-03-03 0900
2023-03-03 1200
2023-03-03 1500
2023-03-03 1800
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2023-03-05 0900
2023-03-05 1200
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2023-03-08 2100
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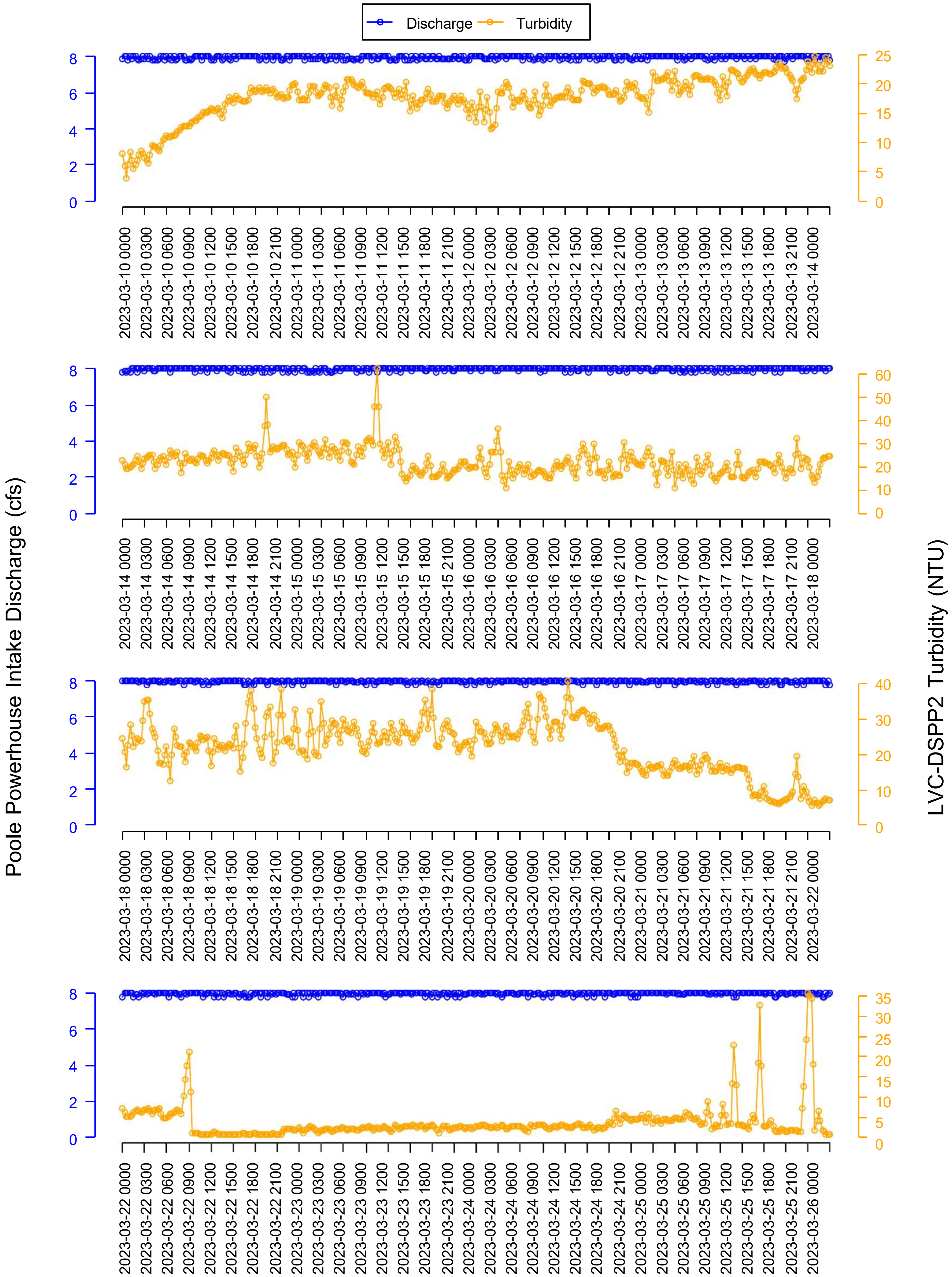
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
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6
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15
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25
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2023-03-10 0600
2023-03-10 0900
2023-03-10 1200
2023-03-10 1500
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2023-03-11 0600
2023-03-11 0900
2023-03-11 1200
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2023-03-11 1800
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2023-03-12 0600
2023-03-12 0900
2023-03-12 1200
2023-03-12 1500
2023-03-12 1800
2023-03-12 2100
2023-03-13 0000
2023-03-13 0300
2023-03-13 0600
2023-03-13 0900
2023-03-13 1200
2023-03-13 1500
2023-03-13 1800
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2023-03-14 0600
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2023-03-15 1200
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2023-03-15 1800
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2023-03-18 0000
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2023-03-19 0600
2023-03-19 0900
2023-03-19 1200
2023-03-19 1500
2023-03-19 1800
2023-03-19 2100
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2023-03-20 0600
2023-03-20 0900
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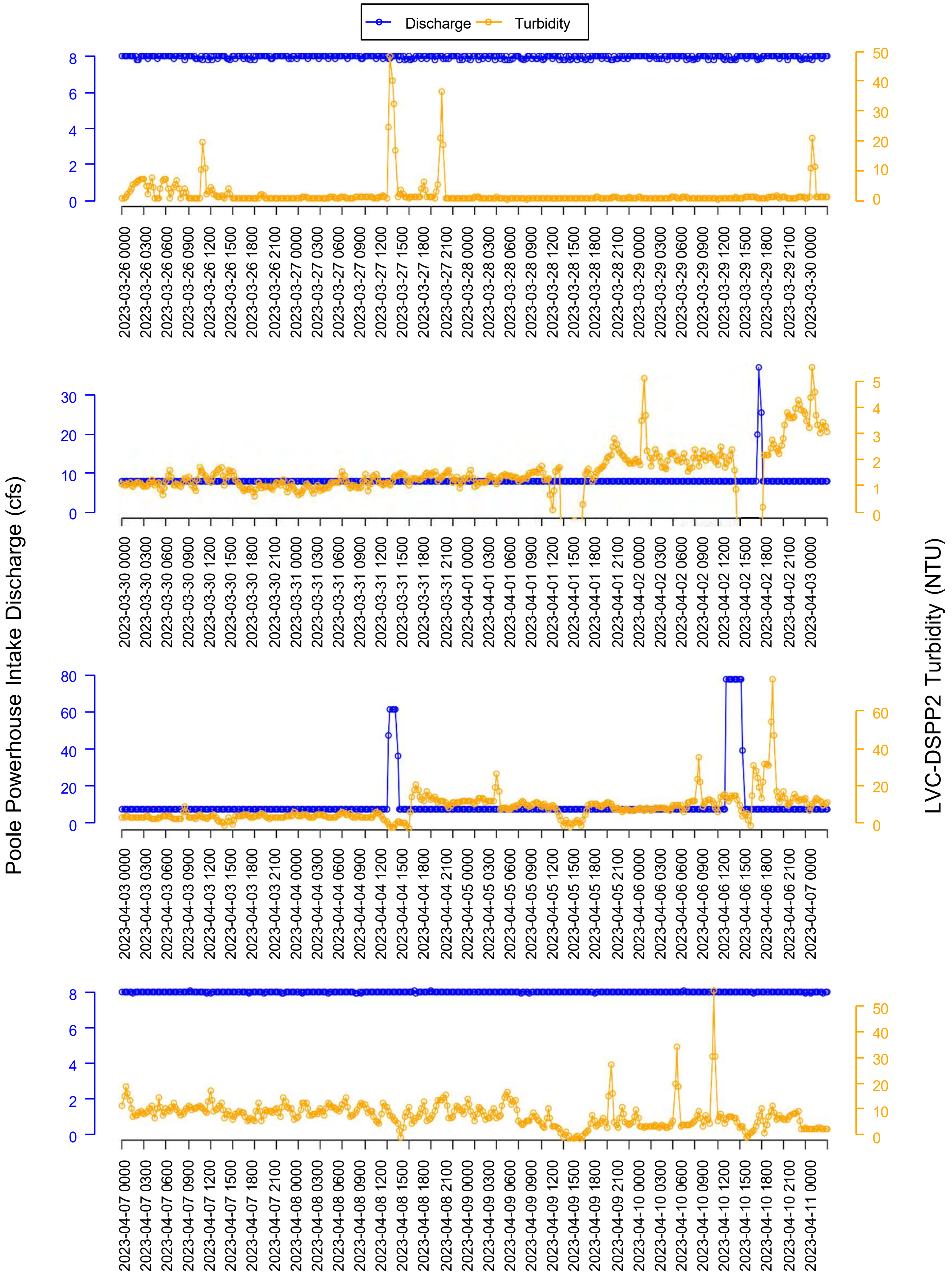
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
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2
4
6
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0
10
20
30
40
50
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2023-03-26 0600
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2023-04-09 1200
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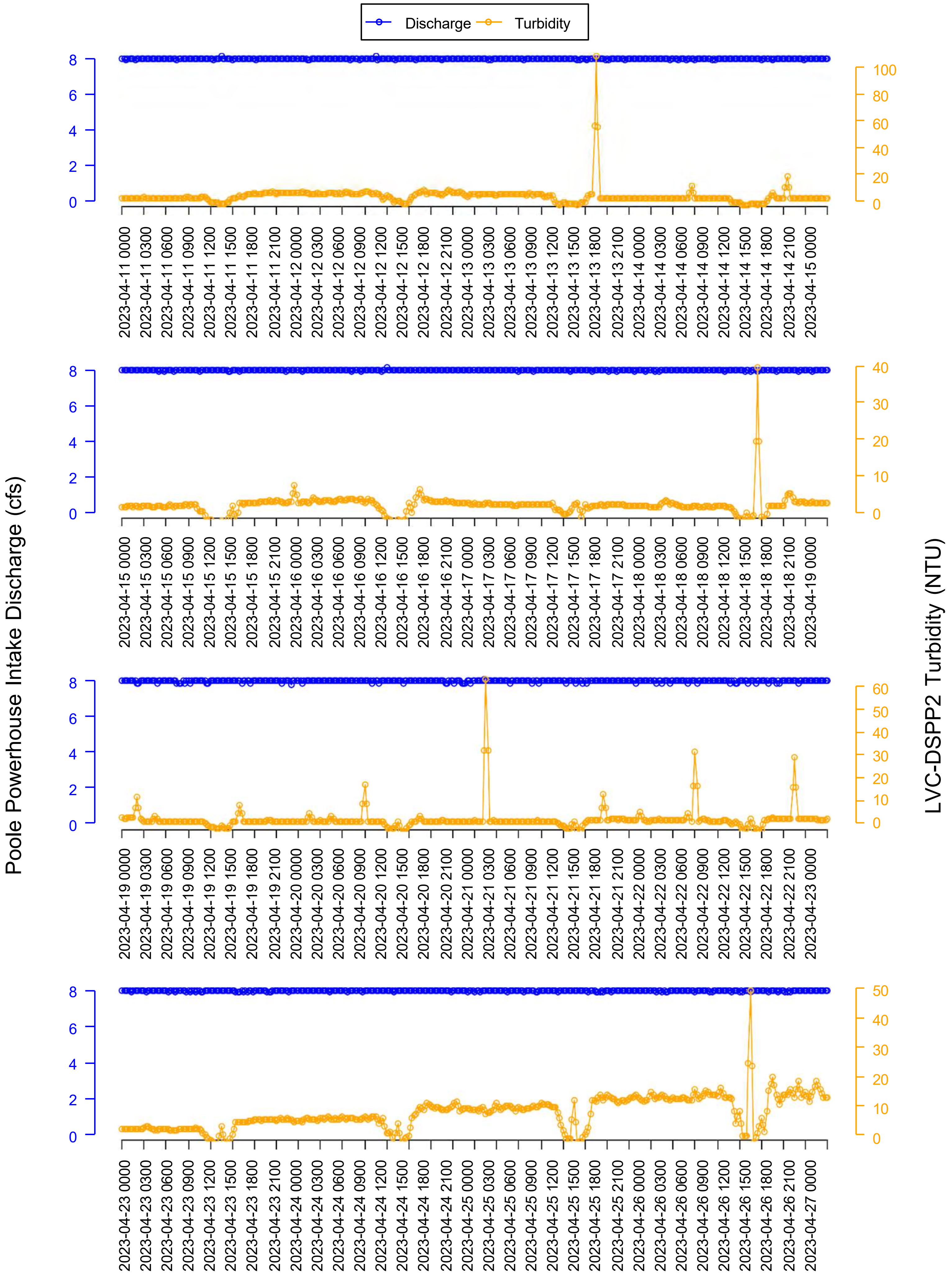
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
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100
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2023-04-11 0600
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2023-04-11 1200
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2023-04-13 1200
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2023-04-14 0600
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2023-04-14 1500
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2023-04-15 1200
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2023-04-22 0600
2023-04-22 0900
2023-04-22 1200
2023-04-22 1500
2023-04-22 1800
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2023-04-23 1200
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2023-04-23 1800
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2023-04-24 0000
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2023-04-24 0600
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2023-04-25 0900
2023-04-25 1200
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2023-04-25 1800
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2023-04-26 1800
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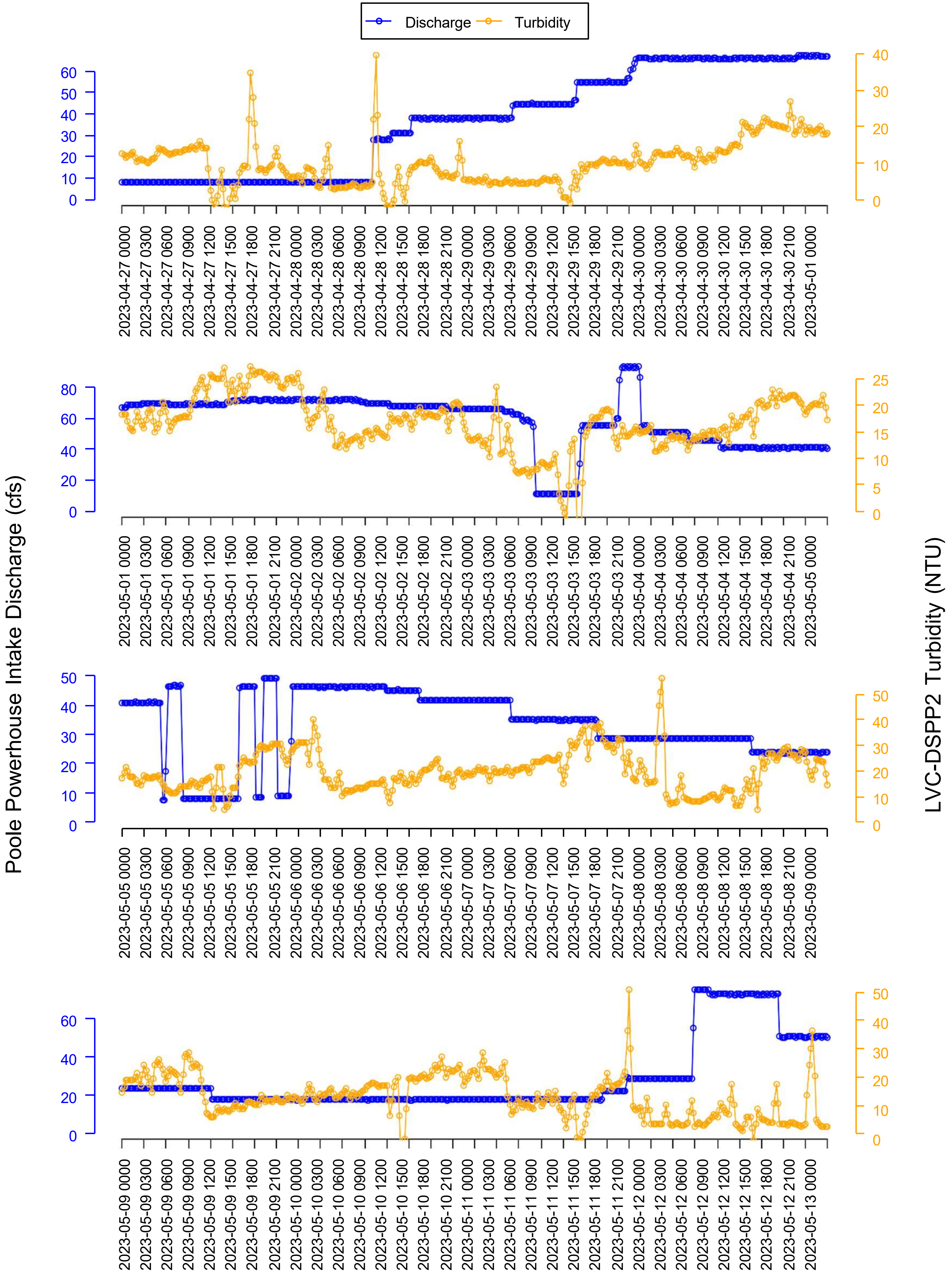
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
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2023-04-28 0600
2023-04-28 0900
2023-04-28 1200
2023-04-28 1500
2023-04-28 1800
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2023-04-29 0600
2023-04-29 0900
2023-04-29 1200
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2023-04-29 1800
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2023-04-30 0600
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2023-04-30 1200
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2023-05-02 1200
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2023-05-02 1800
2023-05-02 2100
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2023-05-03 0900
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2023-05-03 2100
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2023-05-05 0600
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2023-05-06 0600
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2023-05-06 1200
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2023-05-07 0600
2023-05-07 0900
2023-05-07 1200
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2023-05-08 0600
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2023-05-10 0600
2023-05-10 0900
2023-05-10 1200
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2023-05-11 0600
2023-05-11 0900
2023-05-11 1200
2023-05-11 1500
2023-05-11 1800
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2023-05-12 0000
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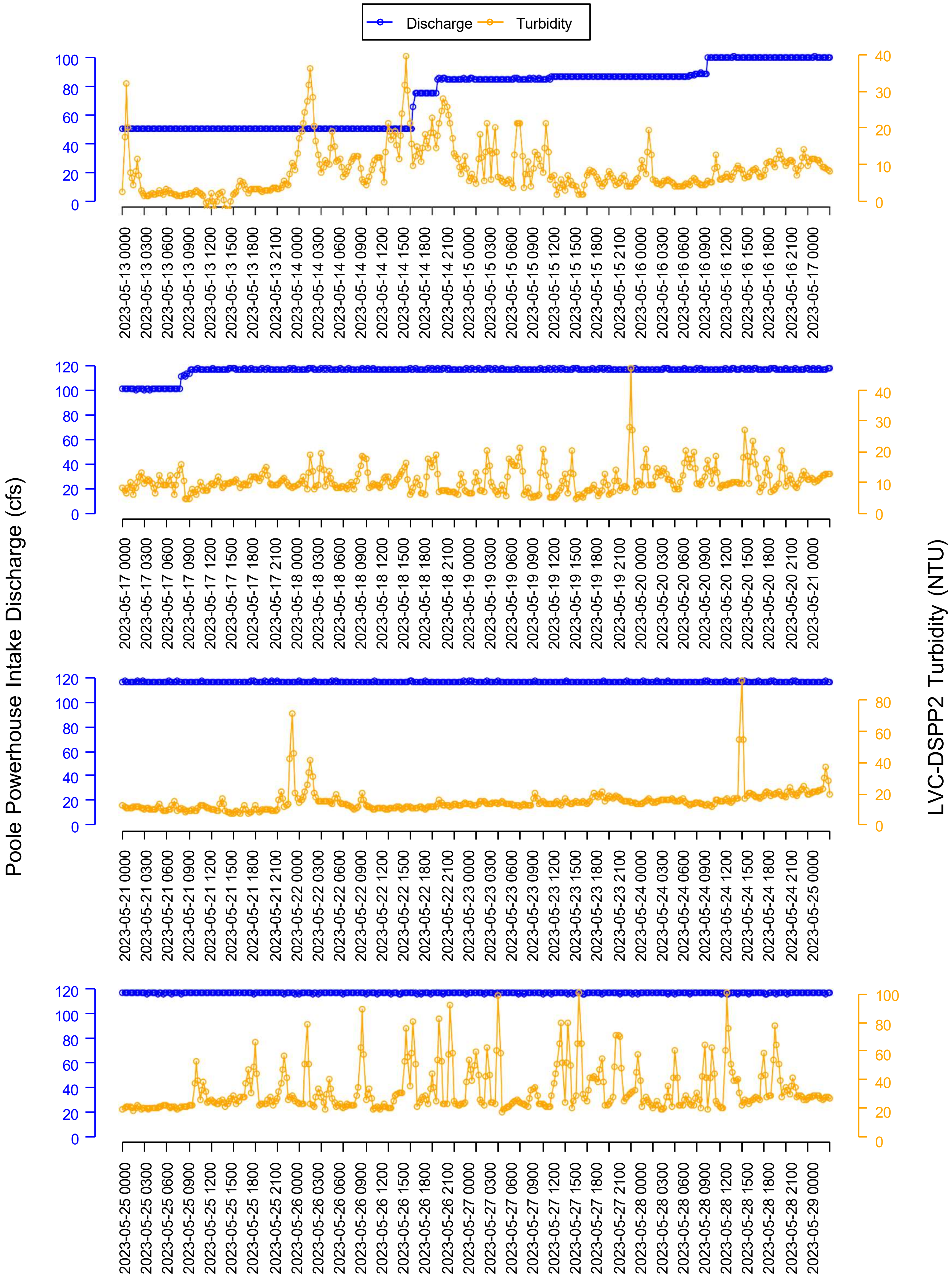
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
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40
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120
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80
100
2023-05-13 0000
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2023-05-13 0600
2023-05-13 0900
2023-05-13 1200
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2023-05-13 1800
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2023-05-14 0600
2023-05-14 0900
2023-05-14 1200
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2023-05-14 1800
2023-05-14 2100
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2023-05-15 0600
2023-05-15 0900
2023-05-15 1200
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2023-05-15 1800
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2023-05-18 0900
2023-05-18 1200
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2023-05-19 0600
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2023-05-19 1200
2023-05-19 1500
2023-05-19 1800
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2023-05-20 0900
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2023-05-20 1500
2023-05-20 1800
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2023-05-21 0600
2023-05-21 0900
2023-05-21 1200
2023-05-21 1500
2023-05-21 1800
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2023-05-22 0600
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2023-05-22 1200
2023-05-22 1500
2023-05-22 1800
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2023-05-23 0600
2023-05-23 0900
2023-05-23 1200
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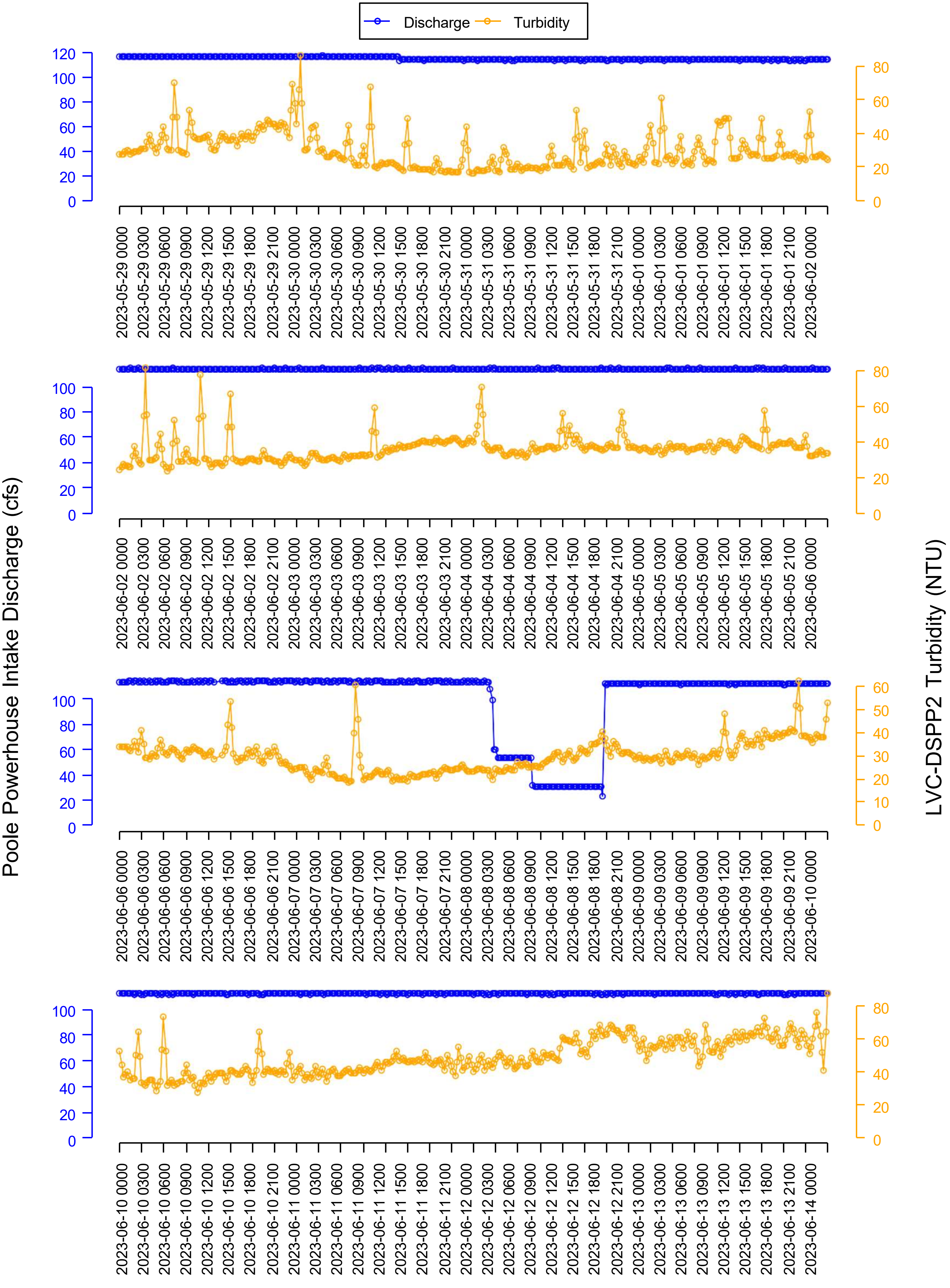
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
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60
80
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120
0
20
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60
80
2023-05-29 0000
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2023-05-29 0600
2023-05-29 0900
2023-05-29 1200
2023-05-29 1500
2023-05-29 1800
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2023-05-30 0600
2023-05-30 0900
2023-05-30 1200
2023-05-30 1500
2023-05-30 1800
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2023-05-31 0600
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2023-05-31 1200
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2023-05-31 1800
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2023-06-02 0000
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2023-06-02 0600
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2023-06-06 0600
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2023-06-09 1800
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2023-06-11 0600
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2023-06-11 1200
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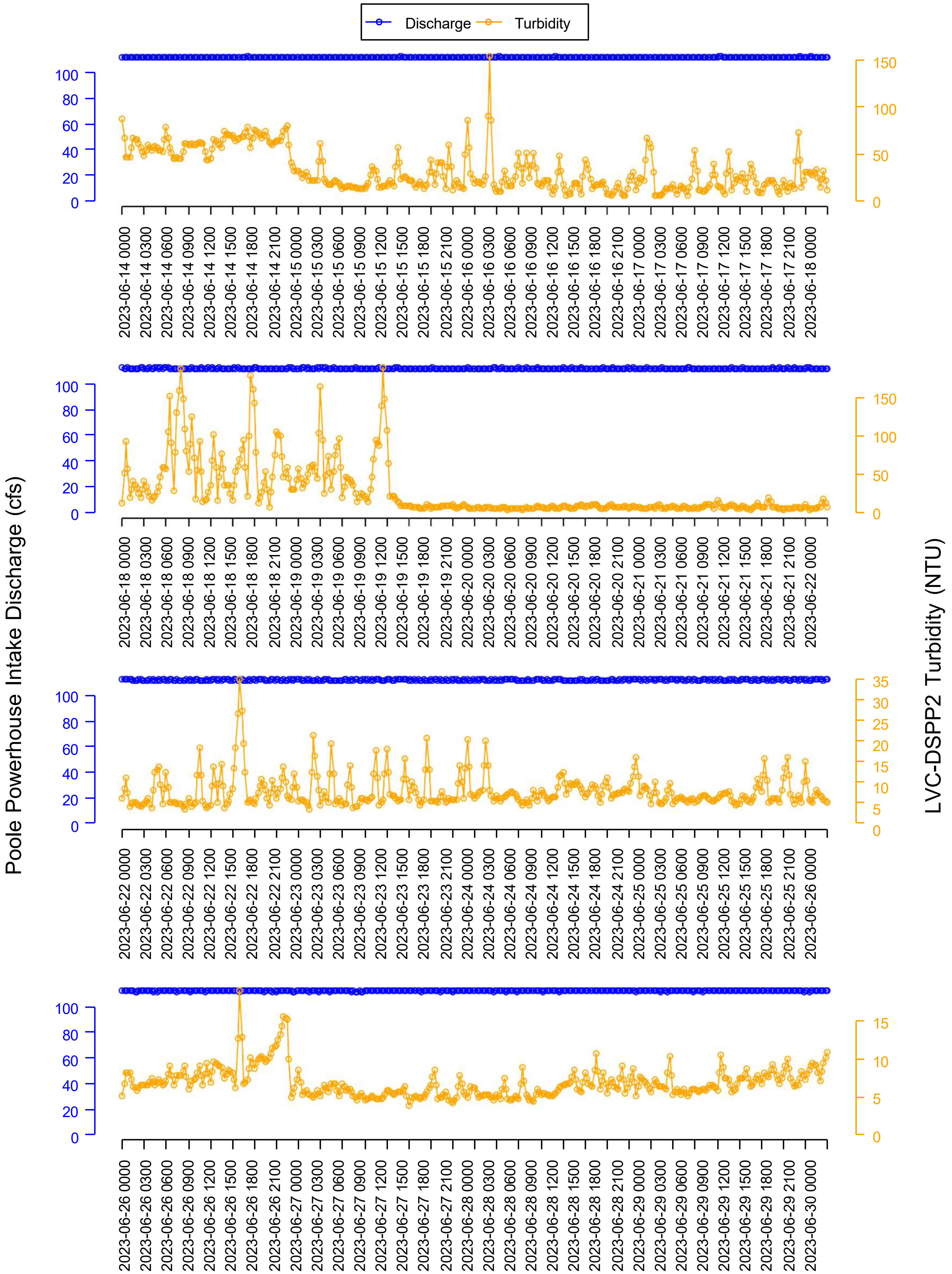
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
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2023-06-14 1200
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2023-06-23 0600
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40
60
80
100
0
5
10
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2023-06-27 0600
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2023-06-27 1800
2023-06-27 2100
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2023-06-28 0600
2023-06-28 0900
2023-06-28 1200
2023-06-28 1500
2023-06-28 1800
2023-06-28 2100
2023-06-29 0000
2023-06-29 0300
2023-06-29 0600
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2023-06-29 1500
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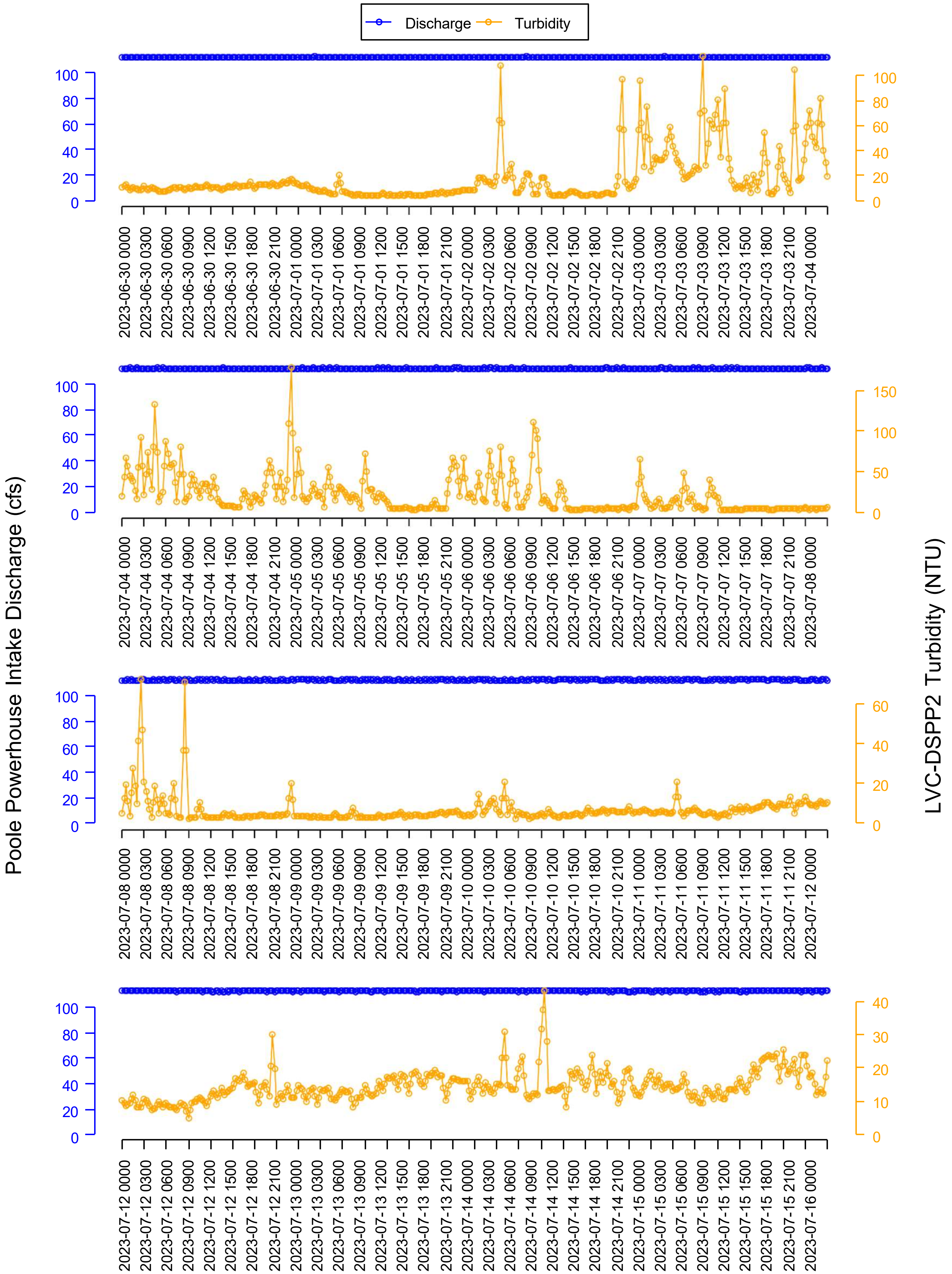
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Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
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60
80
100
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2023-06-30 0600
2023-06-30 0900
2023-06-30 1200
2023-06-30 1500
2023-06-30 1800
2023-06-30 2100
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2023-07-01 0900
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2023-07-01 1500
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2023-07-02 0900
2023-07-02 1200
2023-07-02 1500
2023-07-02 1800
2023-07-02 2100
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2023-07-03 0600
2023-07-03 0900
2023-07-03 1200
2023-07-03 1500
2023-07-03 1800
2023-07-03 2100
2023-07-04 0000
0
50
100
150
2023-07-04 0000
2023-07-04 0300
2023-07-04 0600
2023-07-04 0900
2023-07-04 1200
2023-07-04 1500
2023-07-04 1800
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2023-07-05 1200
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2023-07-13 1500
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2023-07-14 0900
2023-07-14 1200
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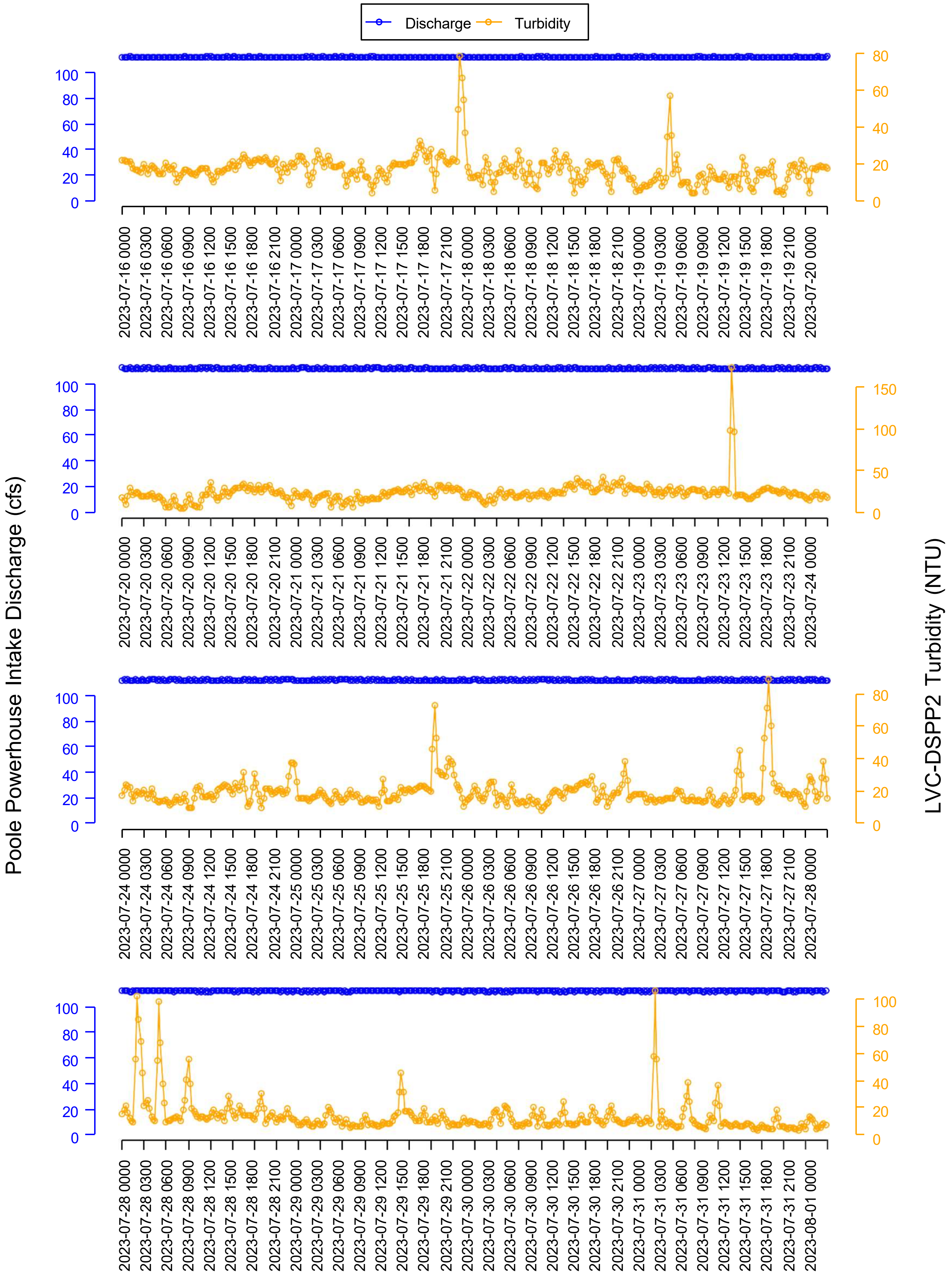
Discharge
Turbidity
Poole Powerhouse Intake Discharge (cfs)
LVC-DSPP2 Turbidity (NTU)
0
20
40
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20
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2023-07-16 0000
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2023-07-16 0600
2023-07-16 0900
2023-07-16 1200
2023-07-16 1500
2023-07-16 1800
2023-07-16 2100
2023-07-17 0000
2023-07-17 0300
2023-07-17 0600
2023-07-17 0900
2023-07-17 1200
2023-07-17 1500
2023-07-17 1800
2023-07-17 2100
2023-07-18 0000
2023-07-18 0300
2023-07-18 0600
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2023-07-19 0000
2023-07-19 0300
2023-07-19 0600
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2023-07-19 1200
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2023-07-27 1200
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2023-07-31 1500
2023-07-31 1800
2023-07-31 2100
2023-08-01 0000

APPENDIX E

2022 AND 2023 RESERVOIR VERTICAL PROFILE IN SITU DATA

Table E-1. Reservoir In Situ Data Collected During Spring, Summer, and Fall 2022

Reservoir	Site ID	Season	Date	Depth (meter)	Water Temperature (°C)	DO (mg/L)	DO (%)	Specific Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)
Spring										
Saddlebag Lake	LV-2	Spring	6/1/2022	0.2	4.2	8.9	99	21	6.7	0.4
Saddlebag Lake	LV-2	Spring	6/1/2022	1	4.2	8.8	99	21	6.6	0.4
Saddlebag Lake	LV-2	Spring	6/1/2022	2	4.2	8.8	99	21	6.5	0.4
Saddlebag Lake	LV-2	Spring	6/1/2022	3	4.2	8.8	98	21	6.5	0.5
Saddlebag Lake	LV-2	Spring	6/1/2022	4	4.2	8.7	97	22	6.5	0.4
Saddlebag Lake	LV-2	Spring	6/1/2022	5	4.2	8.6	99	22	6.5	0.5
Ellery Lake	LV-7	Spring	6/1/2022	0.2	7.5	8.8	105	19	7.0	0.3
Ellery Lake	LV-7	Spring	6/1/2022	1	7.4	8.9	106	19	7.0	0.3
Ellery Lake	LV-7	Spring	6/1/2022	2	7.4	8.9	106	19	6.9	0.4
Tioga Lake	LV-11	Spring	5/31/2022	0.2	5.8	8.3	96	23	6.8	0.5
Tioga Lake	LV-11	Spring	5/31/2022	1	5.8	8.2	95	23	6.7	0.5
Tioga Lake	LV-11	Spring	5/31/2022	2	5.7	8.2	94	23	6.7	0.5
Tioga Lake	LV-11	Spring	5/31/2022	3	5.7	8.2	94	23	6.6	0.6

Reservoir	**Site ID**	**Season**	**Date**	**Depth (meter)**	**Water Temperature (°C)**	**DO (mg/L)**	**DO (%)**	**Specific Conductivity (µS/cm)**	**pH (s.u.)**	**Turbidity (NTU)**
Tioga Lake	LV-11	Spring	5/31/2022	4	5.7	8.2	94	23	6.6	0.5
Tioga Lake	LV-11	Spring	5/31/2022	5	5.6	8.1	93	23	6.6	0.5
Tioga Lake	LV-11	Spring	5/31/2022	6	5.4	8.1	93	23	6.5	0.6
Tioga Lake	LV-11	Spring	5/31/2022	7	5.3	8.0	91	23	6.5	0.5
Tioga Lake	LV-11	Spring	5/31/2022	8	5.3	8.0	91	23	6.5	0.5
Tioga Lake	LV-11	Spring	5/31/2022	9	5.2	8.0	91	23	6.5	0.6
Tioga Lake	LV-11	Spring	5/31/2022	10	5.2	7.9	90	23	6.5	0.5
Tioga Lake	LV-11	Spring	5/31/2022	11	5.2	7.9	90	23	6.5	0.5
Tioga Lake	LV-11	Spring	5/31/2022	12	5.2	7.9	90	23	6.4	0.6
Tioga Lake	LV-11	Spring	5/31/2022	13	5.2	7.9	90	23	6.4	0.5
Tioga Lake	LV-11	Spring	5/31/2022	14	5.2	7.9	90	23	6.4	0.5
Tioga Lake	LV-11	Spring	5/31/2022	15	5.1	7.9	90	23	6.4	0.6
Tioga Lake	LV-11	Spring	5/31/2022	16	5.1	7.8	88	23	6.4	0.6
Tioga Lake	LV-11	Spring	5/31/2022	17	5.1	7.8	88	23	6.4	0.5

Reservoir	Site ID	Season	Date	Depth (meter)	Water Temperature (°C)	DO (mg/L)	DO (%)	Specific Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)
Summer										
Saddlebag Lake	LV-2	Summer	8/18/2022	0.2	16.1	7.1	106	20	8.0	--[a]
Saddlebag Lake	LV-2	Summer	8/18/2022	1	16.1	7.1	106	20	7.8	--[a]
Saddlebag Lake	LV-2	Summer	8/18/2022	2	16.1	7.1	106	20	7.7	--[a]
Saddlebag Lake	LV-2	Summer	8/18/2022	3	16.1	7.1	106	20	6.9	--[a]
Saddlebag Lake	LV-2	Summer	8/18/2022	4	16.1	7.1	106	20	6.6	--[a]
Saddlebag Lake	LV-2	Summer	8/18/2022	5	16.1	7.1	106	20	6.6	--[a]
Saddlebag Lake	LV-2	Summer	8/18/2022	6	16.1	7.0	105	20	6.5	--[a]
Saddlebag Lake	LV-2	Summer	8/18/2022	7	16.1	7.0	105	20	6.3	--[a]
Saddlebag Lake	LV-2	Summer	8/18/2022	8	16.1	7.0	105	20	6.1	--[a]
Saddlebag Lake	LV-2	Summer	8/18/2022	9	15.7	7.2	107	20	6.0	--[a]
Saddlebag Lake	LV-2	Summer	8/18/2022	10	14.0	8.6	123	22	5.9	--[a]
Saddlebag Lake	LV-2	Summer	8/18/2022	11	12.1	9.1	124	22	5.9	--[a]
Saddlebag Lake	LV-2	Summer	8/18/2022	12	10.4	9.3	122	23	5.9	--[a]

Reservoir	Site ID	Season	Date	Depth (meter)	Water Temperature (°C)	DO (mg/L)	DO (%)	Specific Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)
Saddlebag Lake	LV-2	Summer	8/18/2022	13	9.3	9.3	118	23	5.8	-- [a]
Saddlebag Lake	LV-2	Summer	8/18/2022	14	8.5	9.1	115	24	5.8	-- [a]
Saddlebag Lake	LV-2	Summer	8/18/2022	15	7.5	9.1	112	24	5.7	-- [a]
Saddlebag Lake	LV-2	Summer	8/18/2022	16	6.8	8.9	107	25	5.5	-- [a]
Saddlebag Lake	LV-2	Summer	8/18/2022	17	6.4	8.9	106	25	5.5	-- [a]
Saddlebag Lake	LV-2	Summer	8/18/2022	18	6.1	7.2	86	26	5.2	-- [a]
Saddlebag Lake	LV-2	Summer	8/18/2022	19	5.7	6.5	76	26	5.1	-- [a]
Ellery Lake	LV-7	Summer	8/17/2022	0.2	16.8	7.1	106	23	7.6	-- [a]
Ellery Lake	LV-7	Summer	8/17/2022	1	16.8	7.0	104	23	7.5	-- [a]
Ellery Lake	LV-7	Summer	8/17/2022	2	16.4	7.0	103	22	7.3	-- [a]
Tioga Lake	LV-11	Summer	8/17/2022	0.2	16.3	7.0	104	27	7.9	-- [a]
Tioga Lake	LV-11	Summer	8/17/2022	1	16.3	7.0	104	27	7.8	-- [a]
Tioga Lake	LV-11	Summer	8/17/2022	2	16.3	7.0	104	27	7.8	-- [a]
Tioga Lake	LV-11	Summer	8/17/2022	3	16.3	7.0	104	27	7.7	-- [a]

Reservoir	Site ID	Season	Date	Depth (meter)	Water Temperature (°C)	DO (mg/L)	DO (%)	Specific Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)
Tioga Lake	LV-11	Summer	8/17/2022	4	16.3	7.0	104	27	7.7	--[a]
Tioga Lake	LV-11	Summer	8/17/2022	5	16.1	7.1	105	27	7.7	--[a]
Tioga Lake	LV-11	Summer	8/17/2022	6	15.9	7.1	104	27	7.7	--[a]
Tioga Lake	LV-11	Summer	8/17/2022	7	15.5	7.2	105	27	7.7	--[a]
Tioga Lake	LV-11	Summer	8/17/2022	8	14.5	7.8	111	26	7.9	--[a]
Tioga Lake	LV-11	Summer	8/17/2022	9	13.8	8.3	116	24	8.0	--[a]
Tioga Lake	LV-11	Summer	8/17/2022	10	11.7	8.7	116	23	7.9	--[a]
Tioga Lake	LV-11	Summer	8/17/2022	11	10.0	8.8	113	23	7.6	--[a]
Tioga Lake	LV-11	Summer	8/17/2022	12	9.0	8.6	108	22	7.2	--[a]
Tioga Lake	LV-11	Summer	8/17/2022	13	8.4	7.3	90	22	6.6	--[a]
Tioga Lake	LV-11	Summer	8/17/2022	14	7.5	4.8	58	23	6.2	--[a]
Tioga Lake	LV-11	Summer	8/17/2022	15	6.8	3.8	45	23	5.9	--[a]
Tioga Lake	LV-11	Summer	8/17/2022	16	6.7	2.7	32	24	5.5	--[a]
Fall										

Reservoir	**Site ID**	**Season**	**Date**	**Depth (meter)**	**Water Temperature (°C)**	**DO (mg/L)**	**DO (%)**	**Specific Conductivity (µS/cm)**	**pH (s.u.)**	**Turbidity (NTU)**
Saddlebag Lake	LV-2	Fall	10/4/2022	0.2	11.9	7.6	103	24	6.6	0Q
Saddlebag Lake	LV-2	Fall	10/4/2022	1	12.1	7.5	103	24	6.6	0Q
Saddlebag Lake	LV-2	Fall	10/4/2022	2	12.1	7.5	103	24	6.6	0Q
Saddlebag Lake	LV-2	Fall	10/4/2022	3	12.1	7.5	103	24	6.7	0Q
Saddlebag Lake	LV-2	Fall	10/4/2022	4	12.1	7.5	103	24	6.7	0Q
Saddlebag Lake	LV-2	Fall	10/4/2022	5	12.1	7.5	103	24	6.7	0Q
Saddlebag Lake	LV-2	Fall	10/4/2022	6	12.1	7.5	103	24	6.7	0Q
Saddlebag Lake	LV-2	Fall	10/4/2022	7	12.1	7.5	103	24	6.8	0Q
Saddlebag Lake	LV-2	Fall	10/4/2022	8	12.1	7.5	103	24	6.8	0Q
Saddlebag Lake	LV-2	Fall	10/4/2022	9	12.1	7.5	103	24	6.8	0Q
Saddlebag Lake	LV-2	Fall	10/4/2022	10	12.1	7.5	103	24	6.8	0Q
Saddlebag Lake	LV-2	Fall	10/4/2022	11	12.0	7.5	103	24	6.8	0Q
Saddlebag Lake	LV-2	Fall	10/4/2022	12	11.8	7.5	102	25	6.8	0Q
Saddlebag Lake	LV-2	Fall	10/4/2022	13	10.6	7.8	102	28	6.8	0Q

Reservoir	**Site ID**	**Season**	**Date**	**Depth (meter)**	**Water Temperature (°C)**	**DO (mg/L)**	**DO (%)**	**Specific Conductivity (µS/cm)**	**pH (s.u.)**	**Turbidity (NTU)**
Saddlebag Lake	LV-2	Fall	10/4/2022	14	8.8	8.1	103	30	6.7	0^{Q}
Saddlebag Lake	LV-2	Fall	10/4/2022	15	8.0	8.0	99	30	6.7	0^{Q}
Saddlebag Lake	LV-2	Fall	10/4/2022	16	7.3	7.3	89	31	6.6	0^{Q}
Saddlebag Lake	LV-2	Fall	10/4/2022	17	6.7	6.4	77	32	6.6	0^{Q}
Saddlebag Lake	LV-2	Fall	10/4/2022	18	6.4	5.3	63	32	6.5	0^{Q}
Saddlebag Lake	LV-2	Fall	10/4/2022	19	6.0	4.3	50	33	6.4	0.1^{Q}
Saddlebag Lake	LV-2	Fall	10/4/2022	20	5.8	3.3	38	33	6.3	0.1^{Q}
Saddlebag Lake	LV-2	Fall	10/4/2022	21	5.8	2.8	32	33	6.2	0.2^{Q}
Saddlebag Lake	LV-2	Fall	10/4/2022	22	5.7	2.2	26	34	6.2	0.3^{Q}
Saddlebag Lake	LV-2	Fall	10/4/2022	23	5.7	2.0	23	34	6.1	0.3^{Q}
Ellery Lake	LV-7	Fall	10/5/2022	0.2	10.8	7.9	103	33	7.1	0.8^{Q}
Ellery Lake	LV-7	Fall	10/5/2022	1	10.7	7.9	102	33	7.1	0.9^{Q}
Ellery Lake	LV-7	Fall	10/5/2022	2	10.6	7.9	102	33	7.7	0.8^{Q}
Ellery Lake	LV-7	Fall	10/5/2022	3	10.6	7.9	102	33	7.1	0.8^{Q}

Reservoir	Site ID	Season	Date	Depth (meter)	Water Temperature (°C)	DO (mg/L)	DO (%)	Specific Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)
Tioga Lake	LV-11	Fall	10/5/2022	0.2	11.4	8.1	107	37	7.8	0.0^{Q}
Tioga Lake	LV-11	Fall	10/5/2022	1	11.4	8.1	107	37	7.7	0.0^{Q}
Tioga Lake	LV-11	Fall	10/5/2022	2	11.4	8.1	107	37	7.7	0.1^{Q}
Tioga Lake	LV-11	Fall	10/5/2022	3	11.4	8.1	107	37	7.6	0.1^{Q}
Tioga Lake	LV-11	Fall	10/5/2022	4	11.4	8.1	107	37	7.6	0.0^{Q}
Tioga Lake	LV-11	Fall	10/5/2022	5	11.4	8.0	106	37	7.6	0.0^{Q}
Tioga Lake	LV-11	Fall	10/5/2022	6	11.4	8.0	106	37	7.5	0.0^{Q}
Tioga Lake	LV-11	Fall	10/5/2022	7	11.3	8.0	106	37	7.5	0.2^{Q}
Tioga Lake	LV-11	Fall	10/5/2022	8	11.2	8.0	106	37	7.5	0^{Q}
Tioga Lake	LV-11	Fall	10/5/2022	9	11.2	7.9	104	37	7.4	0^{Q}
Tioga Lake	LV-11	Fall	10/5/2022	10	11.1	7.7	101	37	7.4	0^{Q}
Tioga Lake	LV-11	Fall	10/5/2022	11	10.9	7.6	100	37	7.3	0.1^{Q}
Tioga Lake	LV-11	Fall	10/5/2022	12	10.8	7.4	97	37	7.3	0.1^{Q}
Tioga Lake	LV-11	Fall	10/5/2022	13	10.8	7.3	95	37	7.2	0^{Q}

Reservoir	**Site ID**	**Season**	**Date**	**Depth (meter)**	**Water Temperature (°C)**	**DO (mg/L)**	**DO (%)**	**Specific Conductivity (μS/cm)**	**pH (s.u.)**	**Turbidity (NTU)**
Tioga Lake	LV-11	Fall	10/5/2022	14	10.6	7.1	92	36	7.1	0[Q]
Tioga Lake	LV-11	Fall	10/5/2022	15	8.9	2.6	32	33	6.6	0.5[Q]
Tioga Lake	LV-11	Fall	10/5/2022	16	8.2	1.1	13	34	6.4	1.1[Q]
Tioga Lake	LV-11	Fall	10/5/2022	17	7.9	0.4	5	36	6.3	1.3[Q]
Tioga Lake	LV-11	Fall	10/5/2022	18	7.7	0.1	1	38	6.2	1.1[Q]
Tioga Lake	LV-11	Fall	10/5/2022	19	7.5	0.0	0	40	6.2	0.7[Q]
Tioga Lake	LV-11	Fall	10/5/2022	20	7.4	0.0	0	42	6.2	0.8[Q]

-- = no data; % = percent; μS/cm = microSiemens per centimeter; °C = degrees Celsius; DO = dissolved oxygen; ID = identification; mg/L = milligrams per liter; NTU = nephelometric turbidity unit; Q = data qualified based on post-calibration checks; if turbidity measurements were less than zero, data were reported as zero; s.u. = standard units

[a] Turbidity not collected during the summer due to a probe malfunction.

Table E-2. Reservoir In Situ Data Collected in Spring, Summer, and Fall 2023

Reservoir	Site ID	Season	Date	Depth (meter)	Water Temperature (°C)	DO		Specific Conductance (µS/cm)	pH (s.u.)	Turbidity (NTU)
						(mg/L)	(%)			
Spring										
Ellery Lake	LV-7	Spring	7/5/2023	0	6.5	9.4	110	16	6.2	0.5
Ellery Lake	LV-7	Spring	7/5/2023	1	4.8	9.6	107	16	5.9	0.6
Ellery Lake	LV-7	Spring	7/5/2023	2	4.6	9.7	108	16	6.0	0.6
Ellery Lake	LV-7	Spring	7/5/2023	3	4.6	9.6	107	16	6.1	0.6
Summer										
Saddlebag Lake	LV-2	Summer	8/31/2023	0	13.2	7.8[Q]	110[Q]	18	6.8	0.4
Saddlebag Lake	LV-2	Summer	8/31/2023	1	13.2	7.8[Q]	109[Q]	18	6.8	0.5
Saddlebag Lake	LV-2	Summer	8/31/2023	2	13.2	7.8[Q]	109[Q]	18	6.8	0.4
Saddlebag Lake	LV-2	Summer	8/31/2023	3	13.2	7.8[Q]	109[Q]	18	6.8	0.4
Saddlebag Lake	LV-2	Summer	8/31/2023	4	13.2	7.8[Q]	109[Q]	18	6.9	0.5
Saddlebag Lake	LV-2	Summer	8/31/2023	5	13.1	7.8[Q]	109[Q]	18	6.9	0.4
Saddlebag Lake	LV-2	Summer	8/31/2023	6	11.0	8.8[Q]	117[Q]	19	6.6	0.5
Saddlebag Lake	LV-2	Summer	8/31/2023	7	9.3	9.4[Q]	121[Q]	19	6.0	0.4
Saddlebag Lake	LV-2	Summer	8/31/2023	8	8.9	9.5[Q]	120[Q]	20	5.8	0.4
Saddlebag Lake	LV-2	Summer	8/31/2023	9	8.5	9.6[Q]	120[Q]	20	5.8	0.5
Saddlebag Lake	LV-2	Summer	8/31/2023	10	8.0	9.6[Q]	120[Q]	20	5.8	0.5
Saddlebag Lake	LV-2	Summer	8/31/2023	11	7.7	9.7[Q]	119[Q]	20	5.8	0.6
Saddlebag Lake	LV-2	Summer	8/31/2023	12	7.2	9.7[Q]	118[Q]	20	5.8	0.5
Saddlebag Lake	LV-2	Summer	8/31/2023	13	6.8	9.8[Q]	117[Q]	20	5.8	0.6
Saddlebag Lake	LV-2	Summer	8/31/2023	14	6.5	9.8[Q]	117[Q]	20	5.8	0.6

Reservoir	Site ID	Season	Date	Depth (meter)	Water Temperature (°C)	DO		Specific Conductance (µS/cm)	pH (s.u.)	Turbidity (NTU)
						(mg/L)	(%)			
Saddlebag Lake	LV-2	Summer	8/31/2023	15	6.2	9.9^{Q}	117^{Q}	21	5.8	0.6
Saddlebag Lake	LV-2	Summer	8/31/2023	16	5.7	9.3^{Q}	109^{Q}	22	5.8	0.6
Saddlebag Lake	LV-2	Summer	8/31/2023	17	5.2	8.3^{Q}	96^{Q}	23	5.6	0.6
Saddlebag Lake	LV-2	Summer	8/31/2023	18	4.9	7.4^{Q}	84^{Q}	25	5.4	0.6
Saddlebag Lake	LV-2	Summer	8/31/2023	19	4.9	7.0^{Q}	80^{Q}	25	5.4	0.6
Saddlebag Lake	LV-2	Summer	8/31/2023	20	4.7	5.8^{Q}	66^{Q}	26	5.3	0.6
Saddlebag Lake	LV-2	Summer	8/31/2023	21	4.6	5.8^{Q}	66^{Q}	26	5.2	0.6
Saddlebag Lake	LV-2	Summer	8/31/2023	22	4.6	5.4^{Q}	62^{Q}	27	5.2	0.5
Saddlebag Lake	LV-2	Summer	8/31/2023	23	4.5	5.1^{Q}	58^{Q}	27	5.2	0.6
Saddlebag Lake	LV-2	Summer	8/31/2023	24	4.5	4.9^{Q}	55^{Q}	28	5.2	0.6
Saddlebag Lake	LV-2	Summer	8/31/2023	25	4.5	4.8^{Q}	54^{Q}	28	5.2	0.5
Saddlebag Lake	LV-2	Summer	8/31/2023	26	4.4	4.3^{Q}	48^{Q}	29	5.1	0.5
Saddlebag Lake	LV-2	Summer	8/31/2023	27	4.3	4.1^{Q}	47^{Q}	29	5.1	0.5
Saddlebag Lake	LV-2	Summer	8/31/2023	28	4.3	3.9^{Q}	44^{Q}	29	5.1	0.6
Saddlebag Lake	LV-2	Summer	8/31/2023	29	4.3	3.8^{Q}	43^{Q}	29	5.1	0.5
Saddlebag Lake	LV-2	Summer	8/31/2023	30	4.3	3.5^{Q}	39^{Q}	30	5.1	0.5
Saddlebag Lake	LV-2	Summer	8/31/2023	31	4.3	3.4^{Q}	39^{Q}	30	5.1	0.5
Saddlebag Lake	LV-2	Summer	8/31/2023	32	4.3	3.4^{Q}	38^{Q}	30	5.1	0.6
Ellery Lake	LV-7	Summer	9/4/2023	0	9.2	8.1^{Q}	101	18	6.9	0.4^{Q}
Ellery Lake	LV-7	Summer	9/4/2023	1	9.1	8.1^{Q}	101	18	6.9	0.4^{Q}
Ellery Lake	LV-7	Summer	9/4/2023	2	9.0	8.2^{Q}	101	18	7.0	0.4^{Q}
Ellery Lake	LV-7	Summer	9/4/2023	3	8.6	8.3^{Q}	102	18	7.0	0.5^{Q}
Tioga Lake	LV-11	Summer	9/4/2023	0	10.9	7.9^{Q}	103	23	6.9	0.3^{Q}

Reservoir	**Site ID**	**Season**	**Date**	**Depth (meter)**	**Water Temperature (°C)**	**DO**		**Specific Conductance (µS/cm)**	**pH (s.u.)**	**Turbidity (NTU)**
						(mg/L)	**(%)**			
Tioga Lake	LV-11	Summer	9/4/2023	1	10.8	7.9^{Q}	103	23	6.9	0.4^{Q}
Tioga Lake	LV-11	Summer	9/4/2023	2	10.8	7.9^{Q}	102	23	6.9	0.4^{Q}
Tioga Lake	LV-11	Summer	9/4/2023	3	10.8	7.9^{Q}	102	23	6.8	0.4^{Q}
Tioga Lake	LV-11	Summer	9/4/2023	4	10.7	7.9^{Q}	102	23	6.5	0.4^{Q}
Tioga Lake	LV-11	Summer	9/4/2023	5	10.7	7.8^{Q}	102	23	6.4	0.4^{Q}
Tioga Lake	LV-11	Summer	9/4/2023	6	10.7	7.8^{Q}	102	23	6.3	0.4^{Q}
Tioga Lake	LV-11	Summer	9/4/2023	7	10.7	7.8^{Q}	102	23	6.3	0.3^{Q}
Tioga Lake	LV-11	Summer	9/4/2023	8	10.1	7.8^{Q}	101	24	6.3	0.3^{Q}
Tioga Lake	LV-11	Summer	9/4/2023	9	9.6	8.0^{Q}	102	23	6.2	0.4^{Q}
Tioga Lake	LV-11	Summer	9/4/2023	10	7.2	7.1^{Q}	85	24	5.7	0.5^{Q}
Tioga Lake	LV-11	Summer	9/4/2023	11	6.3	6.9^{Q}	80	25	5.4	0.6^{Q}
Tioga Lake	LV-11	Summer	9/4/2023	12	6.0	6.1^{Q}	70	26	5.3	0.7^{Q}
Tioga Lake	LV-11	Summer	9/4/2023	13	5.6	4.8^{Q}	55	27	5.2	0.7^{Q}
Tioga Lake	LV-11	Summer	9/4/2023	14	5.2	3.9^{Q}	45	28	5.1	0.8^{Q}
Tioga Lake	LV-11	Summer	9/4/2023	15	5.0	2.9^{Q}	33	29	5.1	0.7^{Q}
Tioga Lake	LV-11	Summer	9/4/2023	16	4.9	2.2^{Q}	25	30	5.1	0.9^{Q}
Tioga Lake	LV-11	Summer	9/4/2023	17	4.8	1.7^{Q}	19	30	5.2	0.8^{Q}
Tioga Lake	LV-11	Summer	9/4/2023	18	4.7	1.0^{Q}	11	31	5.4	1.0^{Q}
Tioga Lake	LV-11	Summer	9/4/2023	19	4.6	0.8^{Q}	9	31	5.4	1.1^{Q}
Fall										
Saddlebag Lake	LV-2	Fall	10/10/2023	0	9.6	7.8	100	19	6.8	0.2
Saddlebag Lake	LV-2	Fall	10/10/2023	1	9.7	7.8	100	19	6.8	0.1
Saddlebag Lake	LV-2	Fall	10/10/2023	2	9.6	7.8	100	19	6.8	0.2

Reservoir	**Site ID**	**Season**	**Date**	**Depth (meter)**	**Water Temperature (°C)**	**DO**		**Specific Conductance (µS/cm)**	**pH (s.u.)**	**Turbidity (NTU)**
						(mg/L)	**(%)**			
Saddlebag Lake	LV-2	Fall	10/10/2023	3	9.6	7.8	100	19	6.8	0.1
Saddlebag Lake	LV-2	Fall	10/10/2023	4	9.6	7.8	100	19	6.8	0.2
Saddlebag Lake	LV-2	Fall	10/10/2023	5	9.6	7.8	100	19	6.8	0.2
Saddlebag Lake	LV-2	Fall	10/10/2023	6	9.6	7.8	100	19	6.8	0.1
Saddlebag Lake	LV-2	Fall	10/10/2023	7	9.6	7.8	100	19	6.8	0.1
Saddlebag Lake	LV-2	Fall	10/10/2023	8	9.6	7.8	100	19	6.8	0.1
Saddlebag Lake	LV-2	Fall	10/10/2023	9	9.6	7.8	100	19	6.8	0.2
Saddlebag Lake	LV-2	Fall	10/10/2023	10	9.6	7.8	100	19	6.8	0.1
Saddlebag Lake	LV-2	Fall	10/10/2023	11	9.6	7.8	100	19	6.8	0.1
Saddlebag Lake	LV-2	Fall	10/10/2023	12	9.6	7.8	100	19	6.8	0.2
Saddlebag Lake	LV-2	Fall	10/10/2023	13	9.5	7.8	100	19	6.8	0.2
Saddlebag Lake	LV-2	Fall	10/10/2023	14	8.1	8.9	111	21	6.8	0.3
Saddlebag Lake	LV-2	Fall	10/10/2023	15	6.9	8.9	108	22	6.8	0.3
Saddlebag Lake	LV-2	Fall	10/10/2023	16	6.5	8.6	103	23	6.7	0.4
Saddlebag Lake	LV-2	Fall	10/10/2023	17	5.9	7.5	88	24	6.6	0.4
Saddlebag Lake	LV-2	Fall	10/10/2023	18	5.4	6.8	80	25	6.5	0.4
Saddlebag Lake	LV-2	Fall	10/10/2023	19	5.2	6.4	74	26	6.4	0.4
Saddlebag Lake	LV-2	Fall	10/10/2023	20	5.0	5.3	61	26	6.3	0.4
Saddlebag Lake	LV-2	Fall	10/10/2023	21	5.0	5.1	59	26	6.2	0.3
Saddlebag Lake	LV-2	Fall	10/10/2023	22	4.9	4.9	56	27	6.2	0.3
Saddlebag Lake	LV-2	Fall	10/10/2023	23	4.9	4.5	52	27	6.1	0.3
Saddlebag Lake	LV-2	Fall	10/10/2023	24	4.7	4.0	46	28	6.0	0.2
Saddlebag Lake	LV-2	Fall	10/10/2023	25	4.7	4.0	45	28	6.0	0.2

Reservoir	**Site ID**	**Season**	**Date**	**Depth (meter)**	**Water Temperature (°C)**	**DO**		**Specific Conductance (µS/cm)**	**pH (s.u.)**	**Turbidity (NTU)**
						(mg/L)	**(%)**			
Saddlebag Lake	LV-2	Fall	10/10/2023	26	4.7	3.9	45	28	6.0	0.2
Saddlebag Lake	LV-2	Fall	10/10/2023	27	4.7	3.9	45	28	6.0	0.2
Saddlebag Lake	LV-2	Fall	10/10/2023	28	4.7	3.9	45	28	6.0	0.2
Saddlebag Lake	LV-2	Fall	10/10/2023	29	4.6	3.7	42	28	6.0	0.2
Saddlebag Lake	LV-2	Fall	10/10/2023	30	4.6	3.5	39	29	5.9	0.2
Ellery Lake	LV-7	Fall	10/11/2023	0	6.7	9.4	110	23[Q]	7.3	0.4
Ellery Lake	LV-7	Fall	10/11/2023	1	6.7	8.6	101	23[Q]	7.1	0.4
Ellery Lake	LV-7	Fall	10/11/2023	2	6.8	8.5	100	23[Q]	7.1	0.4
Ellery Lake	LV-7	Fall	10/11/2023	3	6.8	8.4	99	23[Q]	7.1	0.4
Tioga Lake	LV-11	Fall	10/11/2023	0	8.1	8.4	102	26[Q]	6.9	0.4
Tioga Lake	LV-11	Fall	10/11/2023	1	8.1	8.1	99	26[Q]	6.8	0.4
Tioga Lake	LV-11	Fall	10/11/2023	2	8.1	8.0	98	26[Q]	6.7	0.4
Tioga Lake	LV-11	Fall	10/11/2023	3	8.1	8.0	98	26[Q]	6.7	0.4
Tioga Lake	LV-11	Fall	10/11/2023	4	8.1	8.0	98	26[Q]	6.7	0.4
Tioga Lake	LV-11	Fall	10/11/2023	5	8.1	8.0	97	26[Q]	6.7	0.4
Tioga Lake	LV-11	Fall	10/11/2023	6	8.1	8.0	97	26[Q]	6.7	0.4
Tioga Lake	LV-11	Fall	10/11/2023	7	8.1	8.0	97	26[Q]	6.7	0.4
Tioga Lake	LV-11	Fall	10/11/2023	8	8.1	7.9	97	26[Q]	6.7	0.4
Tioga Lake	LV-11	Fall	10/11/2023	9	8.0	7.8	95	26[Q]	6.7	0.4
Tioga Lake	LV-11	Fall	10/11/2023	10	8.1	7.9	96	26[Q]	6.7	0.4
Tioga Lake	LV-11	Fall	10/11/2023	11	8.0	7.8	95	26[Q]	6.6	0.4
Tioga Lake	LV-11	Fall	10/11/2023	12	8.0	7.6	93	26[Q]	6.6	0.4
Tioga Lake	LV-11	Fall	10/11/2023	13	7.9	7.6	92	26[Q]	6.6	0.5

Reservoir	**Site ID**	**Season**	**Date**	**Depth (meter)**	**Water Temperature (°C)**	**DO**		**Specific Conductance (µS/cm)**	**pH (s.u.)**	**Turbidity (NTU)**
						(mg/L)	**(%)**			
Tioga Lake	LV-11	Fall	10/11/2023	14	7.9	7.4	90	26^Q	6.5	0.4
Tioga Lake	LV-11	Fall	10/11/2023	15	6.0	5.2	61	29^Q	6.5	0.8
Tioga Lake	LV-11	Fall	10/11/2023	16	5.7	2.5	29	29^Q	6.2	1.1
Tioga Lake	LV-11	Fall	10/11/2023	17	5.5	1.5	17	30^Q	6.0	1.2
Tioga Lake	LV-11	Fall	10/11/2023	18	5.3	0.7	8	31^Q	5.9	1.4
Tioga Lake	LV-11	Fall	10/11/2023	19	5.3	0.3	4	32^Q	5.9	1.4

% = percent; µS/cm = microSiemens per centimeter; °C = degrees Celsius; DO = dissolved oxygen; ID = identification; mg/L = milligrams per liter; NTU = nephelometric turbidity unit; s.u. = standard units

^Q = Data qualified based on post-calibration checks. If turbidity measurements were less than zero, data were reported as zero.

APPENDIX F
RESERVOIR AND STREAM WATER QUALITY ANALYTICAL LABORATORY REPORTS

2022
CALIFORNIA LABORATORY SERVICES LABORATORY REPORTS

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

June 08, 2022

CLS Work Order #: 22F0006
COC #: Web COC

Adam Cohen
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: Lee Vining WQ

Enclosed are the results of analyses for samples received by the laboratory on 06/01/22 10:55. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

Marc Foster, Ph.D.
Technical Director

CA SWRCB ELAP Accreditation/Registration number 1233

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: [none]
Project Manager: Adam Cohen

CLS Work Order #: 22F0006
COC #: Web COC

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LV-9 (22F0006-01) Surface Water	**Sampled: 05/31/22 07:30**		**Received: 06/01/22 10:55**							
Ammonia as N	ND	0.025	0.10	mg/L	1	2204605	06/03/22	06/03/22	SM4500-NH3F-1997	
Nitrate/Nitrite as N	**0.079**	0.055	0.40	"	"	2204497	06/01/22	06/01/22	EPA 300.0	J
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2204549	06/02/22	06/02/22	SM4500-P E	A-COM
Total Dissolved Solids	**23**	5.0	10	"	"	2204607	06/03/22	06/06/22	SM2540C	
Total Kjeldahl Nitrogen	**0.10**	0.040	0.20	"	"	2204636	06/06/22	06/06/22	SM4500-NH3F-1997	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2204727	06/08/22	06/08/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2204594	06/03/22	06/06/22	SM2540D	
LV-8 (22F0006-02) Surface Water	**Sampled: 05/31/22 07:50**		**Received: 06/01/22 10:55**							
Ammonia as N	ND	0.025	0.10	mg/L	1	2204605	06/03/22	06/03/22	SM4500-NH3F-1997	
Nitrate/Nitrite as N	**0.065**	0.055	0.40	"	"	2204497	06/01/22	06/01/22	EPA 300.0	J
Orthophosphate as PO4	**0.018**	0.0051	0.15	"	"	2204549	06/02/22	06/02/22	SM4500-P E	A-COM, J
Total Dissolved Solids	**21**	5.0	10	"	"	2204607	06/03/22	06/06/22	SM2540C	
Total Kjeldahl Nitrogen	**0.060**	0.040	0.20	"	"	2204636	06/06/22	06/06/22	SM4500-NH3F-1997	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2204727	06/08/22	06/08/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2204594	06/03/22	06/06/22	SM2540D	
LV-6 (22F0006-03) Surface Water	**Sampled: 05/31/22 08:40**		**Received: 06/01/22 10:55**							
Ammonia as N	**0.026**	0.025	0.10	mg/L	1	2204605	06/03/22	06/03/22	SM4500-NH3F-1997	J
Nitrate/Nitrite as N	**0.074**	0.055	0.40	"	"	2204497	06/01/22	06/01/22	EPA 300.0	J
Orthophosphate as PO4	**0.0060**	0.0051	0.15	"	"	2204549	06/02/22	06/02/22	SM4500-P E	A-COM, J
Total Dissolved Solids	**15**	5.0	10	"	"	2204607	06/03/22	06/06/22	SM2540C	
Total Kjeldahl Nitrogen	**0.077**	0.040	0.20	"	"	2204636	06/06/22	06/06/22	SM4500-NH3F-1997	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2204727	06/08/22	06/08/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2204594	06/03/22	06/06/22	SM2540D	

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: [none]
Project Manager: Adam Cohen

CLS Work Order #: 22F0006
COC #: Web COC

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LV-5 (22F0006-04) Surface Water	**Sampled: 05/31/22 09:00**		**Received: 06/01/22 10:55**							
Ammonia as N	ND	0.025	0.10	mg/L	1	2204605	06/03/22	06/03/22	SM4500-NH3F-1997	
Nitrate/Nitrite as N	**0.076**	0.055	0.40	"	"	2204497	06/01/22	06/01/22	EPA 300.0	J
Orthophosphate as PO4	**0.039**	0.0051	0.15	"	"	2204549	06/02/22	06/02/22	SM4500-P E	A-COM, J
Total Dissolved Solids	**10**	5.0	10	"	"	2204607	06/03/22	06/06/22	SM2540C	
Total Kjeldahl Nitrogen	**0.081**	0.040	0.20	"	"	2204636	06/06/22	06/06/22	SM4500-NH3F-1997	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2204727	06/08/22	06/08/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2204594	06/03/22	06/06/22	SM2540D	
LV-4 (22F0006-05) Surface Water	**Sampled: 05/31/22 09:15**		**Received: 06/01/22 10:55**							
Ammonia as N	**0.038**	0.025	0.10	mg/L	1	2204605	06/03/22	06/03/22	SM4500-NH3F-1997	J
Nitrate/Nitrite as N	**0.077**	0.055	0.40	"	"	2204497	06/01/22	06/01/22	EPA 300.0	J
Orthophosphate as PO4	**0.043**	0.0051	0.15	"	"	2204549	06/02/22	06/02/22	SM4500-P E	A-COM, J
Total Dissolved Solids	**12**	5.0	10	"	"	2204607	06/03/22	06/06/22	SM2540C	
Total Kjeldahl Nitrogen	**0.084**	0.040	0.20	"	"	2204636	06/06/22	06/06/22	SM4500-NH3F-1997	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2204727	06/08/22	06/08/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2204594	06/03/22	06/06/22	SM2540D	
LV-3 (22F0006-06) Surface Water	**Sampled: 05/31/22 10:00**		**Received: 06/01/22 10:55**							
Ammonia as N	**0.036**	0.025	0.10	mg/L	1	2204605	06/03/22	06/03/22	SM4500-NH3F-1997	J
Nitrate/Nitrite as N	**0.075**	0.055	0.40	"	"	2204497	06/01/22	06/01/22	EPA 300.0	J
Orthophosphate as PO4	**0.026**	0.0051	0.15	"	"	2204549	06/02/22	06/02/22	SM4500-P E	A-COM, J
Total Dissolved Solids	**15**	5.0	10	"	"	2204607	06/03/22	06/06/22	SM2540C	
Total Kjeldahl Nitrogen	**0.057**	0.040	0.20	"	"	2204636	06/06/22	06/06/22	SM4500-NH3F-1997	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2204727	06/08/22	06/08/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2204594	06/03/22	06/06/22	SM2540D	

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Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: [none]
Project Manager: Adam Cohen

CLS Work Order #: 22F0006
COC #: Web COC

Conventional Chemistry Parameters by APHA/EPA Methods

LV-12 (22F0006-07) Surface Water Sampled: 05/31/22 10:30 Received: 06/01/22 10:55

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Ammonia as N	**0.054**	0.025	0.10	mg/L	1	2204605	06/03/22	06/03/22	SM4500-NH3F-1997	J
Nitrate/Nitrite as N	**0.082**	0.055	0.40	"	"	2204497	06/01/22	06/01/22	EPA 300.0	J
Orthophosphate as PO4	**0.018**	0.0051	0.15	"	"	2204549	06/02/22	06/02/22	SM4500-P E	J
Total Dissolved Solids	**22**	5.0	10	"	"	2204607	06/03/22	06/06/22	SM2540C	
Total Kjeldahl Nitrogen	**0.17**	0.040	0.20	"	"	2204636	06/06/22	06/06/22	SM4500-NH3F-1997	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2204727	06/08/22	06/08/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2204594	06/03/22	06/06/22	SM2540D	

LV-11 (22F0006-08) Surface Water Sampled: 05/31/22 11:30 Received: 06/01/22 10:55

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Ammonia as N	**0.066**	0.025	0.10	mg/L	1	2204605	06/03/22	06/03/22	SM4500-NH3F-1997	J
Nitrate/Nitrite as N	**0.087**	0.055	0.40	"	"	2204497	06/01/22	06/01/22	EPA 300.0	J
Orthophosphate as PO4	**0.026**	0.0051	0.15	"	"	2204549	06/02/22	06/02/22	SM4500-P E	J
Total Dissolved Solids	**17**	5.0	10	"	"	2204607	06/03/22	06/06/22	SM2540C	
Total Kjeldahl Nitrogen	**0.15**	0.040	0.20	"	"	2204636	06/06/22	06/06/22	SM4500-NH3F-1997	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2204727	06/08/22	06/08/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2204594	06/03/22	06/06/22	SM2540D	

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Project: Lee Vining WQ
Project Number: [none]
Project Manager: Adam Cohen

CLS Work Order #: 22F0006
COC #: Web COC

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2204497 - General Prep											
Blank (2204497-BLK1)					Prepared & Analyzed: 06/01/22						
Nitrate/Nitrite as N	ND	0.055	0.40	mg/L							
LCS (2204497-BS1)					Prepared & Analyzed: 06/01/22						
Nitrate/Nitrite as N	3.86	0.055	0.40	mg/L	4.00		97	80-120			
LCS Dup (2204497-BSD1)					Prepared & Analyzed: 06/01/22						
Nitrate/Nitrite as N	4.14	0.055	0.40	mg/L	4.00		103	80-120	7	20	
Matrix Spike (2204497-MS1)			**Source: 22E1769-01**		Prepared & Analyzed: 06/01/22						
Nitrate/Nitrite as N	4.07	0.055	0.40	mg/L	4.00	0.118	99	80-120			
Matrix Spike Dup (2204497-MSD1)			**Source: 22E1769-01**		Prepared & Analyzed: 06/01/22						
Nitrate/Nitrite as N	4.04	0.055	0.40	mg/L	4.00	0.118	98	80-120	0.8	20	
Batch 2204549 - General Prep											
Blank (2204549-BLK1)					Prepared & Analyzed: 06/02/22						
Orthophosphate as PO4	ND	0.0051	0.15	mg/L							
LCS (2204549-BS1)					Prepared & Analyzed: 06/02/22						
Orthophosphate as PO4	0.855	0.0051	0.15	mg/L	0.918		93	80-120			
LCS Dup (2204549-BSD1)					Prepared & Analyzed: 06/02/22						
Orthophosphate as PO4	0.864	0.0051	0.15	mg/L	0.918		94	80-120	1	20	
Matrix Spike (2204549-MS1)			**Source: 22F0007-01**		Prepared & Analyzed: 06/02/22						
Orthophosphate as PO4	0.667	0.0051	0.15	mg/L	0.918	0.0140	71	75-125			QM-7

06/08/22 12:47

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Project: Lee Vining WQ
Project Number: [none]
Project Manager: Adam Cohen

CLS Work Order #: 22F0006
COC #: Web COC

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2204549 - General Prep											
Matrix Spike Dup (2204549-MSD1)			**Source: 22F0007-01**		Prepared & Analyzed: 06/02/22						
Orthophosphate as PO4	0.749	0.0051	0.15	mg/L	0.918	0.0140	80	75-125	12	25	QM-7
Batch 2204594 - General Preparation											
Duplicate (2204594-DUP1)			**Source: 22F0006-01**		Prepared: 06/03/22 Analyzed: 06/06/22						
Total Suspended Solids	ND	2.0	5.0	mg/L		ND				20	
Batch 2204605 - General Preparation											
Blank (2204605-BLK1)					Prepared & Analyzed: 06/03/22						
Ammonia as N	ND	0.025	0.10	mg/L							
LCS (2204605-BS1)					Prepared & Analyzed: 06/03/22						
Ammonia as N	0.522	0.025	0.10	mg/L	0.500		104	80-120			
LCS Dup (2204605-BSD1)					Prepared & Analyzed: 06/03/22						
Ammonia as N	0.530	0.025	0.10	mg/L	0.500		106	80-120	2	25	
Matrix Spike (2204605-MS1)			**Source: 22E1755-04**		Prepared & Analyzed: 06/03/22						
Ammonia as N	0.661	0.025	0.10	mg/L	0.500	0.196	93	75-125			
Matrix Spike Dup (2204605-MSD1)			**Source: 22E1755-04**		Prepared & Analyzed: 06/03/22						
Ammonia as N	0.669	0.025	0.10	mg/L	0.500	0.196	95	75-125	1	25	
Batch 2204607 - General Preparation											
Blank (2204607-BLK1)					Prepared: 06/03/22 Analyzed: 06/06/22						
Total Dissolved Solids	ND	5.0	10	mg/L							

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2204607 - General Preparation											
Duplicate (2204607-DUP1)			**Source: 22F0006-01**		Prepared: 06/03/22 Analyzed: 06/06/22						
Total Dissolved Solids	21.0	5.0	10	mg/L		23.0			9	20	
Batch 2204636 - General Preparation											
Blank (2204636-BLK1)					Prepared & Analyzed: 06/06/22						
Total Kjeldahl Nitrogen	ND	0.040	0.20	mg/L							
LCS (2204636-BS1)					Prepared & Analyzed: 06/06/22						
Total Kjeldahl Nitrogen	0.461	0.040	0.20	mg/L	0.500		92	80-120			
LCS Dup (2204636-BSD1)					Prepared & Analyzed: 06/06/22						
Total Kjeldahl Nitrogen	0.475	0.040	0.20	mg/L	0.500		95	80-120	3	20	
Matrix Spike (2204636-MS1)			**Source: 22F0006-03**		Prepared & Analyzed: 06/06/22						
Total Kjeldahl Nitrogen	0.453	0.040	0.20	mg/L	0.500	0.0770	75	75-125			
Matrix Spike Dup (2204636-MSD1)			**Source: 22F0006-03**		Prepared & Analyzed: 06/06/22						
Total Kjeldahl Nitrogen	0.437	0.040	0.20	mg/L	0.500	0.0770	72	75-125	4	25	QM-7
Batch 2204727 - General Preparation											
Blank (2204727-BLK1)					Prepared & Analyzed: 06/08/22						
Total Phosphorus as P	ND	0.023	0.050	mg/L							
LCS (2204727-BS1)					Prepared & Analyzed: 06/08/22						
Total Phosphorus as P	0.300	0.023	0.050	mg/L	0.300		100	80-120			

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Project: Lee Vining WQ
Project Number: [none]
Project Manager: Adam Cohen

CLS Work Order #: 22F0006
COC #: Web COC

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2204727 - General Preparation											
LCS Dup (2204727-BSD1)					Prepared & Analyzed: 06/08/22						
Total Phosphorus as P	0.298	0.023	0.050	mg/L	0.300		99	80-120	0.7	25	
Matrix Spike (2204727-MS1)			**Source: 22F0006-01**		Prepared & Analyzed: 06/08/22						
Total Phosphorus as P	0.310	0.023	0.050	mg/L	0.300	ND	103	75-125			
Matrix Spike Dup (2204727-MSD1)			**Source: 22F0006-01**		Prepared & Analyzed: 06/08/22						
Total Phosphorus as P	0.295	0.023	0.050	mg/L	0.300	ND	98	75-125	5	30	

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: [none]	**CLS Work Order #: 22F0006**
Berkeley, CA 94705	Project Manager: Adam Cohen	COC #: Web COC

Notes and Definitions

QM-7	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS and/or LCSD recovery.
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
A-COM	These samples were run slightly out of hold time.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

This is a “MDL Report”, thus if the report denotes an “ND” for a particular analyte, it should be noted that the analyte was not detected at or above the MDL.

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CHAIN OF CUSTODY CLS ID No.: 22F0006 LOG

HIGHLIGHTED AREAS MUST BE FILLED OUT PRIOR TO ACCEPTANCE

REPORT TO:

NAME AND ADDRESS: Adam Cohen, Stillwater
279 Cousteau Pl. Suite 400
Davis, CA 95618

PROJECT MANAGER: Adam Cohen PHONE#: 650-346-3284

PROJECT NAME: Lee Vining WQ

SAMPLED BY: APC & CWS

JOB DESCRIPTION:

SITE LOCATION: Lee Vining Creek

CLIENT JOB NUMBER:

DESTINATION LABORATORY:
☒ CLS (916) 638-7301
3249 FITZGERALD RD.
RANCHO CORDOVA, CA
95742
☐ OTHER

GEOTRACKER:
EDF REPORT ☐ YES ☐ NO
GLOBAL ID:

CDPH WRITE ON EDT TRANSMISSION? ☐ YES ☐ NO
STATE SYSTEM NUMBER
IF "YES" PLEASE ENTER THE SOURCE NUMBER(S).

COMPOSITE:

ANALYSIS REQUESTED

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	Total Dissolved Solids/Total Suspended Solids	Nitrate/Nitrite	Total Ammonia as N	Total Kjeldahl Nitrogen	Total Phosphorus	Orthophosphate		TURN AROUND TIME 1 DAY	2 DAY	3 DAY	5 DAY	SPECIAL INSTRUCTIONS OR ALT. ID:
5/31	7:30	LV-9					-	-	-	-	-	-					X	
5/31	7:50	LV-8					-	-	-	-	-	-					X	
5/31	8:40	LV-6					-	-	-	-	-	-					X	
5/31	9:00	LV-5					-	-	-	-	-	-					X	
5/31	9:15	LV-4					=	=	=	=	=	=					X	
5/31	10:00	LV-3					-	-	-	-	-	-					X	
5/31	10:30	LV-12					-	-	-	-	-	-					X	
5/31	11:30	LV-11					-	-	-	-	-	-					X	INVOICE TO:
																		P.O. #
																		QUOTE #

Email/Address

PRESERVATIVES: (1) HCL (2) HNO_3 (3) = COLD (4) = NaOH (5) = H_2SO_4 (6) = $Na_2S_2O_3$ (7) =

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
	Adam Cohen, SWS	2:00 PM 5/31		

REC'D AT LAB BY: Shelly DATE / TIME: 6-1-22 10:55 CONDITIONS / COMMENTS: 13.0 / 13.9

SHIPPED BY: ☑ FED X ☐ UPS ☐ OTHER ______ AIR BILL #

Tracking #: 8170 9530 6530

Gold-Project Mgr /Field Sampler/Terms and conditions

Pink - Origin/Terms and Conditions

Yellow - Lab file copy/Terms and Conditions

White-Lab/Terms and conditions

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June 10, 2022

CLS Work Order #: 22F0196
COC #: Web COC

Adam Cohen
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: Lee Vining WQ

Enclosed are the results of analyses for samples received by the laboratory on 06/03/22 10:30. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

Marc Foster, Ph.D.
Technical Director

CA SWRCB ELAP Accreditation/Registration number 1233

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: [none]
Project Manager: Adam Cohen

CLS Work Order #: 22F0196
COC #: Web COC

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LV-1 (22F0196-01) Surface Water Sampled: 06/01/22 10:00 Received: 06/03/22 10:30										
Ammonia as N	ND	0.025	0.10	mg/L	1	2204721	06/08/22	06/08/22	SM4500-NH3F-1997	
Nitrate/Nitrite as N	**0.12**	0.055	0.40	"	"	2204569	06/03/22	06/03/22	EPA 300.0	J
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2204597	06/03/22	06/03/22	SM4500-P E	HT-1
Total Dissolved Solids	**9.0**	5.0	10	"	"	2204697	06/07/22	06/08/22	SM2540C	J
Total Kjeldahl Nitrogen	**0.065**	0.040	0.20	"	"	2204745	06/08/22	06/08/22	SM4500-NH3F-1997	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2204727	06/08/22	06/08/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2204655	06/06/22	06/09/22	SM2540D	
LV-2 (22F0196-02) Surface Water Sampled: 06/01/22 09:00 Received: 06/03/22 10:30										
Ammonia as N	ND	0.025	0.10	mg/L	1	2204721	06/08/22	06/08/22	SM4500-NH3F-1997	
Nitrate/Nitrite as N	**0.063**	0.055	0.40	"	"	2204569	06/03/22	06/03/22	EPA 300.0	J
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2204597	06/03/22	06/03/22	SM4500-P E	HT-1
Total Dissolved Solids	**21**	5.0	10	"	"	2204697	06/07/22	06/08/22	SM2540C	
Total Kjeldahl Nitrogen	**0.048**	0.040	0.20	"	"	2204745	06/08/22	06/08/22	SM4500-NH3F-1997	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2204727	06/08/22	06/08/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2204655	06/06/22	06/09/22	SM2540D	
LV-7 (22F0196-03) Surface Water Sampled: 06/01/22 08:00 Received: 06/03/22 10:30										
Ammonia as N	ND	0.025	0.10	mg/L	1	2204721	06/08/22	06/08/22	SM4500-NH3F-1997	
Nitrate/Nitrite as N	**0.062**	0.055	0.40	"	"	2204569	06/03/22	06/03/22	EPA 300.0	J
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2204597	06/03/22	06/03/22	SM4500-P E	HT-1
Total Dissolved Solids	**12**	5.0	10	"	"	2204697	06/07/22	06/08/22	SM2540C	
Total Kjeldahl Nitrogen	**0.072**	0.040	0.20	"	"	2204745	06/08/22	06/08/22	SM4500-NH3F-1997	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2204727	06/08/22	06/08/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2204655	06/06/22	06/09/22	SM2540D	

06/10/22 09:06

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2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: [none]
Project Manager: Adam Cohen

CLS Work Order #: 22F0196
COC #: Web COC

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LV-11 (22F0196-04) Surface Water	**Sampled: 06/01/22 12:15**		**Received: 06/03/22 10:30**							
Ammonia as N	**0.031**	0.025	0.10	mg/L	1	2204721	06/08/22	06/08/22	SM4500-NH3F-1997	J
Nitrate/Nitrite as N	**0.11**	0.055	0.40	"	"	2204569	06/03/22	06/03/22	EPA 300.0	J
Orthophosphate as PO4	**0.014**	0.0051	0.15	"	"	2204597	06/03/22	06/03/22	SM4500-P E	J
Total Dissolved Solids	**23**	5.0	10	"	"	2204697	06/07/22	06/08/22	SM2540C	
Total Kjeldahl Nitrogen	**0.11**	0.040	0.20	"	"	2204745	06/08/22	06/08/22	SM4500-NH3F-1997	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2204727	06/08/22	06/08/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2204655	06/06/22	06/09/22	SM2540D	

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2204569 - General Prep											
Blank (2204569-BLK1)					Prepared & Analyzed: 06/03/22						
Nitrate/Nitrite as N	ND	0.055	0.40	mg/L							
LCS (2204569-BS1)					Prepared & Analyzed: 06/03/22						
Nitrate/Nitrite as N	3.99	0.055	0.40	mg/L	4.00		100	80-120			
LCS Dup (2204569-BSD1)					Prepared & Analyzed: 06/03/22						
Nitrate/Nitrite as N	3.97	0.055	0.40	mg/L	4.00		99	80-120	0.3	20	
Matrix Spike (2204569-MS1)			**Source: 22F0119-03**		Prepared & Analyzed: 06/03/22						
Nitrate/Nitrite as N	7.66	0.055	0.40	mg/L	4.00	4.13	88	80-120			
Matrix Spike Dup (2204569-MSD1)			**Source: 22F0119-03**		Prepared & Analyzed: 06/03/22						
Nitrate/Nitrite as N	7.78	0.055	0.40	mg/L	4.00	4.13	91	80-120	2	20	
Batch 2204597 - General Preparation											
Blank (2204597-BLK1)					Prepared & Analyzed: 06/03/22						
Orthophosphate as PO4	ND	0.0051	0.15	mg/L							
LCS (2204597-BS1)					Prepared & Analyzed: 06/03/22						
Orthophosphate as PO4	0.855	0.0051	0.15	mg/L	0.918		93	80-120			
LCS Dup (2204597-BSD1)					Prepared & Analyzed: 06/03/22						
Orthophosphate as PO4	0.847	0.0051	0.15	mg/L	0.918		92	80-120	0.9	20	
Matrix Spike (2204597-MS1)			**Source: 22F0196-04**		Prepared & Analyzed: 06/03/22						
Orthophosphate as PO4	0.798	0.0051	0.15	mg/L	0.918	0.0140	85	75-125			

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: [none]	**CLS Work Order #: 22F0196**
Berkeley, CA 94705	Project Manager: Adam Cohen	COC #: Web COC

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2204597 - General Preparation											
Matrix Spike Dup (2204597-MSD1)			**Source: 22F0196-04**	Prepared & Analyzed: 06/03/22							
Orthophosphate as PO4	0.810	0.0051	0.15	mg/L	0.918	0.0140	87	75-125	1	25	
Batch 2204655 - General Preparation											
Duplicate (2204655-DUP1)			**Source: 22F0121-02**	Prepared: 06/06/22 Analyzed: 06/09/22							
Total Suspended Solids	ND	2.0	5.0	mg/L		ND				20	
Batch 2204697 - General Preparation											
Blank (2204697-BLK1)				Prepared: 06/07/22 Analyzed: 06/08/22							
Total Dissolved Solids	ND	5.0	10	mg/L							
Duplicate (2204697-DUP1)			**Source: 22F0134-01**	Prepared: 06/07/22 Analyzed: 06/08/22							
Total Dissolved Solids	114	5.0	10	mg/L		108			5	20	
Batch 2204721 - General Preparation											
Blank (2204721-BLK1)				Prepared & Analyzed: 06/08/22							
Ammonia as N	ND	0.025	0.10	mg/L							
LCS (2204721-BS1)				Prepared & Analyzed: 06/08/22							
Ammonia as N	0.471	0.025	0.10	mg/L	0.500		94	80-120			
LCS Dup (2204721-BSD1)				Prepared & Analyzed: 06/08/22							
Ammonia as N	0.470	0.025	0.10	mg/L	0.500		94	80-120	0.2	25	

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: [none]
Project Manager: Adam Cohen

CLS Work Order #: 22F0196
COC #: Web COC

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2204721 - General Preparation											
Matrix Spike (2204721-MS1)			**Source: 22F0206-01**		Prepared & Analyzed: 06/08/22						
Ammonia as N	0.516	0.025	0.10	mg/L	0.500	0.0640	90	75-125			
Matrix Spike Dup (2204721-MSD1)			**Source: 22F0206-01**		Prepared & Analyzed: 06/08/22						
Ammonia as N	0.539	0.025	0.10	mg/L	0.500	0.0640	95	75-125	4	25	
Batch 2204727 - General Preparation											
Blank (2204727-BLK1)					Prepared & Analyzed: 06/08/22						
Total Phosphorus as P	ND	0.023	0.050	mg/L							
LCS (2204727-BS1)					Prepared & Analyzed: 06/08/22						
Total Phosphorus as P	0.300	0.023	0.050	mg/L	0.300		100	80-120			
LCS Dup (2204727-BSD1)					Prepared & Analyzed: 06/08/22						
Total Phosphorus as P	0.298	0.023	0.050	mg/L	0.300		99	80-120	0.7	25	
Matrix Spike (2204727-MS1)			**Source: 22F0006-01**		Prepared & Analyzed: 06/08/22						
Total Phosphorus as P	0.310	0.023	0.050	mg/L	0.300	ND	103	75-125			
Matrix Spike Dup (2204727-MSD1)			**Source: 22F0006-01**		Prepared & Analyzed: 06/08/22						
Total Phosphorus as P	0.295	0.023	0.050	mg/L	0.300	ND	98	75-125	5	30	
Batch 2204745 - General Preparation											
Blank (2204745-BLK1)					Prepared & Analyzed: 06/08/22						
Total Kjeldahl Nitrogen	ND	0.040	0.20	mg/L							

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2204745 - General Preparation											
LCS (2204745-BS1)					Prepared & Analyzed: 06/08/22						
Total Kjeldahl Nitrogen	0.495	0.040	0.20	mg/L	0.500		99	80-120			
LCS Dup (2204745-BSD1)					Prepared & Analyzed: 06/08/22						
Total Kjeldahl Nitrogen	0.499	0.040	0.20	mg/L	0.500		100	80-120	0.8	20	
Matrix Spike (2204745-MS1)			**Source: 22F0196-04**		Prepared & Analyzed: 06/08/22						
Total Kjeldahl Nitrogen	0.578	0.040	0.20	mg/L	0.500	0.112	93	75-125			
Matrix Spike Dup (2204745-MSD1)			**Source: 22F0196-04**		Prepared & Analyzed: 06/08/22						
Total Kjeldahl Nitrogen	0.557	0.040	0.20	mg/L	0.500	0.112	89	75-125	4	25	

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: [none]	**CLS Work Order #: 22F0196**
Berkeley, CA 94705	Project Manager: Adam Cohen	COC #: Web COC

Notes and Definitions

J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
HT-1	The sample was received outside of the EPA recommended holding time.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

This is a “MDL Report”, thus if the report denotes an “ND” for a particular analyte, it should be noted that the analyte was not detected at or above the MDL.

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22F0196

CHAIN OF CUSTODY CLS ID No.; LOG

HIGHLIGHTED AREAS MUST BE FILLED OUT PRIOR TO ACCEPTANCE

REPORT TO:

NAME AND ADDRESS Adam Cohen, Stillwater
279 Cousteau Pl. Suite 400
Davis, CA 95618

PROJECT MANAGER Adam Cohen PHONE# 650-346-3284

PROJECT NAME Lee Vining WQ

SAMPLED BY APC & CWS

JOB DESCRIPTION

SITE LOCATION Lee Vining Creek

CLIENT JOB NUMBER

DESTINATION LABORATORY

☒ CLS (916) 638-7301
3249 FITZGERALD RD.
RANCHO CORDOVA, CA.
95742

☐ OTHER

PRESERVATIVES

GEOTRACKER:
EDF REPORT ☐ YES ☐ NO
GLOBAL ID:

CDPH WRITE ON EDT TRANSMISSION? ☐ YES ☐ NO
STATE SYSTEM NUMBER
IF "YES" PLEASE ENTER THE SOURCE NUMBER(S).

COMPOSITE:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	ANALYSIS REQUESTED: Total Dissolved Solids/Total Suspended Solids	Nitrate/Nitrite	Total Ammonia as N	Total Kjeldahl Nitrogen	Total Phosphorus	Orthophosphate		TURN AROUND TIME: 1 DAY	2 DAY	3 DAY	5 DAY	SPECIAL INSTRUCTIONS OR ALT. ID:
6/1	10:00	LV-1					-	-	-	-	-	-					X	
6/1	9:00	LV-2					-	-	-	-	-	-					X	
6/1	8:00	LV-7					-	-	-	-	-	-					X	
6/1	12:15	LV-11					-	-	-	-	-	-					X	

INVOICE TO:

P.O. #

QUOTE #

Email/Address

PRESERVATIVES: (1) HCL (2) HNO_3 (3) = COLD (4) = NaOH (5) = H_2SO_4 (6) = $Na_2S_2O_3$ (7) =

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
Adam Cohen	Adam Cohen, SWS	2:00 PM 6/1		

REC'D AT LAB BY: Shellie DATE / TIME: 6-3-22 10:30 CONDITIONS / COMMENTS: 20.0/22.8

SHIPPED BY: ☐ FED X ☐ UPS ☐ OTHER AIR BILL # 8166 9245 3150

White-Lab/Terms and conditions Yellow- Lab file copy/Terms and Conditions Pink- Origin/Terms and Conditions Gold-Project Mgr./Field Sampler/Terms and conditions

CALIFORNIA LABORATORY SERVICES
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September 02, 2022

CLS Work Order #: 22H1311
COC #:

Adam Cohen
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: Lee Vining WQ

Enclosed are the results of analyses for samples received by the laboratory on 08/19/22 08:00. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

Marc Foster, Ph.D.
Technical Director

CA SWRCB ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

CHAIN OF CUSTODY CLS ID No.; 22H1311 LOG

HIGHLIGHTED AREAS MUST BE FILLED OUT PRIOR TO ACCEPTANCE

REPORT TO:

NAME AND ADDRESS Adam Cohen, Stillwater
229 Cousteau Pl. #408
Davis, CA 95618

PROJECT MANAGER Adam Cohen PHONE# 650-346-3284

PROJECT NAME Lee Vining Creek

SAMPLED BY APC & CRW

JOB DESCRIPTION

SITE LOCATION

CLIENT JOB NUMBER

DESTINATION LABORATORY

☒ CLS (916) 638-7301
3249 FITZGERALD RD.
RANCHO CORDOVA, CA
95742

☐ OTHER

GEOTRACKER:
EDF REPORT ☐ YES ☐ NO
GLOBAL ID:

CDPH WRITE ON EDT TRANSMISSION? ☐ YES ☐ NO
STATE SYSTEM NUMBER
IF "YES" PLEASE ENTER THE SOURCE NUMBER(S).

COMPOSITE:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	ANALYSIS REQUESTED: Orthophosphate	Total Phosphorus	Total Kjeldahl Nitrogen	Total Ammonia as N	Nitrate/Nitrite	TDS/TSS		TURN AROUND TIME: 1 DAY	2 DAY	3 DAY	5 DAY	SPECIAL INSTRUCTIONS OR ALT. ID:
8/18/22	10:30 AM	LV-1	Aq	2			—	—	—	—	—	—					X	
8/18	9:00 AM	LV-2	Aq	2			—	—	—	—	—	—					X	
8/18	11:45 AM	LV-3	Aq	2			—	—	—	—	—	—					X	
8/18	12:15 PM	LV-4	Aq	2			—	—	—	—	—	—					X	

INVOICE TO:

P.O. #

QUOTE #

Email/Address

PRESERVATIVES: (1) HCL (2) HNO_3 (3) = COLD (4) = NaOH (5) = H_2SO_4 (6) = $Na_2S_2O_3$ (7) =

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
	Adam Cohen, Stillwater	8/18/22 1 PM		

REC'D AT LAB BY: DATE / TIME: 8/19/22 0800 CONDITIONS / COMMENTS: 2.8/4.2

SHIPPED BY: ☒ FED X ☐ UPS ☐ OTHER ______ AIR BILL #

Gold-Project Mgr./Field Sampler/Terms and conditions
Pink- Origin/Terms and Conditions
Yellow- Lab file copy/Terms and Conditions
White-Lab/Terms and conditions

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LV-1 (22H1311-01) Water	**Sampled: 08/18/22 10:30**	**Received: 08/19/22 08:00**							
Ammonia as N	ND	0.10	mg/L	1	2207173	08/23/22	08/23/22	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2207052	08/19/22	08/19/22	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2207066	08/19/22	08/19/22	SM4500-P E	
Total Dissolved Solids	ND	10	"	"	2207224	08/24/22	08/26/22	SM2540C	
Total Kjeldahl Nitrogen	**0.25**	0.20	"	"	2207218	08/24/22	08/24/22	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2207193	08/24/22	08/24/22	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2207195	08/24/22	08/25/22	SM2540D	
LV-2 (22H1311-02) Water	**Sampled: 08/18/22 09:00**	**Received: 08/19/22 08:00**							
Ammonia as N	ND	0.10	mg/L	1	2207173	08/23/22	08/23/22	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2207052	08/19/22	08/19/22	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2207066	08/19/22	08/19/22	SM4500-P E	
Total Dissolved Solids	**14**	10	"	"	2207224	08/24/22	08/26/22	SM2540C	
Total Kjeldahl Nitrogen	ND	0.20	"	"	2207218	08/24/22	08/24/22	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2207193	08/24/22	08/24/22	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2207195	08/24/22	08/25/22	SM2540D	
LV-3 (22H1311-03) Water	**Sampled: 08/18/22 11:45**	**Received: 08/19/22 08:00**							
Ammonia as N	ND	0.10	mg/L	1	2207173	08/23/22	08/23/22	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2207052	08/19/22	08/19/22	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2207066	08/19/22	08/19/22	SM4500-P E	
Total Dissolved Solids	**14**	10	"	"	2207224	08/24/22	08/26/22	SM2540C	
Total Kjeldahl Nitrogen	ND	0.20	"	"	2207218	08/24/22	08/24/22	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2207193	08/24/22	08/24/22	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2207195	08/24/22	08/25/22	SM2540D	

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: [none]
Project Manager: Adam Cohen

CLS Work Order #: 22H1311
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LV-4 (22H1311-04) Water Sampled: 08/18/22 12:15 Received: 08/19/22 08:00									
Ammonia as N	ND	0.10	mg/L	1	2207173	08/23/22	08/23/22	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2207052	08/19/22	08/19/22	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2207066	08/19/22	08/19/22	SM4500-P E	
Total Dissolved Solids	**15**	10	"	"	2207224	08/24/22	08/26/22	SM2540C	
Total Kjeldahl Nitrogen	ND	0.20	"	"	2207218	08/24/22	08/24/22	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2207193	08/24/22	08/24/22	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2207195	08/24/22	08/25/22	SM2540D	

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: [none]	**CLS Work Order #: 22H1311**
Berkeley, CA 94705	Project Manager: Adam Cohen	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2207052 - General Preparation										
Blank (2207052-BLK1)				Prepared & Analyzed: 08/19/22						
Nitrate/Nitrite as N	ND	0.40	mg/L							
LCS (2207052-BS1)				Prepared & Analyzed: 08/19/22						
Nitrate/Nitrite as N	4.28	0.40	mg/L	4.00		107	80-120			
LCS Dup (2207052-BSD1)				Prepared & Analyzed: 08/19/22						
Nitrate/Nitrite as N	4.13	0.40	mg/L	4.00		103	80-120	4	20	
Matrix Spike (2207052-MS1)	**Source: 22H1311-01**			Prepared & Analyzed: 08/19/22						
Nitrate/Nitrite as N	4.00	0.40	mg/L	4.00	ND	100	80-120			
Matrix Spike Dup (2207052-MSD1)	**Source: 22H1311-01**			Prepared & Analyzed: 08/19/22						
Nitrate/Nitrite as N	3.95	0.40	mg/L	4.00	ND	99	80-120	1	20	
Batch 2207066 - General Preparation										
Blank (2207066-BLK1)				Prepared & Analyzed: 08/19/22						
Orthophosphate as PO4	ND	0.15	mg/L							
LCS (2207066-BS1)				Prepared & Analyzed: 08/19/22						
Orthophosphate as PO4	0.864	0.15	mg/L	0.918		94	80-120			
LCS Dup (2207066-BSD1)				Prepared & Analyzed: 08/19/22						
Orthophosphate as PO4	0.917	0.15	mg/L	0.918		100	80-120	6	20	
Matrix Spike (2207066-MS1)	**Source: 22H1281-01**			Prepared & Analyzed: 08/19/22						
Orthophosphate as PO4	0.908	0.15	mg/L	0.918	0.00590	98	75-125			

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: [none]
Project Manager: Adam Cohen

CLS Work Order #: 22H1311
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2207066 - General Preparation										
Matrix Spike Dup (2207066-MSD1)	**Source: 22H1281-01**			Prepared & Analyzed: 08/19/22						
Orthophosphate as PO4	0.913	0.15	mg/L	0.918	0.00590	99	75-125	0.5	25	
Batch 2207173 - General Preparation										
Blank (2207173-BLK1)				Prepared & Analyzed: 08/23/22						
Ammonia as N	ND	0.10	mg/L							
LCS (2207173-BS1)				Prepared & Analyzed: 08/23/22						
Ammonia as N	0.481	0.10	mg/L	0.500		96	80-120			
LCS Dup (2207173-BSD1)				Prepared & Analyzed: 08/23/22						
Ammonia as N	0.519	0.10	mg/L	0.500		104	80-120	8	25	
Matrix Spike (2207173-MS1)	**Source: 22H1281-01**			Prepared & Analyzed: 08/23/22						
Ammonia as N	0.441	0.10	mg/L	0.500	ND	88	75-125			
Matrix Spike Dup (2207173-MSD1)	**Source: 22H1281-01**			Prepared & Analyzed: 08/23/22						
Ammonia as N	0.529	0.10	mg/L	0.500	ND	106	75-125	18	25	
Batch 2207193 - General Preparation										
Blank (2207193-BLK1)				Prepared & Analyzed: 08/24/22						
Total Phosphorus as P	ND	0.050	mg/L							
LCS (2207193-BS1)				Prepared & Analyzed: 08/24/22						
Total Phosphorus as P	0.306	0.050	mg/L	0.300		102	80-120			

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2207193 - General Preparation										
LCS Dup (2207193-BSD1)				Prepared & Analyzed: 08/24/22						
Total Phosphorus as P	0.295	0.050	mg/L	0.300		98	80-120	4	25	
Matrix Spike (2207193-MS1)		**Source: 22H1238-01**		Prepared & Analyzed: 08/24/22						
Total Phosphorus as P	0.293	0.050	mg/L	0.300	ND	98	75-125			
Matrix Spike Dup (2207193-MSD1)		**Source: 22H1238-01**		Prepared & Analyzed: 08/24/22						
Total Phosphorus as P	0.296	0.050	mg/L	0.300	ND	99	75-125	1	30	
Batch 2207195 - General Preparation										
Blank (2207195-BLK1)				Prepared: 08/24/22 Analyzed: 08/25/22						
Total Suspended Solids	ND	5.0	mg/L							
Duplicate (2207195-DUP1)		**Source: 22H1295-02**		Prepared: 08/24/22 Analyzed: 08/25/22						
Total Suspended Solids	ND	5.0	mg/L		ND				20	
Batch 2207218 - General Preparation										
Blank (2207218-BLK1)				Prepared & Analyzed: 08/24/22						
Total Kjeldahl Nitrogen	ND	0.20	mg/L							
LCS (2207218-BS1)				Prepared & Analyzed: 08/24/22						
Total Kjeldahl Nitrogen	0.523	0.20	mg/L	0.500		105	80-120			
LCS Dup (2207218-BSD1)				Prepared & Analyzed: 08/24/22						
Total Kjeldahl Nitrogen	0.565	0.20	mg/L	0.500		113	80-120	8	20	

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: [none]	**CLS Work Order #: 22H1311**
Berkeley, CA 94705	Project Manager: Adam Cohen	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2207218 - General Preparation										
Matrix Spike (2207218-MS1)	**Source: 22H1281-01**			Prepared & Analyzed: 08/24/22						
Total Kjeldahl Nitrogen	0.791	0.20	mg/L	0.500	0.261	106	75-125			
Matrix Spike Dup (2207218-MSD1)	**Source: 22H1281-01**			Prepared & Analyzed: 08/24/22						
Total Kjeldahl Nitrogen	0.839	0.20	mg/L	0.500	0.261	116	75-125	6	25	
Batch 2207224 - General Preparation										
Blank (2207224-BLK1)				Prepared: 08/24/22 Analyzed: 08/26/22						
Total Dissolved Solids	ND	10	mg/L							
Duplicate (2207224-DUP1)	**Source: 22H1281-01**			Prepared: 08/24/22 Analyzed: 08/26/22						
Total Dissolved Solids	15.0	10	mg/L		14.0			7	20	

Stillwater Sciences	Project:	Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number:	[none]	**CLS Work Order #: 22H1311**
Berkeley, CA 94705	Project Manager:	Adam Cohen	COC #:

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORNIA LABORATORY SERVICES
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September 01, 2022

CLS Work Order #: 22H1238
COC #:

Adam Cohen
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: Lee Vining WQ

Enclosed are the results of analyses for samples received by the laboratory on 08/18/22 10:00. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

Marc Foster, Ph.D.
Technical Director

CA SWRCB ELAP Accreditation/Registration number 1233

09/01/22 15:37

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: [none]	**CLS Work Order #: 22H1238**
Berkeley, CA 94705	Project Manager: Adam Cohen	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LV-12 (22H1238-01) Water Sampled: 08/17/22 09:00 Received: 08/18/22 10:00										
Ammonia as N	ND	0.025	0.10	mg/L	1	2207135	08/22/22	08/22/22	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2207035	08/18/22	08/18/22	EPA 300.0	
Orthophosphate as PO4	**0.034**	0.0051	0.15	"	"	2207034	08/18/22	08/18/22	SM4500-P E	
Total Dissolved Solids	**20**	5.0	10	"	"	2207175	08/23/22	08/25/22	SM2540C	
Total Kjeldahl Nitrogen	**0.25**	0.040	0.20	"	"	2207171	08/23/22	08/23/22	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.023	0.050	"	"	2207193	08/24/22	08/24/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2207174	08/23/22	08/23/22	SM2540D	
LV-11 (22H1238-02) Water Sampled: 08/17/22 08:00 Received: 08/18/22 10:00										
Ammonia as N	**0.033**	0.025	0.10	mg/L	1	2207135	08/22/22	08/22/22	SM4500-NH3F-2011	
Nitrate/Nitrite as N	**0.057**	0.055	0.40	"	"	2207035	08/18/22	08/18/22	EPA 300.0	
Orthophosphate as PO4	**0.0099**	0.0051	0.15	"	"	2207034	"	08/18/22	SM4500-P E	
Total Dissolved Solids	**21**	5.0	10	"	"	2207175	08/23/22	08/25/22	SM2540C	
Total Kjeldahl Nitrogen	**0.20**	0.040	0.20	"	"	2207171	08/23/22	08/23/22	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.023	0.050	"	"	2207193	08/24/22	08/24/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2207174	08/23/22	08/23/22	SM2540D	
LV-10 (22H1238-03) Water Sampled: 08/17/22 09:30 Received: 08/18/22 10:00										
Ammonia as N	**0.029**	0.025	0.10	mg/L	1	2207135	08/22/22	08/22/22	SM4500-NH3F-2011	
Nitrate/Nitrite as N	**0.24**	0.055	0.40	"	"	2207035	08/18/22	08/18/22	EPA 300.0	
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2207034	"	08/18/22	SM4500-P E	
Total Dissolved Solids	**36**	5.0	10	"	"	2207175	08/23/22	08/25/22	SM2540C	
Total Kjeldahl Nitrogen	**0.21**	0.040	0.20	"	"	2207171	08/23/22	08/23/22	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.023	0.050	"	"	2207193	08/24/22	08/24/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2207174	08/23/22	08/23/22	SM2540D	

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: [none]
Project Manager: Adam Cohen

CLS Work Order #: 22H1238
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LV-9 (22H1238-04) Water Sampled: 08/17/22 12:30 Received: 08/18/22 10:00										
Ammonia as N	**0.037**	0.025	0.10	mg/L	1	2207135	08/22/22	08/22/22	SM4500-NH3F-2011	
Nitrate/Nitrite as N	**0.072**	0.055	0.40	"	"	2207035	08/18/22	08/18/22	EPA 300.0	
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2207034	"	08/18/22	SM4500-P E	
Total Dissolved Solids	**34**	5.0	10	"	"	2207175	08/23/22	08/25/22	SM2540C	
Total Kjeldahl Nitrogen	**0.37**	0.040	0.20	"	"	2207171	08/23/22	08/23/22	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.023	0.050	"	"	2207193	08/24/22	08/24/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2207174	08/23/22	08/23/22	SM2540D	
LV-8 (22H1238-05) Water Sampled: 08/17/22 12:15 Received: 08/18/22 10:00										
Ammonia as N	**0.031**	0.025	0.10	mg/L	1	2207135	08/22/22	08/22/22	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2207035	08/18/22	08/18/22	EPA 300.0	
Orthophosphate as PO4	**0.0099**	0.0051	0.15	"	"	2207034	"	08/18/22	SM4500-P E	
Total Dissolved Solids	**18**	5.0	10	"	"	2207175	08/23/22	08/25/22	SM2540C	
Total Kjeldahl Nitrogen	**0.28**	0.040	0.20	"	"	2207171	08/23/22	08/23/22	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.023	0.050	"	"	2207193	08/24/22	08/24/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2207174	08/23/22	08/23/22	SM2540D	
LV-7 (22H1238-06) Water Sampled: 08/17/22 11:00 Received: 08/18/22 10:00										
Ammonia as N	**0.040**	0.025	0.10	mg/L	1	2207135	08/22/22	08/22/22	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2207035	08/18/22	08/18/22	EPA 300.0	
Orthophosphate as PO4	**0.026**	0.0051	0.15	"	"	2207034	"	08/18/22	SM4500-P E	
Total Dissolved Solids	**18**	5.0	10	"	"	2207175	08/23/22	08/25/22	SM2540C	
Total Kjeldahl Nitrogen	**0.37**	0.040	0.20	"	"	2207171	08/23/22	08/23/22	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.023	0.050	"	"	2207193	08/24/22	08/24/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2207174	08/23/22	08/23/22	SM2540D	

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: [none]
Project Manager: Adam Cohen

CLS Work Order #: 22H1238
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LV-6 (22H1238-07) Water	**Sampled: 08/17/22 10:15**	**Received: 08/18/22 10:00**								
Ammonia as N	**0.044**	0.025	0.10	mg/L	1	2207135	08/22/22	08/22/22	SM4500-NH3F-2011	
Nitrate/Nitrite as N	**0.057**	0.055	0.40	"	"	2207035	08/18/22	08/18/22	EPA 300.0	
Orthophosphate as PO4	**0.014**	0.0051	0.15	"	"	2207034	"	08/18/22	SM4500-P E	
Total Dissolved Solids	**25**	5.0	10	"	"	2207175	08/23/22	08/25/22	SM2540C	
Total Kjeldahl Nitrogen	**0.40**	0.040	0.20	"	"	2207171	08/23/22	08/23/22	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.023	0.050	"	"	2207193	08/24/22	08/24/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2207174	08/23/22	08/23/22	SM2540D	
LV-5 (22H1238-08) Water	**Sampled: 08/17/22 10:00**	**Received: 08/18/22 10:00**								
Ammonia as N	**0.034**	0.025	0.10	mg/L	1	2207135	08/22/22	08/22/22	SM4500-NH3F-2011	
Nitrate/Nitrite as N	**0.055**	0.055	0.40	"	"	2207035	08/18/22	08/18/22	EPA 300.0	
Orthophosphate as PO4	**0.051**	0.0051	0.15	"	"	2207034	"	08/18/22	SM4500-P E	
Total Dissolved Solids	**24**	5.0	10	"	"	2207175	08/23/22	08/25/22	SM2540C	
Total Kjeldahl Nitrogen	**0.46**	0.040	0.20	"	"	2207171	08/23/22	08/23/22	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.023	0.050	"	"	2207193	08/24/22	08/24/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2207174	08/23/22	08/23/22	SM2540D	

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: [none]
Project Manager: Adam Cohen

CLS Work Order #: 22H1238
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2207034 - General Preparation											
Blank (2207034-BLK1)					Prepared & Analyzed: 08/18/22						
Orthophosphate as PO4	ND	0.0051	0.15	mg/L							
LCS (2207034-BS1)					Prepared & Analyzed: 08/18/22						
Orthophosphate as PO4	0.917	0.0051	0.15	mg/L	0.918		100	80-120			
LCS Dup (2207034-BSD1)					Prepared & Analyzed: 08/18/22						
Orthophosphate as PO4	0.904	0.0051	0.15	mg/L	0.918		98	80-120	1	20	
Matrix Spike (2207034-MS1)			**Source: 22H1193-01**		Prepared & Analyzed: 08/18/22						
Orthophosphate as PO4	1.04	0.0051	0.15	mg/L	0.918	0.0180	111	75-125			
Matrix Spike Dup (2207034-MSD1)			**Source: 22H1193-01**		Prepared & Analyzed: 08/18/22						
Orthophosphate as PO4	1.06	0.0051	0.15	mg/L	0.918	0.0180	113	75-125	2	25	
Batch 2207035 - General Prep											
Blank (2207035-BLK1)					Prepared & Analyzed: 08/18/22						
Nitrate/Nitrite as N	ND	0.055	0.40	mg/L							
LCS (2207035-BS1)					Prepared & Analyzed: 08/18/22						
Nitrate/Nitrite as N	4.23	0.055	0.40	mg/L	4.00		106	80-120			
LCS Dup (2207035-BSD1)					Prepared & Analyzed: 08/18/22						
Nitrate/Nitrite as N	4.06	0.055	0.40	mg/L	4.00		101	80-120	4	20	
Matrix Spike (2207035-MS1)			**Source: 22H1238-01**		Prepared & Analyzed: 08/18/22						
Nitrate/Nitrite as N	4.10	0.055	0.40	mg/L	4.00	ND	103	80-120			

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: [none]
Project Manager: Adam Cohen

CLS Work Order #: 22H1238
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2207035 - General Prep											
Matrix Spike Dup (2207035-MSD1)			**Source: 22H1238-01**		Prepared & Analyzed: 08/18/22						
Nitrate/Nitrite as N	4.13	0.055	0.40	mg/L	4.00	ND	103	80-120	0.7	20	
Batch 2207135 - General Preparation											
Blank (2207135-BLK1)					Prepared & Analyzed: 08/22/22						
Ammonia as N	ND	0.025	0.10	mg/L							
LCS (2207135-BS1)					Prepared & Analyzed: 08/22/22						
Ammonia as N	0.438	0.025	0.10	mg/L	0.500		88	80-120			
LCS Dup (2207135-BSD1)					Prepared & Analyzed: 08/22/22						
Ammonia as N	0.455	0.025	0.10	mg/L	0.500		91	80-120	4	25	
Matrix Spike (2207135-MS1)			**Source: 22H1293-03**		Prepared & Analyzed: 08/22/22						
Ammonia as N	0.583	0.025	0.10	mg/L	0.500	0.146	87	75-125			
Matrix Spike Dup (2207135-MSD1)			**Source: 22H1293-03**		Prepared & Analyzed: 08/22/22						
Ammonia as N	0.609	0.025	0.10	mg/L	0.500	0.146	93	75-125	4	25	
Batch 2207171 - General Preparation											
Blank (2207171-BLK1)					Prepared & Analyzed: 08/23/22						
Total Kjeldahl Nitrogen	ND	0.040	0.20	mg/L							
LCS (2207171-BS1)					Prepared & Analyzed: 08/23/22						
Total Kjeldahl Nitrogen	0.496	0.040	0.20	mg/L	0.500		99	80-120			

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2207171 - General Preparation											
LCS Dup (2207171-BSD1)					Prepared & Analyzed: 08/23/22						
Total Kjeldahl Nitrogen	0.529	0.040	0.20	mg/L	0.500		106	80-120	6	20	
Matrix Spike (2207171-MS1)			**Source: 22H1193-01**		Prepared & Analyzed: 08/23/22						
Total Kjeldahl Nitrogen	0.885	0.040	0.20	mg/L	0.500	0.265	124	75-125			
Matrix Spike Dup (2207171-MSD1)			**Source: 22H1193-01**		Prepared & Analyzed: 08/23/22						
Total Kjeldahl Nitrogen	0.914	0.040	0.20	mg/L	0.500	0.265	130	75-125	3	25	QM-7
Batch 2207174 - General Preparation											
Blank (2207174-BLK1)					Prepared & Analyzed: 08/23/22						
Total Suspended Solids	ND	2.0	5.0	mg/L							
Duplicate (2207174-DUP1)			**Source: 22H1238-01**		Prepared & Analyzed: 08/23/22						
Total Suspended Solids	ND	2.0	5.0	mg/L		ND				20	
Batch 2207175 - General Preparation											
Blank (2207175-BLK1)					Prepared: 08/23/22 Analyzed: 08/25/22						
Total Dissolved Solids	ND	5.0	10	mg/L							
Duplicate (2207175-DUP1)			**Source: 22H1238-01**		Prepared: 08/23/22 Analyzed: 08/25/22						
Total Dissolved Solids	22.0	5.0	10	mg/L		20.0			10	20	
Batch 2207193 - General Preparation											
Blank (2207193-BLK1)					Prepared & Analyzed: 08/24/22						
Total Phosphorus as P	ND	0.023	0.050	mg/L							

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2207193 - General Preparation											
LCS (2207193-BS1)					Prepared & Analyzed: 08/24/22						
Total Phosphorus as P	0.306	0.023	0.050	mg/L	0.300		102	80-120			
LCS Dup (2207193-BSD1)					Prepared & Analyzed: 08/24/22						
Total Phosphorus as P	0.295	0.023	0.050	mg/L	0.300		98	80-120	4	25	
Matrix Spike (2207193-MS1)			**Source: 22H1238-01**		Prepared & Analyzed: 08/24/22						
Total Phosphorus as P	0.293	0.023	0.050	mg/L	0.300	ND	98	75-125			
Matrix Spike Dup (2207193-MSD1)			**Source: 22H1238-01**		Prepared & Analyzed: 08/24/22						
Total Phosphorus as P	0.296	0.023	0.050	mg/L	0.300	ND	99	75-125	1	30	

Notes and Definitions

QM-7	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS and/or LCSD recovery.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

This is a “MDL Report”, thus if the report denotes an “ND” for a particular analyte, it should be noted that the analyte was not detected at or above the MDL.

CALIFORNIA LABORATORY SERVICES

CHAIN OF CUSTODY

CLS ID No.: 22H1238 **LOG**

HIGHLIGHTED AREAS MUST BE FILLED OUT PRIOR TO ACCEPTANCE

REPORT TO:

NAME AND ADDRESS: Adam Cohen, Stillwater
279 Cousteau Pl. #900
Davis, CA 95618

PROJECT MANAGER: PHONE#:

PROJECT NAME: Lee Vining WQ

SAMPLED BY: APC & CRW

JOB DESCRIPTION:

SITE LOCATION:

CLIENT JOB NUMBER:

DESTINATION LABORATORY:
☒ CLS (916) 638-7301
3249 FITZGERALD RD.
RANCHO CORDOVA, CA
95742
☐ OTHER

PRESERVATIVES

ANALYSIS REQUESTED: TDS / TSS; Nitrate / Nitrite; Total Ammonia as N; Total Kjeldahl Nitrogen; Total Phosphorous; Orthophosphate

GEOTRACKER:
EDF REPORT ☐ YES ☐ NO
GLOBAL ID:

CDPH WRITE ON EDT TRANSMISSION? ☐ YES ☐ NO
STATE SYSTEM NUMBER
IF "YES" PLEASE ENTER THE SOURCE NUMBER(S).

COMPOSITE:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	TDS / TSS	Nitrate / Nitrite	Total Ammonia as N	Total Kjeldahl Nitrogen	Total Phosphorous	Orthophosphate	1 DAY	2 DAY	3 DAY	5 DAY	SPECIAL INSTRUCTIONS
8/17/22	9:00	LV-12	Aq													X	OR
8/18/22	8:00	LV-11														X	ALT. ID:
8/17/22	9:30	LV-10														X	
8/17/22	12:30	LV-9														X	
8/17/22	12:15	LV-8														X	
8/17/22	11:00	LV-7														X	
8/17/22	10:15	LV-6														X	
8/17/22	10:00	LV-5														X	

INVOICE TO:

P.O. #

QUOTE #

PRESERVATIVES: (1) HCL (2) HNO_3 (3) = COLD (4) = NaOH (5) = H_2SO_4 (6) = $Na_2S_2O_3$ (7) -

Email/Address

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
	Adam Cohen, Stillwater	1:00 PM 8/17		

REC'D AT LAB BY: DATE / TIME: 8/18/22 1000 CONDITIONS / COMMENTS: 2.9/4.3

SHIPPED BY: ☒ FED X ☐ UPS ☐ OTHER ________ AIR BILL #

White-Lab/Terms and conditions
Yellow- Lab file copy/Terms and Conditions
Pink- Origin/Terms and Conditions
Gold-Project Mgr./Field Sampler/Terms and conditions

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

October 12, 2022 **CLS Work Order #: 22J0189**

COC #:

Heather Neff
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: Lee Vining WQ

Enclosed are the results of analyses for samples received by the laboratory on 10/05/22 09:35. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

Marc Foster

Marc Foster, Ph.D.
Technical Director

CA SWRCB ELAP Accreditation/Registration number 1233

10/12/22 14:37

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0711.00
Project Manager: Heather Neff

CLS Work Order #: 22J0189
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LV-1 (22J0189-01) Water Sampled: 10/04/22 10:32 Received: 10/05/22 09:35										
Ammonia as N	**0.073**	0.025	0.10	mg/L	1	2208544	10/06/22	10/06/22	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2208495	10/05/22	10/05/22	EPA 300.0	
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2208498	10/05/22	10/05/22	SM4500-P E	
Total Dissolved Solids	**16**	5.0	10	"	"	2208550	10/06/22	10/11/22	SM2540C	
Total Kjeldahl Nitrogen	**0.19**	0.040	0.20	"	"	2208571	10/07/22	10/07/22	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2208582	10/07/22	10/07/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2208542	10/06/22	10/11/22	SM2540D	
LV-2 (22J0189-02) Water Sampled: 10/04/22 09:38 Received: 10/05/22 09:35										
Ammonia as N	**0.043**	0.025	0.10	mg/L	1	2208544	10/06/22	10/06/22	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2208495	10/05/22	10/05/22	EPA 300.0	
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2208498	10/05/22	10/05/22	SM4500-P E	
Total Dissolved Solids	**14**	5.0	10	"	"	2208550	10/06/22	10/11/22	SM2540C	
Total Kjeldahl Nitrogen	**0.34**	0.040	0.20	"	"	2208571	10/07/22	10/07/22	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.023	0.050	"	"	2208582	10/07/22	10/07/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2208542	10/06/22	10/11/22	SM2540D	
LV-3 (22J0189-03) Water Sampled: 10/04/22 11:50 Received: 10/05/22 09:35										
Ammonia as N	ND	0.025	0.10	mg/L	1	2208544	10/06/22	10/06/22	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2208495	10/05/22	10/05/22	EPA 300.0	
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2208498	10/05/22	10/05/22	SM4500-P E	
Total Dissolved Solids	**20**	5.0	10	"	"	2208550	10/06/22	10/11/22	SM2540C	
Total Kjeldahl Nitrogen	**0.28**	0.040	0.20	"	"	2208571	10/07/22	10/07/22	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.023	0.050	"	"	2208582	10/07/22	10/07/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2208542	10/06/22	10/11/22	SM2540D	

10/12/22 14:37

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: 856.01 Task 0711.00	**CLS Work Order #: 22J0189**
Berkeley, CA 94705	Project Manager: Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LV-4 (22J0189-04) Water Sampled: 10/04/22 12:08 Received: 10/05/22 09:35										
Ammonia as N	**0.032**	0.025	0.10	mg/L	1	2208544	10/06/22	10/06/22	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2208495	10/05/22	10/05/22	EPA 300.0	
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2208498	10/05/22	10/05/22	SM4500-P E	
Total Dissolved Solids	**23**	5.0	10	"	"	2208550	10/06/22	10/11/22	SM2540C	
Total Kjeldahl Nitrogen	**0.19**	0.040	0.20	"	"	2208571	10/07/22	10/07/22	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2208582	10/07/22	10/07/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2208542	10/06/22	10/11/22	SM2540D	
LV-5 (22J0189-05) Water Sampled: 10/04/22 12:25 Received: 10/05/22 09:35										
Ammonia as N	**0.026**	0.025	0.10	mg/L	1	2208544	10/06/22	10/06/22	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2208495	10/05/22	10/05/22	EPA 300.0	
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2208498	10/05/22	10/05/22	SM4500-P E	
Total Dissolved Solids	**11**	5.0	10	"	"	2208550	10/06/22	10/11/22	SM2540C	
Total Kjeldahl Nitrogen	**0.34**	0.040	0.20	"	"	2208571	10/07/22	10/07/22	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.023	0.050	"	"	2208582	10/07/22	10/07/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2208542	10/06/22	10/11/22	SM2540D	
LV-2DEPTH (22J0189-06) Depth Sampled: 10/04/22 09:42 Received: 10/05/22 09:35										
Ammonia as N	**0.033**	0.025	0.10	mg/L	1	2208544	10/06/22	10/06/22	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2208495	10/05/22	10/05/22	EPA 300.0	
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2208498	10/05/22	10/05/22	SM4500-P E	
Total Dissolved Solids	**29**	5.0	10	"	"	2208550	10/06/22	10/11/22	SM2540C	
Total Kjeldahl Nitrogen	**0.17**	0.040	0.20	"	"	2208571	10/07/22	10/07/22	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2208582	10/07/22	10/07/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2208542	10/06/22	10/11/22	SM2540D	

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0711.00
Project Manager: Heather Neff

CLS Work Order #: 22J0189
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2208495 - General Preparation											
Blank (2208495-BLK1)					Prepared & Analyzed: 10/05/22						
Nitrate/Nitrite as N	ND	0.055	0.40	mg/L							
LCS (2208495-BS1)					Prepared & Analyzed: 10/05/22						
Nitrate/Nitrite as N	4.24	0.055	0.40	mg/L	4.00		106	80-120			
LCS Dup (2208495-BSD1)					Prepared & Analyzed: 10/05/22						
Nitrate/Nitrite as N	4.44	0.055	0.40	mg/L	4.00		111	80-120	5	20	
Matrix Spike (2208495-MS1)			**Source: 22J0189-01**		Prepared & Analyzed: 10/05/22						
Nitrate/Nitrite as N	4.24	0.055	0.40	mg/L	4.00	ND	106	80-120			
Matrix Spike Dup (2208495-MSD1)			**Source: 22J0189-01**		Prepared & Analyzed: 10/05/22						
Nitrate/Nitrite as N	4.29	0.055	0.40	mg/L	4.00	ND	107	80-120	1	20	
Batch 2208498 - General Prep											
Blank (2208498-BLK1)					Prepared & Analyzed: 10/05/22						
Orthophosphate as PO4	ND	0.0051	0.15	mg/L							
LCS (2208498-BS1)					Prepared & Analyzed: 10/05/22						
Orthophosphate as PO4	0.916	0.0051	0.15	mg/L	0.918		100	80-120			
LCS Dup (2208498-BSD1)					Prepared & Analyzed: 10/05/22						
Orthophosphate as PO4	0.904	0.0051	0.15	mg/L	0.918		98	80-120	1	20	
Matrix Spike (2208498-MS1)			**Source: 22J0189-01**		Prepared & Analyzed: 10/05/22						
Orthophosphate as PO4	0.850	0.0051	0.15	mg/L	0.918	ND	93	75-125			

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0711.00
Project Manager: Heather Neff

CLS Work Order #: 22J0189
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2208498 - General Prep											
Matrix Spike Dup (2208498-MSD1)			**Source: 22J0189-01**		Prepared & Analyzed: 10/05/22						
Orthophosphate as PO4	0.875	0.0051	0.15	mg/L	0.918	ND	95	75-125	3	25	
Batch 2208542 - General Preparation											
Duplicate (2208542-DUP1)			**Source: 22J0150-02**		Prepared: 10/06/22 Analyzed: 10/11/22						
Total Suspended Solids	ND	2.0	5.0	mg/L		ND				20	
Batch 2208544 - General Preparation											
Blank (2208544-BLK1)					Prepared & Analyzed: 10/06/22						
Ammonia as N	ND	0.025	0.10	mg/L							
LCS (2208544-BS1)					Prepared & Analyzed: 10/06/22						
Ammonia as N	0.492	0.025	0.10	mg/L	0.500		98	80-120			
LCS Dup (2208544-BSD1)					Prepared & Analyzed: 10/06/22						
Ammonia as N	0.490	0.025	0.10	mg/L	0.500		98	80-120	0.4	25	
Matrix Spike (2208544-MS1)			**Source: 22J0046-03**		Prepared & Analyzed: 10/06/22						
Ammonia as N	0.709	0.025	0.10	mg/L	0.500	0.137	114	75-125			
Matrix Spike Dup (2208544-MSD1)			**Source: 22J0046-03**		Prepared & Analyzed: 10/06/22						
Ammonia as N	0.716	0.025	0.10	mg/L	0.500	0.137	116	75-125	1	25	
Batch 2208550 - General Preparation											
Blank (2208550-BLK1)					Prepared: 10/06/22 Analyzed: 10/11/22						
Total Dissolved Solids	ND	5.0	10	mg/L							

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0711.00
Project Manager: Heather Neff

CLS Work Order #: 22J0189
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2208550 - General Preparation											
Duplicate (2208550-DUP1)			**Source: 22J0150-03**		Prepared: 10/06/22 Analyzed: 10/11/22						
Total Dissolved Solids	461	5.0	10	mg/L		455			1	20	
Batch 2208571 - General Preparation											
Blank (2208571-BLK1)					Prepared & Analyzed: 10/07/22						
Total Kjeldahl Nitrogen	ND	0.040	0.20	mg/L							
LCS (2208571-BS1)					Prepared & Analyzed: 10/07/22						
Total Kjeldahl Nitrogen	0.583	0.040	0.20	mg/L	0.500		117	80-120			
LCS Dup (2208571-BSD1)					Prepared & Analyzed: 10/07/22						
Total Kjeldahl Nitrogen	0.585	0.040	0.20	mg/L	0.500		117	80-120	0.3	20	
Matrix Spike (2208571-MS1)			**Source: 22J0189-01**		Prepared & Analyzed: 10/07/22						
Total Kjeldahl Nitrogen	0.817	0.040	0.20	mg/L	0.500	0.188	126	75-125			QM-7
Matrix Spike Dup (2208571-MSD1)			**Source: 22J0189-01**		Prepared & Analyzed: 10/07/22						
Total Kjeldahl Nitrogen	0.812	0.040	0.20	mg/L	0.500	0.188	125	75-125	0.6	25	
Batch 2208582 - General Preparation											
Blank (2208582-BLK1)					Prepared & Analyzed: 10/07/22						
Total Phosphorus as P	ND	0.023	0.050	mg/L							
LCS (2208582-BS1)					Prepared & Analyzed: 10/07/22						
Total Phosphorus as P	0.322	0.023	0.050	mg/L	0.300		107	80-120			

10/12/22 14:37

Stillwater Sciences	Project:	Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number:	856.01 Task 0711.00	**CLS Work Order #: 22J0189**
Berkeley, CA 94705	Project Manager:	Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2208582 - General Preparation											
LCS Dup (2208582-BSD1)					Prepared & Analyzed: 10/07/22						
Total Phosphorus as P	0.324	0.023	0.050	mg/L	0.300		108	80-120	0.5	25	
Matrix Spike (2208582-MS1)			**Source: 22I1578-01**		Prepared & Analyzed: 10/07/22						
Total Phosphorus as P	0.306	0.023	0.050	mg/L	0.300	ND	102	75-125			
Matrix Spike Dup (2208582-MSD1)			**Source: 22I1578-01**		Prepared & Analyzed: 10/07/22						
Total Phosphorus as P	0.308	0.023	0.050	mg/L	0.300	ND	103	75-125	0.5	30	

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: 856.01 Task 0711.00	**CLS Work Order #: 22J0189**
Berkeley, CA 94705	Project Manager: Heather Neff	COC #:

Notes and Definitions

QM-7	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS and/or LCSD recovery.
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

This is a "MDL Report", thus if the report denotes an "ND" for a particular analyte, it should be noted that the analyte was not detected at or above the MDL.

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY

CLS ID. NO. 22J0189 (1 of 1)

Report To:

Stillwater Sciences
279 Cousteau Place Suite 400
Davis, CA 95618

Project Manager: Heather Neff heather@stillwatersci.com

Project Name: Lee Vining WQ

Sampled By: AXK, BRL

Job Description: Monitor water chemistry in project reaches.

Site Location: Lee Vining Hydroelectric Project

Client Job Number: 856.01 Task 0711.00

Destination Laboratory: Rancho Cordova

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA
95742
www.californialab.com

☐ **OTHER**

GEOTRACKER

EDF REPORT: YES ☒ ☐ NO

GLOBAL ID:

FIELD CONDITIONS: SUNNY, CLEAR

ANALYSIS REQUESTED: Orthophosphate; Total phosphorous; Total Kjeldahl Nitrogen; Total Ammonia as N; Nitrate/Nitrite; TDS/TSS

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
10/4/22	10:32	LV-1		Surface water	3		6				X	
10/4/22	0938	LV-2		Surface water	3		6				X	
10/4/22	11:50	LV-3		Surface water	3		6				X	
10/4/22	12:08	LV-4		Surface water	3		6				X	
10/4/22	12:25	LV-5		Surface water	3		6				X	
10/4/22	09:42	LV-2DEPTH		~~Surface water~~ DEPTH	3		6				X	
				Surface water			6				X	INVOICE TO:
				Surface water			6				X	Stillwater Sciences
				Surface water			6				X	Same as above
				Surface water			6				X	**Project No. 856.01 Task 0711.00**
				Surface water			6				X	
				Surface water			6				X	QUOTE#

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO₃ (3) = COLD (4)= H2SO4 (5) NH₃/NH₄ (6) NAOH

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	AVI KERTESZ/STILLWATER SCI	10/4/22		

RECEIVED AT LAB BY: OB **DATE/TIME:** 10/5/22 935 **CONDITIONS/COMMENTS:** 9.9/11.3

SHIPPED BY: ☒ FED EX ☐ UPS ☐ OTHER **AIR BILL #** 8171 1914 7937

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

October 13, 2022

CLS Work Order #: 22J0322
COC #:

Heather Neff
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: Lee Vining WQ

Enclosed are the results of analyses for samples received by the laboratory on 10/06/22 10:15. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

Marc Foster, Ph.D.
Technical Director

CA SWRCB ELAP Accreditation/Registration number 1233

10/13/22 15:41

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: 856.01 Task 0711.00	**CLS Work Order #: 22J0322**
Berkeley, CA 94705	Project Manager: Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LV-8 (22J0322-01) Water Sampled: 10/05/22 13:15 Received: 10/06/22 10:15										
Ammonia as N	**0.044**	0.025	0.10	mg/L	1	2208602	10/07/22	10/07/22	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2208551	10/06/22	10/06/22	EPA 300.0	
Orthophosphate as PO4	**0.027**	0.0051	0.15	"	"	2208525	10/06/22	10/06/22	SM4500-P E	J
Total Dissolved Solids	**38**	5.0	10	"	"	2208634	10/10/22	10/12/22	SM2540C	
Total Kjeldahl Nitrogen	**0.33**	0.040	0.20	"	"	2208665	10/11/22	10/11/22	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.023	0.050	"	"	2208670	10/11/22	10/11/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2208633	10/10/22	10/12/22	SM2540D	
LV-9 (22J0322-02) Water Sampled: 10/05/22 13:27 Received: 10/06/22 10:15										
Ammonia as N	**0.037**	0.025	0.10	mg/L	1	2208602	10/07/22	10/07/22	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2208551	10/06/22	10/06/22	EPA 300.0	
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2208525	10/06/22	10/06/22	SM4500-P E	
Total Dissolved Solids	**44**	5.0	10	"	"	2208634	10/10/22	10/12/22	SM2540C	
Total Kjeldahl Nitrogen	**0.27**	0.040	0.20	"	"	2208665	10/11/22	10/11/22	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.023	0.050	"	"	2208670	10/11/22	10/11/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2208633	10/10/22	10/12/22	SM2540D	
LV-6 (22J0322-03) Water Sampled: 10/05/22 10:35 Received: 10/06/22 10:15										
Ammonia as N	**0.042**	0.025	0.10	mg/L	1	2208602	10/07/22	10/07/22	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2208551	10/06/22	10/06/22	EPA 300.0	
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2208525	10/06/22	10/06/22	SM4500-P E	
Total Dissolved Solids	**26**	5.0	10	"	"	2208634	10/10/22	10/12/22	SM2540C	
Total Kjeldahl Nitrogen	**0.29**	0.040	0.20	"	"	2208665	10/11/22	10/11/22	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.023	0.050	"	"	2208670	10/11/22	10/11/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2208633	10/10/22	10/12/22	SM2540D	

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0711.00
Project Manager: Heather Neff

CLS Work Order #: 22J0322
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

LV-7 (22J0322-04) Water Sampled: 10/05/22 11:52 Received: 10/06/22 10:15

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Ammonia as N	**0.036**	0.025	0.10	mg/L	1	2208602	10/07/22	10/07/22	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2208551	10/06/22	10/06/22	EPA 300.0	
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2208525	10/06/22	10/06/22	SM4500-P E	
Total Dissolved Solids	**25**	5.0	10	"	"	2208634	10/10/22	10/12/22	SM2540C	
Total Kjeldahl Nitrogen	**0.32**	0.040	0.20	"	"	2208665	10/11/22	10/11/22	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.023	0.050	"	"	2208670	10/11/22	10/11/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2208633	10/10/22	10/12/22	SM2540D	

LV-10 (22J0322-05) Water Sampled: 10/05/22 09:55 Received: 10/06/22 10:15

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Ammonia as N	ND	0.025	0.10	mg/L	1	2208602	10/07/22	10/07/22	SM4500-NH3F-2011	
Nitrate/Nitrite as N	**0.24**	0.055	0.40	"	"	2208551	10/06/22	10/06/22	EPA 300.0	J
Orthophosphate as PO4	**0.015**	0.0051	0.15	"	"	2208525	10/06/22	10/06/22	SM4500-P E	J
Total Dissolved Solids	**43**	5.0	10	"	"	2208634	10/10/22	10/12/22	SM2540C	
Total Kjeldahl Nitrogen	**0.25**	0.040	0.20	"	"	2208665	10/11/22	10/11/22	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.023	0.050	"	"	2208670	10/11/22	10/11/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2208633	10/10/22	10/12/22	SM2540D	

LV-11 (22J0322-06) Depth Sampled: 10/05/22 09:23 Received: 10/06/22 10:15

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Ammonia as N	**0.047**	0.025	0.10	mg/L	1	2208602	10/07/22	10/07/22	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2208551	10/06/22	10/06/22	EPA 300.0	
Orthophosphate as PO4	**0.035**	0.0051	0.15	"	"	2208525	10/06/22	10/06/22	SM4500-P E	J
Total Dissolved Solids	**34**	5.0	10	"	"	2208634	10/10/22	10/12/22	SM2540C	
Total Kjeldahl Nitrogen	**0.29**	0.040	0.20	"	"	2208665	10/11/22	10/11/22	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.023	0.050	"	"	2208670	10/11/22	10/11/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2208633	10/10/22	10/12/22	SM2540D	

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0711.00
Project Manager: Heather Neff

CLS Work Order #: 22J0322
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

LV-12 (22J0322-07) Depth Sampled: 10/05/22 10:42 Received: 10/06/22 10:15

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Ammonia as N	**0.026**	0.025	0.10	mg/L	1	2208602	10/07/22	10/07/22	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2208551	10/06/22	10/06/22	EPA 300.0	
Orthophosphate as PO4	**0.011**	0.0051	0.15	"	"	2208525	10/06/22	10/06/22	SM4500-P E	J
Total Dissolved Solids	**35**	5.0	10	"	"	2208634	10/10/22	10/12/22	SM2540C	
Total Kjeldahl Nitrogen	**0.32**	0.040	0.20	"	"	2208665	10/11/22	10/11/22	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.023	0.050	"	"	2208670	10/11/22	10/11/22	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2208633	10/10/22	10/12/22	SM2540D	

LV-11DEPTH (22J0322-08) Depth Sampled: 10/05/22 09:51 Received: 10/06/22 10:15

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Ammonia as N	**0.089**	0.025	0.10	mg/L	1	2208602	10/07/22	10/07/22	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2208551	10/06/22	10/06/22	EPA 300.0	
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2208525	10/06/22	10/06/22	SM4500-P E	
Total Dissolved Solids	**39**	5.0	10	"	"	2208634	10/10/22	10/12/22	SM2540C	
Total Kjeldahl Nitrogen	**0.18**	0.040	0.20	"	"	2208665	10/11/22	10/11/22	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2208670	10/11/22	10/11/22	SM4500-P E	
Total Suspended Solids	**2.0**	2.0	5.0	"	"	2208633	10/10/22	10/12/22	SM2540D	J

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2208525 - General Preparation											
Blank (2208525-BLK1)					Prepared & Analyzed: 10/06/22						
Orthophosphate as PO4	ND	0.0051	0.15	mg/L							
LCS (2208525-BS1)					Prepared & Analyzed: 10/06/22						
Orthophosphate as PO4	0.904	0.0051	0.15	mg/L	0.918		98	80-120			
LCS Dup (2208525-BSD1)					Prepared & Analyzed: 10/06/22						
Orthophosphate as PO4	0.998	0.0051	0.15	mg/L	0.918		109	80-120	10	20	
Matrix Spike (2208525-MS1)			**Source: 22J0222-01**		Prepared & Analyzed: 10/06/22						
Orthophosphate as PO4	1.92	0.0051	0.15	mg/L	0.918	0.916	109	75-125			
Matrix Spike Dup (2208525-MSD1)			**Source: 22J0222-01**		Prepared & Analyzed: 10/06/22						
Orthophosphate as PO4	1.89	0.0051	0.15	mg/L	0.918	0.916	106	75-125	2	25	
Batch 2208551 - General Prep											
Blank (2208551-BLK1)					Prepared & Analyzed: 10/06/22						
Nitrate/Nitrite as N	ND	0.055	0.40	mg/L							
LCS (2208551-BS1)					Prepared & Analyzed: 10/06/22						
Nitrate/Nitrite as N	4.25	0.055	0.40	mg/L	4.00		106	80-120			
LCS Dup (2208551-BSD1)					Prepared & Analyzed: 10/06/22						
Nitrate/Nitrite as N	4.27	0.055	0.40	mg/L	4.00		107	80-120	0.4	20	
Matrix Spike (2208551-MS1)			**Source: 22J0322-01**		Prepared & Analyzed: 10/06/22						
Nitrate/Nitrite as N	4.27	0.055	0.40	mg/L	4.00	ND	107	80-120			

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2208551 - General Prep											
Matrix Spike Dup (2208551-MSD1)			**Source: 22J0322-01**		Prepared & Analyzed: 10/06/22						
Nitrate/Nitrite as N	4.25	0.055	0.40	mg/L	4.00	ND	106	80-120	0.4	20	
Batch 2208602 - General Preparation											
Blank (2208602-BLK1)					Prepared & Analyzed: 10/07/22						
Ammonia as N	ND	0.025	0.10	mg/L							
LCS (2208602-BS1)					Prepared & Analyzed: 10/07/22						
Ammonia as N	0.530	0.025	0.10	mg/L	0.500		106	80-120			
LCS Dup (2208602-BSD1)					Prepared & Analyzed: 10/07/22						
Ammonia as N	0.518	0.025	0.10	mg/L	0.500		104	80-120	2	25	
Matrix Spike (2208602-MS1)			**Source: 22J0256-01**		Prepared & Analyzed: 10/07/22						
Ammonia as N	0.486	0.025	0.10	mg/L	0.500	0.0410	89	75-125			
Matrix Spike Dup (2208602-MSD1)			**Source: 22J0256-01**		Prepared & Analyzed: 10/07/22						
Ammonia as N	0.485	0.025	0.10	mg/L	0.500	0.0410	89	75-125	0.2	25	
Batch 2208633 - General Preparation											
Duplicate (2208633-DUP1)			**Source: 22J0322-01**		Prepared: 10/10/22 Analyzed: 10/12/22						
Total Suspended Solids	ND	2.0	5.0	mg/L		ND				20	
Batch 2208634 - General Preparation											
Blank (2208634-BLK1)					Prepared: 10/10/22 Analyzed: 10/12/22						
Total Dissolved Solids	ND	5.0	10	mg/L							

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: 856.01 Task 0711.00	**CLS Work Order #: 22J0322**
Berkeley, CA 94705	Project Manager: Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2208634 - General Preparation											
Duplicate (2208634-DUP1)			**Source: 22J0421-01**		Prepared: 10/10/22 Analyzed: 10/12/22						
Total Dissolved Solids	640	5.0	10	mg/L		ND				20	
Batch 2208665 - General Preparation											
Blank (2208665-BLK1)					Prepared & Analyzed: 10/11/22						
Total Kjeldahl Nitrogen	ND	0.040	0.20	mg/L							
LCS (2208665-BS1)					Prepared & Analyzed: 10/11/22						
Total Kjeldahl Nitrogen	0.444	0.040	0.20	mg/L	0.500		89	80-120			
LCS Dup (2208665-BSD1)					Prepared & Analyzed: 10/11/22						
Total Kjeldahl Nitrogen	0.418	0.040	0.20	mg/L	0.500		84	80-120	6	20	
Matrix Spike (2208665-MS1)			**Source: 22J0322-03**		Prepared & Analyzed: 10/11/22						
Total Kjeldahl Nitrogen	0.922	0.040	0.20	mg/L	0.500	0.288	127	75-125			QM-7
Matrix Spike Dup (2208665-MSD1)			**Source: 22J0322-03**		Prepared & Analyzed: 10/11/22						
Total Kjeldahl Nitrogen	0.936	0.040	0.20	mg/L	0.500	0.288	130	75-125	2	25	QM-7
Batch 2208670 - General Preparation											
Blank (2208670-BLK1)					Prepared & Analyzed: 10/11/22						
Total Phosphorus as P	ND	0.023	0.050	mg/L							
LCS (2208670-BS1)					Prepared & Analyzed: 10/11/22						
Total Phosphorus as P	0.313	0.023	0.050	mg/L	0.300		104	80-120			

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2208670 - General Preparation											
LCS Dup (2208670-BSD1)					Prepared & Analyzed: 10/11/22						
Total Phosphorus as P	0.313	0.023	0.050	mg/L	0.300		104	80-120	0	25	
Matrix Spike (2208670-MS1)			**Source: 22J0322-01**		Prepared & Analyzed: 10/11/22						
Total Phosphorus as P	0.319	0.023	0.050	mg/L	0.300	ND	106	75-125			
Matrix Spike Dup (2208670-MSD1)			**Source: 22J0322-01**		Prepared & Analyzed: 10/11/22						
Total Phosphorus as P	0.322	0.023	0.050	mg/L	0.300	ND	107	75-125	0.9	30	

Notes and Definitions

QM-7	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS and/or LCSD recovery.
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

This is a "MDL Report", thus if the report denotes an "ND" for a particular analyte, it should be noted that the analyte was not detected at or above the MDL.

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY CLS ID. NO. 22J0322 (1 of 1)

Report To:

Stillwater Sciences
279 Cousteau Place Suite 400
Davis, CA 95618

Project Manager
Heather Neff heather@stillwatersci.com

Project Name
Lee Vining WQ

Sampled By
AXK, BRL

Job Description
Monitor water chemistry in project reaches.

Site Location Lee Vining Hydroelectric Project

Client Job Number
856.01 Task 0711.00

Destination Laboratory
Rancho Cordova

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA
95742
www.californialab.com

☐ **OTHER**

ANALYSIS REQUESTED

GEOTRACKER

EDF REPORT YES ☒ ☐ NO

GLOBAL ID

FIELD CONDITIONS:
SUNNY, WARM, CLEAR

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES ▼		Orthophosphate	Total phosphorus	Total Kjeldahl Nitrogen	Total Ammonia as N	Nitrate/Nitrite	TDS/TSS	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
10/5/22	13:15	LV-8	LV-8	Surface water	3		6											X	
	13:27	LV-9	LV-9	Surface water			6											X	
	10:35	LV-6	LV-6	Surface water			6											X	
	11:52	LV-7	LV-7	Surface water			6											X	
	9:55	LV-10	LV-10	Surface water			6											X	
	9:33	LV-11	LV-11	Surface water			6											X	
	10:47	LV-12	LV-12	Surface water			6											X	INVOICE TO:
	9:51	LV-17 DEPTH INV		Surface water			6											X	Stillwater Sciences
				Surface water			6											X	Same as above
				Surface water			6											X	**Project No. 856.01**
				Surface water			6											X	**~~Task 0711.00~~**
				Surface water			6											X	QUOTE#

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO₃ (3) = COLD (4) H2SO4 (5) NH₃/NH₄ (6) NAOH

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	AVI KERTESZ / STILLWATER SCI	10/5/22		

RECEIVED AT LAB BY: **DATE/TIME:** 10/6/22 1015 **CONDITIONS/COMMENTS:** 14.9/15.8

SHIPPED BY: ☒ **FED EX** ☐ **UPS** ☐ **OTHER** **AIR BILL #** 8171 1914 7856

2023
CALIFORNIA LABORATORY SERVICES LABORATORY REPORTS

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

July 13, 2023

CLS Work Order #: 23G0160
COC #:

Heather Neff
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: Lee Vining WQ

Enclosed are the results of analyses for samples received by the laboratory on 07/06/23 09:15. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

Daniel Johnson

Daniel johnson
Technical Director

CA SWRCB ELAP Accreditation/Registration number 1233

07/13/23 15:17

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23G0160
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LV-6 (23G0160-01) Water Sampled: 07/05/23 12:00 Received: 07/06/23 09:15										
Ammonia as N	ND		0.10	mg/L	1	2305654	07/10/23	07/10/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND		0.40	"	"	2305523	07/06/23	07/06/23	EPA 300.0	
Orthophosphate as PO4	ND		0.15	"	"	2305515	07/06/23	07/06/23	SM4500-P E	
Total Dissolved Solids	**18**		10	"	"	2305567	07/07/23	07/11/23	SM2540C	
Total Kjeldahl Nitrogen	ND		0.20	"	"	2305673	07/11/23	07/12/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND		0.050	"	"	2305569	07/07/23	07/07/23	SM4500-P E	
Total Suspended Solids	ND		5.0	"	"	2305566	07/07/23	07/11/23	SM2540D	
SURFACE LV-7 (23G0160-02) Water Sampled: 07/05/23 10:55 Received: 07/06/23 09:15										
Ammonia as N	ND		0.10	mg/L	1	2305654	07/10/23	07/10/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND		0.40	"	"	2305523	07/06/23	07/06/23	EPA 300.0	
Orthophosphate as PO4	ND		0.15	"	"	2305515	07/06/23	07/06/23	SM4500-P E	
Total Dissolved Solids	**18**		10	"	"	2305567	07/07/23	07/11/23	SM2540C	
Total Kjeldahl Nitrogen	ND		0.20	"	"	2305673	07/11/23	07/12/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND		0.050	"	"	2305569	07/07/23	07/07/23	SM4500-P E	
Total Suspended Solids	ND		5.0	"	"	2305566	07/07/23	07/11/23	SM2540D	
BOTTOM LV-7 (23G0160-03) Water Sampled: 07/05/23 11:10 Received: 07/06/23 09:15										
Ammonia as N	ND		0.10	mg/L	1	2305654	07/10/23	07/10/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND		0.40	"	"	2305523	07/06/23	07/06/23	EPA 300.0	
Orthophosphate as PO4	ND		0.15	"	"	2305515	07/06/23	07/06/23	SM4500-P E	
Total Dissolved Solids	**16**		10	"	"	2305567	07/07/23	07/11/23	SM2540C	
Total Kjeldahl Nitrogen	**0.25**		0.20	"	"	2305673	07/11/23	07/12/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND		0.050	"	"	2305569	07/07/23	07/07/23	SM4500-P E	
Total Suspended Solids	ND		5.0	"	"	2305566	07/07/23	07/11/23	SM2540D	

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23G0160
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
EQUIPMENT BLANK (23G0160-04) Water Sampled: 07/05/23 11:00 Received: 07/06/23 09:15										
Ammonia as N	ND		0.10	mg/L	1	2305654	07/10/23	07/10/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND		0.40	"	"	2305523	07/06/23	07/06/23	EPA 300.0	
Orthophosphate as PO4	ND		0.15	"	"	2305515	07/06/23	07/06/23	SM4500-P E	
Total Dissolved Solids	ND		10	"	"	2305567	07/07/23	07/11/23	SM2540C	
Total Kjeldahl Nitrogen	ND		0.20	"	"	2305673	07/11/23	07/12/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND		0.050	"	"	2305569	07/07/23	07/07/23	SM4500-P E	
Total Suspended Solids	ND		5.0	"	"	2305566	07/07/23	07/11/23	SM2540D	

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2305515 - General Preparation											
Blank (2305515-BLK1)					Prepared & Analyzed: 07/06/23						
Orthophosphate as PO4	ND		0.15	mg/L							
LCS (2305515-BS1)					Prepared & Analyzed: 07/06/23						
Orthophosphate as PO4	0.862		0.15	mg/L	0.918		94	80-120			
LCS Dup (2305515-BSD1)					Prepared & Analyzed: 07/06/23						
Orthophosphate as PO4	0.953		0.15	mg/L	0.918		104	80-120	10	20	
Matrix Spike (2305515-MS1)			**Source: 23G0077-01**		Prepared & Analyzed: 07/06/23						
Orthophosphate as PO4	1.91		0.30	mg/L	0.918	0.957	103	75-125			
Matrix Spike Dup (2305515-MSD1)			**Source: 23G0077-01**		Prepared & Analyzed: 07/06/23						
Orthophosphate as PO4	1.84		0.30	mg/L	0.918	0.957	96	75-125	4	25	
Batch 2305523 - General Prep											
Blank (2305523-BLK1)					Prepared & Analyzed: 07/06/23						
Nitrate/Nitrite as N	ND		0.40	mg/L							
LCS (2305523-BS1)					Prepared & Analyzed: 07/06/23						
Nitrate/Nitrite as N	4.08		0.40	mg/L	4.00		102	80-120			
LCS Dup (2305523-BSD1)					Prepared & Analyzed: 07/06/23						
Nitrate/Nitrite as N	4.27		0.40	mg/L	4.00		107	80-120	4	20	
Matrix Spike (2305523-MS1)			**Source: 23G0160-01**		Prepared & Analyzed: 07/06/23						
Nitrate/Nitrite as N	3.75		0.40	mg/L	4.00	ND	94	80-120			

07/13/23 15:17

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: 856.01 Task 0717.00	**CLS Work Order #: 23G0160**
Berkeley, CA 94705	Project Manager: Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2305523 - General Prep											
Matrix Spike Dup (2305523-MSD1)			**Source: 23G0160-01**		Prepared & Analyzed: 07/06/23						
Nitrate/Nitrite as N	3.83		0.40	mg/L	4.00	ND	96	80-120	2	20	
Batch 2305566 - General Preparation											
Blank (2305566-BLK1)					Prepared: 07/07/23 Analyzed: 07/11/23						
Total Suspended Solids	ND		5.0	mg/L							
Duplicate (2305566-DUP1)			**Source: 23G0058-02**		Prepared: 07/07/23 Analyzed: 07/11/23						
Total Suspended Solids	ND		5.0	mg/L		ND				20	
Batch 2305567 - General Preparation											
Blank (2305567-BLK1)					Prepared: 07/07/23 Analyzed: 07/11/23						
Total Dissolved Solids	ND		10	mg/L							
Duplicate (2305567-DUP1)			**Source: 23G0105-01**		Prepared: 07/07/23 Analyzed: 07/11/23						
Total Dissolved Solids	326		10	mg/L		314			4	20	
Batch 2305569 - General Preparation											
Blank (2305569-BLK1)					Prepared & Analyzed: 07/07/23						
Total Phosphorus as P	ND		0.050	mg/L							
Blank (2305569-BLK2)					Prepared & Analyzed: 07/07/23						
Total Phosphorus as P	ND		0.050	mg/L							

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2305569 - General Preparation											
LCS (2305569-BS1)					Prepared & Analyzed: 07/07/23						
Total Phosphorus as P	0.343		0.050	mg/L	0.300		114	80-120			
LCS (2305569-BS2)					Prepared & Analyzed: 07/07/23						
Total Phosphorus as P	0.333		0.050	mg/L	0.300		111	80-120			
LCS Dup (2305569-BSD1)					Prepared & Analyzed: 07/07/23						
Total Phosphorus as P	0.314		0.050	mg/L	0.300		105	80-120	9	25	
LCS Dup (2305569-BSD2)					Prepared & Analyzed: 07/07/23						
Total Phosphorus as P	0.321		0.050	mg/L	0.300		107	80-120	4	25	
Matrix Spike (2305569-MS1)			**Source: 23F1440-01**		Prepared & Analyzed: 07/07/23						
Total Phosphorus as P	0.330		0.050	mg/L	0.300	ND	110	75-125			
Matrix Spike (2305569-MS2)			**Source: 23G0161-05**		Prepared & Analyzed: 07/07/23						
Total Phosphorus as P	0.321		0.050	mg/L	0.300	ND	107	75-125			
Matrix Spike Dup (2305569-MSD1)			**Source: 23F1440-01**		Prepared & Analyzed: 07/07/23						
Total Phosphorus as P	0.321		0.050	mg/L	0.300	ND	107	75-125	3	30	
Matrix Spike Dup (2305569-MSD2)			**Source: 23G0161-05**		Prepared & Analyzed: 07/07/23						
Total Phosphorus as P	0.338		0.050	mg/L	0.300	ND	113	75-125	5	30	
Batch 2305654 - General Preparation											
Blank (2305654-BLK1)					Prepared & Analyzed: 07/10/23						
Ammonia as N	ND		0.10	mg/L							

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2305654 - General Preparation											
LCS (2305654-BS1)					Prepared & Analyzed: 07/10/23						
Ammonia as N	0.430		0.10	mg/L	0.500		86	80-120			
LCS Dup (2305654-BSD1)					Prepared & Analyzed: 07/10/23						
Ammonia as N	0.436		0.10	mg/L	0.500		87	80-120	1	25	
Matrix Spike (2305654-MS1)			**Source: 23G0079-02**		Prepared & Analyzed: 07/10/23						
Ammonia as N	0.669		0.10	mg/L	0.500	0.233	87	75-125			
Matrix Spike Dup (2305654-MSD1)			**Source: 23G0079-02**		Prepared & Analyzed: 07/10/23						
Ammonia as N	0.696		0.10	mg/L	0.500	0.233	93	75-125	4	25	
Batch 2305673 - General Preparation											
Blank (2305673-BLK1)					Prepared: 07/11/23 Analyzed: 07/12/23						
Total Kjeldahl Nitrogen	ND		0.20	mg/L							
LCS (2305673-BS1)					Prepared: 07/11/23 Analyzed: 07/12/23						
Total Kjeldahl Nitrogen	0.507		0.20	mg/L	0.500		101	80-120			
LCS Dup (2305673-BSD1)					Prepared: 07/11/23 Analyzed: 07/12/23						
Total Kjeldahl Nitrogen	0.479		0.20	mg/L	0.500		96	80-120	6	20	
Matrix Spike (2305673-MS1)			**Source: 23G0160-01**		Prepared: 07/11/23 Analyzed: 07/12/23						
Total Kjeldahl Nitrogen	0.542		0.20	mg/L	0.500	0.140	80	75-125			
Matrix Spike Dup (2305673-MSD1)			**Source: 23G0160-01**		Prepared: 07/11/23 Analyzed: 07/12/23						
Total Kjeldahl Nitrogen	0.563		0.20	mg/L	0.500	0.140	85	75-125	4	25	

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
*	The laboratory does not hold CA-ELAP accreditation for this analyte or method. Accreditation may not be available from CA-ELAP for this analyte or method.

This is a "MDL Report", thus if the report denotes an "ND" for a particular analyte, it should be noted that the analyte was not detected at or above the MDL.

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY

CLS ID. NO. 23G0160 (1 of 1)

Report To:	Client Job Number **856.01 Task 0717.00**
Stillwater Sciences 279 Cousteau Place Suite 400 Davis, CA 95618	Destination Laboratory Rancho Cordova
Project Manager Heather Neff heather@stillwatersci.com	☒ **CLS** (916) 638-7301 3249 Fitzgerald Road Rancho Cordova, CA 95742 **www.californialab.com**
Project Name Lee Vining WQ	☐ **OTHER**
Sampled By AFH, SKL Stillwater	
Job Description Monitor water chemistry in project reaches.	
Site Location Lee Vining Hydroelectric Project	

ANALYSIS REQUESTED

GEOTRACKER

EDF REPORT YES ☒ ☐ NO

GLOBAL ID.

FIELD CONDITIONS:
Clear, Sunny

DATE	**TIME**	**SAMPLE IDENTIFICATION**	**FIELD ID.**	**MATRIX**	**CONTAINER NO.**	**CONTAINER TYPE**	**PRESERVATIVES**		Orthophosphate	Total phosphorous	Total Kjeldahl Nitrogen	Total Ammonia as N	Nitrate/Nitrite	TDS/TSS	**TURNAROUND TIME IN DAYS 1**	**2**	**3**	**5**	**SPECIAL INSTRUCTIONS**
7/5/23	12:00	LV-6		Surface water	3		6		X	X	X	X	X	X				X	
7/5/23	10:55	SURFACE LV-7		Surface water	3		6		X	X	X	X	X	X				X	
7/5/23	11:10	BOTTOM LV-7		~~Surface water~~ Depth	3		6		X	X	X	X	X	X				X	
7/5/23	11:00	EQUIPMENT BLANK		Surface water	3		6		X	X	X	X	X	X				X	
				Surface water			6											X	
				Surface water			6											X	
				Surface water			6											X	INVOICE TO:
				Surface water			6											X	Stillwater Sciences
				Surface water			6											X	Same as above
				Surface water			6											X	**Project No. 856.01**
				Surface water			6											X	**Task 0717.00**
				Surface water			6											X	QUOTE#

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)= H2SO4 (5) NH_3/NH_4 (6) NAOH

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	Matt McKechnie Stillwater Sciences	7/5/23 1330		

RECEIVED AT LAB BY: **DATE/TIME:** 7/6/23 915 **CONDITIONS/COMMENTS:** 9.1/9.0

SHIPPED BY: ☒ **FED EX** ☐ **UPS** ☐ **OTHER** **AIR BILL #** 8172 8025 6287

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

July 13, 2023

CLS Work Order #: 23G0161
COC #:

Heather Neff
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: Lee Vining WQ

Enclosed are the results of analyses for samples received by the laboratory on 07/06/23 09:15. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

Daniel Johnson

Daniel johnson
Technical Director

CA SWRCB ELAP Accreditation/Registration number 1233

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23G0161
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LV-4 (23G0161-01) Water Sampled: 07/05/23 09:55 Received: 07/06/23 09:15										
Ammonia as N	**0.038**	0.025	0.10	mg/L	1	2305654	07/10/23	07/10/23	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2305523	07/06/23	07/06/23	EPA 300.0	
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2305515	07/06/23	07/06/23	SM4500-P E	
Total Dissolved Solids	**13**	5.0	10	"	"	2305567	07/07/23	07/11/23	SM2540C	
Total Kjeldahl Nitrogen	**0.14**	0.040	0.20	"	"	2305673	07/11/23	07/12/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2305569	07/07/23	07/07/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2305566	07/07/23	07/11/23	SM2540D	
LV-5 (23G0161-02) Water Sampled: 07/05/23 11:03 Received: 07/06/23 09:15										
Ammonia as N	**0.045**	0.025	0.10	mg/L	1	2305654	07/10/23	07/10/23	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2305523	07/06/23	07/06/23	EPA 300.0	
Orthophosphate as PO4	**0.040**	0.0051	0.15	"	"	2305515	07/06/23	07/06/23	SM4500-P E	J
Total Dissolved Solids	**10**	5.0	10	"	"	2305567	07/07/23	07/11/23	SM2540C	
Total Kjeldahl Nitrogen	**0.10**	0.040	0.20	"	"	2305673	07/11/23	07/12/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2305569	07/07/23	07/07/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2305566	07/07/23	07/11/23	SM2540D	
LV-5 duplicate (23G0161-03) Water Sampled: 07/05/23 11:01 Received: 07/06/23 09:15										
Ammonia as N	**0.026**	0.025	0.10	mg/L	1	2305654	07/10/23	07/10/23	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2305523	07/06/23	07/06/23	EPA 300.0	
Orthophosphate as PO4	**0.0066**	0.0051	0.15	"	"	2305515	07/06/23	07/06/23	SM4500-P E	J
Total Dissolved Solids	**7.0**	5.0	10	"	"	2305567	07/07/23	07/11/23	SM2540C	J
Total Kjeldahl Nitrogen	**0.11**	0.040	0.20	"	"	2305673	07/11/23	07/12/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2305569	07/07/23	07/07/23	SM4500-P E	
Total Suspended Solids	**2.0**	2.0	5.0	"	"	2305566	07/07/23	07/11/23	SM2540D	J

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23G0161
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Field BLANK (23G0161-04) Water Sampled: 07/05/23 11:14 Received: 07/06/23 09:15

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Ammonia as N	**0.040**	0.025	0.10	mg/L	1	2305654	07/10/23	07/10/23	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2305523	07/06/23	07/06/23	EPA 300.0	
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2305515	07/06/23	07/06/23	SM4500-P E	
Total Dissolved Solids	ND	5.0	10	"	"	2305567	07/07/23	07/11/23	SM2540C	
Total Kjeldahl Nitrogen	**0.19**	0.040	0.20	"	"	2305673	07/11/23	07/12/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2305569	07/07/23	07/07/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2305566	07/07/23	07/11/23	SM2540D	

LV-12 (23G0161-05) Water Sampled: 07/05/23 11:40 Received: 07/06/23 09:15

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Ammonia as N	**0.043**	0.025	0.10	mg/L	1	2305654	07/10/23	07/10/23	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2305523	07/06/23	07/06/23	EPA 300.0	
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2305515	07/06/23	07/06/23	SM4500-P E	
Total Dissolved Solids	**12**	5.0	10	"	"	2305567	07/07/23	07/11/23	SM2540C	
Total Kjeldahl Nitrogen	**0.14**	0.040	0.20	"	"	2305673	07/11/23	07/12/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2305569	07/07/23	07/07/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2305566	07/07/23	07/11/23	SM2540D	

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: 856.01 Task 0717.00	**CLS Work Order #: 23G0161**
Berkeley, CA 94705	Project Manager: Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2305515 - General Preparation											
Blank (2305515-BLK1)					Prepared & Analyzed: 07/06/23						
Orthophosphate as PO4	ND	0.0051	0.15	mg/L							
LCS (2305515-BS1)					Prepared & Analyzed: 07/06/23						
Orthophosphate as PO4	0.862	0.0051	0.15	mg/L	0.918		94	80-120			
LCS Dup (2305515-BSD1)					Prepared & Analyzed: 07/06/23						
Orthophosphate as PO4	0.953	0.0051	0.15	mg/L	0.918		104	80-120	10	20	
Matrix Spike (2305515-MS1)			**Source: 23G0077-01**		Prepared & Analyzed: 07/06/23						
Orthophosphate as PO4	1.91	0.010	0.30	mg/L	0.918	0.957	103	75-125			
Matrix Spike Dup (2305515-MSD1)			**Source: 23G0077-01**		Prepared & Analyzed: 07/06/23						
Orthophosphate as PO4	1.84	0.010	0.30	mg/L	0.918	0.957	96	75-125	4	25	
Batch 2305523 - General Prep											
Blank (2305523-BLK1)					Prepared & Analyzed: 07/06/23						
Nitrate/Nitrite as N	ND	0.055	0.40	mg/L							
LCS (2305523-BS1)					Prepared & Analyzed: 07/06/23						
Nitrate/Nitrite as N	4.08	0.055	0.40	mg/L	4.00		102	80-120			
LCS Dup (2305523-BSD1)					Prepared & Analyzed: 07/06/23						
Nitrate/Nitrite as N	4.27	0.055	0.40	mg/L	4.00		107	80-120	4	20	
Matrix Spike (2305523-MS1)			**Source: 23G0160-01**		Prepared & Analyzed: 07/06/23						
Nitrate/Nitrite as N	3.75	0.055	0.40	mg/L	4.00	ND	94	80-120			

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23G0161
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Batch 2305523 - General Prep

Matrix Spike Dup (2305523-MSD1) **Source: 23G0160-01** Prepared & Analyzed: 07/06/23

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Nitrate/Nitrite as N	3.83	0.055	0.40	mg/L	4.00	ND	96	80-120	2	20	

Batch 2305566 - General Preparation

Blank (2305566-BLK1) Prepared: 07/07/23 Analyzed: 07/11/23

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Suspended Solids	ND	2.0	5.0	mg/L							

Duplicate (2305566-DUP1) **Source: 23G0058-02** Prepared: 07/07/23 Analyzed: 07/11/23

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Suspended Solids	ND	2.0	5.0	mg/L		ND				20	

Batch 2305567 - General Preparation

Blank (2305567-BLK1) Prepared: 07/07/23 Analyzed: 07/11/23

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Dissolved Solids	ND	5.0	10	mg/L							

Duplicate (2305567-DUP1) **Source: 23G0105-01** Prepared: 07/07/23 Analyzed: 07/11/23

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Dissolved Solids	326	5.0	10	mg/L		314			4	20	

Batch 2305569 - General Preparation

Blank (2305569-BLK1) Prepared & Analyzed: 07/07/23

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Phosphorus as P	ND	0.023	0.050	mg/L							

Blank (2305569-BLK2) Prepared & Analyzed: 07/07/23

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Phosphorus as P	ND	0.023	0.050	mg/L							

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2305569 - General Preparation											
LCS (2305569-BS1)					Prepared & Analyzed: 07/07/23						
Total Phosphorus as P	0.343	0.023	0.050	mg/L	0.300		114	80-120			
LCS (2305569-BS2)					Prepared & Analyzed: 07/07/23						
Total Phosphorus as P	0.333	0.023	0.050	mg/L	0.300		111	80-120			
LCS Dup (2305569-BSD1)					Prepared & Analyzed: 07/07/23						
Total Phosphorus as P	0.314	0.023	0.050	mg/L	0.300		105	80-120	9	25	
LCS Dup (2305569-BSD2)					Prepared & Analyzed: 07/07/23						
Total Phosphorus as P	0.321	0.023	0.050	mg/L	0.300		107	80-120	4	25	
Matrix Spike (2305569-MS1)			**Source: 23F1440-01**		Prepared & Analyzed: 07/07/23						
Total Phosphorus as P	0.330	0.023	0.050	mg/L	0.300	ND	110	75-125			
Matrix Spike (2305569-MS2)			**Source: 23G0161-05**		Prepared & Analyzed: 07/07/23						
Total Phosphorus as P	0.321	0.023	0.050	mg/L	0.300	ND	107	75-125			
Matrix Spike Dup (2305569-MSD1)			**Source: 23F1440-01**		Prepared & Analyzed: 07/07/23						
Total Phosphorus as P	0.321	0.023	0.050	mg/L	0.300	ND	107	75-125	3	30	
Matrix Spike Dup (2305569-MSD2)			**Source: 23G0161-05**		Prepared & Analyzed: 07/07/23						
Total Phosphorus as P	0.338	0.023	0.050	mg/L	0.300	ND	113	75-125	5	30	
Batch 2305654 - General Preparation											
Blank (2305654-BLK1)					Prepared & Analyzed: 07/10/23						
Ammonia as N	ND	0.025	0.10	mg/L							

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23G0161
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2305654 - General Preparation											
LCS (2305654-BS1)					Prepared & Analyzed: 07/10/23						
Ammonia as N	0.430	0.025	0.10	mg/L	0.500		86	80-120			
LCS Dup (2305654-BSD1)					Prepared & Analyzed: 07/10/23						
Ammonia as N	0.436	0.025	0.10	mg/L	0.500		87	80-120	1	25	
Matrix Spike (2305654-MS1)			**Source: 23G0079-02**		Prepared & Analyzed: 07/10/23						
Ammonia as N	0.669	0.025	0.10	mg/L	0.500	0.233	87	75-125			
Matrix Spike Dup (2305654-MSD1)			**Source: 23G0079-02**		Prepared & Analyzed: 07/10/23						
Ammonia as N	0.696	0.025	0.10	mg/L	0.500	0.233	93	75-125	4	25	
Batch 2305673 - General Preparation											
Blank (2305673-BLK1)					Prepared: 07/11/23 Analyzed: 07/12/23						
Total Kjeldahl Nitrogen	0.0700	0.040	0.20	mg/L							J
LCS (2305673-BS1)					Prepared: 07/11/23 Analyzed: 07/12/23						
Total Kjeldahl Nitrogen	0.507	0.040	0.20	mg/L	0.500		101	80-120			
LCS Dup (2305673-BSD1)					Prepared: 07/11/23 Analyzed: 07/12/23						
Total Kjeldahl Nitrogen	0.479	0.040	0.20	mg/L	0.500		96	80-120	6	20	
Matrix Spike (2305673-MS1)			**Source: 23G0160-01**		Prepared: 07/11/23 Analyzed: 07/12/23						
Total Kjeldahl Nitrogen	0.542	0.040	0.20	mg/L	0.500	0.140	80	75-125			
Matrix Spike Dup (2305673-MSD1)			**Source: 23G0160-01**		Prepared: 07/11/23 Analyzed: 07/12/23						
Total Kjeldahl Nitrogen	0.563	0.040	0.20	mg/L	0.500	0.140	85	75-125	4	25	

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: 856.01 Task 0717.00	**CLS Work Order #: 23G0161**
Berkeley, CA 94705	Project Manager: Heather Neff	COC #:

Notes and Definitions

J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
*	The laboratory does not hold CA-ELAP accreditation for this analyte or method. Accreditation may not be available from CA-ELAP for this analyte or method.

This is a "MDL Report", thus if the report denotes an "ND" for a particular analyte, it should be noted that the analyte was not detected at or above the MDL.

CALIFORNIA LABORATORY SERVICES CHAIN OF COUNTY

CLS ID. NO. 2360161 (1 of 1)

Report To:

Stillwater Sciences
279 Cousteau Place Suite 400
Davis, CA 95618

Project Manager
Heather Neff heather@stillwatersci.com

Project Name
Lee Vining WQ

Sampled By
MAM/CSH Stillwater

Job Description
Monitor water chemistry in project reaches.

Site Location Lee Vining Hydroelectric Project

Client Job Number
856.01 Task 0717.00

Destination Laboratory
Rancho Cordova

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA
95742
www.californialab.com

☐ **OTHER**

GEOTRACKER

EDF REPORT YES ☒ ☐ NO

GLOBAL ID.

FIELD CONDITIONS:
Clear, sunny

ANALYSIS REQUESTED

DATE	**TIME**	**SAMPLE IDENTIFICATION**	**FIELD ID.**	**MATRIX**	**CONTAINER**		**PRESERVATIVES**								**TURNAROUND TIME IN DAYS**				**SPECIAL INSTRUCTIONS**
					NO.	**TYPE**	▼		Orthophosphate	Total phosphorous	Total Kjeldahl Nitrogen	Total Ammonia as N	Nitrate/Nitrite	TDS/TSS	1	2	3	5	
7/5/23	0955	LV-4		Surface water	3		6	~~X~~	X	X	X	X	X	X				X	
7/5/23	1103	LV-5		Surface water	3		6	~~X~~	X	X	X	X	X	X				X	
7/5/23	1101	LV-5 duplicate		Surface water	3		6	~~X~~	X	X	X	X	X	X				X	
7/5/23	1114	Field BLANK		Surface water	3		6	~~X~~	X	X	X	X	X	X				X	
7/5/23	1140	LV-12		Surface water	3		6	~~X~~	X	X	X	X	X	X				X	
				Surface water			6											X	
				Surface water			6											X	INVOICE TO:
				Surface water			6											X	Stillwater Sciences
				Surface water			6											X	Same as above
				Surface water			6											X	**Project No. 856.01**
				Surface water			6											X	**Task 0717.00**
				Surface water			6											X	QUOTE#

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO$_3$ (3) = COLD (4)= H2SO4 (5) NH$_3$/NH$_4$ (6) NAOH

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	Matt McKechnie	7/5/23		
	Stillwater Sciences	1330		

RECEIVED AT LAB BY: **DATE/TIME:** 7/6/23 915 **CONDITIONS/COMMENTS:** 9.1/9.0

SHIPPED BY: ☒ **FED EX** ☐ **UPS** ☐ **OTHER** **AIR BILL #** 8172 8028 6204

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

July 14, 2023

CLS Work Order #: 23G0264
COC #:

Heather Neff
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: Lee Vining WQ

Enclosed are the results of analyses for samples received by the laboratory on 07/07/23 09:20. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

Daniel Johnson

Daniel johnson
Technical Director

CA SWRCB ELAP Accreditation/Registration number 1233

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23G0264
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Field Blank (23G0264-01) Surface water Sampled: 07/06/23 11:15 Received: 07/07/23 09:20										
Ammonia as N	**0.034**	0.025	0.10	mg/L	1	2305671	07/11/23	07/12/23	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2305562	07/07/23	07/07/23	EPA 300.0	
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2305593	07/07/23	07/07/23	SM4500-P E	
Total Dissolved Solids	ND	5.0	10	"	"	2305731	07/12/23	07/14/23	SM2540C	
Total Kjeldahl Nitrogen	**0.094**	0.040	0.20	"	"	2305673	07/11/23	07/12/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2305758	07/13/23	07/13/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2305678	07/11/23	07/13/23	SM2540D	
LV-8 (23G0264-02) Surface water Sampled: 07/06/23 11:30 Received: 07/07/23 09:20										
Ammonia as N	**0.030**	0.025	0.10	mg/L	1	2305671	07/11/23	07/12/23	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2305562	07/07/23	07/07/23	EPA 300.0	
Orthophosphate as PO4	**0.0066**	0.0051	0.15	"	"	2305593	07/07/23	07/07/23	SM4500-P E	J
Total Dissolved Solids	**11**	5.0	10	"	"	2305731	07/12/23	07/14/23	SM2540C	
Total Kjeldahl Nitrogen	**0.081**	0.040	0.20	"	"	2305673	07/11/23	07/12/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2305758	07/13/23	07/13/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2305678	07/11/23	07/13/23	SM2540D	
LV-9 (23G0264-03) Surface water Sampled: 07/06/23 12:25 Received: 07/07/23 09:20										
Ammonia as N	**0.031**	0.025	0.10	mg/L	1	2305671	07/11/23	07/12/23	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2305562	07/07/23	07/07/23	EPA 300.0	
Orthophosphate as PO4	**0.023**	0.0051	0.15	"	"	2305593	07/07/23	07/07/23	SM4500-P E	J
Total Dissolved Solids	**14**	5.0	10	"	"	2305731	07/12/23	07/14/23	SM2540C	
Total Kjeldahl Nitrogen	**0.065**	0.040	0.20	"	"	2305673	07/11/23	07/12/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2305758	07/13/23	07/13/23	SM4500-P E	
Total Suspended Solids	**4.5**	2.0	5.0	"	"	2305678	07/11/23	07/13/23	SM2540D	J

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23G0264
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

LV-9 Duplicate (23G0264-04) Surface water Sampled: 07/06/23 12:25 Received: 07/07/23 09:20

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Ammonia as N	**0.040**	0.025	0.10	mg/L	1	2305671	07/11/23	07/12/23	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2305562	07/07/23	07/07/23	EPA 300.0	
Orthophosphate as PO4	**0.023**	0.0051	0.15	"	"	2305593	07/07/23	07/07/23	SM4500-P E	J
Total Dissolved Solids	**18**	5.0	10	"	"	2305731	07/12/23	07/14/23	SM2540C	
Total Kjeldahl Nitrogen	**0.11**	0.040	0.20	"	"	2305673	07/11/23	07/12/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2305758	07/13/23	07/13/23	SM4500-P E	
Total Suspended Solids	**4.0**	2.0	5.0	"	"	2305678	07/11/23	07/13/23	SM2540D	J

LV-10 (23G0264-05) Surface water Sampled: 07/06/23 10:02 Received: 07/07/23 09:20

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Ammonia as N	**0.033**	0.025	0.10	mg/L	1	2305671	07/11/23	07/12/23	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	**0.071**	0.055	0.40	"	"	2305562	07/07/23	07/07/23	EPA 300.0	J
Orthophosphate as PO4	**0.011**	0.0051	0.15	"	"	2305593	07/07/23	07/07/23	SM4500-P E	J
Total Dissolved Solids	**22**	5.0	10	"	"	2305731	07/12/23	07/14/23	SM2540C	
Total Kjeldahl Nitrogen	ND	0.040	0.20	"	"	2305673	07/11/23	07/12/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.023	0.050	"	"	2305758	07/13/23	07/13/23	SM4500-P E	
Total Suspended Solids	**4.0**	2.0	5.0	"	"	2305678	07/11/23	07/13/23	SM2540D	J

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2305562 - General Prep											
Blank (2305562-BLK1)					Prepared & Analyzed: 07/07/23						
Nitrate/Nitrite as N	ND	0.055	0.40	mg/L							
LCS (2305562-BS1)					Prepared & Analyzed: 07/07/23						
Nitrate/Nitrite as N	4.09	0.055	0.40	mg/L	4.00		102	80-120			
LCS Dup (2305562-BSD1)					Prepared & Analyzed: 07/07/23						
Nitrate/Nitrite as N	4.07	0.055	0.40	mg/L	4.00		102	80-120	0.5	20	
Matrix Spike (2305562-MS1)			**Source: 23G0211-01**		Prepared & Analyzed: 07/07/23						
Nitrate/Nitrite as N	3.90	0.055	0.40	mg/L	4.00	ND	98	80-120			
Matrix Spike Dup (2305562-MSD1)			**Source: 23G0211-01**		Prepared & Analyzed: 07/07/23						
Nitrate/Nitrite as N	3.76	0.055	0.40	mg/L	4.00	ND	94	80-120	4	20	
Batch 2305593 - General Preparation											
Blank (2305593-BLK1)					Prepared & Analyzed: 07/07/23						
Orthophosphate as PO4	ND	0.0051	0.15	mg/L							
LCS (2305593-BS1)					Prepared & Analyzed: 07/07/23						
Orthophosphate as PO4	1.09	0.0051	0.15	mg/L	0.918		119	80-120			
LCS Dup (2305593-BSD1)					Prepared & Analyzed: 07/07/23						
Orthophosphate as PO4	1.00	0.0051	0.15	mg/L	0.918		109	80-120	8	20	
Matrix Spike (2305593-MS1)			**Source: 23G0191-01**		Prepared & Analyzed: 07/07/23						
Orthophosphate as PO4	1.85	0.010	0.30	mg/L	0.918	0.957	97	75-125			

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: 856.01 Task 0717.00	**CLS Work Order #: 23G0264**
Berkeley, CA 94705	Project Manager: Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2305593 - General Preparation											
Matrix Spike Dup (2305593-MSD1)			**Source: 23G0191-01**		Prepared & Analyzed: 07/07/23						
Orthophosphate as PO4	2.05	0.010	0.30	mg/L	0.918	0.957	119	75-125	11	25	
Batch 2305671 - General Preparation											
Blank (2305671-BLK1)					Prepared: 07/11/23 Analyzed: 07/12/23						
Ammonia as N	ND	0.025	0.10	mg/L							
LCS (2305671-BS1)					Prepared: 07/11/23 Analyzed: 07/12/23						
Ammonia as N	0.448	0.025	0.10	mg/L	0.500		90	80-120			
LCS Dup (2305671-BSD1)					Prepared: 07/11/23 Analyzed: 07/12/23						
Ammonia as N	0.456	0.025	0.10	mg/L	0.500		91	80-120	2	25	
Matrix Spike (2305671-MS1)			**Source: 23G0162-01**		Prepared: 07/11/23 Analyzed: 07/12/23						
Ammonia as N	0.602	0.025	0.10	mg/L	0.500	0.138	93	75-125			
Matrix Spike Dup (2305671-MSD1)			**Source: 23G0162-01**		Prepared: 07/11/23 Analyzed: 07/12/23						
Ammonia as N	0.587	0.025	0.10	mg/L	0.500	0.138	90	75-125	3	25	
Batch 2305673 - General Preparation											
Blank (2305673-BLK1)					Prepared: 07/11/23 Analyzed: 07/12/23						
Total Kjeldahl Nitrogen	0.0700	0.040	0.20	mg/L							J
LCS (2305673-BS1)					Prepared: 07/11/23 Analyzed: 07/12/23						
Total Kjeldahl Nitrogen	0.507	0.040	0.20	mg/L	0.500		101	80-120			

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23G0264
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2305673 - General Preparation											
LCS Dup (2305673-BSD1)					Prepared: 07/11/23 Analyzed: 07/12/23						
Total Kjeldahl Nitrogen	0.479	0.040	0.20	mg/L	0.500		96	80-120	6	20	
Matrix Spike (2305673-MS1)			**Source: 23G0160-01**		Prepared: 07/11/23 Analyzed: 07/12/23						
Total Kjeldahl Nitrogen	0.542	0.040	0.20	mg/L	0.500	0.140	80	75-125			
Matrix Spike Dup (2305673-MSD1)			**Source: 23G0160-01**		Prepared: 07/11/23 Analyzed: 07/12/23						
Total Kjeldahl Nitrogen	0.563	0.040	0.20	mg/L	0.500	0.140	85	75-125	4	25	
Batch 2305678 - General Preparation											
Blank (2305678-BLK1)					Prepared: 07/11/23 Analyzed: 07/13/23						
Total Suspended Solids	ND	2.0	5.0	mg/L							
Duplicate (2305678-DUP1)			**Source: 23G0170-01**		Prepared: 07/11/23 Analyzed: 07/13/23						
Total Suspended Solids	ND	2.0	5.0	mg/L		ND				20	
Batch 2305731 - General Preparation											
Blank (2305731-BLK1)					Prepared: 07/12/23 Analyzed: 07/14/23						
Total Dissolved Solids	ND	5.0	10	mg/L							
Duplicate (2305731-DUP1)			**Source: 23G0264-01**		Prepared: 07/12/23 Analyzed: 07/14/23						
Total Dissolved Solids	ND	5.0	10	mg/L		ND				20	
Batch 2305758 - General Preparation											
Blank (2305758-BLK1)					Prepared & Analyzed: 07/13/23						
Total Phosphorus as P	ND	0.023	0.050	mg/L							

Stillwater Sciences	Project:	Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number:	856.01 Task 0717.00	**CLS Work Order #: 23G0264**
Berkeley, CA 94705	Project Manager:	Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2305758 - General Preparation											
LCS (2305758-BS1)					Prepared & Analyzed: 07/13/23						
Total Phosphorus as P	0.302	0.023	0.050	mg/L	0.300		101	80-120			
LCS Dup (2305758-BSD1)					Prepared & Analyzed: 07/13/23						
Total Phosphorus as P	0.312	0.023	0.050	mg/L	0.300		104	80-120	3	25	
Matrix Spike (2305758-MS1)			**Source: 23G0264-02**		Prepared & Analyzed: 07/13/23						
Total Phosphorus as P	0.331	0.023	0.050	mg/L	0.300	ND	110	75-125			
Matrix Spike Dup (2305758-MSD1)			**Source: 23G0264-02**		Prepared & Analyzed: 07/13/23						
Total Phosphorus as P	0.298	0.023	0.050	mg/L	0.300	ND	99	75-125	10	30	

07/14/23 14:34

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: 856.01 Task 0717.00	**CLS Work Order #: 23G0264**
Berkeley, CA 94705	Project Manager: Heather Neff	COC #:

Notes and Definitions

J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
*	The laboratory does not hold CA-ELAP accreditation for this analyte or method. Accreditation may not be available from CA-ELAP for this analyte or method.

This is a “MDL Report”, thus if the report denotes an “ND” for a particular analyte, it should be noted that the analyte was not detected at or above the MDL.

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY CLS ID. NO. 23G0264 (1 of 1)

Report To:

Stillwater Sciences
279 Cousteau Place Suite 400
Davis, CA 95618

Project Manager
Heather Neff heather@stillwatersci.com

Project Name
Lee Vining WQ

Sampled By
AFH, CSH

Job Description
Monitor water chemistry in project reaches.

Site Location Lee Vining Hydroelectric Project

Client Job Number
856.01 Task 0717.00

Destination Laboratory
Rancho Cordova

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA
95742
www.californialab.com

☐ **OTHER**

ANALYSIS REQUESTED

GEOTRACKER

EDF REPORT YES ☒ ☐ NO

GLOBAL ID.

FIELD CONDITIONS: SUNNY, CLEAR

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES		Orthophosphate	Total phosphorous	Total Kjeldahl Nitrogen	Total Ammonia as N	Nitrate/Nitrite	TDS/TSS	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
7/6/23	11:15	Field Blank		Surface water	3		6		X	X	X	X	X	X				X	
7/6/23	11:30	LV-8		Surface water	3		6		X	X	X	X	X	X				X	
7/6/23	12:25	LV-9		Surface water	3		6		X	X	X	X	X	X				X	
7/6/23	12:25	LV-9 Duplicate		Surface water	3		6		X	X	X	X	X	X				X	
7/6/23	10:02	LV-10		Surface water	3		6		X	X	X	X	X	X				X	
				Surface water			6											X	
				Surface water			6											X	INVOICE TO:
				Surface water			6											X	Stillwater Sciences
				Surface water			6											X	Same as above
				Surface water			6											X	**Project No. 856.01**
				Surface water			6											X	**Task 0717.00**
				Surface water			6											X	QUOTE#

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)= H2SO4 (5) NH_3/NH_4 (6) NAOH

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	ANNABELLE HOWE, STILLWATER	7/6/23, 12:45		

RECEIVED AT LAB BY: **DATE/TIME:** 7/7/23 920 **CONDITIONS/COMMENTS:** 3.7/3.6

SHIPPED BY: ☒ **FED EX** ☐ **UPS** ☐ **OTHER** **AIR BILL #** 8172 8025 6190

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

September 07, 2023

CLS Work Order #: 23H1655
COC #:

Heather Neff
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: Lee Vining WQ

Enclosed are the results of analyses for samples received by the laboratory on 08/30/23 09:45. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

Daniel Johnson

Daniel Johnson
Technical Director

CA SWRCB ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY **CLS ID. NO.** 23H1055 (1 of 1)

Report To:

Stillwater Sciences
279 Cousteau Place Suite 400
Davis, CA 95618

Project Manager
Heather Neff heather@stillwatersci.com

Project Name
Lee Vining WQ

Sampled By MAM/EEA

Job Description
Monitor water chemistry in project reaches.

Site Location Lee Vining Hydroelectric Project

Client Job Number
856.01 Task 0717.00

Destination Laboratory
Rancho Cordova

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA
95742
www.californialab.com

☐ **OTHER**

GEOTRACKER

EDF REPORT YES ☒ ☐ NO

GLOBAL ID.

FIELD CONDITIONS:

ANALYSIS REQUESTED

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	Orthophosphate	Total phosphorous	Total Kjeldahl Nitrogen	Total Ammonia as N	Nitrate/Nitrite	TDS/TSS	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
8/29/23	0845	Field BLANK		Surface water	3		6	X	X	X	X	X	X				x	
8/29/23	0900	LV-3		Surface water	3		6	X	X	X	X	X	X				x	
8/29/23	0935	LV-4		Surface water	3		6	X	X	X	X	X	X				x	
8/29/23	0935	Duplicate		Surface water	3		6	X	X	X	X	X	X				x	
8/29/23	1010	LV-5		Surface water	3		6	X	X	X	X	X	X				x	
8/29/23	1030	LV-12		Surface water	3		6	X	X	X	X	X	X				x	
				Surface water			6										x	INVOICE TO:
				Surface water			6										x	Stillwater Sciences
				Surface water			6										x	Same as above
				Surface water			6										x	**Project No. 856.01**
				Surface water			6										x	**Task 0717.00**
				Surface water			6										x	QUOTE#

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)= H2SO4 (5) NH_3/NH_4 (6) NAOH

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	Elliott Allen/Stillwater Sciences	8/29 1330		

RECEIVED AT LAB BY: **DATE/TIME:** 8/30/23 945 **CONDITIONS/COMMENTS:** 13.3/14.0

SHIPPED BY: ☒ **FED EX** ☐ **UPS** ☐ **OTHER** **AIR BILL #** 8172-8674 1512

Stillwater Sciences	Project:	Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number:	856.01 Task 0717.00	**CLS Work Order #: 23H1655**
Berkeley, CA 94705	Project Manager:	Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Field Blank (23H1655-01) Surface water Sampled: 08/29/23 08:45 Received: 08/30/23 09:45									
Ammonia as N	ND	0.10	mg/L	1	2307341	08/31/23	08/31/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2307247	08/30/23	08/30/23	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2307279	08/30/23	08/30/23	SM4500-P E	
Total Dissolved Solids	ND	10	"	"	2307320	08/31/23	09/05/23	SM2540C	
Total Kjeldahl Nitrogen	ND	0.20	"	"	2307346	09/01/23	09/01/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2307305	08/31/23	08/31/23	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2307355	09/01/23	09/05/23	SM2540D	
LV-3 (23H1655-02) Surface water Sampled: 08/29/23 09:00 Received: 08/30/23 09:45									
Ammonia as N	ND	0.10	mg/L	1	2307341	08/31/23	08/31/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2307247	08/30/23	08/30/23	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2307279	08/30/23	08/30/23	SM4500-P E	
Total Dissolved Solids	**13**	10	"	"	2307320	08/31/23	09/05/23	SM2540C	
Total Kjeldahl Nitrogen	**0.23**	0.20	"	"	2307346	09/01/23	09/01/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2307305	08/31/23	08/31/23	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2307355	09/01/23	09/05/23	SM2540D	
LV-4 (23H1655-03) Surface water Sampled: 08/29/23 09:35 Received: 08/30/23 09:45									
Ammonia as N	ND	0.10	mg/L	1	2307341	08/31/23	08/31/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2307247	08/30/23	08/30/23	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2307279	08/30/23	08/30/23	SM4500-P E	
Total Dissolved Solids	**12**	10	"	"	2307320	08/31/23	09/05/23	SM2540C	
Total Kjeldahl Nitrogen	**0.20**	0.20	"	"	2307346	09/01/23	09/01/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2307305	08/31/23	08/31/23	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2307355	09/01/23	09/05/23	SM2540D	

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23H1655
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Duplicate (23H1655-04) Surface water Sampled: 08/29/23 09:35 Received: 08/30/23 09:45									
Ammonia as N	ND	0.10	mg/L	1	2307341	08/31/23	08/31/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2307247	08/30/23	08/30/23	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2307279	08/30/23	08/30/23	SM4500-P E	
Total Dissolved Solids	**16**	10	"	"	2307320	08/31/23	09/05/23	SM2540C	
Total Kjeldahl Nitrogen	ND	0.20	"	"	2307346	09/01/23	09/01/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2307305	08/31/23	08/31/23	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2307355	09/01/23	09/05/23	SM2540D	
LV-5 (23H1655-05) Surface water Sampled: 08/29/23 10:10 Received: 08/30/23 09:45									
Ammonia as N	ND	0.10	mg/L	1	2307341	08/31/23	08/31/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2307247	08/30/23	08/30/23	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2307279	08/30/23	08/30/23	SM4500-P E	
Total Dissolved Solids	**20**	10	"	"	2307320	08/31/23	09/05/23	SM2540C	
Total Kjeldahl Nitrogen	ND	0.20	"	"	2307346	09/01/23	09/01/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2307305	08/31/23	08/31/23	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2307355	09/01/23	09/05/23	SM2540D	
LV-12 (23H1655-06) Surface water Sampled: 08/29/23 10:30 Received: 08/30/23 09:45									
Ammonia as N	ND	0.10	mg/L	1	2307341	08/31/23	08/31/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2307247	08/30/23	08/30/23	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2307279	08/30/23	08/30/23	SM4500-P E	
Total Dissolved Solids	**24**	10	"	"	2307320	08/31/23	09/05/23	SM2540C	
Total Kjeldahl Nitrogen	ND	0.20	"	"	2307346	09/01/23	09/01/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2307305	08/31/23	08/31/23	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2307355	09/01/23	09/05/23	SM2540D	

Stillwater Sciences
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CLS Work Order #: 23H1655
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2307247 - General Prep										
Blank (2307247-BLK1)				Prepared & Analyzed: 08/30/23						
Nitrate/Nitrite as N	ND	0.40	mg/L							
LCS (2307247-BS1)				Prepared & Analyzed: 08/30/23						
Nitrate/Nitrite as N	3.83	0.40	mg/L	4.00		96	80-120			
LCS Dup (2307247-BSD1)				Prepared & Analyzed: 08/30/23						
Nitrate/Nitrite as N	3.94	0.40	mg/L	4.00		99	80-120	3	20	
Matrix Spike (2307247-MS1)		**Source: 23H1634-03**		Prepared & Analyzed: 08/30/23						
Nitrate/Nitrite as N	4.93	0.40	mg/L	4.00	1.06	97	80-120			
Matrix Spike Dup (2307247-MSD1)		**Source: 23H1634-03**		Prepared & Analyzed: 08/30/23						
Nitrate/Nitrite as N	4.86	0.40	mg/L	4.00	1.06	95	80-120	1	20	
Batch 2307279 - General Preparation										
Blank (2307279-BLK1)				Prepared & Analyzed: 08/30/23						
Orthophosphate as PO4	ND	0.15	mg/L							
LCS (2307279-BS1)				Prepared & Analyzed: 08/30/23						
Orthophosphate as PO4	0.830	0.15	mg/L	0.918		90	80-120			
LCS Dup (2307279-BSD1)				Prepared & Analyzed: 08/30/23						
Orthophosphate as PO4	0.842	0.15	mg/L	0.918		92	80-120	1	20	
Matrix Spike (2307279-MS1)		**Source: 23H1655-01**		Prepared & Analyzed: 08/30/23						
Orthophosphate as PO4	0.788	0.15	mg/L	0.918	ND	86	75-125			

Stillwater Sciences	Project:	Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number:	856.01 Task 0717.00	**CLS Work Order #: 23H1655**
Berkeley, CA 94705	Project Manager:	Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2307279 - General Preparation										
Matrix Spike Dup (2307279-MSD1)	**Source: 23H1655-01**			Prepared & Analyzed: 08/30/23						
Orthophosphate as PO4	0.813	0.15	mg/L	0.918	ND	89	75-125	3	25	
Batch 2307305 - General Preparation										
Blank (2307305-BLK1)				Prepared & Analyzed: 08/31/23						
Total Phosphorus as P	ND	0.050	mg/L							
LCS (2307305-BS1)				Prepared & Analyzed: 08/31/23						
Total Phosphorus as P	0.324	0.050	mg/L	0.300		108	80-120			
LCS Dup (2307305-BSD1)				Prepared & Analyzed: 08/31/23						
Total Phosphorus as P	0.316	0.050	mg/L	0.300		105	80-120	3	25	
Matrix Spike (2307305-MS1)	**Source: 23H1552-01**			Prepared & Analyzed: 08/31/23						
Total Phosphorus as P	0.437	0.050	mg/L	0.300	0.129	103	75-125			
Matrix Spike Dup (2307305-MSD1)	**Source: 23H1552-01**			Prepared & Analyzed: 08/31/23						
Total Phosphorus as P	0.454	0.050	mg/L	0.300	0.129	108	75-125	4	30	
Batch 2307320 - General Preparation										
Blank (2307320-BLK1)				Prepared: 08/31/23 Analyzed: 09/05/23						
Total Dissolved Solids	ND	10	mg/L							
LCS (2307320-BS1)				Prepared: 08/31/23 Analyzed: 09/05/23						
Total Dissolved Solids	48.0	10	mg/L	50.0		96	80-120			

Stillwater Sciences	Project:	Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number:	856.01 Task 0717.00	**CLS Work Order #: 23H1655**
Berkeley, CA 94705	Project Manager:	Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2307320 - General Preparation										
LCS Dup (2307320-BSD1)				Prepared: 08/31/23 Analyzed: 09/05/23						
Total Dissolved Solids	47.0	10	mg/L	50.0		94	80-120	2	200	
Duplicate (2307320-DUP1)		**Source: 23H1602-01**		Prepared: 08/31/23 Analyzed: 09/05/23						
Total Dissolved Solids	609	10	mg/L		600			1	20	
Batch 2307341 - General Preparation										
Blank (2307341-BLK1)				Prepared & Analyzed: 08/31/23						
Ammonia as N	ND	0.10	mg/L							
LCS (2307341-BS1)				Prepared & Analyzed: 08/31/23						
Ammonia as N	0.460	0.10	mg/L	0.500		92	80-120			
LCS Dup (2307341-BSD1)				Prepared & Analyzed: 08/31/23						
Ammonia as N	0.450	0.10	mg/L	0.500		90	80-120	2	25	
Matrix Spike (2307341-MS1)		**Source: 23H1568-04**		Prepared & Analyzed: 08/31/23						
Ammonia as N	0.693	0.10	mg/L	0.500	0.201	98	75-125			
Matrix Spike Dup (2307341-MSD1)		**Source: 23H1568-04**		Prepared & Analyzed: 08/31/23						
Ammonia as N	0.688	0.10	mg/L	0.500	0.201	97	75-125	0.7	25	
Batch 2307346 - General Preparation										
Blank (2307346-BLK1)				Prepared & Analyzed: 09/01/23						
Total Kjeldahl Nitrogen	ND	0.20	mg/L							

Stillwater Sciences	Project:	Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number:	856.01 Task 0717.00	**CLS Work Order #: 23H1655**
Berkeley, CA 94705	Project Manager:	Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2307346 - General Preparation										
LCS (2307346-BS1)				Prepared & Analyzed: 09/01/23						
Total Kjeldahl Nitrogen	0.479	0.20	mg/L	0.500		96	80-120			
LCS Dup (2307346-BSD1)				Prepared & Analyzed: 09/01/23						
Total Kjeldahl Nitrogen	0.485	0.20	mg/L	0.500		97	80-120	1	20	
Matrix Spike (2307346-MS1)	**Source: 23H1655-01**			Prepared & Analyzed: 09/01/23						
Total Kjeldahl Nitrogen	0.641	0.20	mg/L	0.500	0.167	95	75-125			
Matrix Spike Dup (2307346-MSD1)	**Source: 23H1655-01**			Prepared & Analyzed: 09/01/23						
Total Kjeldahl Nitrogen	0.594	0.20	mg/L	0.500	0.167	85	75-125	8	25	
Batch 2307355 - General Preparation										
Blank (2307355-BLK1)				Prepared: 09/01/23 Analyzed: 09/05/23						
Total Suspended Solids	ND	5.0	mg/L							
LCS (2307355-BS1)				Prepared: 09/01/23 Analyzed: 09/05/23						
Total Suspended Solids	91.7	5.0	mg/L	100		92	80-120			
LCS Dup (2307355-BSD1)				Prepared: 09/01/23 Analyzed: 09/05/23						
Total Suspended Solids	91.5	5.0	mg/L	100		92	80-120	0.2	200	
Duplicate (2307355-DUP1)	**Source: 23H1615-02**			Prepared: 09/01/23 Analyzed: 09/05/23						
Total Suspended Solids	ND	5.0	mg/L		ND				20	

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
*	The laboratory does not hold CA-ELAP accreditation for this analyte or method. Accreditation may not be available from CA-ELAP for this analyte or method.

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

September 08, 2023

CLS Work Order #: 23H1726
COC #:

Heather Neff
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: Lee Vining WQ

Enclosed are the results of analyses for samples received by the laboratory on 08/31/23 09:20. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

Daniel Johnson

Daniel Johnson
Technical Director

CA SWRCB ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY **CLS ID. NO.** 23H1726 (1 of 1)

Report To:
Stillwater Sciences
279 Cousteau Place Suite 400
Davis, CA 95618

Project Manager
Heather Neff heather@stillwatersci.com

Project Name
Lee Vining WQ

Sampled By MAM / MTS Stillwater

Job Description
Monitor water chemistry in project reaches.

Site Location Lee Vining Hydroelectric Project

Client Job Number
856.01 Task 0717.00

Destination Laboratory
Rancho Cordova

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA
95742
www.californialab.com

☐ **OTHER**

GEOTRACKER

EDF REPORT YES ☒ ☐ NO

GLOBAL ID.

FIELD CONDITIONS:

Clear, Sunny

ANALYSIS REQUESTED

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES		Orthophosphate	Total phosphorous	Total Kjeldahl Nitrogen	Total Ammonia as N	Nitrate/Nitrite	TDS/TSS	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
8/30/23	0855	Field Blank		Surface water	3		6		X	X	X	X	X	X				X	
8/30/23	0905	LV-9		Surface water	3		6		X	X	X	X	X	X				X	
8/30/23	0905	LV-9 Duplicate		Surface water	3		6		X	X	X	X	X	X				X	
8/30/23	0935	LV-8		Surface water	3		6		X	X	X	X	X	X				X	
8/30/23	1040	LV-10		Surface water	3		6		X	X	X	X	X	X				X	
				Surface water			6											X	
				Surface water			6											X	INVOICE TO:
				Surface water			6											X	Stillwater Sciences
				Surface water			6											X	Same as above
				Surface water			6											X	**Project No. 856.01**
				Surface water			6											X	**Task 0717.00**
				Surface water			6											X	QUOTE#

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)= H2SO4 (5) NH_3/NH_4 (6) NAOH

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	Matt McKechnie, Stillwater	8/30/23 1300		

RECEIVED AT LAB BY: **DATE/TIME:** 8/31/23 920 **CONDITIONS/COMMENTS:** 9.5/0.4

SHIPPED BY: ☒ **FED EX** ☐ **UPS** ☐ **OTHER** **AIR BILL #** 8172 8674 1501

Stillwater Sciences	Project:	Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number:	856.01 Task 0717.00	**CLS Work Order #: 23H1726**
Berkeley, CA 94705	Project Manager:	Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Field Blank (23H1726-01) Surface water Sampled: 08/30/23 08:55 Received: 08/31/23 09:20									
Ammonia as N	ND	0.10	mg/L	1	2307378	09/01/23	09/01/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2307289	08/31/23	08/31/23	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2307297	08/31/23	08/31/23	SM4500-P E	
Total Dissolved Solids	ND	10	"	"	2307326	08/31/23	09/05/23	SM2540C	
Total Kjeldahl Nitrogen	**0.52**	0.20	"	"	2307414	09/05/23	09/05/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2307526	09/07/23	09/08/23	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2307426	09/06/23	09/08/23	SM2540D	
LV-9 (23H1726-02) Surface water Sampled: 08/30/23 09:05 Received: 08/31/23 09:20									
Ammonia as N	ND	0.10	mg/L	1	2307378	09/01/23	09/01/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2307289	08/31/23	08/31/23	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2307297	08/31/23	08/31/23	SM4500-P E	
Total Dissolved Solids	**31**	10	"	"	2307326	08/31/23	09/05/23	SM2540C	
Total Kjeldahl Nitrogen	**0.27**	0.20	"	"	2307414	09/05/23	09/05/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2307526	09/07/23	09/08/23	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2307426	09/06/23	09/08/23	SM2540D	
LV-9 Duplicate (23H1726-03) Surface water Sampled: 08/30/23 09:05 Received: 08/31/23 09:20									
Ammonia as N	ND	0.10	mg/L	1	2307378	09/01/23	09/01/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2307289	08/31/23	08/31/23	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2307297	08/31/23	08/31/23	SM4500-P E	
Total Dissolved Solids	**29**	10	"	"	2307326	08/31/23	09/05/23	SM2540C	
Total Kjeldahl Nitrogen	ND	0.20	"	"	2307414	09/05/23	09/05/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2307526	09/07/23	09/08/23	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2307426	09/06/23	09/08/23	SM2540D	

Stillwater Sciences
2855 Telegraph Ave., Suite 400
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Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23H1726
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LV-8 (23H1726-04) Surface water Sampled: 08/30/23 09:35 Received: 08/31/23 09:20									
Ammonia as N	ND	0.10	mg/L	1	2307378	09/01/23	09/01/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2307289	08/31/23	08/31/23	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2307297	08/31/23	08/31/23	SM4500-P E	
Total Dissolved Solids	ND	10	"	"	2307326	08/31/23	09/05/23	SM2540C	
Total Kjeldahl Nitrogen	ND	0.20	"	"	2307414	09/05/23	09/05/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2307526	09/07/23	09/08/23	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2307426	09/06/23	09/08/23	SM2540D	
LV-10 (23H1726-05) Surface water Sampled: 08/30/23 10:40 Received: 08/31/23 09:20									
Ammonia as N	ND	0.10	mg/L	1	2307378	09/01/23	09/01/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2307289	08/31/23	08/31/23	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2307297	08/31/23	08/31/23	SM4500-P E	
Total Dissolved Solids	**37**	10	"	"	2307326	08/31/23	09/05/23	SM2540C	
Total Kjeldahl Nitrogen	ND	0.20	"	"	2307414	09/05/23	09/05/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2307526	09/07/23	09/08/23	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2307426	09/06/23	09/08/23	SM2540D	

Stillwater Sciences	Project:	Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number:	856.01 Task 0717.00	**CLS Work Order #: 23H1726**
Berkeley, CA 94705	Project Manager:	Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2307289 - General Prep										
Blank (2307289-BLK1)				Prepared & Analyzed: 08/31/23						
Nitrate/Nitrite as N	ND	0.40	mg/L							
LCS (2307289-BS1)				Prepared & Analyzed: 08/31/23						
Nitrate/Nitrite as N	4.03	0.40	mg/L	4.00		101	80-120			
LCS Dup (2307289-BSD1)				Prepared & Analyzed: 08/31/23						
Nitrate/Nitrite as N	4.06	0.40	mg/L	4.00		102	80-120	0.8	20	
Matrix Spike (2307289-MS1)		**Source: 23H1708-02**		Prepared & Analyzed: 08/31/23						
Nitrate/Nitrite as N	6.34	0.40	mg/L	4.00	2.25	102	80-120			
Matrix Spike Dup (2307289-MSD1)		**Source: 23H1708-02**		Prepared & Analyzed: 08/31/23						
Nitrate/Nitrite as N	6.67	0.40	mg/L	4.00	2.25	110	80-120	5	20	
Batch 2307297 - General Preparation										
Blank (2307297-BLK1)				Prepared & Analyzed: 08/31/23						
Orthophosphate as PO4	ND	0.15	mg/L							
LCS (2307297-BS1)				Prepared & Analyzed: 08/31/23						
Orthophosphate as PO4	0.846	0.15	mg/L	0.918		92	80-120			
LCS Dup (2307297-BSD1)				Prepared & Analyzed: 08/31/23						
Orthophosphate as PO4	0.862	0.15	mg/L	0.918		94	80-120	2	20	
Matrix Spike (2307297-MS1)		**Source: 23H1703-01**		Prepared & Analyzed: 08/31/23						
Orthophosphate as PO4	0.961	0.15	mg/L	0.918	0.171	86	75-125			

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2307297 - General Preparation										
Matrix Spike Dup (2307297-MSD1)	**Source: 23H1703-01**			Prepared & Analyzed: 08/31/23						
Orthophosphate as PO4	0.994	0.15	mg/L	0.918	0.171	90	75-125	3	25	
Batch 2307326 - General Preparation										
Blank (2307326-BLK1)				Prepared: 08/31/23 Analyzed: 09/05/23						
Total Dissolved Solids	ND	10	mg/L							
LCS (2307326-BS1)				Prepared: 08/31/23 Analyzed: 09/05/23						
Total Dissolved Solids	46.0	10	mg/L	50.0		92	80-120			
LCS Dup (2307326-BSD1)				Prepared: 08/31/23 Analyzed: 09/05/23						
Total Dissolved Solids	45.0	10	mg/L	50.0		90	80-120	2	200	
Duplicate (2307326-DUP1)	**Source: 23H1619-01**			Prepared: 08/31/23 Analyzed: 09/05/23						
Total Dissolved Solids	674	10	mg/L		676			0.3	20	
Batch 2307378 - General Preparation										
Blank (2307378-BLK1)				Prepared & Analyzed: 09/01/23						
Ammonia as N	ND	0.10	mg/L							
LCS (2307378-BS1)				Prepared & Analyzed: 09/01/23						
Ammonia as N	0.490	0.10	mg/L	0.500		98	80-120			
LCS Dup (2307378-BSD1)				Prepared & Analyzed: 09/01/23						
Ammonia as N	0.461	0.10	mg/L	0.500		92	80-120	6	25	

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2307378 - General Preparation										
Matrix Spike (2307378-MS1)		**Source: 23H1701-01**		Prepared & Analyzed: 09/01/23						
Ammonia as N	0.822	0.10	mg/L	0.500	0.240	116	75-125			
Matrix Spike Dup (2307378-MSD1)		**Source: 23H1701-01**		Prepared & Analyzed: 09/01/23						
Ammonia as N	0.677	0.10	mg/L	0.500	0.240	87	75-125	19	25	
Batch 2307414 - General Preparation										
Blank (2307414-BLK1)				Prepared & Analyzed: 09/05/23						
Total Kjeldahl Nitrogen	ND	0.20	mg/L							
LCS (2307414-BS1)				Prepared & Analyzed: 09/05/23						
Total Kjeldahl Nitrogen	0.425	0.20	mg/L	0.500		85	80-120			
LCS Dup (2307414-BSD1)				Prepared & Analyzed: 09/05/23						
Total Kjeldahl Nitrogen	0.436	0.20	mg/L	0.500		87	80-120	3	20	
Matrix Spike (2307414-MS1)		**Source: 23H1726-01**		Prepared & Analyzed: 09/05/23						
Total Kjeldahl Nitrogen	0.960	0.20	mg/L	0.500	0.518	88	75-125			
Matrix Spike Dup (2307414-MSD1)		**Source: 23H1726-01**		Prepared & Analyzed: 09/05/23						
Total Kjeldahl Nitrogen	0.930	0.20	mg/L	0.500	0.518	82	75-125	3	25	
Batch 2307426 - General Preparation										
Blank (2307426-BLK1)				Prepared: 09/06/23 Analyzed: 09/08/23						
Total Suspended Solids	ND	5.0	mg/L							

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2307426 - General Preparation										
LCS (2307426-BS1)				Prepared: 09/06/23 Analyzed: 09/08/23						
Total Suspended Solids	91.9	5.0	mg/L	100		92	80-120			
LCS Dup (2307426-BSD1)				Prepared: 09/06/23 Analyzed: 09/08/23						
Total Suspended Solids	91.8	5.0	mg/L	100		92	80-120	0.1	200	
Duplicate (2307426-DUP1)		**Source: 23H1726-01**		Prepared: 09/06/23 Analyzed: 09/08/23						
Total Suspended Solids	ND	5.0	mg/L		ND				20	
Batch 2307526 - General Preparation										
Blank (2307526-BLK1)				Prepared: 09/07/23 Analyzed: 09/08/23						
Total Phosphorus as P	ND	0.050	mg/L							
LCS (2307526-BS1)				Prepared: 09/07/23 Analyzed: 09/08/23						
Total Phosphorus as P	0.302	0.050	mg/L	0.300		101	80-120			
LCS Dup (2307526-BSD1)				Prepared: 09/07/23 Analyzed: 09/08/23						
Total Phosphorus as P	0.305	0.050	mg/L	0.300		102	80-120	1	25	
Matrix Spike (2307526-MS1)		**Source: 23H1726-01**		Prepared: 09/07/23 Analyzed: 09/08/23						
Total Phosphorus as P	0.332	0.050	mg/L	0.300	ND	111	75-125			
Matrix Spike Dup (2307526-MSD1)		**Source: 23H1726-01**		Prepared: 09/07/23 Analyzed: 09/08/23						
Total Phosphorus as P	0.335	0.050	mg/L	0.300	ND	112	75-125	0.9	30	

Stillwater Sciences	Project:	Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number:	856.01 Task 0717.00	**CLS Work Order #: 23H1726**
Berkeley, CA 94705	Project Manager:	Heather Neff	COC #:

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
*	The laboratory does not hold CA-ELAP accreditation for this analyte or method. Accreditation may not be available from CA-ELAP for this analyte or method.

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

September 08, 2023

CLS Work Order #: 23H1727
COC #:

Heather Neff
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: Lee Vining WQ

Enclosed are the results of analyses for samples received by the laboratory on 08/31/23 09:20. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

Daniel Johnson

Daniel Johnson
Technical Director

CA SWRCB ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY **CLS ID. NO.** 23H1727 (1 of 1)

Report To:

Stillwater Sciences
279 Cousteau Place Suite 400
Davis, CA 95618

Project Manager
Heather Neff heather@stillwatersci.com

Project Name
Lee Vining WQ

Sampled By MAM / EFA

Job Description
Monitor water chemistry in project reaches.

Site Location Lee Vining Hydroelectric Project

Client Job Number
856.01 Task 0717.00

Destination Laboratory
Rancho Cordova

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA
95742
www.californialab.com

☐ **OTHER**

ANALYSIS REQUESTED

GEOTRACKER

EDF REPORT YES ☒ ☐ NO

GLOBAL ID.

FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES ▼		Orthophosphate	Total phosphorous	Total Kjeldahl Nitrogen	Total Ammonia as N	Nitrate/Nitrite	TDS/TSS	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
8/29/23	0930	Equipment Blank		Surface water	3		6		X	X	X	X	X	X				x	
8/29/23	0950	LV-11-Surface		Surface water	3		6		X	X	X	X	X	X				x	
8/29/23	1110	LV-11-Bottom		Surface water	3		6		X	X	X	X	X	X				x	
				Surface water			6											x	
				Surface water			6											x	
				Surface water			6											x	
				Surface water			6											x	INVOICE TO:
				Surface water			6											x	Stillwater Sciences
				Surface water			6											x	Same as above
				Surface water			6											x	**Project No. 856.01**
				Surface water			6											x	**Task 0717.00**
				Surface water			6											x	QUOTE#

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)= H2SO4 (5) NH_3/NH_4 (6) NAOH

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
~~Elliott Allen~~ EA	Elliott Allen / Stillwater Sciences	1330 8/29		

RECEIVED AT LAB BY: **DATE/TIME:** 8/31/23 920 **CONDITIONS/COMMENTS:** 0.5/0.4

SHIPPED BY: ☒ **FED EX** ☐ **UPS** ☐ **OTHER** **AIR BILL #** 8172 8674 1523

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Equipment Blank (23H1727-01) Surface water Sampled: 08/29/23 09:30 Received: 08/31/23 09:20									
Ammonia as N	ND	0.10	mg/L	1	2307415	09/05/23	09/06/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2307289	08/31/23	08/31/23	EPA 300.0	HT-B2
Orthophosphate as PO4	ND	0.15	"	"	2307297	08/31/23	08/31/23	SM4500-P E	HT-B2
Total Dissolved Solids	ND	10	"	"	2307391	09/05/23	09/08/23	SM2540C	
Total Kjeldahl Nitrogen	ND	0.20	"	"	2307414	09/05/23	09/05/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2307526	09/07/23	09/08/23	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2307355	09/01/23	09/05/23	SM2540D	
LV-11-Surface (23H1727-02) Surface water Sampled: 08/29/23 09:50 Received: 08/31/23 09:20									
Ammonia as N	ND	0.10	mg/L	1	2307415	09/05/23	09/06/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2307289	08/31/23	08/31/23	EPA 300.0	HT-B2
Orthophosphate as PO4	ND	0.15	"	"	2307297	08/31/23	08/31/23	SM4500-P E	HT-B2
Total Dissolved Solids	**20**	10	"	"	2307391	09/05/23	09/08/23	SM2540C	
Total Kjeldahl Nitrogen	**0.30**	0.20	"	"	2307414	09/05/23	09/05/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2307526	09/07/23	09/08/23	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2307355	09/01/23	09/05/23	SM2540D	
LV-11-Bottom (23H1727-03) Surface water Sampled: 08/29/23 11:10 Received: 08/31/23 09:20									
Ammonia as N	**0.12**	0.10	mg/L	1	2307415	09/05/23	09/06/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2307289	08/31/23	08/31/23	EPA 300.0	A-COM
Orthophosphate as PO4	ND	0.15	"	"	2307297	08/31/23	08/31/23	SM4500-P E	HT-B2
Total Dissolved Solids	**15**	10	"	"	2307391	09/05/23	09/08/23	SM2540C	
Total Kjeldahl Nitrogen	**0.28**	0.20	"	"	2307414	09/05/23	09/05/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2307526	09/07/23	09/08/23	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2307355	09/01/23	09/05/23	SM2540D	

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: 856.01 Task 0717.00	**CLS Work Order #: 23H1727**
Berkeley, CA 94705	Project Manager: Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2307289 - General Prep										
Blank (2307289-BLK1)				Prepared & Analyzed: 08/31/23						
Nitrate/Nitrite as N	ND	0.40	mg/L							
LCS (2307289-BS1)				Prepared & Analyzed: 08/31/23						
Nitrate/Nitrite as N	4.03	0.40	mg/L	4.00		101	80-120			
LCS Dup (2307289-BSD1)				Prepared & Analyzed: 08/31/23						
Nitrate/Nitrite as N	4.06	0.40	mg/L	4.00		102	80-120	0.8	20	
Matrix Spike (2307289-MS1)		**Source: 23H1708-02**		Prepared & Analyzed: 08/31/23						
Nitrate/Nitrite as N	6.34	0.40	mg/L	4.00	2.25	102	80-120			
Matrix Spike Dup (2307289-MSD1)		**Source: 23H1708-02**		Prepared & Analyzed: 08/31/23						
Nitrate/Nitrite as N	6.67	0.40	mg/L	4.00	2.25	110	80-120	5	20	
Batch 2307297 - General Preparation										
Blank (2307297-BLK1)				Prepared & Analyzed: 08/31/23						
Orthophosphate as PO4	ND	0.15	mg/L							
LCS (2307297-BS1)				Prepared & Analyzed: 08/31/23						
Orthophosphate as PO4	0.846	0.15	mg/L	0.918		92	80-120			
LCS Dup (2307297-BSD1)				Prepared & Analyzed: 08/31/23						
Orthophosphate as PO4	0.862	0.15	mg/L	0.918		94	80-120	2	20	
Matrix Spike (2307297-MS1)		**Source: 23H1703-01**		Prepared & Analyzed: 08/31/23						
Orthophosphate as PO4	0.961	0.15	mg/L	0.918	0.171	86	75-125			

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2307297 - General Preparation										
Matrix Spike Dup (2307297-MSD1)	**Source: 23H1703-01**			Prepared & Analyzed: 08/31/23						
Orthophosphate as PO4	0.994	0.15	mg/L	0.918	0.171	90	75-125	3	25	
Batch 2307355 - General Preparation										
Blank (2307355-BLK1)				Prepared: 09/01/23 Analyzed: 09/05/23						
Total Suspended Solids	ND	5.0	mg/L							
LCS (2307355-BS1)				Prepared: 09/01/23 Analyzed: 09/05/23						
Total Suspended Solids	91.7	5.0	mg/L	100		92	80-120			
LCS Dup (2307355-BSD1)				Prepared: 09/01/23 Analyzed: 09/05/23						
Total Suspended Solids	91.5	5.0	mg/L	100		92	80-120	0.2	200	
Duplicate (2307355-DUP1)	**Source: 23H1615-02**			Prepared: 09/01/23 Analyzed: 09/05/23						
Total Suspended Solids	ND	5.0	mg/L		ND				20	
Batch 2307391 - General Preparation										
Blank (2307391-BLK1)				Prepared: 09/05/23 Analyzed: 09/08/23						
Total Dissolved Solids	ND	10	mg/L							
LCS (2307391-BS1)				Prepared: 09/05/23 Analyzed: 09/08/23						
Total Dissolved Solids	47.0	10	mg/L	50.0		94	80-120			
LCS Dup (2307391-BSD1)				Prepared: 09/05/23 Analyzed: 09/08/23						
Total Dissolved Solids	46.0	10	mg/L	50.0		92	80-120	2	200	

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2307391 - General Preparation										
Duplicate (2307391-DUP1)	**Source: 23H1727-01**			Prepared: 09/05/23 Analyzed: 09/08/23						
Total Dissolved Solids	5.00	10	mg/L		ND				20	
Batch 2307414 - General Preparation										
Blank (2307414-BLK1)				Prepared & Analyzed: 09/05/23						
Total Kjeldahl Nitrogen	ND	0.20	mg/L							
LCS (2307414-BS1)				Prepared & Analyzed: 09/05/23						
Total Kjeldahl Nitrogen	0.425	0.20	mg/L	0.500		85	80-120			
LCS Dup (2307414-BSD1)				Prepared & Analyzed: 09/05/23						
Total Kjeldahl Nitrogen	0.436	0.20	mg/L	0.500		87	80-120	3	20	
Matrix Spike (2307414-MS1)	**Source: 23H1726-01**			Prepared & Analyzed: 09/05/23						
Total Kjeldahl Nitrogen	0.960	0.20	mg/L	0.500	0.518	88	75-125			
Matrix Spike Dup (2307414-MSD1)	**Source: 23H1726-01**			Prepared & Analyzed: 09/05/23						
Total Kjeldahl Nitrogen	0.930	0.20	mg/L	0.500	0.518	82	75-125	3	25	
Batch 2307415 - General Preparation										
Blank (2307415-BLK1)				Prepared: 09/05/23 Analyzed: 09/06/23						
Ammonia as N	ND	0.10	mg/L							
LCS (2307415-BS1)				Prepared: 09/05/23 Analyzed: 09/06/23						
Ammonia as N	0.459	0.10	mg/L	0.500		92	80-120			

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2307415 - General Preparation										
LCS Dup (2307415-BSD1)				Prepared: 09/05/23 Analyzed: 09/06/23						
Ammonia as N	0.516	0.10	mg/L	0.500		103	80-120	12	25	
Matrix Spike (2307415-MS1)	**Source: 23H1727-01**			Prepared: 09/05/23 Analyzed: 09/06/23						
Ammonia as N	0.503	0.10	mg/L	0.500	0.0850	84	75-125			
Matrix Spike Dup (2307415-MSD1)	**Source: 23H1727-01**			Prepared: 09/05/23 Analyzed: 09/06/23						
Ammonia as N	0.487	0.10	mg/L	0.500	0.0850	80	75-125	3	25	
Batch 2307526 - General Preparation										
Blank (2307526-BLK1)				Prepared: 09/07/23 Analyzed: 09/08/23						
Total Phosphorus as P	ND	0.050	mg/L							
LCS (2307526-BS1)				Prepared: 09/07/23 Analyzed: 09/08/23						
Total Phosphorus as P	0.302	0.050	mg/L	0.300		101	80-120			
LCS Dup (2307526-BSD1)				Prepared: 09/07/23 Analyzed: 09/08/23						
Total Phosphorus as P	0.305	0.050	mg/L	0.300		102	80-120	1	25	
Matrix Spike (2307526-MS1)	**Source: 23H1726-01**			Prepared: 09/07/23 Analyzed: 09/08/23						
Total Phosphorus as P	0.332	0.050	mg/L	0.300	ND	111	75-125			
Matrix Spike Dup (2307526-MSD1)	**Source: 23H1726-01**			Prepared: 09/07/23 Analyzed: 09/08/23						
Total Phosphorus as P	0.335	0.050	mg/L	0.300	ND	112	75-125	0.9	30	

Stillwater Sciences	Project:	Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number:	856.01 Task 0717.00	**CLS Work Order #: 23H1727**
Berkeley, CA 94705	Project Manager:	Heather Neff	COC #:

Notes and Definitions

HT-B2	The remaining holding time was less than an hour when the sample was received at the laboratory. Therefore, it was analyzed outside the holding time.
A-COM	Sample was received over an hour before expiration, but logged in less than an hour before expiration. Therefore the sample was run outside of hold time.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
*	The laboratory does not hold CA-ELAP accreditation for this analyte or method. Accreditation may not be available from CA-ELAP for this analyte or method.

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

September 08, 2023

CLS Work Order #: 23H1728
COC #:

Heather Neff
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: Lee Vining WQ

Enclosed are the results of analyses for samples received by the laboratory on 08/31/23 09:20. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

Daniel Johnson

Daniel Johnson
Technical Director

CA SWRCB ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY CLS ID. NO. 23H1728 (1 of 1)

Report To:

Stillwater Sciences
279 Cousteau Place Suite 400
Davis, CA 95618

Project Manager
Heather Neff heather@stillwatersci.com

Project Name
Lee Vining WQ

Sampled By
CRW / EFA, Stillwater Sciences

Job Description
Monitor water chemistry in project reaches.

Site Location Lee Vining Hydroelectric Project

Client Job Number
856.01 Task 0717.00

Destination Laboratory
Rancho Cordova

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA
95742
www.californialab.com

☐ **OTHER**

ANALYSIS REQUESTED

GEOTRACKER

EDF REPORT YES ☒ ☐ NO

GLOBAL ID

FIELD CONDITIONS

Clear, Sunny

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES		Orthophosphate	Total phosphorous	Total Kjeldahl Nitrogen	Total Ammonia as N	Nitrate/Nitrite	TDS/TSS	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
8/30/23	1120	LV-6		Surface water	3		6		X	X	X	X	X	X				X	
8/30/23	1008	LV-7 Surface		Surface water	3		6		X	X	X	X	X	X				X	
8/30/23	1034	LV-7 Bottom		Surface water	3		6		X	X	X	X	X	X				X	
8/30/23	1115	Equipment Blank		Surface water	3		6		X	X	X	X	X	X				X	
				Surface water			6											X	
				Surface water			6											X	
				Surface water			6											X	INVOICE TO:
				Surface water			6											X	Stillwater Sciences
				Surface water			6											X	Same as above
				Surface water			6											X	**Project No. 856.01**
				Surface water			6											X	**Task 0717.00**
				Surface water			6											X	QUOTE#

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)= H2SO4 (5) NH_3/NH_4 (6) NAOH

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	Matt McKechnie	08/30/23		

RECEIVED AT LAB BY: DATE/TIME: 8/30/23 1300 CONDITIONS/COMMENTS: 0.5/0.4

SHIPPED BY: ☒ FED EX ☐ UPS ☐ OTHER 8/31/23 920 AIR BILL # 8172 8674 1497

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: 856.01 Task 0717.00	**CLS Work Order #: 23H1728**
Berkeley, CA 94705	Project Manager: Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LV-6 (23H1728-01) Surface water Sampled: 08/30/23 11:20 Received: 08/31/23 09:20									
Ammonia as N	ND	0.10	mg/L	1	2307415	09/05/23	09/06/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2307289	08/31/23	08/31/23	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2307297	08/31/23	08/31/23	SM4500-P E	
Total Dissolved Solids	**28**	10	"	"	2307326	08/31/23	09/05/23	SM2540C	
Total Kjeldahl Nitrogen	ND	0.20	"	"	2307414	09/05/23	09/05/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2307526	09/07/23	09/08/23	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2307426	09/06/23	09/08/23	SM2540D	
LV-7 Surface (23H1728-02) Surface water Sampled: 08/30/23 10:08 Received: 08/31/23 09:20									
Ammonia as N	ND	0.10	mg/L	1	2307415	09/05/23	09/06/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2307289	08/31/23	08/31/23	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2307297	08/31/23	08/31/23	SM4500-P E	
Total Dissolved Solids	**12**	10	"	"	2307326	08/31/23	09/05/23	SM2540C	
Total Kjeldahl Nitrogen	ND	0.20	"	"	2307414	09/05/23	09/05/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2307526	09/07/23	09/08/23	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2307426	09/06/23	09/08/23	SM2540D	
LV-7 Bottom (23H1728-03) Surface water Sampled: 08/30/23 10:34 Received: 08/31/23 09:20									
Ammonia as N	ND	0.10	mg/L	1	2307415	09/05/23	09/06/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2307289	08/31/23	08/31/23	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2307297	08/31/23	08/31/23	SM4500-P E	
Total Dissolved Solids	**12**	10	"	"	2307326	08/31/23	09/05/23	SM2540C	
Total Kjeldahl Nitrogen	ND	0.20	"	"	2307414	09/05/23	09/05/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2307526	09/07/23	09/08/23	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2307426	09/06/23	09/08/23	SM2540D	

Stillwater Sciences	Project:	Lee Vining WQ		
2855 Telegraph Ave., Suite 400	Project Number:	856.01 Task 0717.00	**CLS Work Order #: 23H1728**	
Berkeley, CA 94705	Project Manager:	Heather Neff	COC #:	

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Equipment Blank (23H1728-04) Surface water Sampled: 08/30/23 11:15 Received: 08/31/23 09:20									
Ammonia as N	ND	0.10	mg/L	1	2307415	09/05/23	09/06/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2307289	08/31/23	08/31/23	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2307297	08/31/23	08/31/23	SM4500-P E	
Total Dissolved Solids	ND	10	"	"	2307326	08/31/23	09/05/23	SM2540C	
Total Kjeldahl Nitrogen	ND	0.20	"	"	2307414	09/05/23	09/05/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2307526	09/07/23	09/08/23	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2307426	09/06/23	09/08/23	SM2540D	

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2307289 - General Prep										
Blank (2307289-BLK1)				Prepared & Analyzed: 08/31/23						
Nitrate/Nitrite as N	ND	0.40	mg/L							
LCS (2307289-BS1)				Prepared & Analyzed: 08/31/23						
Nitrate/Nitrite as N	4.03	0.40	mg/L	4.00		101	80-120			
LCS Dup (2307289-BSD1)				Prepared & Analyzed: 08/31/23						
Nitrate/Nitrite as N	4.06	0.40	mg/L	4.00		102	80-120	0.8	20	
Matrix Spike (2307289-MS1)		**Source: 23H1708-02**		Prepared & Analyzed: 08/31/23						
Nitrate/Nitrite as N	6.34	0.40	mg/L	4.00	2.25	102	80-120			
Matrix Spike Dup (2307289-MSD1)		**Source: 23H1708-02**		Prepared & Analyzed: 08/31/23						
Nitrate/Nitrite as N	6.67	0.40	mg/L	4.00	2.25	110	80-120	5	20	
Batch 2307297 - General Preparation										
Blank (2307297-BLK1)				Prepared & Analyzed: 08/31/23						
Orthophosphate as PO4	ND	0.15	mg/L							
LCS (2307297-BS1)				Prepared & Analyzed: 08/31/23						
Orthophosphate as PO4	0.846	0.15	mg/L	0.918		92	80-120			
LCS Dup (2307297-BSD1)				Prepared & Analyzed: 08/31/23						
Orthophosphate as PO4	0.862	0.15	mg/L	0.918		94	80-120	2	20	
Matrix Spike (2307297-MS1)		**Source: 23H1703-01**		Prepared & Analyzed: 08/31/23						
Orthophosphate as PO4	0.961	0.15	mg/L	0.918	0.171	86	75-125			

Stillwater Sciences	Project:	Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number:	856.01 Task 0717.00	**CLS Work Order #: 23H1728**
Berkeley, CA 94705	Project Manager:	Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2307297 - General Preparation										
Matrix Spike Dup (2307297-MSD1)		**Source: 23H1703-01**		Prepared & Analyzed: 08/31/23						
Orthophosphate as PO4	0.994	0.15	mg/L	0.918	0.171	90	75-125	3	25	
Batch 2307326 - General Preparation										
Blank (2307326-BLK1)				Prepared: 08/31/23 Analyzed: 09/05/23						
Total Dissolved Solids	ND	10	mg/L							
LCS (2307326-BS1)				Prepared: 08/31/23 Analyzed: 09/05/23						
Total Dissolved Solids	46.0	10	mg/L	50.0		92	80-120			
LCS Dup (2307326-BSD1)				Prepared: 08/31/23 Analyzed: 09/05/23						
Total Dissolved Solids	45.0	10	mg/L	50.0		90	80-120	2	200	
Duplicate (2307326-DUP1)		**Source: 23H1619-01**		Prepared: 08/31/23 Analyzed: 09/05/23						
Total Dissolved Solids	674	10	mg/L		676			0.3	20	
Batch 2307414 - General Preparation										
Blank (2307414-BLK1)				Prepared & Analyzed: 09/05/23						
Total Kjeldahl Nitrogen	ND	0.20	mg/L							
LCS (2307414-BS1)				Prepared & Analyzed: 09/05/23						
Total Kjeldahl Nitrogen	0.425	0.20	mg/L	0.500		85	80-120			
LCS Dup (2307414-BSD1)				Prepared & Analyzed: 09/05/23						
Total Kjeldahl Nitrogen	0.436	0.20	mg/L	0.500		87	80-120	3	20	

Stillwater Sciences 2855 Telegraph Ave., Suite 400 Berkeley, CA 94705	Project: Lee Vining WQ Project Number: 856.01 Task 0717.00 Project Manager: Heather Neff	**CLS Work Order #: 23H1728** COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2307414 - General Preparation										
Matrix Spike (2307414-MS1)		**Source: 23H1726-01**		Prepared & Analyzed: 09/05/23						
Total Kjeldahl Nitrogen	0.960	0.20	mg/L	0.500	0.518	88	75-125			
Matrix Spike Dup (2307414-MSD1)		**Source: 23H1726-01**		Prepared & Analyzed: 09/05/23						
Total Kjeldahl Nitrogen	0.930	0.20	mg/L	0.500	0.518	82	75-125	3	25	
Batch 2307415 - General Preparation										
Blank (2307415-BLK1)				Prepared: 09/05/23 Analyzed: 09/06/23						
Ammonia as N	ND	0.10	mg/L							
LCS (2307415-BS1)				Prepared: 09/05/23 Analyzed: 09/06/23						
Ammonia as N	0.459	0.10	mg/L	0.500		92	80-120			
LCS Dup (2307415-BSD1)				Prepared: 09/05/23 Analyzed: 09/06/23						
Ammonia as N	0.516	0.10	mg/L	0.500		103	80-120	12	25	
Matrix Spike (2307415-MS1)		**Source: 23H1727-01**		Prepared: 09/05/23 Analyzed: 09/06/23						
Ammonia as N	0.503	0.10	mg/L	0.500	0.0850	84	75-125			
Matrix Spike Dup (2307415-MSD1)		**Source: 23H1727-01**		Prepared: 09/05/23 Analyzed: 09/06/23						
Ammonia as N	0.487	0.10	mg/L	0.500	0.0850	80	75-125	3	25	
Batch 2307426 - General Preparation										
Blank (2307426-BLK1)				Prepared: 09/06/23 Analyzed: 09/08/23						
Total Suspended Solids	ND	5.0	mg/L							

Stillwater Sciences	Project:	Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number:	856.01 Task 0717.00	**CLS Work Order #: 23H1728**
Berkeley, CA 94705	Project Manager:	Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2307426 - General Preparation										
LCS (2307426-BS1)				Prepared: 09/06/23 Analyzed: 09/08/23						
Total Suspended Solids	91.9	5.0	mg/L	100		92	80-120			
LCS Dup (2307426-BSD1)				Prepared: 09/06/23 Analyzed: 09/08/23						
Total Suspended Solids	91.8	5.0	mg/L	100		92	80-120	0.1	200	
Duplicate (2307426-DUP1)		**Source: 23H1726-01**		Prepared: 09/06/23 Analyzed: 09/08/23						
Total Suspended Solids	ND	5.0	mg/L		ND				20	
Batch 2307526 - General Preparation										
Blank (2307526-BLK1)				Prepared: 09/07/23 Analyzed: 09/08/23						
Total Phosphorus as P	ND	0.050	mg/L							
LCS (2307526-BS1)				Prepared: 09/07/23 Analyzed: 09/08/23						
Total Phosphorus as P	0.302	0.050	mg/L	0.300		101	80-120			
LCS Dup (2307526-BSD1)				Prepared: 09/07/23 Analyzed: 09/08/23						
Total Phosphorus as P	0.305	0.050	mg/L	0.300		102	80-120	1	25	
Matrix Spike (2307526-MS1)		**Source: 23H1726-01**		Prepared: 09/07/23 Analyzed: 09/08/23						
Total Phosphorus as P	0.332	0.050	mg/L	0.300	ND	111	75-125			
Matrix Spike Dup (2307526-MSD1)		**Source: 23H1726-01**		Prepared: 09/07/23 Analyzed: 09/08/23						
Total Phosphorus as P	0.335	0.050	mg/L	0.300	ND	112	75-125	0.9	30	

Stillwater Sciences	Project:	Lee Vining WQ		
2855 Telegraph Ave., Suite 400	Project Number:	856.01 Task 0717.00	**CLS Work Order #: 23H1728**	
Berkeley, CA 94705	Project Manager:	Heather Neff	COC #:	

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
*	The laboratory does not hold CA-ELAP accreditation for this analyte or method. Accreditation may not be available from CA-ELAP for this analyte or method.

CALIFORNIA LABORATORY SERVICES
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September 11, 2023

CLS Work Order #: 23I0001
COC #:

Heather Neff
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: Lee Vining WQ

Enclosed are the results of analyses for samples received by the laboratory on 09/01/23 08:15. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

Daniel Johnson

Daniel Johnson
Technical Director

CA SWRCB ELAP Accreditation/Registration number 1233

09/11/23 14:42

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: 856.01 Task 0717.00	**CLS Work Order #: 23I0001**
Berkeley, CA 94705	Project Manager: Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Field BLANK (23I0001-01) Surface water Sampled: 08/31/23 09:10 Received: 09/01/23 08:15										
Ammonia as N	**0.045**	0.025	0.10	mg/L	1	2307415	09/05/23	09/06/23	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2307343	09/01/23	09/01/23	EPA 300.0	
Orthophosphate as PO4	**0.027**	0.0051	0.15	"	"	2307353	09/01/23	09/01/23	SM4500-P E	J
Total Dissolved Solids	ND	5.0	10	"	"	2307391	09/05/23	09/08/23	SM2540C	
Total Kjeldahl Nitrogen	**0.081**	0.040	0.20	"	"	2307414	09/05/23	09/05/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2307526	09/07/23	09/08/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2307426	09/06/23	09/08/23	SM2540D	
Equipment BLANK (23I0001-02) Surface water Sampled: 08/31/23 09:15 Received: 09/01/23 08:15										
Ammonia as N	**0.053**	0.025	0.10	mg/L	1	2307415	09/05/23	09/06/23	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2307343	09/01/23	09/01/23	EPA 300.0	
Orthophosphate as PO4	**0.0066**	0.0051	0.15	"	"	2307353	09/01/23	09/01/23	SM4500-P E	J
Total Dissolved Solids	**6.0**	5.0	10	"	"	2307391	09/05/23	09/08/23	SM2540C	J
Total Kjeldahl Nitrogen	**0.13**	0.040	0.20	"	"	2307414	09/05/23	09/05/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2307526	09/07/23	09/08/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2307426	09/06/23	09/08/23	SM2540D	
LV-1 (23I0001-03) Surface water Sampled: 08/31/23 10:05 Received: 09/01/23 08:15										
Ammonia as N	**0.031**	0.025	0.10	mg/L	1	2307415	09/05/23	09/06/23	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2307343	09/01/23	09/01/23	EPA 300.0	
Orthophosphate as PO4	**0.040**	0.0051	0.15	"	"	2307353	09/01/23	09/01/23	SM4500-P E	J
Total Dissolved Solids	ND	5.0	10	"	"	2307391	09/05/23	09/08/23	SM2540C	
Total Kjeldahl Nitrogen	**0.11**	0.040	0.20	"	"	2307414	09/05/23	09/05/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2307526	09/07/23	09/08/23	SM4500-P E	
Total Suspended Solids	**2.0**	2.0	5.0	"	"	2307426	09/06/23	09/08/23	SM2540D	J

09/11/23 14:42

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23I0001
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LV-1 Field duplicate (23I0001-04) Surface water Sampled: 08/31/23 10:12 Received: 09/01/23 08:15										
Ammonia as N	**0.032**	0.025	0.10	mg/L	1	2307415	09/05/23	09/06/23	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2307343	09/01/23	09/01/23	EPA 300.0	
Orthophosphate as PO4	**0.023**	0.0051	0.15	"	"	2307353	09/01/23	09/01/23	SM4500-P E	J
Total Dissolved Solids	**9.0**	5.0	10	"	"	2307391	09/05/23	09/08/23	SM2540C	J
Total Kjeldahl Nitrogen	**0.12**	0.040	0.20	"	"	2307414	09/05/23	09/05/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2307526	09/07/23	09/08/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2307426	09/06/23	09/08/23	SM2540D	
LV-2 Surface (23I0001-05) Surface water Sampled: 08/31/23 11:23 Received: 09/01/23 08:15										
Ammonia as N	**0.067**	0.025	0.10	mg/L	1	2307415	09/05/23	09/06/23	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2307343	09/01/23	09/01/23	EPA 300.0	
Orthophosphate as PO4	**0.019**	0.0051	0.15	"	"	2307353	09/01/23	09/01/23	SM4500-P E	J
Total Dissolved Solids	**8.0**	5.0	10	"	"	2307391	09/05/23	09/08/23	SM2540C	J
Total Kjeldahl Nitrogen	**0.085**	0.040	0.20	"	"	2307414	09/05/23	09/05/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2307526	09/07/23	09/08/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2307426	09/06/23	09/08/23	SM2540D	
LV-2 Bottom (23I0001-06) Surface water Sampled: 08/31/23 11:45 Received: 09/01/23 08:15										
Ammonia as N	**0.031**	0.025	0.10	mg/L	1	2307415	09/05/23	09/06/23	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	**0.073**	0.055	0.40	"	"	2307343	09/01/23	09/01/23	EPA 300.0	J
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2307353	09/01/23	09/01/23	SM4500-P E	
Total Dissolved Solids	**25**	5.0	10	"	"	2307391	09/05/23	09/08/23	SM2540C	
Total Kjeldahl Nitrogen	**0.071**	0.040	0.20	"	"	2307414	09/05/23	09/05/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2307526	09/07/23	09/08/23	SM4500-P E	
Total Suspended Solids	**3.8**	2.0	5.0	"	"	2307426	09/06/23	09/08/23	SM2540D	J

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23I0001
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Batch 2307343 - General Prep

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (2307343-BLK1)					Prepared & Analyzed: 09/01/23						
Nitrate/Nitrite as N	ND	0.055	0.40	mg/L							
LCS (2307343-BS1)					Prepared & Analyzed: 09/01/23						
Nitrate/Nitrite as N	3.91	0.055	0.40	mg/L	4.00		98	80-120			
LCS Dup (2307343-BSD1)					Prepared & Analyzed: 09/01/23						
Nitrate/Nitrite as N	3.86	0.055	0.40	mg/L	4.00		96	80-120	1	20	
Matrix Spike (2307343-MS1)			**Source: 23H1749-04**		Prepared & Analyzed: 09/01/23						
Nitrate/Nitrite as N	4.78	0.055	0.40	mg/L	4.00	0.827	99	80-120			
Matrix Spike Dup (2307343-MSD1)			**Source: 23H1749-04**		Prepared & Analyzed: 09/01/23						
Nitrate/Nitrite as N	4.83	0.055	0.40	mg/L	4.00	0.827	100	80-120	0.9	20	

Batch 2307353 - General Preparation

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (2307353-BLK1)					Prepared & Analyzed: 09/01/23						
Orthophosphate as PO4	ND	0.0051	0.15	mg/L							
LCS (2307353-BS1)					Prepared & Analyzed: 09/01/23						
Orthophosphate as PO4	0.920	0.0051	0.15	mg/L	0.918		100	80-120			
LCS Dup (2307353-BSD1)					Prepared & Analyzed: 09/01/23						
Orthophosphate as PO4	0.895	0.0051	0.15	mg/L	0.918		98	80-120	3	20	
Matrix Spike (2307353-MS1)			**Source: 23I0001-01**		Prepared & Analyzed: 09/01/23						
Orthophosphate as PO4	1.06	0.0051	0.15	mg/L	0.918	0.0271	113	75-125			

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23I0001
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2307353 - General Preparation											
Matrix Spike Dup (2307353-MSD1)			**Source: 23I0001-01**		Prepared & Analyzed: 09/01/23						
Orthophosphate as PO4	1.08	0.0051	0.15	mg/L	0.918	0.0271	115	75-125	2	25	
Batch 2307391 - General Preparation											
Blank (2307391-BLK1)					Prepared: 09/05/23 Analyzed: 09/08/23						
Total Dissolved Solids	ND	5.0	10	mg/L							
LCS (2307391-BS1)					Prepared: 09/05/23 Analyzed: 09/08/23						
Total Dissolved Solids	47.0	5.0	10	mg/L	50.0		94	80-120			
LCS Dup (2307391-BSD1)					Prepared: 09/05/23 Analyzed: 09/08/23						
Total Dissolved Solids	46.0	5.0	10	mg/L	50.0		92	80-120	2	200	
Duplicate (2307391-DUP1)			**Source: 23H1727-01**		Prepared: 09/05/23 Analyzed: 09/08/23						
Total Dissolved Solids	5.00	5.0	10	mg/L		ND				20	J
Batch 2307414 - General Preparation											
Blank (2307414-BLK1)					Prepared & Analyzed: 09/05/23						
Total Kjeldahl Nitrogen	0.0650	0.040	0.20	mg/L							J
LCS (2307414-BS1)					Prepared & Analyzed: 09/05/23						
Total Kjeldahl Nitrogen	0.425	0.040	0.20	mg/L	0.500		85	80-120			
LCS Dup (2307414-BSD1)					Prepared & Analyzed: 09/05/23						
Total Kjeldahl Nitrogen	0.436	0.040	0.20	mg/L	0.500		87	80-120	3	20	

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2307414 - General Preparation											
Matrix Spike (2307414-MS1)			**Source: 23H1726-01**		Prepared & Analyzed: 09/05/23						
Total Kjeldahl Nitrogen	0.960	0.040	0.20	mg/L	0.500	0.518	88	75-125			
Matrix Spike Dup (2307414-MSD1)			**Source: 23H1726-01**		Prepared & Analyzed: 09/05/23						
Total Kjeldahl Nitrogen	0.930	0.040	0.20	mg/L	0.500	0.518	82	75-125	3	25	
Batch 2307415 - General Preparation											
Blank (2307415-BLK1)					Prepared: 09/05/23 Analyzed: 09/06/23						
Ammonia as N	0.0270	0.025	0.10	mg/L							J
LCS (2307415-BS1)					Prepared: 09/05/23 Analyzed: 09/06/23						
Ammonia as N	0.459	0.025	0.10	mg/L	0.500		92	80-120			
LCS Dup (2307415-BSD1)					Prepared: 09/05/23 Analyzed: 09/06/23						
Ammonia as N	0.516	0.025	0.10	mg/L	0.500		103	80-120	12	25	
Matrix Spike (2307415-MS1)			**Source: 23H1727-01**		Prepared: 09/05/23 Analyzed: 09/06/23						
Ammonia as N	0.503	0.025	0.10	mg/L	0.500	0.0850	84	75-125			
Matrix Spike Dup (2307415-MSD1)			**Source: 23H1727-01**		Prepared: 09/05/23 Analyzed: 09/06/23						
Ammonia as N	0.487	0.025	0.10	mg/L	0.500	0.0850	80	75-125	3	25	
Batch 2307426 - General Preparation											
Blank (2307426-BLK1)					Prepared: 09/06/23 Analyzed: 09/08/23						
Total Suspended Solids	ND	2.0	5.0	mg/L							

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23I0001
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2307426 - General Preparation											
LCS (2307426-BS1)					Prepared: 09/06/23 Analyzed: 09/08/23						
Total Suspended Solids	91.9	2.0	5.0	mg/L	100		92	80-120			
LCS Dup (2307426-BSD1)					Prepared: 09/06/23 Analyzed: 09/08/23						
Total Suspended Solids	91.8	2.0	5.0	mg/L	100		92	80-120	0.1	200	
Duplicate (2307426-DUP1)			**Source: 23H1726-01**		Prepared: 09/06/23 Analyzed: 09/08/23						
Total Suspended Solids	ND	2.0	5.0	mg/L		ND				20	
Batch 2307526 - General Preparation											
Blank (2307526-BLK1)					Prepared: 09/07/23 Analyzed: 09/08/23						
Total Phosphorus as P	ND	0.023	0.050	mg/L							
LCS (2307526-BS1)					Prepared: 09/07/23 Analyzed: 09/08/23						
Total Phosphorus as P	0.302	0.023	0.050	mg/L	0.300		101	80-120			
LCS Dup (2307526-BSD1)					Prepared: 09/07/23 Analyzed: 09/08/23						
Total Phosphorus as P	0.305	0.023	0.050	mg/L	0.300		102	80-120	1	25	
Matrix Spike (2307526-MS1)			**Source: 23H1726-01**		Prepared: 09/07/23 Analyzed: 09/08/23						
Total Phosphorus as P	0.332	0.023	0.050	mg/L	0.300	ND	111	75-125			
Matrix Spike Dup (2307526-MSD1)			**Source: 23H1726-01**		Prepared: 09/07/23 Analyzed: 09/08/23						
Total Phosphorus as P	0.335	0.023	0.050	mg/L	0.300	ND	112	75-125	0.9	30	

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23I0001
COC #:

Notes and Definitions

J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
*	The laboratory does not hold CA-ELAP accreditation for this analyte or method. Accreditation may not be available from CA-ELAP for this analyte or method.

This is a “MDL Report”, thus if the report denotes an “ND” for a particular analyte, it should be noted that the analyte was not detected at or above the MDL.

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY **CLS ID. NO.** ~~[illegible]~~ 2310001 (1 of 1)

Report To:

Stillwater Sciences
279 Cousteau Place Suite 400
Davis, CA 95618

Project Manager
Heather Neff heather@stillwatersci.com

Project Name
Lee Vining WQ

Sampled By
CRW, EFA, Stillwater Sciences

Job Description
Monitor water chemistry in project reaches.

Site Location Lee Vining Hydroelectric Project

Client Job Number
856.01 Task 0717.00

Destination Laboratory
Rancho Cordova

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA
95742
www.californialab.com

☐ **OTHER**

GEOTRACKER

EDF REPORT YES ☒ ☐ NO

GLOBAL ID.

FIELD CONDITIONS:
Clear, Sunny, windy

DATE	**TIME**	**SAMPLE IDENTIFICATION**	**FIELD ID.**	**MATRIX**	**CONTAINER NO.**	**CONTAINER TYPE**	**PRESERVATIVES** ▼		Orthophosphate	Total phosphorous	Total Kjeldahl Nitrogen	Total Ammonia as N	Nitrate/Nitrite	TDS/TSS	**TURNAROUND TIME IN DAYS 1**	**2**	**3**	**5**	**SPECIAL INSTRUCTIONS**
8/31/23	0910	Field BLANK		Surface water	3		6		X	X	X	X	X	X				x	
8/31/23	0915	Equipment BLANK		Surface water	3		6		X	X	X	X	X	X				x	
8/31/23	1005	LV-1		Surface water	3		6		X	X	X	X	X	X				x	
8/31/23	1012	LV-1 Field duplicate		Surface water	2		6		X	X	X	X	X	X				x	
8/31/23	1123	LV-2 - Surface		Surface water	3		6		X	X	X	X	X	X				x	
8/31/23	1145	LV-2 - Bottom		Surface water	3		6		X	X	X	X	X	X				x	No H_2SO_4 (rinsed out)
				Surface water			6											x	INVOICE TO:
				Surface water			6											x	Stillwater Sciences
				Surface water			6											x	Same as above
				Surface water			6											x	**Project No. 856.01**
				Surface water			6											x	**Task 0717.00**
				Surface water			6											x	QUOTE#

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)= H2SO4 (5) NH_3/NH_4 (6) NAOH

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Elliott Allen	Elliott Allen Stillwater Sciences	~~[illegible]~~ 9/1/23 815am		

RECEIVED AT LAB BY: **DATE/TIME:** 9/1/23 815 **CONDITIONS/COMMENTS:** 5.3/5.2

SHIPPED BY: ☒ FED EX EA ☐ UPS ☒ OTHER Delivery **AIR BILL #**

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

October 17, 2023

CLS Work Order #: 23J0529
COC #:

Heather Neff
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: Lee Vining WQ

Enclosed are the results of analyses for samples received by the laboratory on 10/10/23 09:45. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

Daniel Johnson

Daniel Johnson
Technical Director

CA SWRCB ELAP Accreditation/Registration number 1233

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23J0529
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Dup-1 (23J0529-01) Surface water Sampled: 10/09/23 10:50 Received: 10/10/23 09:45										
Ammonia as N	**0.026**	0.025	0.10	mg/L	1	2308630	10/12/23	10/12/23	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	**0.10**	0.055	0.40	"	"	2308483	10/10/23	10/10/23	EPA 300.0	J
Orthophosphate as PO4	**0.012**	0.0051	0.15	"	"	2308517	10/10/23	10/10/23	SM4500-P E	J
Total Dissolved Solids	**20**	5.0	10	"	"	2308561	10/11/23	10/13/23	SM2540C	
Total Kjeldahl Nitrogen	**0.081**	0.040	0.20	"	"	2308659	10/13/23	10/13/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2308645	10/13/23	10/13/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2308559	10/11/23	10/13/23	SM2540D	
LV-4 (23J0529-02) Surface water Sampled: 10/09/23 11:15 Received: 10/10/23 09:45										
Ammonia as N	ND	0.025	0.10	mg/L	1	2308630	10/12/23	10/12/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	**0.078**	0.055	0.40	"	"	2308483	10/10/23	10/10/23	EPA 300.0	J
Orthophosphate as PO4	**0.028**	0.0051	0.15	"	"	2308517	10/10/23	10/10/23	SM4500-P E	J
Total Dissolved Solids	**17**	5.0	10	"	"	2308561	10/11/23	10/13/23	SM2540C	
Total Kjeldahl Nitrogen	**0.12**	0.040	0.20	"	"	2308659	10/13/23	10/13/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2308645	10/13/23	10/13/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2308559	10/11/23	10/13/23	SM2540D	
LV-12 (23J0529-03) Surface water Sampled: 10/09/23 11:45 Received: 10/10/23 09:45										
Ammonia as N	ND	0.025	0.10	mg/L	1	2308630	10/12/23	10/12/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	**0.075**	0.055	0.40	"	"	2308483	10/10/23	10/10/23	EPA 300.0	J
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2308517	10/10/23	10/10/23	SM4500-P E	
Total Dissolved Solids	**27**	5.0	10	"	"	2308561	10/11/23	10/13/23	SM2540C	
Total Kjeldahl Nitrogen	**0.12**	0.040	0.20	"	"	2308659	10/13/23	10/13/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2308645	10/13/23	10/13/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2308559	10/11/23	10/13/23	SM2540D	

10/17/23 12:47

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: 856.01 Task 0717.00	**CLS Work Order #: 23J0529**
Berkeley, CA 94705	Project Manager: Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308483 - General Prep											
Blank (2308483-BLK1)					Prepared & Analyzed: 10/10/23						
Nitrate/Nitrite as N	ND	0.055	0.40	mg/L							
LCS (2308483-BS1)					Prepared & Analyzed: 10/10/23						
Nitrate/Nitrite as N	3.93	0.055	0.40	mg/L	4.00		98	80-120			
LCS Dup (2308483-BSD1)					Prepared & Analyzed: 10/10/23						
Nitrate/Nitrite as N	3.81	0.055	0.40	mg/L	4.00		95	80-120	3	20	
Matrix Spike (2308483-MS1)			**Source: 23J0507-04**		Prepared & Analyzed: 10/10/23						
Nitrate/Nitrite as N	4.25	0.055	0.40	mg/L	4.00	0.771	87	80-120			
Matrix Spike Dup (2308483-MSD1)			**Source: 23J0507-04**		Prepared & Analyzed: 10/10/23						
Nitrate/Nitrite as N	5.14	0.055	0.40	mg/L	4.00	0.771	109	80-120	19	20	
Batch 2308517 - General Preparation											
Blank (2308517-BLK1)					Prepared & Analyzed: 10/10/23						
Orthophosphate as PO4	ND	0.0051	0.15	mg/L							
LCS (2308517-BS1)					Prepared & Analyzed: 10/10/23						
Orthophosphate as PO4	1.05	0.0051	0.15	mg/L	0.918		114	80-120			
LCS Dup (2308517-BSD1)					Prepared & Analyzed: 10/10/23						
Orthophosphate as PO4	0.974	0.0051	0.15	mg/L	0.918		106	80-120	7	20	
Matrix Spike (2308517-MS1)			**Source: 23J0529-01**		Prepared & Analyzed: 10/10/23						
Orthophosphate as PO4	1.05	0.0051	0.15	mg/L	0.918	0.0115	113	75-125			

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308517 - General Preparation											
Matrix Spike Dup (2308517-MSD1)			**Source: 23J0529-01**		Prepared & Analyzed: 10/10/23						
Orthophosphate as PO4	1.15	0.0051	0.15	mg/L	0.918	0.0115	124	75-125	10	25	
Batch 2308559 - General Preparation											
Blank (2308559-BLK1)					Prepared: 10/11/23 Analyzed: 10/13/23						
Total Suspended Solids	ND	2.0	5.0	mg/L							
LCS (2308559-BS1)					Prepared: 10/11/23 Analyzed: 10/13/23						
Total Suspended Solids	92.9	2.0	5.0	mg/L	100		93	80-120			
LCS Dup (2308559-BSD1)					Prepared: 10/11/23 Analyzed: 10/13/23						
Total Suspended Solids	93.0	2.0	5.0	mg/L	100		93	80-120	0.1	200	
Duplicate (2308559-DUP1)			**Source: 23J0472-01**		Prepared: 10/11/23 Analyzed: 10/13/23						
Total Suspended Solids	ND	5.0	13	mg/L		ND				20	
Batch 2308561 - General Preparation											
Blank (2308561-BLK1)					Prepared: 10/11/23 Analyzed: 10/13/23						
Total Dissolved Solids	ND	5.0	10	mg/L							
LCS (2308561-BS1)					Prepared: 10/11/23 Analyzed: 10/13/23						
Total Dissolved Solids	46.0	5.0	10	mg/L	50.0		92	80-120			
LCS Dup (2308561-BSD1)					Prepared: 10/11/23 Analyzed: 10/13/23						
Total Dissolved Solids	45.0	5.0	10	mg/L	50.0		90	80-120	2	200	

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: 856.01 Task 0717.00	**CLS Work Order #: 23J0529**
Berkeley, CA 94705	Project Manager: Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308561 - General Preparation											
Duplicate (2308561-DUP1)			**Source: 23J0494-01**		Prepared: 10/11/23 Analyzed: 10/13/23						
Total Dissolved Solids	615	5.0	10	mg/L		615			0	20	
Batch 2308630 - General Preparation											
Blank (2308630-BLK1)					Prepared & Analyzed: 10/12/23						
Ammonia as N	ND	0.025	0.10	mg/L							
LCS (2308630-BS1)					Prepared & Analyzed: 10/12/23						
Ammonia as N	0.462	0.025	0.10	mg/L	0.500		92	80-120			
LCS Dup (2308630-BSD1)					Prepared & Analyzed: 10/12/23						
Ammonia as N	0.472	0.025	0.10	mg/L	0.500		94	80-120	2	25	
Matrix Spike (2308630-MS1)			**Source: 23J0529-01**		Prepared & Analyzed: 10/12/23						
Ammonia as N	0.468	0.025	0.10	mg/L	0.500	0.0260	88	75-125			
Matrix Spike Dup (2308630-MSD1)			**Source: 23J0529-01**		Prepared & Analyzed: 10/12/23						
Ammonia as N	0.483	0.025	0.10	mg/L	0.500	0.0260	91	75-125	3	25	
Batch 2308645 - General Preparation											
Blank (2308645-BLK1)					Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	ND	0.023	0.050	mg/L							
LCS (2308645-BS1)					Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.335	0.023	0.050	mg/L	0.300		112	80-120			

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23J0529
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308645 - General Preparation											
LCS Dup (2308645-BSD1)					Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.311	0.023	0.050	mg/L	0.300		104	80-120	8	25	
Matrix Spike (2308645-MS1)			**Source: 23J0529-03**		Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.318	0.023	0.050	mg/L	0.300	ND	106	75-125			
Matrix Spike Dup (2308645-MSD1)			**Source: 23J0529-03**		Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.318	0.023	0.050	mg/L	0.300	ND	106	75-125	0	30	
Batch 2308659 - General Preparation											
Blank (2308659-BLK1)					Prepared & Analyzed: 10/13/23						
Total Kjeldahl Nitrogen	0.0740	0.040	0.20	mg/L							J
LCS (2308659-BS1)					Prepared & Analyzed: 10/13/23						
Total Kjeldahl Nitrogen	0.481	0.040	0.20	mg/L	0.500		96	80-120			
LCS Dup (2308659-BSD1)					Prepared & Analyzed: 10/13/23						
Total Kjeldahl Nitrogen	0.478	0.040	0.20	mg/L	0.500		96	80-120	0.6	20	
Matrix Spike (2308659-MS1)			**Source: 23J0529-01**		Prepared & Analyzed: 10/13/23						
Total Kjeldahl Nitrogen	0.350	0.040	0.20	mg/L	0.500	0.0810	54	75-125			QM-5
Matrix Spike Dup (2308659-MSD1)			**Source: 23J0529-01**		Prepared & Analyzed: 10/13/23						
Total Kjeldahl Nitrogen	0.363	0.040	0.20	mg/L	0.500	0.0810	56	75-125	4	25	QM-5

10/17/23 12:47

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: 856.01 Task 0717.00	**CLS Work Order #: 23J0529**
Berkeley, CA 94705	Project Manager: Heather Neff	COC #:

Notes and Definitions

QM-5	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
*	The laboratory does not hold CA-ELAP accreditation for this analyte or method. Accreditation may not be available from CA-ELAP for this analyte or method.

This is a “MDL Report”, thus if the report denotes an “ND” for a particular analyte, it should be noted that the analyte was not detected at or above the MDL.

CALIFORNIA LABORATORY SERVICES CHAIN OF COUSTODY

CLS ID. NO. 23J0529 (1 of 1)

Report To:

Stillwater Sciences
279 Cousteau Place Suite 400
Davis, CA 95618

Project Manager
Heather Neff heather@stillwatersci.com

Project Name
Lee Vining WQ

Sampled By

Job Description
Monitor water chemistry in project reaches.

Site Location Lee Vining Hydroelectric Project

Client Job Number
856.01 Task 0717.00

Destination Laboratory
Rancho Cordova

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA
95742
www.californialab.com

☐ **OTHER**

GEOTRACKER

EDF REPORT YES ☒ ☐ NO

GLOBAL ID.

FIELD CONDITIONS:

ANALYSIS REQUESTED

DATE	**TIME**	**SAMPLE IDENTIFICATION**	**FIELD ID.**	**MATRIX**	**CONTAINER NO.**	**CONTAINER TYPE**	**PRESERVATIVES** ▼		Orthophosphate	Total phosphorous	Total Kjeldahl Nitrogen	Total Ammonia as N	Nitrate/Nitrite	TDS/TSS	**TURNAROUND TIME IN DAYS 1**	**2**	**3**	**5**	**SPECIAL INSTRUCTIONS**
10/9	1050	Dup-1		Surface water	3		6	X	X	X	X	X	X	X				X	
√	1115	LV-4		Surface water	√		6	√	√	√	√	√	√	√				X	
√	1143	LV-12		Surface water	√		6	√	√	√	√	√	√	√				X	
				Surface water			6											X	
				Surface water			6											X	
				Surface water			6											X	
				Surface water			6											X	INVOICE TO:
				Surface water			6											X	Stillwater Sciences
				Surface water			6											X	Same as above
				Surface water			6											X	**Project No. 856.01**
				Surface water			6											X	**Task 0717.00**
				Surface water			6											X	QUOTE#

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)= H2SO4 (5) NH_3/NH_4 (6) NAOH

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY

RECEIVED AT LAB BY: **DATE/TIME:** 10/10/23 945 **CONDITIONS/COMMENTS:** 2.3/2.2

SHIPPED BY: ☒ **FED EX** ☐ **UPS** ☐ **OTHER** **AIR BILL #** 8172 8674 1372

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

October 17, 2023

CLS Work Order #: 23J0530
COC #:

Heather Neff
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: Lee Vining WQ

Enclosed are the results of analyses for samples received by the laboratory on 10/10/23 09:45. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

Daniel Johnson

Daniel Johnson
Technical Director

CA SWRCB ELAP Accreditation/Registration number 1233

10/17/23 12:48

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23J0530
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LV-6 (23J0530-01) Surface water	**Sampled: 10/09/23 10:00**		**Received: 10/10/23 09:45**							
Ammonia as N	ND	0.025	0.10	mg/L	1	2308630	10/12/23	10/12/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	**0.080**	0.055	0.40	"	"	2308483	10/10/23	10/10/23	EPA 300.0	J
Orthophosphate as PO4	**0.016**	0.0051	0.15	"	"	2308517	10/10/23	10/10/23	SM4500-P E	J
Total Dissolved Solids	**22**	5.0	10	"	"	2308561	10/11/23	10/13/23	SM2540C	
Total Kjeldahl Nitrogen	**0.099**	0.040	0.20	"	"	2308659	10/13/23	10/13/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2308645	10/13/23	10/13/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2308598	10/12/23	10/16/23	SM2540D	
LV-5 (23J0530-02) Surface water	**Sampled: 10/09/23 10:15**		**Received: 10/10/23 09:45**							
Ammonia as N	ND	0.025	0.10	mg/L	1	2308630	10/12/23	10/12/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	**0.10**	0.055	0.40	"	"	2308483	10/10/23	10/10/23	EPA 300.0	J
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2308517	10/10/23	10/10/23	SM4500-P E	
Total Dissolved Solids	**28**	5.0	10	"	"	2308561	10/11/23	10/13/23	SM2540C	
Total Kjeldahl Nitrogen	**0.081**	0.040	0.20	"	"	2308659	10/13/23	10/13/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2308645	10/13/23	10/13/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2308598	10/12/23	10/16/23	SM2540D	
LV-3 (23J0530-03) Surface water	**Sampled: 10/09/23 10:45**		**Received: 10/10/23 09:45**							
Ammonia as N	ND	0.025	0.10	mg/L	1	2308630	10/12/23	10/12/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	**0.075**	0.055	0.40	"	"	2308483	10/10/23	10/10/23	EPA 300.0	J
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2308517	10/10/23	10/10/23	SM4500-P E	
Total Dissolved Solids	**14**	5.0	10	"	"	2308561	10/11/23	10/13/23	SM2540C	
Total Kjeldahl Nitrogen	**0.10**	0.040	0.20	"	"	2308659	10/13/23	10/13/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2308645	10/13/23	10/13/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2308598	10/12/23	10/16/23	SM2540D	

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308483 - General Prep											
Blank (2308483-BLK1)					Prepared & Analyzed: 10/10/23						
Nitrate/Nitrite as N	ND	0.055	0.40	mg/L							
LCS (2308483-BS1)					Prepared & Analyzed: 10/10/23						
Nitrate/Nitrite as N	3.93	0.055	0.40	mg/L	4.00		98	80-120			
LCS Dup (2308483-BSD1)					Prepared & Analyzed: 10/10/23						
Nitrate/Nitrite as N	3.81	0.055	0.40	mg/L	4.00		95	80-120	3	20	
Matrix Spike (2308483-MS1)			**Source: 23J0507-04**		Prepared & Analyzed: 10/10/23						
Nitrate/Nitrite as N	4.25	0.055	0.40	mg/L	4.00	0.771	87	80-120			
Matrix Spike Dup (2308483-MSD1)			**Source: 23J0507-04**		Prepared & Analyzed: 10/10/23						
Nitrate/Nitrite as N	5.14	0.055	0.40	mg/L	4.00	0.771	109	80-120	19	20	
Batch 2308517 - General Preparation											
Blank (2308517-BLK1)					Prepared & Analyzed: 10/10/23						
Orthophosphate as PO4	ND	0.0051	0.15	mg/L							
LCS (2308517-BS1)					Prepared & Analyzed: 10/10/23						
Orthophosphate as PO4	1.05	0.0051	0.15	mg/L	0.918		114	80-120			
LCS Dup (2308517-BSD1)					Prepared & Analyzed: 10/10/23						
Orthophosphate as PO4	0.974	0.0051	0.15	mg/L	0.918		106	80-120	7	20	
Matrix Spike (2308517-MS1)			**Source: 23J0529-01**		Prepared & Analyzed: 10/10/23						
Orthophosphate as PO4	1.05	0.0051	0.15	mg/L	0.918	0.0115	113	75-125			

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23J0530
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308517 - General Preparation											
Matrix Spike Dup (2308517-MSD1)			**Source: 23J0529-01**	Prepared & Analyzed: 10/10/23							
Orthophosphate as PO4	1.15	0.0051	0.15	mg/L	0.918	0.0115	124	75-125	10	25	
Batch 2308561 - General Preparation											
Blank (2308561-BLK1)				Prepared: 10/11/23 Analyzed: 10/13/23							
Total Dissolved Solids	ND	5.0	10	mg/L							
LCS (2308561-BS1)				Prepared: 10/11/23 Analyzed: 10/13/23							
Total Dissolved Solids	46.0	5.0	10	mg/L	50.0		92	80-120			
LCS Dup (2308561-BSD1)				Prepared: 10/11/23 Analyzed: 10/13/23							
Total Dissolved Solids	45.0	5.0	10	mg/L	50.0		90	80-120	2	200	
Duplicate (2308561-DUP1)			**Source: 23J0494-01**	Prepared: 10/11/23 Analyzed: 10/13/23							
Total Dissolved Solids	615	5.0	10	mg/L		615			0	20	
Batch 2308598 - General Preparation											
Blank (2308598-BLK1)				Prepared: 10/12/23 Analyzed: 10/16/23							
Total Suspended Solids	ND	2.0	5.0	mg/L							
LCS (2308598-BS1)				Prepared: 10/12/23 Analyzed: 10/16/23							
Total Suspended Solids	93.2	2.0	5.0	mg/L	100		93	80-120			
LCS Dup (2308598-BSD1)				Prepared: 10/12/23 Analyzed: 10/16/23							
Total Suspended Solids	93.3	2.0	5.0	mg/L	100		93	80-120	0.1	200	

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308598 - General Preparation											
Duplicate (2308598-DUP1)			**Source: 23J0556-02**		Prepared: 10/12/23 Analyzed: 10/16/23						
Total Suspended Solids	ND	5.0	13	mg/L		ND				20	
Batch 2308630 - General Preparation											
Blank (2308630-BLK1)					Prepared & Analyzed: 10/12/23						
Ammonia as N	ND	0.025	0.10	mg/L							
LCS (2308630-BS1)					Prepared & Analyzed: 10/12/23						
Ammonia as N	0.462	0.025	0.10	mg/L	0.500		92	80-120			
LCS Dup (2308630-BSD1)					Prepared & Analyzed: 10/12/23						
Ammonia as N	0.472	0.025	0.10	mg/L	0.500		94	80-120	2	25	
Matrix Spike (2308630-MS1)			**Source: 23J0529-01**		Prepared & Analyzed: 10/12/23						
Ammonia as N	0.468	0.025	0.10	mg/L	0.500	0.0260	88	75-125			
Matrix Spike Dup (2308630-MSD1)			**Source: 23J0529-01**		Prepared & Analyzed: 10/12/23						
Ammonia as N	0.483	0.025	0.10	mg/L	0.500	0.0260	91	75-125	3	25	
Batch 2308645 - General Preparation											
Blank (2308645-BLK1)					Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	ND	0.023	0.050	mg/L							
LCS (2308645-BS1)					Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.335	0.023	0.050	mg/L	0.300		112	80-120			

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23J0530
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308645 - General Preparation											
LCS Dup (2308645-BSD1)					Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.311	0.023	0.050	mg/L	0.300		104	80-120	8	25	
Matrix Spike (2308645-MS1)			**Source: 23J0529-03**		Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.318	0.023	0.050	mg/L	0.300	ND	106	75-125			
Matrix Spike Dup (2308645-MSD1)			**Source: 23J0529-03**		Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.318	0.023	0.050	mg/L	0.300	ND	106	75-125	0	30	
Batch 2308659 - General Preparation											
Blank (2308659-BLK1)					Prepared & Analyzed: 10/13/23						
Total Kjeldahl Nitrogen	0.0740	0.040	0.20	mg/L							J
LCS (2308659-BS1)					Prepared & Analyzed: 10/13/23						
Total Kjeldahl Nitrogen	0.481	0.040	0.20	mg/L	0.500		96	80-120			
LCS Dup (2308659-BSD1)					Prepared & Analyzed: 10/13/23						
Total Kjeldahl Nitrogen	0.478	0.040	0.20	mg/L	0.500		96	80-120	0.6	20	
Matrix Spike (2308659-MS1)			**Source: 23J0529-01**		Prepared & Analyzed: 10/13/23						
Total Kjeldahl Nitrogen	0.350	0.040	0.20	mg/L	0.500	0.0810	54	75-125			QM-5
Matrix Spike Dup (2308659-MSD1)			**Source: 23J0529-01**		Prepared & Analyzed: 10/13/23						
Total Kjeldahl Nitrogen	0.363	0.040	0.20	mg/L	0.500	0.0810	56	75-125	4	25	QM-5

10/17/23 12:48

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: 856.01 Task 0717.00	**CLS Work Order #: 23J0530**
Berkeley, CA 94705	Project Manager: Heather Neff	COC #:

Notes and Definitions

QM-5	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
*	The laboratory does not hold CA-ELAP accreditation for this analyte or method. Accreditation may not be available from CA-ELAP for this analyte or method.

This is a “MDL Report”, thus if the report denotes an “ND” for a particular analyte, it should be noted that the analyte was not detected at or above the MDL.

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY CLS ID. NO. 23J0530 (1 of 1)

Report To:

Stillwater Sciences
279 Cousteau Place Suite 400
Davis, CA 95618

Project Manager
Heather Neff heather@stillwatersci.com

Project Name
Lee Vining WQ

Sampled By

Job Description
Monitor water chemistry in project reaches.

Site Location Lee Vining Hydroelectric Project

Client Job Number
856.01 Task 0717.00

Destination Laboratory
Rancho Cordova

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA
95742
www.californialab.com

☐ **OTHER**

ANALYSIS REQUESTED

GEOTRACKER

EDF REPORT YES ☒ ☐ NO

GLOBAL ID.

FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES ▼	Orthophosphate	Total phosphorous	Total Kjeldahl Nitrogen	Total Ammonia as N	Nitrate/Nitrite	TDS/TSS	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
10/9	1000	LV-6		Surface water	3		6	X	X	X	X	X	X				X	
✓	1015	LV-5		Surface water	✓		6	✓	✓	✓	✓	✓	✓				X	
✓	1045	LV-3		Surface water	✓		6	✓	✓	✓	✓	✓	✓				X	
				Surface water			6										X	
				Surface water			6										X	
				Surface water			6										X	
				Surface water			6										X	INVOICE TO:
				Surface water			6										X	Stillwater Sciences
				Surface water			6										X	Same as above
				Surface water			6										X	**Project No. 856.01**
				Surface water			6										X	**Task 0717.00**
				Surface water			6										X	QUOTE#

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)= H2SO4 (5) NH_3/NH_4 (6) NAOH

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	Elliott Ahn/Stillwater Sciences	10/9 1400		

RECEIVED AT LAB BY: **DATE/TIME:** 10/10/23 945 **CONDITIONS/COMMENTS:** 2.3/2.2

SHIPPED BY: ☒ **FED EX** ☐ **UPS** ☐ **OTHER** ______ **AIR BILL #** 8172 8674 1394

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

October 17, 2023

CLS Work Order #: 23J0531
COC #:

Heather Neff
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: Lee Vining WQ

Enclosed are the results of analyses for samples received by the laboratory on 10/10/23 09:45. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

Daniel Johnson

Daniel Johnson
Technical Director

CA SWRCB ELAP Accreditation/Registration number 1233

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23J0531
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Field Blank (23J0531-01) Surface water Sampled: 10/09/23 08:45 Received: 10/10/23 09:45										
Ammonia as N	**0.036**	0.025	0.10	mg/L	1	2308630	10/12/23	10/12/23	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	**0.080**	0.055	0.40	"	"	2308483	10/10/23	10/10/23	EPA 300.0	J
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2308517	10/10/23	10/10/23	SM4500-P E	
Total Dissolved Solids	**5.0**	5.0	10	"	"	2308561	10/11/23	10/13/23	SM2540C	J
Total Kjeldahl Nitrogen	**0.080**	0.040	0.20	"	"	2308659	10/13/23	10/13/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2308645	10/13/23	10/13/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2308598	10/12/23	10/16/23	SM2540D	
LV-8 (23J0531-02) Surface water Sampled: 10/09/23 09:00 Received: 10/10/23 09:45										
Ammonia as N	**0.038**	0.025	0.10	mg/L	1	2308630	10/12/23	10/12/23	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	**0.077**	0.055	0.40	"	"	2308483	10/10/23	10/10/23	EPA 300.0	J
Orthophosphate as PO4	**0.020**	0.0051	0.15	"	"	2308517	10/10/23	10/10/23	SM4500-P E	J
Total Dissolved Solids	**19**	5.0	10	"	"	2308561	10/11/23	10/13/23	SM2540C	
Total Kjeldahl Nitrogen	**0.10**	0.040	0.20	"	"	2308659	10/13/23	10/13/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2308645	10/13/23	10/13/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2308598	10/12/23	10/16/23	SM2540D	
LV-9 (23J0531-03) Surface water Sampled: 10/09/23 09:30 Received: 10/10/23 09:45										
Ammonia as N	ND	0.025	0.10	mg/L	1	2308630	10/12/23	10/12/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	**0.13**	0.055	0.40	"	"	2308483	10/10/23	10/10/23	EPA 300.0	J
Orthophosphate as PO4	ND	0.0051	0.15	"	"	2308517	10/10/23	10/10/23	SM4500-P E	
Total Dissolved Solids	**38**	5.0	10	"	"	2308561	10/11/23	10/13/23	SM2540C	
Total Kjeldahl Nitrogen	**0.26**	0.040	0.20	"	"	2308659	10/13/23	10/13/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.023	0.050	"	"	2308645	10/13/23	10/13/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2308598	10/12/23	10/16/23	SM2540D	

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23J0531
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308483 - General Prep											
Blank (2308483-BLK1)					Prepared & Analyzed: 10/10/23						
Nitrate/Nitrite as N	ND	0.055	0.40	mg/L							
LCS (2308483-BS1)					Prepared & Analyzed: 10/10/23						
Nitrate/Nitrite as N	3.93	0.055	0.40	mg/L	4.00		98	80-120			
LCS Dup (2308483-BSD1)					Prepared & Analyzed: 10/10/23						
Nitrate/Nitrite as N	3.81	0.055	0.40	mg/L	4.00		95	80-120	3	20	
Matrix Spike (2308483-MS1)			**Source: 23J0507-04**		Prepared & Analyzed: 10/10/23						
Nitrate/Nitrite as N	4.25	0.055	0.40	mg/L	4.00	0.771	87	80-120			
Matrix Spike Dup (2308483-MSD1)			**Source: 23J0507-04**		Prepared & Analyzed: 10/10/23						
Nitrate/Nitrite as N	5.14	0.055	0.40	mg/L	4.00	0.771	109	80-120	19	20	
Batch 2308517 - General Preparation											
Blank (2308517-BLK1)					Prepared & Analyzed: 10/10/23						
Orthophosphate as PO4	ND	0.0051	0.15	mg/L							
LCS (2308517-BS1)					Prepared & Analyzed: 10/10/23						
Orthophosphate as PO4	1.05	0.0051	0.15	mg/L	0.918		114	80-120			
LCS Dup (2308517-BSD1)					Prepared & Analyzed: 10/10/23						
Orthophosphate as PO4	0.974	0.0051	0.15	mg/L	0.918		106	80-120	7	20	
Matrix Spike (2308517-MS1)			**Source: 23J0529-01**		Prepared & Analyzed: 10/10/23						
Orthophosphate as PO4	1.05	0.0051	0.15	mg/L	0.918	0.0115	113	75-125			

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Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23J0531
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308517 - General Preparation											
Matrix Spike Dup (2308517-MSD1)			**Source: 23J0529-01**		Prepared & Analyzed: 10/10/23						
Orthophosphate as PO4	1.15	0.0051	0.15	mg/L	0.918	0.0115	124	75-125	10	25	
Batch 2308561 - General Preparation											
Blank (2308561-BLK1)					Prepared: 10/11/23 Analyzed: 10/13/23						
Total Dissolved Solids	ND	5.0	10	mg/L							
LCS (2308561-BS1)					Prepared: 10/11/23 Analyzed: 10/13/23						
Total Dissolved Solids	46.0	5.0	10	mg/L	50.0		92	80-120			
LCS Dup (2308561-BSD1)					Prepared: 10/11/23 Analyzed: 10/13/23						
Total Dissolved Solids	45.0	5.0	10	mg/L	50.0		90	80-120	2	200	
Duplicate (2308561-DUP1)			**Source: 23J0494-01**		Prepared: 10/11/23 Analyzed: 10/13/23						
Total Dissolved Solids	615	5.0	10	mg/L		615			0	20	
Batch 2308598 - General Preparation											
Blank (2308598-BLK1)					Prepared: 10/12/23 Analyzed: 10/16/23						
Total Suspended Solids	ND	2.0	5.0	mg/L							
LCS (2308598-BS1)					Prepared: 10/12/23 Analyzed: 10/16/23						
Total Suspended Solids	93.2	2.0	5.0	mg/L	100		93	80-120			
LCS Dup (2308598-BSD1)					Prepared: 10/12/23 Analyzed: 10/16/23						
Total Suspended Solids	93.3	2.0	5.0	mg/L	100		93	80-120	0.1	200	

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308598 - General Preparation											
Duplicate (2308598-DUP1)			**Source: 23J0556-02**		Prepared: 10/12/23 Analyzed: 10/16/23						
Total Suspended Solids	ND	5.0	13	mg/L		ND				20	
Batch 2308630 - General Preparation											
Blank (2308630-BLK1)					Prepared & Analyzed: 10/12/23						
Ammonia as N	ND	0.025	0.10	mg/L							
LCS (2308630-BS1)					Prepared & Analyzed: 10/12/23						
Ammonia as N	0.462	0.025	0.10	mg/L	0.500		92	80-120			
LCS Dup (2308630-BSD1)					Prepared & Analyzed: 10/12/23						
Ammonia as N	0.472	0.025	0.10	mg/L	0.500		94	80-120	2	25	
Matrix Spike (2308630-MS1)			**Source: 23J0529-01**		Prepared & Analyzed: 10/12/23						
Ammonia as N	0.468	0.025	0.10	mg/L	0.500	0.0260	88	75-125			
Matrix Spike Dup (2308630-MSD1)			**Source: 23J0529-01**		Prepared & Analyzed: 10/12/23						
Ammonia as N	0.483	0.025	0.10	mg/L	0.500	0.0260	91	75-125	3	25	
Batch 2308645 - General Preparation											
Blank (2308645-BLK1)					Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	ND	0.023	0.050	mg/L							
LCS (2308645-BS1)					Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.335	0.023	0.050	mg/L	0.300		112	80-120			

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23J0531
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308645 - General Preparation											
LCS Dup (2308645-BSD1)					Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.311	0.023	0.050	mg/L	0.300		104	80-120	8	25	
Matrix Spike (2308645-MS1)			**Source: 23J0529-03**		Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.318	0.023	0.050	mg/L	0.300	ND	106	75-125			
Matrix Spike Dup (2308645-MSD1)			**Source: 23J0529-03**		Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.318	0.023	0.050	mg/L	0.300	ND	106	75-125	0	30	
Batch 2308659 - General Preparation											
Blank (2308659-BLK1)					Prepared & Analyzed: 10/13/23						
Total Kjeldahl Nitrogen	0.0740	0.040	0.20	mg/L							J
LCS (2308659-BS1)					Prepared & Analyzed: 10/13/23						
Total Kjeldahl Nitrogen	0.481	0.040	0.20	mg/L	0.500		96	80-120			
LCS Dup (2308659-BSD1)					Prepared & Analyzed: 10/13/23						
Total Kjeldahl Nitrogen	0.478	0.040	0.20	mg/L	0.500		96	80-120	0.6	20	
Matrix Spike (2308659-MS1)			**Source: 23J0529-01**		Prepared & Analyzed: 10/13/23						
Total Kjeldahl Nitrogen	0.350	0.040	0.20	mg/L	0.500	0.0810	54	75-125			QM-5
Matrix Spike Dup (2308659-MSD1)			**Source: 23J0529-01**		Prepared & Analyzed: 10/13/23						
Total Kjeldahl Nitrogen	0.363	0.040	0.20	mg/L	0.500	0.0810	56	75-125	4	25	QM-5

Notes and Definitions

QM-5	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
*	The laboratory does not hold CA-ELAP accreditation for this analyte or method. Accreditation may not be available from CA-ELAP for this analyte or method.

This is a “MDL Report”, thus if the report denotes an “ND” for a particular analyte, it should be noted that the analyte was not detected at or above the MDL.

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY

CLS ID. NO. 23J0531 (1 of 1)

Report To:

Stillwater Sciences
279 Cousteau Place Suite 400
Davis, CA 95618

Project Manager
Heather Neff heather@stillwatersci.com

Project Name
Lee Vining WQ

Sampled By EFA

Job Description
Monitor water chemistry in project reaches.

Site Location Lee Vining Hydroelectric Project

Client Job Number
856.01 Task 0717.00

Destination Laboratory
Rancho Cordova

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA
95742
www.californialab.com

☐ **OTHER**

GEOTRACKER

EDF REPORT YES ☒ ☐ NO

GLOBAL ID.

FIELD CONDITIONS:

ANALYSIS REQUESTED

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES ▼		Orthophosphate	Total phosphorous	Total Kjeldahl Nitrogen	Total Ammonia as N	Nitrate/Nitrite	TDS/TSS	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
10/9	845	Field Blank		Surface water	3		6		X	X	X	X	X	X				X	
|	900	LV-8		Surface water	|		6		|	|	|	|	|	|				X	
	930	LV-9		Surface water	|		6		|	|	|	|	|	|				X	
				Surface water			6											X	
				Surface water			6											X	
				Surface water			6											X	
				Surface water			6											X	INVOICE TO:
				Surface water			6											X	Stillwater Sciences
				Surface water			6											X	Same as above
				Surface water			6											X	**Project No. 856.01**
				Surface water			6											X	**Task 0717.00**
				Surface water			6											X	QUOTE#

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)= H2SO4 (5) NH_3/NH_4 (6) NAOH

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
EA	Elliott Allen / Stillwater Sciences	10/9 1400		

RECEIVED AT LAB BY:

DATE/TIME: 10/10/23 945

CONDITIONS/COMMENTS: 2.3/2.2

SHIPPED BY: ☒ **FED EX** ☐ **UPS** ☐ **OTHER** ______

AIR BILL # 8172 8674 1383

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

October 18, 2023

CLS Work Order #: 23J0599
COC #:

Heather Neff
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: Lee Vining WQ

Enclosed are the results of analyses for samples received by the laboratory on 10/11/23 09:30. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

Daniel Johnson

Daniel Johnson
Technical Director

CA SWRCB ELAP Accreditation/Registration number 1233

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23J0599
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LV-10 (23J0599-01) Surface water Sampled: 10/10/23 09:40 Received: 10/11/23 09:30										
Ammonia as N	**0.026**	0.025	0.10	mg/L	1	2308661	10/13/23	10/13/23	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	**0.16**	0.055	0.40	"	"	2308531	10/11/23	10/11/23	EPA 300.0	J
Orthophosphate as PO4	**0.028**	0.0051	0.15	"	"	2308572	10/11/23	10/11/23	SM4500-P E	J
Total Dissolved Solids	**22**	5.0	10	"	"	2308616	10/12/23	10/16/23	SM2540C	
Total Kjeldahl Nitrogen	**0.14**	0.040	0.20	"	"	2308659	10/13/23	10/13/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2308645	10/13/23	10/13/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2308598	10/12/23	10/16/23	SM2540D	
LV-2 Surface (23J0599-02) Surface water Sampled: 10/10/23 11:50 Received: 10/11/23 09:30										
Ammonia as N	ND	0.025	0.10	mg/L	1	2308661	10/13/23	10/13/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2308531	10/11/23	10/11/23	EPA 300.0	
Orthophosphate as PO4	**0.020**	0.0051	0.15	"	"	2308572	10/11/23	10/11/23	SM4500-P E	J
Total Dissolved Solids	**19**	5.0	10	"	"	2308616	10/12/23	10/16/23	SM2540C	
Total Kjeldahl Nitrogen	**0.12**	0.040	0.20	"	"	2308659	10/13/23	10/13/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2308645	10/13/23	10/13/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2308598	10/12/23	10/16/23	SM2540D	
Equip Blank (23J0599-03) Surface water Sampled: 10/10/23 10:15 Received: 10/11/23 09:30										
Ammonia as N	ND	0.025	0.10	mg/L	1	2308661	10/13/23	10/13/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.055	0.40	"	"	2308531	10/11/23	10/11/23	EPA 300.0	
Orthophosphate as PO4	**0.012**	0.0051	0.15	"	"	2308572	10/11/23	10/11/23	SM4500-P E	J
Total Dissolved Solids	ND	5.0	10	"	"	2308616	10/12/23	10/16/23	SM2540C	
Total Kjeldahl Nitrogen	**0.085**	0.040	0.20	"	"	2308659	10/13/23	10/13/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2308645	10/13/23	10/13/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2308598	10/12/23	10/16/23	SM2540D	

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23J0599
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LV-2 Bottom (23J0599-04) Surface water	**Sampled: 10/10/23 11:45**	**Received: 10/11/23 09:30**								
Ammonia as N	**0.026**	0.025	0.10	mg/L	1	2308661	10/13/23	10/13/23	SM4500-NH3F-2011	J
Nitrate/Nitrite as N	**0.059**	0.055	0.40	"	"	2308531	10/11/23	10/11/23	EPA 300.0	J
Orthophosphate as PO4	**0.024**	0.0051	0.15	"	"	2308572	10/11/23	10/11/23	SM4500-P E	J
Total Dissolved Solids	**21**	5.0	10	"	"	2308616	10/12/23	10/16/23	SM2540C	
Total Kjeldahl Nitrogen	**0.15**	0.040	0.20	"	"	2308659	10/13/23	10/13/23	SM4500-NH3F-2011	J
Total Phosphorus as P	ND	0.023	0.050	"	"	2308645	10/13/23	10/13/23	SM4500-P E	
Total Suspended Solids	ND	2.0	5.0	"	"	2308598	10/12/23	10/16/23	SM2540D	

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23J0599
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308531 - General Prep											
Blank (2308531-BLK1)					Prepared & Analyzed: 10/11/23						
Nitrate/Nitrite as N	ND	0.055	0.40	mg/L							
LCS (2308531-BS1)					Prepared & Analyzed: 10/11/23						
Nitrate/Nitrite as N	3.80	0.055	0.40	mg/L	4.00		95	80-120			
LCS Dup (2308531-BSD1)					Prepared & Analyzed: 10/11/23						
Nitrate/Nitrite as N	3.78	0.055	0.40	mg/L	4.00		94	80-120	0.7	20	
Matrix Spike (2308531-MS1)			**Source: 23J0569-04**		Prepared & Analyzed: 10/11/23						
Nitrate/Nitrite as N	4.86	0.055	0.40	mg/L	4.00	0.954	98	80-120			
Matrix Spike Dup (2308531-MSD1)			**Source: 23J0569-04**		Prepared & Analyzed: 10/11/23						
Nitrate/Nitrite as N	4.92	0.055	0.40	mg/L	4.00	0.954	99	80-120	1	20	
Batch 2308572 - General Preparation											
Blank (2308572-BLK1)					Prepared & Analyzed: 10/11/23						
Orthophosphate as PO4	ND	0.0051	0.15	mg/L							
LCS (2308572-BS1)					Prepared & Analyzed: 10/11/23						
Orthophosphate as PO4	0.974	0.0051	0.15	mg/L	0.918		106	80-120			
LCS Dup (2308572-BSD1)					Prepared & Analyzed: 10/11/23						
Orthophosphate as PO4	0.868	0.0051	0.15	mg/L	0.918		95	80-120	12	20	
Matrix Spike (2308572-MS1)			**Source: 23J0599-01**		Prepared & Analyzed: 10/11/23						
Orthophosphate as PO4	0.950	0.0051	0.15	mg/L	0.918	0.0278	100	75-125			

10/18/23 13:05

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23J0599
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308572 - General Preparation											
Matrix Spike Dup (2308572-MSD1)			**Source: 23J0599-01**		Prepared & Analyzed: 10/11/23						
Orthophosphate as PO4	1.00	0.0051	0.15	mg/L	0.918	0.0278	106	75-125	5	25	
Batch 2308598 - General Preparation											
Blank (2308598-BLK1)					Prepared: 10/12/23 Analyzed: 10/16/23						
Total Suspended Solids	ND	2.0	5.0	mg/L							
LCS (2308598-BS1)					Prepared: 10/12/23 Analyzed: 10/16/23						
Total Suspended Solids	93.2	2.0	5.0	mg/L	100		93	80-120			
LCS Dup (2308598-BSD1)					Prepared: 10/12/23 Analyzed: 10/16/23						
Total Suspended Solids	93.3	2.0	5.0	mg/L	100		93	80-120	0.1	200	
Duplicate (2308598-DUP1)			**Source: 23J0556-02**		Prepared: 10/12/23 Analyzed: 10/16/23						
Total Suspended Solids	ND	5.0	13	mg/L		ND				20	
Batch 2308616 - General Preparation											
Blank (2308616-BLK1)					Prepared: 10/12/23 Analyzed: 10/16/23						
Total Dissolved Solids	ND	5.0	10	mg/L							
LCS (2308616-BS1)					Prepared: 10/12/23 Analyzed: 10/16/23						
Total Dissolved Solids	45.0	5.0	10	mg/L	50.0		90	80-120			
LCS Dup (2308616-BSD1)					Prepared: 10/12/23 Analyzed: 10/16/23						
Total Dissolved Solids	44.0	5.0	10	mg/L	50.0		88	80-120	2	200	

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308616 - General Preparation											
Duplicate (2308616-DUP1)			**Source: 23J0548-01**		Prepared: 10/12/23 Analyzed: 10/16/23						
Total Dissolved Solids	150	5.0	10	mg/L		145			3	20	
Batch 2308645 - General Preparation											
Blank (2308645-BLK1)					Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	ND	0.023	0.050	mg/L							
LCS (2308645-BS1)					Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.335	0.023	0.050	mg/L	0.300		112	80-120			
LCS Dup (2308645-BSD1)					Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.311	0.023	0.050	mg/L	0.300		104	80-120	8	25	
Matrix Spike (2308645-MS1)			**Source: 23J0529-03**		Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.318	0.023	0.050	mg/L	0.300	ND	106	75-125			
Matrix Spike Dup (2308645-MSD1)			**Source: 23J0529-03**		Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.318	0.023	0.050	mg/L	0.300	ND	106	75-125	0	30	
Batch 2308659 - General Preparation											
Blank (2308659-BLK1)					Prepared & Analyzed: 10/13/23						
Total Kjeldahl Nitrogen	0.0740	0.040	0.20	mg/L							J
LCS (2308659-BS1)					Prepared & Analyzed: 10/13/23						
Total Kjeldahl Nitrogen	0.481	0.040	0.20	mg/L	0.500		96	80-120			

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23J0599
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308659 - General Preparation											
LCS Dup (2308659-BSD1)					Prepared & Analyzed: 10/13/23						
Total Kjeldahl Nitrogen	0.478	0.040	0.20	mg/L	0.500		96	80-120	0.6	20	
Matrix Spike (2308659-MS1)			**Source: 23J0529-01**		Prepared & Analyzed: 10/13/23						
Total Kjeldahl Nitrogen	0.350	0.040	0.20	mg/L	0.500	0.0810	54	75-125			QM-5
Matrix Spike Dup (2308659-MSD1)			**Source: 23J0529-01**		Prepared & Analyzed: 10/13/23						
Total Kjeldahl Nitrogen	0.363	0.040	0.20	mg/L	0.500	0.0810	56	75-125	4	25	QM-5
Batch 2308661 - General Preparation											
Blank (2308661-BLK1)					Prepared & Analyzed: 10/13/23						
Ammonia as N	ND	0.025	0.10	mg/L							
LCS (2308661-BS1)					Prepared & Analyzed: 10/13/23						
Ammonia as N	0.515	0.025	0.10	mg/L	0.500		103	80-120			
LCS Dup (2308661-BSD1)					Prepared & Analyzed: 10/13/23						
Ammonia as N	0.498	0.025	0.10	mg/L	0.500		100	80-120	3	25	
Matrix Spike (2308661-MS1)			**Source: 23J0599-01**		Prepared & Analyzed: 10/13/23						
Ammonia as N	0.451	0.025	0.10	mg/L	0.500	0.0260	85	75-125			
Matrix Spike Dup (2308661-MSD1)			**Source: 23J0599-01**		Prepared & Analyzed: 10/13/23						
Ammonia as N	0.459	0.025	0.10	mg/L	0.500	0.0260	87	75-125	2	25	

Notes and Definitions

QM-5	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
*	The laboratory does not hold CA-ELAP accreditation for this analyte or method. Accreditation may not be available from CA-ELAP for this analyte or method.

This is a “MDL Report”, thus if the report denotes an “ND” for a particular analyte, it should be noted that the analyte was not detected at or above the MDL.

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY CLS ID. NO. 23J0599 (1 of 1)

Report To:

Stillwater Sciences
279 Cousteau Place Suite 400
Davis, CA 95618

Project Manager
Heather Neff heather@stillwatersci.com

Project Name
Lee Vining WQ

Sampled By EEA

Job Description
Monitor water chemistry in project reaches.

Site Location Lee Vining Hydroelectric Project

Client Job Number
856.01 Task 0717.00

Destination Laboratory
Rancho Cordova

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA
95742
www.californialab.com

☐ **OTHER**

GEOTRACKER

EDF REPORT YES ☒ ☐ NO

GLOBAL ID.

FIELD CONDITIONS:

ANALYSIS REQUESTED

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES		Orthophosphate	Total phosphorous	Total Kjeldahl Nitrogen	Total Ammonia as N	Nitrate/Nitrite	TDS/TSS	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
10/10	940	LV-10		Surface water	3		6	X	X	X	X	X	X	X				X	
10/10	1150	LV-2-Surface		Surface water	↓		6	↓	↓	↓	↓	↓	↓	↓				X	
10/10	1015	Equip Blank		Surface water	↓		6	↓	↓	↓	↓	↓	↓	↓				X	
10/16	1145	LV-2-Bottom		Surface water	↓		6	↓	↓	↓	↓	↓	↓	↓				X	
				Surface water			6											X	
				Surface water			6											X	
				Surface water			6											X	INVOICE TO:
				Surface water			6											X	Stillwater Sciences
				Surface water			6											X	Same as above
				Surface water			6											X	**Project No. 856.01**
				Surface water			6											X	**Task 0717.00**
				Surface water			6											X	QUOTE#

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)= H2SO4 (5) NH_3/NH_4 (6) NAOH

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	Elliott Allen/Stillwater Sciences	10/10 1400		

RECEIVED AT LAB BY: **DATE/TIME:** 10/11/23 930 **CONDITIONS/COMMENTS:** 2.6/2.5

SHIPPED BY: ☒ **FED EX** ☐ **UPS** ☐ **OTHER** **AIR BILL #** 8172 8674 1361

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

October 19, 2023

CLS Work Order #: 23J0708
COC #:

Heather Neff
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: Lee Vining WQ

Enclosed are the results of analyses for samples received by the laboratory on 10/12/23 09:20. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

Daniel Johnson

Daniel Johnson
Technical Director

CA SWRCB ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY

CLS ID. NO. 13J0708 (_1_of_1_)

Report To:

Stillwater Sciences
279 Cousteau Place Suite 400
Davis, CA 95618

Project Manager
Heather Neff heather@stillwatersci.com

Project Name
Lee Vining WQ

Sampled By Michael Schweiker

Job Description
Monitor water chemistry in project reaches.

Site Location Lee Vining Hydroelectric Project

Client Job Number
856.01 Task 0717.00

Destination Laboratory
Rancho Cordova

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA
95742
www.californialab.com

☐ **OTHER**

GEOTRACKER

EDF REPORT YES ☒ NO ☐

GLOBAL ID.

FIELD CONDITIONS:

ANALYSIS REQUESTED

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES		Orthophosphate	Total phosphorous	Total Kjeldahl Nitrogen	Total Ammonia as N	Nitrate/Nitrite	TDS/TSS	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
10/11/23	8:30	LV-7-surface		Surface water	3		6		X	X	X	X	X	X				X	
10/11/23	8:35	LV-7-bottom		Surface water	3		6		X	X	X	X	X	X				X	
				Surface water			6											X	
				Surface water			6											X	
				Surface water			6											X	
				Surface water			6											X	
				Surface water			6											X	INVOICE TO:
				Surface water			6											X	Stillwater Sciences
				Surface water			6											X	Same as above
				Surface water			6											X	**Project No. 856.01**
				Surface water			6											X	**Task 0717.00**
				Surface water			6											X	QUOTE#

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO$_3$ (3) = COLD (4)= H2SO4 (5) NH$_3$/NH$_4$ (6) NAOH

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Michael	Michael Schweiker Stillwater Sciences	10/11/23 2pm		

RECEIVED AT LAB BY: **DATE/TIME:** 10/12/23 920 **CONDITIONS/COMMENTS:** 2.6/2.5

SHIPPED BY: ☒ **FED EX** ☐ **UPS** ☐ **OTHER** ____________ **AIR BILL #** 8172 8674 1350

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23J0708
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

LV-7-surface (23J0708-01) Surface water Sampled: 10/11/23 08:30 Received: 10/12/23 09:20

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Ammonia as N	ND	0.10	mg/L	1	2308661	10/13/23	10/13/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2308583	10/12/23	10/12/23	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2308595	10/12/23	10/12/23	SM4500-P E	
Total Dissolved Solids	**20**	10	"	"	2308695	10/16/23	10/17/23	SM2540C	
Total Kjeldahl Nitrogen	ND	0.20	"	"	2308704	10/16/23	10/16/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2308645	10/13/23	10/13/23	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2308647	10/13/23	10/16/23	SM2540D	

LV-7-bottom (23J0708-02) Surface water Sampled: 10/11/23 08:35 Received: 10/12/23 09:20

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Ammonia as N	ND	0.10	mg/L	1	2308661	10/13/23	10/13/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2308583	10/12/23	10/12/23	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2308595	10/12/23	10/12/23	SM4500-P E	
Total Dissolved Solids	**20**	10	"	"	2308695	10/16/23	10/17/23	SM2540C	
Total Kjeldahl Nitrogen	ND	0.20	"	"	2308704	10/16/23	10/16/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2308645	10/13/23	10/13/23	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2308647	10/13/23	10/16/23	SM2540D	

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308583 - General Prep										
Blank (2308583-BLK1)				Prepared & Analyzed: 10/12/23						
Nitrate/Nitrite as N	ND	0.40	mg/L							
LCS (2308583-BS1)				Prepared & Analyzed: 10/12/23						
Nitrate/Nitrite as N	3.75	0.40	mg/L	4.00		94	80-120			
LCS Dup (2308583-BSD1)				Prepared & Analyzed: 10/12/23						
Nitrate/Nitrite as N	3.88	0.40	mg/L	4.00		97	80-120	3	20	
Matrix Spike (2308583-MS1)		**Source: 23J0639-05**		Prepared & Analyzed: 10/12/23						
Nitrate/Nitrite as N	5.02	0.40	mg/L	4.00	1.14	97	80-120			
Matrix Spike Dup (2308583-MSD1)		**Source: 23J0639-05**		Prepared & Analyzed: 10/12/23						
Nitrate/Nitrite as N	5.03	0.40	mg/L	4.00	1.14	97	80-120	0.09	20	
Batch 2308595 - General Preparation										
Blank (2308595-BLK1)				Prepared & Analyzed: 10/12/23						
Orthophosphate as PO4	ND	0.15	mg/L							
LCS (2308595-BS1)				Prepared & Analyzed: 10/12/23						
Orthophosphate as PO4	0.994	0.15	mg/L	0.918		108	80-120			
LCS Dup (2308595-BSD1)				Prepared & Analyzed: 10/12/23						
Orthophosphate as PO4	0.998	0.15	mg/L	0.918		109	80-120	0.4	20	
Matrix Spike (2308595-MS1)		**Source: 23J0617-01**		Prepared & Analyzed: 10/12/23						
Orthophosphate as PO4	28.5	3.0	mg/L	0.918	12.0	NR	75-125			QM-7

Stillwater Sciences	Project:	Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number:	856.01 Task 0717.00	**CLS Work Order #: 23J0708**
Berkeley, CA 94705	Project Manager:	Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308595 - General Preparation										
Matrix Spike Dup (2308595-MSD1)	**Source: 23J0617-01**			Prepared & Analyzed: 10/12/23						
Orthophosphate as PO4	26.7	3.0	mg/L	0.918	12.0	NR	75-125	7	25	QM-7
Batch 2308645 - General Preparation										
Blank (2308645-BLK1)				Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	ND	0.050	mg/L							
LCS (2308645-BS1)				Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.335	0.050	mg/L	0.300		112	80-120			
LCS Dup (2308645-BSD1)				Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.311	0.050	mg/L	0.300		104	80-120	8	25	
Matrix Spike (2308645-MS1)	**Source: 23J0529-03**			Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.318	0.050	mg/L	0.300	ND	106	75-125			
Matrix Spike Dup (2308645-MSD1)	**Source: 23J0529-03**			Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.318	0.050	mg/L	0.300	ND	106	75-125	0	30	
Batch 2308647 - General Preparation										
Blank (2308647-BLK1)				Prepared: 10/13/23 Analyzed: 10/16/23						
Total Suspended Solids	ND	2.5	mg/L							
LCS (2308647-BS1)				Prepared: 10/13/23 Analyzed: 10/16/23						
Total Suspended Solids	93.7	2.5	mg/L	100		94	80-120			

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308647 - General Preparation										
LCS Dup (2308647-BSD1)				Prepared: 10/13/23 Analyzed: 10/16/23						
Total Suspended Solids	93.8	2.5	mg/L	100		94	80-120	0.1	200	
Duplicate (2308647-DUP1)	**Source: 23J0619-01**			Prepared: 10/13/23 Analyzed: 10/16/23						
Total Suspended Solids	ND	6.3	mg/L		ND				20	
Batch 2308661 - General Preparation										
Blank (2308661-BLK1)				Prepared & Analyzed: 10/13/23						
Ammonia as N	ND	0.10	mg/L							
LCS (2308661-BS1)				Prepared & Analyzed: 10/13/23						
Ammonia as N	0.515	0.10	mg/L	0.500		103	80-120			
LCS Dup (2308661-BSD1)				Prepared & Analyzed: 10/13/23						
Ammonia as N	0.498	0.10	mg/L	0.500		100	80-120	3	25	
Matrix Spike (2308661-MS1)	**Source: 23J0599-01**			Prepared & Analyzed: 10/13/23						
Ammonia as N	0.451	0.10	mg/L	0.500	0.0260	85	75-125			
Matrix Spike Dup (2308661-MSD1)	**Source: 23J0599-01**			Prepared & Analyzed: 10/13/23						
Ammonia as N	0.459	0.10	mg/L	0.500	0.0260	87	75-125	2	25	
Batch 2308695 - General Preparation										
Blank (2308695-BLK1)				Prepared: 10/16/23 Analyzed: 10/17/23						
Total Dissolved Solids	ND	10	mg/L							

Stillwater Sciences	Project:	Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number:	856.01 Task 0717.00	**CLS Work Order #: 23J0708**
Berkeley, CA 94705	Project Manager:	Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308695 - General Preparation										
LCS (2308695-BS1)				Prepared: 10/16/23 Analyzed: 10/17/23						
Total Dissolved Solids	49.0	10	mg/L	50.0		98	80-120			
LCS Dup (2308695-BSD1)				Prepared: 10/16/23 Analyzed: 10/17/23						
Total Dissolved Solids	48.0	10	mg/L	50.0		96	80-120	2	200	
Duplicate (2308695-DUP1)		**Source: 23J0635-01**		Prepared: 10/16/23 Analyzed: 10/17/23						
Total Dissolved Solids	1470	10	mg/L		1470			0.1	20	
Batch 2308704 - General Preparation										
Blank (2308704-BLK1)				Prepared & Analyzed: 10/16/23						
Total Kjeldahl Nitrogen	ND	0.20	mg/L							
LCS (2308704-BS1)				Prepared & Analyzed: 10/16/23						
Total Kjeldahl Nitrogen	0.535	0.20	mg/L	0.500		107	80-120			
LCS Dup (2308704-BSD1)				Prepared & Analyzed: 10/16/23						
Total Kjeldahl Nitrogen	0.551	0.20	mg/L	0.500		110	80-120	3	20	
Matrix Spike (2308704-MS1)		**Source: 23J0617-01**		Prepared & Analyzed: 10/16/23						
Total Kjeldahl Nitrogen	1.30	0.40	mg/L	0.500	1.02	56	75-125			QM-7
Matrix Spike Dup (2308704-MSD1)		**Source: 23J0617-01**		Prepared & Analyzed: 10/16/23						
Total Kjeldahl Nitrogen	1.34	0.40	mg/L	0.500	1.02	64	75-125	3	25	QM-7

Stillwater Sciences	Project:	Lee Vining WQ		
2855 Telegraph Ave., Suite 400	Project Number:	856.01 Task 0717.00	**CLS Work Order #: 23J0708**	
Berkeley, CA 94705	Project Manager:	Heather Neff	COC #:	

Notes and Definitions

QM-7	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS and/or LCSD recovery.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
*	The laboratory does not hold CA-ELAP accreditation for this analyte or method. Accreditation may not be available from CA-ELAP for this analyte or method.

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

October 19, 2023

CLS Work Order #: 23J0730
COC #:

Heather Neff
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: Lee Vining WQ

Enclosed are the results of analyses for samples received by the laboratory on 10/12/23 09:20. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

Daniel Johnson

Daniel Johnson
Technical Director

CA SWRCB ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY

CLS ID. NO. 23J0130 (1 of 1)

Report To:

Stillwater Sciences
279 Cousteau Place Suite 400
Davis, CA 95618

Project Manager
Heather Neff heather@stillwatersci.com

Project Name
Lee Vining WQ

Sampled By Michael Schweiker

Job Description
Monitor water chemistry in project reaches.

Site Location Lee Vining Hydroelectric Project

Client Job Number
856.01 Task 0717.00

Destination Laboratory
Rancho Cordova

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA
95742
www.californialab.com

☐ **OTHER**

ANALYSIS REQUESTED

GEOTRACKER

EDF REPORT YES ☒ ☐ NO

GLOBAL ID.

FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES		Orthophosphate	Total phosphorous	Total Kjeldahl Nitrogen	Total Ammonia as N	Nitrate/Nitrite	TDS/TSS	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
10/11/23	9:45	LV-11-Surface		Surface water	3		6		X	X	X	X	X	X				X	
10/11/23	10:00	LV-11-Bottom		Surface water	3		6		X	X	X	X	X	X				X	
				Surface water			6											X	
				Surface water			6											X	
				Surface water			6											X	
				Surface water			6											X	
				Surface water			6											X	INVOICE TO:
				Surface water			6											X	Stillwater Sciences
				Surface water			6											X	Same as above
				Surface water			6											X	**Project No. 856.01**
				Surface water			6											X	**Task 0717.00**
				Surface water			6											X	QUOTE#

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)= H2SO4 (5) NH_3/NH_4 (6) NAOH

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	Michael Schweiker Stillwater Sciences	10/11/23 2pm		

RECEIVED AT LAB BY: **DATE/TIME:** 10/12/23 920 **CONDITIONS/COMMENTS:** 2.6/2.5

SHIPPED BY: ☒ **FED EX** ☐ **UPS** ☐ **OTHER** **AIR BILL #** 8172 8674 1340

Stillwater Sciences	Project: Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number: 856.01 Task 0717.00	**CLS Work Order #: 23J0730**
Berkeley, CA 94705	Project Manager: Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

LV-11 Surface (23J0730-01) Surface water Sampled: 10/11/23 09:45 Received: 10/12/23 09:20

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Ammonia as N	ND	0.10	mg/L	1	2308757	10/17/23	10/17/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2308628	10/12/23	10/12/23	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2308595	10/12/23	10/12/23	SM4500-P E	
Total Dissolved Solids	**21**	10	"	"	2308695	10/16/23	10/17/23	SM2540C	
Total Kjeldahl Nitrogen	**0.31**	0.20	"	"	2308704	10/16/23	10/16/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2308645	10/13/23	10/13/23	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2308730	10/17/23	10/18/23	SM2540D	

LV-11 Bottom (23J0730-02) Surface water Sampled: 10/11/23 10:00 Received: 10/12/23 09:20

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Ammonia as N	ND	0.10	mg/L	1	2308757	10/17/23	10/17/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2308628	10/12/23	10/12/23	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2308595	10/12/23	10/12/23	SM4500-P E	
Total Dissolved Solids	**25**	10	"	"	2308695	10/16/23	10/17/23	SM2540C	
Total Kjeldahl Nitrogen	ND	0.20	"	"	2308704	10/16/23	10/16/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2308645	10/13/23	10/13/23	SM4500-P E	
Total Suspended Solids	**6.0**	5.0	"	"	2308730	10/17/23	10/18/23	SM2540D	

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff

CLS Work Order #: 23J0730
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308595 - General Preparation										
Blank (2308595-BLK1)				Prepared & Analyzed: 10/12/23						
Orthophosphate as PO4	ND	0.15	mg/L							
LCS (2308595-BS1)				Prepared & Analyzed: 10/12/23						
Orthophosphate as PO4	0.994	0.15	mg/L	0.918		108	80-120			
LCS Dup (2308595-BSD1)				Prepared & Analyzed: 10/12/23						
Orthophosphate as PO4	0.998	0.15	mg/L	0.918		109	80-120	0.4	20	
Matrix Spike (2308595-MS1)		**Source: 23J0617-01**		Prepared & Analyzed: 10/12/23						
Orthophosphate as PO4	28.5	3.0	mg/L	0.918	12.0	NR	75-125			QM-7
Matrix Spike Dup (2308595-MSD1)		**Source: 23J0617-01**		Prepared & Analyzed: 10/12/23						
Orthophosphate as PO4	26.7	3.0	mg/L	0.918	12.0	NR	75-125	7	25	QM-7
Batch 2308628 - General Prep										
Blank (2308628-BLK1)				Prepared & Analyzed: 10/12/23						
Nitrate/Nitrite as N	ND	0.40	mg/L							
LCS (2308628-BS1)				Prepared & Analyzed: 10/12/23						
Nitrate/Nitrite as N	3.87	0.40	mg/L	4.00		97	80-120			
LCS Dup (2308628-BSD1)				Prepared & Analyzed: 10/12/23						
Nitrate/Nitrite as N	3.90	0.40	mg/L	4.00		97	80-120	0.7	20	
Matrix Spike (2308628-MS1)		**Source: 23J0730-01**		Prepared & Analyzed: 10/12/23						
Nitrate/Nitrite as N	3.97	0.40	mg/L	4.00	ND	99	80-120			

Stillwater Sciences	Project:	Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number:	856.01 Task 0717.00	**CLS Work Order #: 23J0730**
Berkeley, CA 94705	Project Manager:	Heather Neff	COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308628 - General Prep										
Matrix Spike Dup (2308628-MSD1)	**Source: 23J0730-01**			Prepared & Analyzed: 10/12/23						
Nitrate/Nitrite as N	3.98	0.40	mg/L	4.00	ND	99	80-120	0.3	20	
Batch 2308645 - General Preparation										
Blank (2308645-BLK1)				Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	ND	0.050	mg/L							
LCS (2308645-BS1)				Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.335	0.050	mg/L	0.300		112	80-120			
LCS Dup (2308645-BSD1)				Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.311	0.050	mg/L	0.300		104	80-120	8	25	
Matrix Spike (2308645-MS1)	**Source: 23J0529-03**			Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.318	0.050	mg/L	0.300	ND	106	75-125			
Matrix Spike Dup (2308645-MSD1)	**Source: 23J0529-03**			Prepared & Analyzed: 10/13/23						
Total Phosphorus as P	0.318	0.050	mg/L	0.300	ND	106	75-125	0	30	
Batch 2308695 - General Preparation										
Blank (2308695-BLK1)				Prepared: 10/16/23 Analyzed: 10/17/23						
Total Dissolved Solids	ND	10	mg/L							
LCS (2308695-BS1)				Prepared: 10/16/23 Analyzed: 10/17/23						
Total Dissolved Solids	49.0	10	mg/L	50.0		98	80-120			

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308695 - General Preparation										
LCS Dup (2308695-BSD1)				Prepared: 10/16/23 Analyzed: 10/17/23						
Total Dissolved Solids	48.0	10	mg/L	50.0		96	80-120	2	200	
Duplicate (2308695-DUP1)	**Source: 23J0635-01**			Prepared: 10/16/23 Analyzed: 10/17/23						
Total Dissolved Solids	1470	10	mg/L		1470			0.1	20	
Batch 2308704 - General Preparation										
Blank (2308704-BLK1)				Prepared & Analyzed: 10/16/23						
Total Kjeldahl Nitrogen	ND	0.20	mg/L							
LCS (2308704-BS1)				Prepared & Analyzed: 10/16/23						
Total Kjeldahl Nitrogen	0.535	0.20	mg/L	0.500		107	80-120			
LCS Dup (2308704-BSD1)				Prepared & Analyzed: 10/16/23						
Total Kjeldahl Nitrogen	0.551	0.20	mg/L	0.500		110	80-120	3	20	
Matrix Spike (2308704-MS1)	**Source: 23J0617-01**			Prepared & Analyzed: 10/16/23						
Total Kjeldahl Nitrogen	1.30	0.40	mg/L	0.500	1.02	56	75-125			QM-7
Matrix Spike Dup (2308704-MSD1)	**Source: 23J0617-01**			Prepared & Analyzed: 10/16/23						
Total Kjeldahl Nitrogen	1.34	0.40	mg/L	0.500	1.02	64	75-125	3	25	QM-7
Batch 2308730 - General Preparation										
Blank (2308730-BLK1)				Prepared: 10/17/23 Analyzed: 10/18/23						
Total Suspended Solids	ND	5.0	mg/L							

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: Lee Vining WQ
Project Number: 856.01 Task 0717.00
Project Manager: Heather Neff
CLS Work Order #: 23J0730
COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308730 - General Preparation										
LCS (2308730-BS1)				Prepared: 10/17/23 Analyzed: 10/18/23						
Total Suspended Solids	93.8	5.0	mg/L	100		94	80-120			
LCS Dup (2308730-BSD1)				Prepared: 10/17/23 Analyzed: 10/18/23						
Total Suspended Solids	94.0	5.0	mg/L	100		94	80-120	0.2	200	
Duplicate (2308730-DUP1)		**Source: 23J0727-02**		Prepared: 10/17/23 Analyzed: 10/18/23						
Total Suspended Solids	ND	9.1	mg/L		ND				20	
Batch 2308757 - General Preparation										
Blank (2308757-BLK1)				Prepared & Analyzed: 10/17/23						
Ammonia as N	ND	0.10	mg/L							
LCS (2308757-BS1)				Prepared & Analyzed: 10/17/23						
Ammonia as N	0.493	0.10	mg/L	0.500		99	80-120			
LCS Dup (2308757-BSD1)				Prepared & Analyzed: 10/17/23						
Ammonia as N	0.498	0.10	mg/L	0.500		100	80-120	1	25	
Matrix Spike (2308757-MS1)		**Source: 23J0729-03**		Prepared & Analyzed: 10/17/23						
Ammonia as N	0.757	0.10	mg/L	0.500	0.260	99	75-125			
Matrix Spike Dup (2308757-MSD1)		**Source: 23J0729-03**		Prepared & Analyzed: 10/17/23						
Ammonia as N	0.764	0.10	mg/L	0.500	0.260	101	75-125	0.9	25	

Stillwater Sciences	Project:	Lee Vining WQ	
2855 Telegraph Ave., Suite 400	Project Number:	856.01 Task 0717.00	**CLS Work Order #: 23J0730**
Berkeley, CA 94705	Project Manager:	Heather Neff	COC #:

Notes and Definitions

QM-7	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS and/or LCSD recovery.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
*	The laboratory does not hold CA-ELAP accreditation for this analyte or method. Accreditation may not be available from CA-ELAP for this analyte or method.

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

October 20, 2023

CLS Work Order #: 23J0782
COC #: 230673

Heather Neff
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: 0856.01/0717.00

Enclosed are the results of analyses for samples received by the laboratory on 10/13/23 09:30. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

Daniel Johnson

Daniel Johnson
Technical Director

CA SWRCB ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

CHAIN OF CUSTODY

CLS ID No.; 23J0782

LOG № 230673

HIGHLIGHTED AREAS MUST BE FILLED OUT PRIOR TO ACCEPTANCE

REPORT TO:

NAME AND ADDRESS
Stillwater Sciences
279 Cousteau PL #400, Davis, CA

PROJECT MANAGER Heather Neff PHONE # heather@stillwatersci.com

PROJECT NAME 0856.01/0717.00

SAMPLED BY Elliott Allen

JOB DESCRIPTION Lee Vining WQ

SITE LOCATION

CLIENT JOB NUMBER

DESTINATION LABORATORY
☐ **CLS (916) 638-7301**
3249 FITZGERALD RD.
RANCHO CORDOVA, CA 95742
☐ **OTHER**

GEOTRACKER: EDF REPORT ☐ YES ☐ NO
GLOBAL ID:

CDPH WRITE ON EDT TRANSMISSION? ☐ YES ☐ NO
STATE SYSTEM NUMBER
IF "YES" PLEASE ENTER THE SOURCE NUMBER(S).

COMPOSITE:

							ANALYSIS REQUESTED							**TURN AROUND TIME**				**SPECIAL INSTRUCTIONS OR**	
DATE	**TIME**	**SAMPLE IDENTIFICATION**	**MATRIX**	**CONTAINER NO.**	**CONTAINER TYPE**	**PRESERVATIVES**	Orthophosphate	total phosphorous	TKN	Total Ammonia as N	Nitrate/Nitrite	TDS/TSS		1 DAY	2 DAY	3 DAY	5 DAY	**ALT.**	**ID:**
10/12	1000	LV-1	W	3			X	X	X	X	X	X					X		

INVOICE TO:

P.O. #

QUOTE #

Email/Address heather@stillwater-sci.com

PRESERVATIVES: (1) HCL (2) HNO_3 (3) = COLD (4) = NaOH (5) = H_2SO_4 (6) = $Na_2S_2O_3$ (7) =

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
	Elliott Allen/Stillwater	10/13 930		

RE'D AT LAB BY:

DATE / TIME: 10/13/23 930

CONDITIONS / COMMENTS: 5.6/5.5

SHIPPED BY: ☐ FED X ☐ UPS ☐ OTHER

AIR BILL #

White-Lab/Terms and Conditions Yellow-Lab file copy/Terms and Conditions

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: 0856.01/0717.00
Project Number: [none]
Project Manager: Heather Neff

CLS Work Order #: 23J0782
COC #: 230673

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LV-1 (23J0782-01) W Sampled: 10/12/23 10:00 Received: 10/13/23 09:30									
Ammonia as N	ND	0.10	mg/L	1	2308757	10/17/23	10/17/23	SM4500-NH3F-2011	
Nitrate/Nitrite as N	ND	0.40	"	"	2308633	10/13/23	10/13/23	EPA 300.0	
Orthophosphate as PO4	ND	0.15	"	"	2308652	10/13/23	10/13/23	SM4500-P E	
Total Dissolved Solids	**13**	10	"	"	2308695	10/16/23	10/17/23	SM2540C	
Total Kjeldahl Nitrogen	**0.22**	0.20	"	"	2308704	10/16/23	10/16/23	SM4500-NH3F-2011	
Total Phosphorus as P	ND	0.050	"	"	2308861	10/20/23	10/20/23	SM4500-P E	
Total Suspended Solids	ND	5.0	"	"	2308730	10/17/23	10/18/23	SM2540D	

Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project: 0856.01/0717.00
Project Number: [none]
Project Manager: Heather Neff

CLS Work Order #: 23J0782
COC #: 230673

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308633 - General Prep										
Blank (2308633-BLK1)				Prepared & Analyzed: 10/13/23						
Nitrate/Nitrite as N	ND	0.40	mg/L							
LCS (2308633-BS1)				Prepared & Analyzed: 10/13/23						
Nitrate/Nitrite as N	3.88	0.40	mg/L	4.00		97	80-120			
LCS Dup (2308633-BSD1)				Prepared & Analyzed: 10/13/23						
Nitrate/Nitrite as N	3.81	0.40	mg/L	4.00		95	80-120	2	20	
Matrix Spike (2308633-MS1)	**Source: 23J0727-03**			Prepared & Analyzed: 10/13/23						
Nitrate/Nitrite as N	10.4	0.40	mg/L	4.00	6.73	92	80-120			
Matrix Spike Dup (2308633-MSD1)	**Source: 23J0727-03**			Prepared & Analyzed: 10/13/23						
Nitrate/Nitrite as N	10.4	0.40	mg/L	4.00	6.73	92	80-120	0.1	20	
Batch 2308652 - General Preparation										
Blank (2308652-BLK1)				Prepared & Analyzed: 10/13/23						
Orthophosphate as PO4	ND	0.15	mg/L							
LCS (2308652-BS1)				Prepared & Analyzed: 10/13/23						
Orthophosphate as PO4	1.06	0.15	mg/L	0.918		115	80-120			
LCS Dup (2308652-BSD1)				Prepared & Analyzed: 10/13/23						
Orthophosphate as PO4	1.06	0.15	mg/L	0.918		116	80-120	0.4	20	
Matrix Spike (2308652-MS1)	**Source: 23J0782-01**			Prepared & Analyzed: 10/13/23						
Orthophosphate as PO4	1.10	0.15	mg/L	0.918	0.0359	116	75-125			

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308652 - General Preparation										
Matrix Spike Dup (2308652-MSD1)		**Source: 23J0782-01**		Prepared & Analyzed: 10/13/23						
Orthophosphate as PO4	1.10	0.15	mg/L	0.918	0.0359	116	75-125	0.4	25	
Batch 2308695 - General Preparation										
Blank (2308695-BLK1)				Prepared: 10/16/23 Analyzed: 10/17/23						
Total Dissolved Solids	ND	10	mg/L							
LCS (2308695-BS1)				Prepared: 10/16/23 Analyzed: 10/17/23						
Total Dissolved Solids	49.0	10	mg/L	50.0		98	80-120			
LCS Dup (2308695-BSD1)				Prepared: 10/16/23 Analyzed: 10/17/23						
Total Dissolved Solids	48.0	10	mg/L	50.0		96	80-120	2	200	
Duplicate (2308695-DUP1)		**Source: 23J0635-01**		Prepared: 10/16/23 Analyzed: 10/17/23						
Total Dissolved Solids	1470	10	mg/L		1470			0.1	20	
Batch 2308704 - General Preparation										
Blank (2308704-BLK1)				Prepared & Analyzed: 10/16/23						
Total Kjeldahl Nitrogen	ND	0.20	mg/L							
LCS (2308704-BS1)				Prepared & Analyzed: 10/16/23						
Total Kjeldahl Nitrogen	0.535	0.20	mg/L	0.500		107	80-120			
LCS Dup (2308704-BSD1)				Prepared & Analyzed: 10/16/23						
Total Kjeldahl Nitrogen	0.551	0.20	mg/L	0.500		110	80-120	3	20	

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308704 - General Preparation										
Matrix Spike (2308704-MS1)		**Source: 23J0617-01**		Prepared & Analyzed: 10/16/23						
Total Kjeldahl Nitrogen	1.30	0.40	mg/L	0.500	1.02	56	75-125			QM-7
Matrix Spike Dup (2308704-MSD1)		**Source: 23J0617-01**		Prepared & Analyzed: 10/16/23						
Total Kjeldahl Nitrogen	1.34	0.40	mg/L	0.500	1.02	64	75-125	3	25	QM-7
Batch 2308730 - General Preparation										
Blank (2308730-BLK1)				Prepared: 10/17/23 Analyzed: 10/18/23						
Total Suspended Solids	ND	5.0	mg/L							
LCS (2308730-BS1)				Prepared: 10/17/23 Analyzed: 10/18/23						
Total Suspended Solids	93.8	5.0	mg/L	100		94	80-120			
LCS Dup (2308730-BSD1)				Prepared: 10/17/23 Analyzed: 10/18/23						
Total Suspended Solids	94.0	5.0	mg/L	100		94	80-120	0.2	200	
Duplicate (2308730-DUP1)		**Source: 23J0727-02**		Prepared: 10/17/23 Analyzed: 10/18/23						
Total Suspended Solids	ND	9.1	mg/L		ND				20	
Batch 2308757 - General Preparation										
Blank (2308757-BLK1)				Prepared & Analyzed: 10/17/23						
Ammonia as N	ND	0.10	mg/L							
LCS (2308757-BS1)				Prepared & Analyzed: 10/17/23						
Ammonia as N	0.493	0.10	mg/L	0.500		99	80-120			

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2308757 - General Preparation										
LCS Dup (2308757-BSD1)				Prepared & Analyzed: 10/17/23						
Ammonia as N	0.498	0.10	mg/L	0.500		100	80-120	1	25	
Matrix Spike (2308757-MS1)	**Source: 23J0729-03**			Prepared & Analyzed: 10/17/23						
Ammonia as N	0.757	0.10	mg/L	0.500	0.260	99	75-125			
Matrix Spike Dup (2308757-MSD1)	**Source: 23J0729-03**			Prepared & Analyzed: 10/17/23						
Ammonia as N	0.764	0.10	mg/L	0.500	0.260	101	75-125	0.9	25	
Batch 2308861 - General Preparation										
Blank (2308861-BLK1)				Prepared & Analyzed: 10/20/23						
Total Phosphorus as P	ND	0.050	mg/L							
LCS (2308861-BS1)				Prepared & Analyzed: 10/20/23						
Total Phosphorus as P	0.321	0.050	mg/L	0.300		107	80-120			
LCS Dup (2308861-BSD1)				Prepared & Analyzed: 10/20/23						
Total Phosphorus as P	0.323	0.050	mg/L	0.300		108	80-120	0.6	25	
Matrix Spike (2308861-MS1)	**Source: 23J0782-01**			Prepared & Analyzed: 10/20/23						
Total Phosphorus as P	0.309	0.050	mg/L	0.300	ND	103	75-125			
Matrix Spike Dup (2308861-MSD1)	**Source: 23J0782-01**			Prepared & Analyzed: 10/20/23						
Total Phosphorus as P	0.321	0.050	mg/L	0.300	ND	107	75-125	4	30	

Stillwater Sciences	Project:	0856.01/0717.00		
2855 Telegraph Ave., Suite 400	Project Number:	[none]	**CLS Work Order #: 23J0782**	
Berkeley, CA 94705	Project Manager:	Heather Neff	COC #: 230673	

Notes and Definitions

QM-7	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS and/or LCSD recovery.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
*	The laboratory does not hold CA-ELAP accreditation for this analyte or method. Accreditation may not be available from CA-ELAP for this analyte or method.

APPENDIX G
BACTERIOLOGICAL LABORATORY REPORTS

2022
SILVER STATE LABORATORY REPORTS

Silver State Labs-Reno
1135 Financial Blvd
Reno, NV 89502
(775) 857-2400 FAX: (888) 398-7002
www.ssalabs.com

September 27, 2022
Workorder **22090716**

Heather Neff
Stillwater Sciences
279 Costeau Place #400
Davis, CA 95618

Project: 856.01/711/ Bact-LV-1

Dear Heather Neff:

It is the policy of Silver State Analytical Laboratory - Reno to strictly adhere to a comprehensive Quality Assurance Plan that ensures the data presented in this report are both accurate and precise. Silver State Analytical Laboratory - Reno maintains accreditation in the State of Nevada (NV-00015) and the State of California (ELAP 2990).

The data presented in this report was obtained from the analysis of samples received under a chain of custody. Unless otherwise noted below, samples were received in good condition, properly preserved and within the hold time for the requested analyses. Any anomalies associated with the analysis of the samples have been flagged in the Analytical Report with an appropriate explanation in the Definitions & Qualifiers.

Sincerely,

Carly Wood
Laboratory Director
1135 Financial Blvd
Reno, NV 89502

Analytical Report

Workorder#: **22090716**
Date Reported: **9/27/2022**

Client: Stillwater Sciences
Project Name: 856.01/711/ Bact-LV-1
PO #: 856.01/711
Sampled By: Esther A.

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
22090716-01	Bact - LV - 1	09/15/2022 9:00	9/15/2022

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9221 E	350	MPN/100mL	1.8	IF	09/15/2022 14:50	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
22090716-02	Bact - LV - 2	09/15/2022 9:20	9/15/2022

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9221 E	540	MPN/100mL	1.8	IF	09/15/2022 14:50	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
22090716-03	Bact - LV - 3	09/15/2022 9:35	9/15/2022

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9221 E	49	MPN/100mL	1.8	IF	09/15/2022 14:50	

SilverState Analytical Laboratories Sierra Environmental Monitoring EnviroTech

ssalabs.com sem-analytical.com envirotechonline.com

☐ 3626 E. SUNSET RD., STE 100, LAS VEGAS, NV 89120
Phone (702) 873-4478 Fax: (702) 873-7967 (EPA#: NV00930, CA2885)

☒ 1135 FINANCIAL BOULEVARD, RENO, NV 89502
Phone (775) 857-2400 Fax: (888) 398-7002 (EPA#: NV00015, CA2526)

CHAIN-OF-CUSTODY-RECORD

22090716

Page 1 of 1

Report Results To:

Report Attention: Heather Neff
Project Number: 856.01/711
Company: Stillwater Sciences
Mailing Address: 279 Costeau Place #400
City, State, Zip: Davis, CA 95618
Phone: 530-751-7550 x322
Email / Fax: heather@stillwatersci.com

Send Invoice To:

Invoice Attention:
PO#: 856.01/711
Quote #
Company: Stillwater Sciences
Mailing Address: 279 Costeau Place # 400
City, State, Zip: Davis, CA 95618
Phone: 530-756-7550
Email / Fax: heather@stillwatersci.com

COMPLIANCE MONITORING? Yes ☐ No ☒

NEW ADDRESS? Results: ☐ Invoice: ☐

Applicable Program
SDWA ☐ CWA ☐ RCRA ☐
Mining ☐ Other ______

QC Level Report
I II III IV
NOTE: Surcharges apply to Level II, III and IV reports

Send Results Via:
Mail: ☐ Email: ☒ Fax: ☐

Send Invoice Via:
Mail: ☐ Email: ☒ Fax: ☐

Field Measurements
On-Site pH: Chlorine :
Temperature: Other

COMMENTS:

Sampled by: Esther Adelstein Signature:

I attest to the validity and authenticity of the sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time is considered fraud and may be grounds for legal action.

Standard: ☒ Standard TAT 7-10 Business Days. Note that some tests vary.
Rush
Same Day: ☐ 3 Day: ☐ Other (specify): ______
1 Day: ☐ 4 Day: ☐ Rush results will be issued after 4:00 p.m.
2 Day: ☐ 5 Day: ☐
NOTE: A Rush Surcharge is applied for rush samples

Other Pertinent Information / Special Instructions
9°C

ANALYSES REQUESTED

Date Sampled	Time Sampled	Sample Identification	SSAL - SEM Lab No.	Comp. Grab	Matrix*	Preservative**	Number / Type of Containers ***	Fecal coliform MPN
9/15/22	0900	Bact-LV-1					1	
9/15/22	0920	Bact-LV-2					1	
9/15/22	0935	Bact-LV-3					1	

	Signature	Print Name	Company	Date	Time
Relinquished By:		Esther Adelstein	Stillwater Sciences	9/15/22	1321
Received By:		Kayla Montelezo	SSAL	9/15/22	1321
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Authorized By:					

Authorization is required to process samples. This obligates your organization for service fees. SSAL Standard T & C's or other written agreement applies. If collections or legal services are required to recover said fees, your organization will be responsible for all fees and costs in addition to service fees.

Samples are discarded 30 days after results are reported unless other arrangements are made and storage fees may apply. The analytical results associated with this COC apply only to these samples as they are received by the laboratory. The liability of the laboratory is limited to the amount paid for the report.

Matrix* DW-Drinking Water, WW-Waste Water, GW-Ground Water, SW-Surface Water, SS-Soil, S-Solid, OT-Other
Preservative** 1=H_2SO_4, 2=HNO_3, 3=HCl, 4=NaOH, 5=$Na_2S_2O_3$, 6=None, 7=Other

Container*** P-Plastic, G-Glass, V-Voa Vial, OT-Other

Definitions & Qualifiers

WO#: **22090716**
Date: **9/27/2022**

Definitions:

LCS: Laboratory Control Sample; prepared by adding a known mass of target analytes to a specified amount of de-ionized water and prepared with the batch of samples, used to calculate Accuracy (%REC).

LCSD: LCS Duplicate; used to calculate both Accuracy (%REC) and Precision (%RPD)

MBLK: Method Blank; a sample of similar matrix that is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedure, and in which no target analytes or interferences are present at concentrations that impact the analytical results for sample analyses.

MS: Matrix Spike; prepared by adding a known mass of target analytes to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available, used to calculate Accuracy (%REC)

MSD: Matrix Spike Duplicate; used to calculate both Accuracy (%REC) and Precision (%RPD)

RPD: Relative Percent Difference; comparison between sample and duplicate and/or MS and MSD.

PQL: Practical Quantitation Limit; the limit to which data is quantitated for reporting.

MDL: Method Detection Limit; the limit to which the instrument can reliably detect.

MCL: Maximum Contaminant Level; value set according to EPA guidelines.

Qualifiers:

* - Analyte exceeds Safe Drinking Water Act MCL, does not meet drinking water standards.
C - Analyte value below Safe Drinking Water Act MCL, does not meet drinking water standards.
B - Analyte found above the PQL in associated method blank.
G - Calibration blank analyte detected above PQL.
H - Sample analyzed beyond holding time for this parameter.
J - Estimated Value; Analyte found between MDL and PQL limits.
L - Sample concentration is at least 5 times greater than spike contribution. Spike recovery criteria do not apply.
R - RPD between sample and duplicate sample outside the RPD acceptance limits.
S - Batch MS and/or MSD were outside acceptance limits, batch LCS was acceptable.
W - Sample temperature when recieved was out of limit as specified by method.
Z - Batch LCS and/or LCSD were outside acceptance limits.

Silver State Labs-Reno
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(775) 857-2400 FAX: (888) 398-7002
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October 04, 2022
Workorder **22090937**

Heather Nett
Stillwater Sciences
279 Costeau Place #400
Davis, CA 95618

Project: 856.01/711/ Bact-LV-1

Dear Heather Nett:

It is the policy of Silver State Analytical Laboratory - Reno to strictly adhere to a comprehensive Quality Assurance Plan that ensures the data presented in this report are both accurate and precise. Silver State Analytical Laboratory - Reno maintains accreditation in the State of Nevada (NV-00015) and the State of California (ELAP 2990).

The data presented in this report was obtained from the analysis of samples received under a chain of custody. Unless otherwise noted below, samples were received in good condition, properly preserved and within the hold time for the requested analyses. Any anomalies associated with the analysis of the samples have been flagged in the Analytical Report with an appropriate explanation in the Definitions & Qualifiers.

Sincerely,

Carly Wood

Carly Wood
Laboratory Director
1135 Financial Blvd
Reno, NV 89502

Silver State Labs-Reno
1135 Financial Blvd
Reno, NV 89502
(775) 857-2400 FAX: (888) 398-7002
www.ssalabs.com

Analytical Report

Workorder#: **22090937**
Date Reported: **10/4/2022**

Client: Stillwater Sciences
Project Name: 856.01/711/ Bact-LV-1
PO #: 856.01/711

Sampled By: Bethany L.

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
22090937-01	Bact-LV-1	09/20/2022 8:45	9/20/2022

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9222 D	< 2	CFU/100ml	2	IF	09/20/2022 16:11	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
22090937-02	Bact-LV-12	09/20/2022 8:30	9/20/2022

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9222 D	< 2	CFU/100ml	2	IF	09/20/2022 16:11	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
22090937-03	Bact-LV-3	09/20/2022 8:20	9/20/2022

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9222 D	4	CFU/100ml	2	IF	09/20/2022 16:11	

SilverState Analytical Laboratories Sierra Environmental Monitoring EnviroTech

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Phone (775) 857-2400 Fax: (888) 398-7002 (EPA#: NV00015, CA2526)

CHAIN-OF-CUSTODY-RECORD

Page ______ of ______

22090937

Report Results To:

Report Attention: Heather Neff
Project Number: 856.01/711
Company: Stillwater Sciences
Mailing Address: 279 Costeau Place #400
City, State, Zip: Davis, CA 95618
Phone: 530-756-7550 x322
Email / Fax: heather@stillwatersci.com

Send Invoice To:

Invoice Attention:
PO#: 856.01/711
Quote #:
Company: Stillwater Sciences
Mailing Address: 279 Costeau Place #400
City, State, Zip: Davis, CA 95618
Phone: 530-756-7550
Email / Fax: heather@stillwatersci.com

COMPLIANCE MONITORING? Yes ☐ No ☒
NEW ADDRESS? Results ☐ Invoice ☐

Applicable Program
SDWA ☐ CWA ☐ RCRA ☐
Mining ☐ Other ______

QC Level Report
I II III IV
NOTE: Surcharges apply to Level II, III and IV reports

Send Results Via:
Mail: ☐ Email: ☒ Fax: ☐

Send Invoice Via:
Mail: ☐ Email: ☒ Fax: ☐

Field Measurements
On-Site pH
Chlorine
Temperature
Other

Metals*

COMMENTS:

Sampled by: Bethany Leach Signature:

I attest to the validity and authenticity of the sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time is considered fraud and may be grounds for legal action.

Standard: ☒ Standard TAT 7-10 Business Days. Note that some tests vary.
Rush
Same Day: ☐ 3 Day: ☐ Other (specify): ______
1 Day: ☐ 4 Day: ☐ **Rush results will be issued after 4:00 p.m.**
2 Day: ☐ 5 Day: ☐

NOTE: A Rush Surcharge is applied for rush samples

Other Pertinent Information / Special Instructions
4°C

ANALYSES REQUESTED

Date Sampled	Time Sampled	Sample Identification	SSAL - SEM Lab No.	Comp. Grab	Matrix*	Preservative**	Number / Type of Containers ***	Fecal Coliform ~~SM 9221E~~	FECAL MF
9/20/22	8:45	Bact-LV-1					1	X	
9/20/22	8:30	Bact-LV-2					1	X	
9/20/22	8:20	Bact-LV-3					1	X	

	Signature	Print Name	Company	Date	Time
Relinquished By:	Bethany Leach	Bethany Leach	Stillwater Sciences	9/20/22	1220
Received By:		Cydnee McGuire	SSAL	9/20/22	1220
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Authorized By:					

Authorization is required to process samples. This obligates your organization for service fees. SSAL Standard T & C's or other written agreement applies. If collections or legal services are required to recover said fees, your organization will be responsible for all fees and costs in addition to service fees.

Samples are discarded 30 days after results are reported unless other arrangements are made and storage fees may apply. The analytical results associated with this COC apply only to these samples as they are received by the laboratory. The liability of the laboratory is limited to the amount paid for the report.

Matrix* DW-Drinking Water, WW-Waste Water, GW-Ground Water, SW-Surface Water, SS-Soil, S-Solid, OT-Other
Preservative** 1=H_2SO_4, 2=HNO_3, 3=HCl, 4=NaOH, 5=$Na_2S_2O_3$, 6=None, 7=Other
Container*** P-Plastic, G-Glass, V-Voa Vial, OT-Other

Definitions & Qualifiers

WO#: **22090937**
Date: **10/4/2022**

Definitions:

LCS: Laboratory Control Sample; prepared by adding a known mass of target analytes to a specified amount of de-ionized water and prepared with the batch of samples, used to calculate Accuracy (%REC).

LCSD: LCS Duplicate; used to calculate both Accuracy (%REC) and Precision (%RPD)

MBLK: Method Blank; a sample of similar matrix that is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedure, and in which no target analytes or interferences are present at concentrations that impact the analytical results for sample analyses.

MS: Matrix Spike; prepared by adding a known mass of target analytes to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available, used to calculate Accuracy (%REC)

MSD: Matrix Spike Duplicate; used to calculate both Accuracy (%REC) and Precision (%RPD)

RPD: Relative Percent Difference; comparison between sample and duplicate and/or MS and MSD.

PQL: Practical Quantitation Limit; the limit to which data is quantitated for reporting.

MDL: Method Detection Limit; the limit to which the instrument can reliably detect.

MCL: Maximum Contaminant Level; value set according to EPA guidelines.

Qualifiers:

* - Analyte exceeds Safe Drinking Water Act MCL, does not meet drinking water standards.
C - Analyte value below Safe Drinking Water Act MCL, does not meet drinking water standards.
B - Analyte found above the PQL in associated method blank.
G - Calibration blank analyte detected above PQL.
H - Sample analyzed beyond holding time for this parameter.
J - Estimated Value; Analyte found between MDL and PQL limits.
L - Sample concentration is at least 5 times greater than spike contribution. Spike recovery criteria do not apply.
R - RPD between sample and duplicate sample outside the RPD acceptance limits.
S - Batch MS and/or MSD were outside acceptance limits, batch LCS was acceptable.
W - Sample temperature when recieved was out of limit as specified by method.
Z - Batch LCS and/or LCSD were outside acceptance limits.

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October 05, 2022
Workorder **22091002**

Heather Nett
Stillwater Sciences
279 Costeau Place #400
Davis, CA 95618

Project: 856.01/711/Bact-LV-1

Dear Heather Nett:

It is the policy of Silver State Analytical Laboratory - Reno to strictly adhere to a comprehensive Quality Assurance Plan that ensures the data presented in this report are both accurate and precise. Silver State Analytical Laboratory - Reno maintains accreditation in the State of Nevada (NV-00015) and the State of California (ELAP 2990).

The data presented in this report was obtained from the analysis of samples received under a chain of custody. Unless otherwise noted below, samples were received in good condition, properly preserved and within the hold time for the requested analyses. Any anomalies associated with the analysis of the samples have been flagged in the Analytical Report with an appropriate explanation in the Definitions & Qualifiers.

Sincerely,

Carly Wood
Laboratory Director
1135 Financial Blvd
Reno, NV 89502

Analytical Report

Workorder#: **22091002**
Date Reported: **10/5/2022**

Client: Stillwater Sciences
Project Name: 856.01/711/Bact-LV-1
PO #: 856.01/711

Sampled By: Bethany L.

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
22091002-01	Bact-LV-1	09/21/2022 9:10	9/21/2022

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9222 D	< 2	CFU/100ml	2	IF	09/21/2022 15:19	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
22091002-02	Bact-LV-2	09/21/2022 9:30	9/21/2022

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9222 D	< 2	CFU/100ml	2	IF	09/21/2022 15:19	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
22091002-03	Bact-LV-3	09/21/2022 8:50	9/21/2022

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9222 D	20	CFU/100ml	2	IF	09/21/2022 15:19	

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CHAIN-OF-CUSTODY-RECORD

22091002

[redacted]

Page ______ of ______

Report Results To:

Report Attention: Heather Neff
Project Number: 856.01/711
Company: Stillwater Sciences
Mailing Address: 279 Costeau Place #400
City, State, Zip: Davis, CA 95618
Phone: 530-756-7550 x322
Email / Fax: heather@stillwatersci.com

Send Invoice To:

Invoice Attention:
PO# 856.01/711
Quote #
Company: Stillwater Sciences
Mailing Address: 279 Costeau Place #400
City, State, Zip: Davis, CA 95618
Phone: 530-756-7550
Email / Fax: heather@stillwatersci.com

COMPLIANCE MONITORING? Yes ☐ No ☒

NEW ADDRESS? Results: ☐ Invoice: ☐

Applicable Program
SDWA ☐ CWA ☐ RCRA ☐
Mining ☐ Other ______

QC Level Report
I II III IV
NOTE: Surcharges apply to Level II, III and IV reports

Send Results Via:
Mail: ☐ Email: ☒ Fax: ☐

Send Invoice Via:
Mail: ☐ Email: ☒ Fax: ☐

Field Measurements
On-Site pH: Chlorine:
Temperature: Other:

Metals*:

COMMENTS:

Sampled by: Bethany Leach Signature:

I attest to the validity and authenticity of the sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time is considered fraud and may be grounds for legal action.

Standard: ☒ Standard TAT 7-10 Business Days. Note that some tests vary.

Rush
Same Day: ☐ 3 Day: ☐ Other (specify): ______
1 Day: ☐ 4 Day: ☐ **Rush results will be issued after 4:00 p.m.**
2 Day: ☐ 5 Day: ☐

NOTE: A Rush Surcharge is applied for rush samples

Other Pertinent Information / Special Instructions: 8°C

ANALYSES REQUESTED

Date Sampled	Time Sampled	Sample Identification	SSAL - SEM Lab No.	Comp. Grab	Matrix*	Preservative**	Number / Type of Containers ***	Fecal Coliform ~~SM 9221E~~	MF
9/21/22	9:10	Bact-LV-1					1	X	
9/21/22	9:30	Bact-LV-2					1	X	
9/21/22	8:50	Bact-LV-3					1	X	

	Signature	Print Name	Company	Date	Time
Relinquished By:		Bethany Leach	Stillwater Sciences	9/21/22	12:40
Received By:		Kayla Londezo	SSAL	9/21/22	1240
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Authorized By:					

Authorization is required to process samples. This obligates your organization for service fees. SSAL Standard T & C's or other written agreement applies. If collections or legal services are required to recover said fees, your organization will be responsible for all fees and costs in addition to service fees.

Samples are discarded 30 days after results are reported unless other arrangements are made and storage fees may apply
The analytical results associated with this COC apply only to these samples as they are received by the laboratory
The liability of the laboratory is limited to the amount paid for the report.

Matrix* DW-Drinking Water, WW-Waste Water, GW-Ground Water, SW-Surface Water, SS-Soil, S-Solid, OT-Other
Preservative** 1=H_2SO_4, 2=HNO_3, 3=HCl, 4=NaOH, 5=$Na_2S_2O_3$, 6=None, 7=Other
Container*** P-Plastic, G-Glass, V-Voa Vial, OT-Other

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(775) 857-2400 FAX: (888) 398-7002
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Definitions & Qualifiers

WO#: **22091002**
Date: **10/5/2022**

Definitions:

LCS: Laboratory Control Sample; prepared by adding a known mass of target analytes to a specified amount of de-ionized water and prepared with the batch of samples, used to calculate Accuracy (%REC).

LCSD: LCS Duplicate; used to calculate both Accuracy (%REC) and Precision (%RPD)

MBLK: Method Blank; a sample of similar matrix that is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedure, and in which no target analytes
or interferences are present at concentrations that impact the analytical results for sample analyses.

MS: Matrix Spike; prepared by adding a known mass of target analytes to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available, used to calculate Accuracy (%REC)

MSD: Matrix Spike Duplicate; used to calculate both Accuracy (%REC) and Precision (%RPD)

RPD: Relative Percent Difference; comparison between sample and duplicate and/or MS and MSD.

PQL: Practical Quantitation Limit; the limit to which data is quantitated for reporting.

MDL: Method Detection Limit; the limit to which the instrument can reliably detect.

MCL: Maximum Contaminant Level; value set according to EPA guidelines.

Qualifiers:

* - Analyte exceeds Safe Drinking Water Act MCL, does not meet drinking water standards.
C - Analyte value below Safe Drinking Water Act MCL, does not meet drinking water standards.
B - Analyte found above the PQL in associated method blank.
G - Calibration blank analyte detected above PQL.
H - Sample analyzed beyond holding time for this parameter.
J - Estimated Value; Analyte found between MDL and PQL limits.
L - Sample concentration is at least 5 times greater than spike contribution. Spike recovery criteria do not apply.
R - RPD between sample and duplicate sample outside the RPD acceptance limits.
S - Batch MS and/or MSD were outside acceptance limits, batch LCS was acceptable.
W - Sample temperature when recieved was out of limit as specified by method.
Z - Batch LCS and/or LCSD were outside acceptance limits.

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October 11, 2022
Workorder **22100184**

Heather Nett
Stillwater Sciences
279 Costeau Place #400
Davis, CA 95618

Project: 856.01/711/ Bact-LV-1

Dear Heather Nett:

It is the policy of Silver State Analytical Laboratory - Reno to strictly adhere to a comprehensive Quality Assurance Plan that ensures the data presented in this report are both accurate and precise. Silver State Analytical Laboratory - Reno maintains accreditation in the State of Nevada (NV-00015) and the State of California (ELAP 2990).

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Sincerely,

Carly Wood

Carly Wood
Laboratory Director
1135 Financial Blvd
Reno, NV 89502

Silver State Labs-Reno
1135 Financial Blvd
Reno, NV 89502
(775) 857-2400 FAX: (888) 398-7002
www.ssalabs.com

Analytical Report

Workorder#: **22100184**
Date Reported: **10/11/2022**

Client: Stillwater Sciences
Project Name: 856.01/711/ Bact-LV-1
PO #: 856.01/711

Sampled By: Bethany L.

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
22100184-01	Bact-LV-1	10/04/2022 10:10	10/4/2022

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9222 D	6	CFU/100ml	2	IF	10/04/2022 17:00	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
22100184-02	Bact-LV-2	10/04/2022 13:10	10/4/2022

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9222 D	< 2	CFU/100ml	2	IF	10/04/2022 17:00	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
22100184-03	Bact-LV-3	10/04/2022 13:00	10/4/2022

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9222 D	< 2	CFU/100ml	2	IF	10/04/2022 17:00	

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☒ 1135 FINANCIAL BOULEVARD, RENO, NV 89502
Phone (775) 857-2400 Fax: (888) 398-7002 (EPA#: NV00015, CA2526)

CHAIN-OF-CUSTODY-RECORD

Page ______ of ______

22100184

Report Results To:

Report Attention: Heather Neff
Project Number: 856.01/711
Company: Stillwater Sciences
Mailing Address: 279 Costeau Place #400
City, State, Zip: Davis, CA 95618
Phone: 530-756-7550 x322
Email / Fax: heather@stillwatersci.com

Send Invoice To:

Invoice Attention:
PO#: 856.01/711
Quote #:
Company: Stillwater Sciences
Mailing Address: 279 Costeau Place #400
City, State, Zip: Davis, CA 95618
Phone: 530-756-7550
Email / Fax: heather@stillwatersci.com

COMPLIANCE MONITORING? Yes ☐ No ☒
NEW ADDRESS? Results: ☐ Invoice: ☐

Applicable Program
SDWA ☐ CWA ☐ RCRA ☐
Mining ☐ Other ____________

QC Level Report
I II III IV
NOTE: Surcharges apply to Level II, III and IV reports

Send Results Via:
Mail: ☐ Email: ☒ Fax: ☐

Send Invoice Via:
Mail: ☐ Email: ☒ Fax: ☐

Field Measurements
On-Site pH: Chlorine:
Temperature: Other:

Sampled by: Bethany Leach Signature:

I attest to the validity and authenticity of the sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time is considered fraud and may be grounds for legal action.

Standard: ☒ Standard TAT 7-10 Business Days. Note that some tests vary.

Rush
Same Day: ☐ 3 Day: ☐ Other (specify): ________
1 Day: ☐ 4 Day: ☐ **Rush results will be issued after 4:00 p.m.**
2 Day: ☐ 5 Day: ☐

NOTE: A Rush Surcharge is applied for rush samples

Other Pertinent Information / Special Instructions: 24°C

ANALYSES REQUESTED

Date Sampled	Time Sampled	Sample Identification	SSAL - SEM Lab No.	Comp. Grab	Matrix*	Preservative**	Number / Type of Containers ***	Fecal Coliform SM 9221E mFC	~~Quanti-Tray~~	Metals*
10/4	10:10	Bact-LV-1			SW	5	1	X		
10/4	13:10	Bact-LV-2			SW	5	1	X		
10/4	1300	Bact-LV-3			SW	5	1	X		

COMMENTS:

	Signature	Print Name	Company	Date	Time
Relinquished By:		Bethany Leach	Stillwater Sciences	10/4/22	16:50
Received By:	Joe Now	Joe Now	SSA	10/4/22	1650
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Authorized By:					

Authorization is required to process samples. This obligates your organization for service fees. SSAL Standard T & C's or other written agreement applies. If collections or legal services are required to recover said fees, your organization will be responsible for all fees and costs in addition to service fees.

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Matrix* DW-Drinking Water, WW-Waste Water, GW-Ground Water, SW-Surface Water, SS-Soil, S-Solid, OT-Other

Preservative** 1=H_2SO_4, 2=HNO_3, 3=HCl, 4=NaOH, 5=$Na_2S_2O_3$, 6=None, 7=Other

Container*** P-Plastic, G-Glass, V-Voa Vial, OT-Other

Definitions & Qualifiers

WO#: **22100184**
Date: **10/11/2022**

Definitions:

LCS: Laboratory Control Sample; prepared by adding a known mass of target analytes to a specified amount of de-ionized water and prepared with the batch of samples, used to calculate Accuracy (%REC).

LCSD: LCS Duplicate; used to calculate both Accuracy (%REC) and Precision (%RPD)

MBLK: Method Blank; a sample of similar matrix that is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedure, and in which no target analytes
or interferences are present at concentrations that impact the analytical results for sample analyses.

MS: Matrix Spike; prepared by adding a known mass of target analytes to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available, used to calculate Accuracy (%REC)

MSD: Matrix Spike Duplicate; used to calculate both Accuracy (%REC) and Precision (%RPD)

RPD: Relative Percent Difference; comparison between sample and duplicate and/or MS and MSD.

PQL: Practical Quantitation Limit; the limit to which data is quantitated for reporting.

MDL: Method Detection Limit; the limit to which the instrument can reliably detect.

MCL: Maximum Contaminant Level; value set according to EPA guidelines.

Qualifiers:

* - Analyte exceeds Safe Drinking Water Act MCL, does not meet drinking water standards.
C - Analyte value below Safe Drinking Water Act MCL, does not meet drinking water standards.
B - Analyte found above the PQL in associated method blank.
G - Calibration blank analyte detected above PQL.
H - Sample analyzed beyond holding time for this parameter.
J - Estimated Value; Analyte found between MDL and PQL limits.
L - Sample concentration is at least 5 times greater than spike contribution. Spike recovery criteria do not apply.
R - RPD between sample and duplicate sample outside the RPD acceptance limits.
S - Batch MS and/or MSD were outside acceptance limits, batch LCS was acceptable.
W - Sample temperature when recieved was out of limit as specified by method.
Z - Batch LCS and/or LCSD were outside acceptance limits.

Silver State Labs-Reno
1135 Financial Blvd
Reno, NV 89502
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October 14, 2022
Workorder **22100285**

Heather Nett
Stillwater Sciences
279 Costeau Place #400
Davis, CA 95618

Project: 856.01/711/Bact-LV-1

Dear Heather Nett:

It is the policy of Silver State Analytical Laboratory - Reno to strictly adhere to a comprehensive Quality Assurance Plan that ensures the data presented in this report are both accurate and precise. Silver State Analytical Laboratory - Reno maintains accreditation in the State of Nevada (NV-00015) and the State of California (ELAP 2990).

The data presented in this report was obtained from the analysis of samples received under a chain of custody. Unless otherwise noted below, samples were received in good condition, properly preserved and within the hold time for the requested analyses. Any anomalies associated with the analysis of the samples have been flagged in the Analytical Report with an appropriate explanation in the Definitions & Qualifiers.

Sincerely,

Carly Wood

Carly Wood
Laboratory Director
1135 Financial Blvd
Reno, NV 89502

Analytical Report

Workorder#: **22100285**
Date Reported: **10/14/2022**

Client: Stillwater Sciences
Project Name: 856.01/711/Bact-LV-1
PO #: 856.01/711
Sampled By: Bethany L.

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
22100285-01	Bact-LV-1	10/05/2022 13:07	10/5/2022

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9222 D	< 2	CFU/100ml	2	MG	10/05/2022 16:51	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
22100285-02	Bact-LV-2	10/05/2022 10:05	10/5/2022

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9222 D	< 2	CFU/100ml	2	MG	10/05/2022 16:51	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
22100285-03	Bact-LV-3	10/05/2022 12:40	10/5/2022

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9222 D	< 2	CFU/100ml	2	MG	10/05/2022 16:51	

SilverState Analytical Laboratories — Sierra Environmental Monitoring — EnviroTech

ssalabs.com sem-analytical.com envirotechonline.com

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Phone (775) 857-2400 Fax: (888) 398-7002 (EPA#: NV00015, CA2526)

CHAIN-OF-CUSTODY-RECORD

Page ______ of ______

22100285

Report Results To:

Report Attention: Heather Neff
Project Number: 856.01/711
Company: Stillwater Sciences
Mailing Address: 279 Costeau Place #400
City, State, Zip: Davis, CA 95618
Phone: 530-756-7550 x322
Email / Fax: heather@stillwatersci.com

Send Invoice To:

Invoice Attention:
PO# 856.01/711
Quote #
Company: Stillwater Sciences
Mailing Address: 279 Costeau Place #400
City, State, Zip: Davis, CA 95618
Phone: 530-756-7550
Email / Fax: heather@stillwatersci.com

COMPLIANCE MONITORING? Yes ☐ No ☒

NEW ADDRESS? Results: ☐ Invoice: ☐

Applicable Program
SDWA ☐ CWA ☐ RCRA ☐
Mining ☐ Other ______

QC Level Report
I II III IV
NOTE: Surcharges apply to Level II, III and IV reports

Send Results Via:
Mail: ☐ Email: ☒ Fax: ☐

Send Invoice Via:
Mail: ☐ Email: ☒ Fax: ☐

Field Measurements
On-Site pH:
Chlorine:
Temperature:
Other:

Metals*

COMMENTS:

Sampled by: Bethany Leach Signature: BL

I attest to the validity and authenticity of the sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time is considered fraud and may be grounds for legal action.

Standard: ☒ Standard TAT 7-10 Business Days. Note that some tests vary.

Rush
Same Day: ☐ 3 Day: ☐ Other (specify): ______
1 Day: ☐ 4 Day: ☐ **Rush results will be issued after 4:00 p.m.**
2 Day: ☐ 5 Day: ☐

NOTE: A Rush Surcharge is applied for rush samples

Other Pertinent Information / Special Instructions

6°C

ANALYSES REQUESTED

Date Sampled	Time Sampled	Sample Identification	SSAL - SEM Lab No.	Comp. Grab	Matrix*	Preservative**	Number / Type of Containers ***	Fecal Coliform SM ~~9221E~~	MFC								
10/5	13:07	Bact-LV-1			SW	5	1	X									
10/5	10:05	Bact-LV-2			SW	5	1	X									
10/5	12:40	Bact-LV-3			SW	5	1	X									

	Signature	Print Name	Company	Date	Time
Relinquished By:		Bethany Leach	Stillwater Sciences	10/5/22	16:15
Received By:		Joe Ware	SSA	10/5/22	1615
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Authorized By:					

Authorization is required to process samples. This obligates your organization for service fees. SSAL Standard T & C's or other written agreement applies. If collections or legal services are required to recover said fees, your organization will be responsible for all fees and costs in addition to service fees.

Samples are discarded 30 days after results are reported unless other arrangements are made and storage fees may apply. The analytical results associated with this COC apply only to these samples as they are received by the laboratory. The liability of the laboratory is limited to the amount paid for the report.

Matrix* DW-Drinking Water, WW-Waste Water, GW-Ground Water, SW-Surface Water, SS-Soil, S-Solid, OT-Other

Preservative** 1=H_2SO_4, 2=HNO_3, 3=HCl, 4=NaOH, 5=$Na_2S_2O_3$, 6=None, 7=Other

Container*** P-Plastic, G-Glass, V-Voa Vial, OT-Other

Definitions & Qualifiers

WO#: **22100285**
Date: **10/14/2022**

Definitions:

LCS: Laboratory Control Sample; prepared by adding a known mass of target analytes to a specified amount of de-ionized water and prepared with the batch of samples, used to calculate Accuracy (%REC).

LCSD: LCS Duplicate; used to calculate both Accuracy (%REC) and Precision (%RPD)

MBLK: Method Blank; a sample of similar matrix that is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedure, and in which no target analytes
or interferences are present at concentrations that impact the analytical results for sample analyses.

MS: Matrix Spike; prepared by adding a known mass of target analytes to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available, used to calculate Accuracy (%REC)

MSD: Matrix Spike Duplicate; used to calculate both Accuracy (%REC) and Precision (%RPD)

RPD: Relative Percent Difference; comparison between sample and duplicate and/or MS and MSD.

PQL: Practical Quantitation Limit; the limit to which data is quantitated for reporting.

MDL: Method Detection Limit; the limit to which the instrument can reliably detect.

MCL: Maximum Contaminant Level; value set according to EPA guidelines.

Qualifiers:

* - Analyte exceeds Safe Drinking Water Act MCL, does not meet drinking water standards.
C - Analyte value below Safe Drinking Water Act MCL, does not meet drinking water standards.
B - Analyte found above the PQL in associated method blank.
G - Calibration blank analyte detected above PQL.
H - Sample analyzed beyond holding time for this parameter.
J - Estimated Value; Analyte found between MDL and PQL limits.
L - Sample concentration is at least 5 times greater than spike contribution. Spike recovery criteria do not apply.
R - RPD between sample and duplicate sample outside the RPD acceptance limits.
S - Batch MS and/or MSD were outside acceptance limits, batch LCS was acceptable.
W - Sample temperature when recieved was out of limit as specified by method.
Z - Batch LCS and/or LCSD were outside acceptance limits.

2023
SILVER STATE LABORATORY REPORTS

SGS Silver State Analytical Laboratories
1135 Financial Blvd
Reno, NV 89502
(775) 857-2400
www.ssalabs.com

September 08, 2023
Workorder **23081389**

Amy Baur
Stillwater Sciences
279 Costeau Place #400
Davis, CA 95618

Project: Bact - LV - B1

Dear Amy Baur:

It is the policy of SGS Silver State Analytical Laboratory - Reno to strictly adhere to a comprehensive Quality Assurance Plan that ensures the data presented in this report are both accurate and precise. SGS Silver State Analytical Laboratory - Reno maintains accreditation in the State of Nevada (NV-00015) and the State of California (ELAP 2990).

The data presented in this report was obtained from the analysis of samples received under a chain of custody. Unless otherwise noted below, samples were received in good condition, properly preserved and within the hold time for the requested analyses. Any anomalies associated with the analysis of the samples have been flagged in the Analytical Report with an appropriate explanation in the Definitions & Qualifiers.

Sincerely,

Carly Wood

Carly Wood
Laboratory Director
1135 Financial Blvd
Reno, NV 89502

SGS Silver State Analytical Laboratories
1135 Financial Blvd
Reno, NV 89502
(775) 857-2400
www.ssalabs.com

Analytical Report

Workorder#: **23081389**
Date Reported: **9/8/2023**

Client: Stillwater Sciences
Project Name: Bact - LV - B1
PO #:

Sampled By: C. Hymes

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
23081389-01	Bact - LV - B1	08/24/2023 9:50	8/24/2023

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9222 D	<2	CFU/100ml	2	MG	08/24/2023 16:33	
E. coli	SM 9221 F	< 1.8	MPN/100mL	1.8	IF	08/24/2023 16:05	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
23081389-02	Bact - LV - B2	08/24/2023 10:20	8/24/2023

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9222 D	<2	CFU/100ml	2	MG	08/24/2023 16:33	
E. coli	SM 9221 F	< 1.8	MPN/100mL	1.8	IF	08/24/2023 16:05	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
23081389-03	Bact - LV - B3	08/24/2023 10:35	8/24/2023

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9222 D	<2	CFU/100ml	2	MG	08/24/2023 16:33	
E. coli	SM 9221 F	< 1.8	MPN/100mL	1.8	IF	08/24/2023 16:05	

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Phone (775) 857-2400 (EPA#: NV00015, CA2526)

CHAIN-OF-CUSTODY-RECORD

Page ______ of ______

23081389

Report Results To:

Report Attention: Heather Neff
Company: Stillwater Sciences
Mailing Address: 279 Costeau Place #400
City, State, Zip: Davis, Ca 95618
Phone: 530-751-7550 x322

Send Invoice To:

Invoice Attention:
Company: Stillwater Sciences
Mailing Address: 279 Costeau Place #400
City, State, Zip: Davis, Ca 95618
Phone: 530-751-7550
Email / Fax: heather@stillwatersci.com

COMPLIANCE MONITORING? Yes ☐ No ☒

NEW ADDRESS? Results: ☐ Invoice: ☐

Applicable Program
SDWA ☐ CWA ☐ RCRA ☐
Mining ☐ Other ______

QC Level Report
I II III IV
NOTE: Surcharges apply to Level II, III and IV reports

Sampled by: camille Hymes

I attest to the validity and authenticity of the sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time is considered fraud and may be grounds for legal action. Samples may be subcontracted as necessary.

Standard: ☒ Standard TAT 7-10 Business Days. Note that some tests vary.

Rush
☐ Same Day: ☐ 3 Day: ☐ Other (specify): ______
☐ 1 Day: ☐ 4 Day:
☐ 2 Day: ☐ 5 Day:

Rush results will be issued after 4:00 p.m.

NOTE: A Rush Surcharge is applied for rush samples

Other Pertinent Information / Special Instructions
5°c

ANALYSES REQUESTED

Send Results Via:
Mail: ☐ Email: ☒ EDD: ☐

Send Invoice Via:
Mail: ☐ Email: ☒

Field Measurements
On-Site pH: Chlorine:
Temperature: Other:

Date Sampled	Time Sampled	Sample Identification	Comp. Grab	Matrix*	Preservative**	Number / Type of Containers ***	mfc Fecal Coliform (SM 9222D)	E. coli mpn (SM 9221F)
8/24	09:50	Bact-LV-B1				2	1	1
8/24	10:20	Bact-LV-B2				2	1	1
8/24	10:35	Bact-LV-B3				2	1	1

COMMENTS:

	Signature	Print Name	Company	Date	Time
Relinquished By:		camille Hymes N/A	Stillwater Science	8/24/23	1447
Received By:		Kayla Jonkno	SSAL	8/24/23	1447
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Authorized By:					

…on is required to process samples. This obligates your organization for service fees. SSAL Standard T & C's or other written agreement applies. If collections or …are required to recover said fees, your organization will be responsible for all fees and costs in addition to service fees.

Samples are discarded 30 days after results are reported unless other arrangements are made and storage fees may apply. The analytical results associated with this COC apply only to these samples as they are received by the laboratory. The liability of the laboratory is limited to the amount paid for the report.

…nking Water, WW-Waste Water, GW-Ground Water, SW-Surface Water, SS-Soil, S-Solid, OT-Other

Container*** P-Plastic, G-Glass, V-Voa Vial, OT-Other

Definitions & Qualifiers

WO#: **23081389**
Date: **9/8/2023**

Definitions:

LCS: Laboratory Control Sample; prepared by adding a known mass of target analytes to a specified amount of de-ionized water and prepared with the batch of samples, used to calculate Accuracy (%REC).

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RPD: Relative Percent Difference; comparison between sample and duplicate and/or MS and MSD.

PQL: Practical Quantitation Limit; the limit to which data is quantitated for reporting.

MDL: Method Detection Limit; the limit to which the instrument can reliably detect.

MCL: Maximum Contaminant Level; value set according to EPA guidelines.

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C - Analyte value below Safe Drinking Water Act MCL, does not meet drinking water standards.
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G - Calibration blank analyte detected above PQL.
H - Sample analyzed beyond holding time for this parameter.
J - Estimated Value; Analyte found between MDL and PQL limits.
L - Sample concentration is at least 5 times greater than spike contribution. Spike recovery criteria do not apply.
R - RPD between sample and duplicate sample outside the RPD acceptance limits.
S - Batch MS and/or MSD were outside acceptance limits, batch LCS was acceptable.
W - Sample temperature when recieved was out of limit as specified by method.
Z - Batch LCS and/or LCSD were outside acceptance limits.

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September 13, 2023
Workorder **23081587**

Heather Nett
Stillwater Sciences
279 Costeau Place #400
Davis, CA 95618

Project: 856.01 / 711 / Bact - LV - 1 (LV - B1)

Dear Heather Nett:

It is the policy of SGS Silver State Analytical Laboratory - Reno to strictly adhere to a comprehensive Quality Assurance Plan that ensures the data presented in this report are both accurate and precise. SGS Silver State Analytical Laboratory - Reno maintains accreditation in the State of Nevada (NV-00015) and the State of California (ELAP 2990).

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Sincerely,

CarlyWood

Carly Wood
Laboratory Director
1135 Financial Blvd
Reno, NV 89502

SGS Silver State Analytical Laboratories
1135 Financial Blvd
Reno, NV 89502
(775) 857-2400
www.ssalabs.com

Analytical Report

Workorder#: **23081587**
Date Reported: **9/13/2023**

Client: Stillwater Sciences
Project Name: 856.01 / 711 / Bact - LV - 1 (LV - B1)
PO #: 856.01 / 711

Sampled By: M. Schweiker

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
23081587-01	Bact - LV - 1 (LV - B1)	08/29/2023 11:20	8/29/2023

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9221 E	< 1.8	MPN/100mL	1.8	IF	08/29/2023 15:40	
E. coli	SM 9221 F	< 1.8	MPN/100mL	1.8	IF	08/29/2023 15:38	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
23081587-02	Bact - LV - 2 (LV - B2)	08/29/2023 11:00	8/29/2023

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9221 E	< 1.8	MPN/100mL	1.8	IF	08/29/2023 15:40	
E. coli	SM 9221 F	< 1.8	MPN/100mL	1.8	IF	08/29/2023 15:38	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
23081587-03	Bact - LV - 3 (LV - B2)	08/29/2023 11:45	8/29/2023

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9221 E	< 1.8	MPN/100mL	1.8	IF	08/29/2023 15:40	
E. coli	SM 9221 F	< 1.8	MPN/100mL	1.8	IF	08/29/2023 15:38	

SilverState Analytical Laboratories Sierra Environmental Monitoring EnviroTech

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CHAIN-OF-CUSTODY-RECORD

Page 1 of 1

23081594

Report Results To:

Report Attention: Heather Neff
Project Number: 856.01/711
Company: Stillwater Sciences
Mailing Address: 279 Costeau Place #400
City, State, Zip: Davis, CA 95618
Phone: 530-756-7550 x322
Email / Fax: heather@stillwatersci.com

Send Invoice To:

Invoice Attention:
PO# 856.01/711
Quote #
Company: Stillwater Sciences
Mailing Address: 279 Costeau Place #400
City, State, Zip: Davis, CA 95618
Phone: 530-756-7550
Email / Fax: heather@stillwatersci.com

COMPLIANCE MONITORING? Yes ☐ No ☒

NEW ADDRESS? Results: ☐ Invoice: ☐

Applicable Program
SDWA ☐ CWA ☐ RCRA ☐
Mining ☐ Other ____

QC Level Report
I II III IV
NOTE: Surcharges apply to Level II, III and IV reports

Send Results Via:
Mail: ☐ Email: ☒ Fax: ☐

Send Invoice Via:
Mail: ☐ Email: ☒ Fax: ☐

Field Measurements
On-Site pH: Chlorine:
Temperature: Other:

Sampled by: Michael Schweiker Signature: Michael

I attest to the validity and authenticity of the sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time is considered fraud and may be grounds for legal action.

Standard: ☒ Standard TAT 7-10 Business Days. Note that some tests vary.

Rush
Same Day: ☐ 3 Day: ☐ Other (specify): ____
1 Day: ☐ 4 Day: ☐ **Rush results will be issued after 4:00 p.m.**
2 Day: ☐ 5 Day: ☐

NOTE: A Rush Surcharge is applied for rush samples

Other Pertinent Information / Special Instructions
tc

ANALYSES REQUESTED

Date Sampled	Time Sampled	Sample Identification	SSAL - SEM Lab No.	Comp. Grab	Matrix*	Preservative**	Number / Type of Containers ***	Fecal Coliform SM 9221E MPN	E. coli SM9221F									
8/29/23	11:20	Bact-LV-1 (LV-B1)					2	1	1									
8/29/23	11:00	Bact-LV-2 (LV-B2)					2	1	1									
8/29/23	11:45	Bact-LV-3 (LV-B2)					2	1	1									

Metals*

COMMENTS:

	Signature	Print Name	Company	Date	Time
Relinquished By:	Michael	Michael Schweiker	Stillwater Science	8/29/23	3:30
Received By:		Mondrag	SSAL	8/29/23	1530
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Authorized By:					

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Matrix* DW-Drinking Water, WW-Waste Water, GW-Ground Water, SW-Surface Water, SS-Soil, S-Solid, OT-Other
Preservative** 1=H_2SO_4, 2=HNO_3, 3=HCl, 4=NaOH, 5=$Na_2S_2O_3$, 6=None, 7=Other

Container*** P-Plastic, G-Glass, V-Voa Vial, OT-Other

Definitions & Qualifiers

WO#: **23081587**
Date: **9/13/2023**

Definitions:

LCS: Laboratory Control Sample; prepared by adding a known mass of target analytes to a specified amount of de-ionized water and prepared with the batch of samples, used to calculate Accuracy (%REC).

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G - Calibration blank analyte detected above PQL.
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R - RPD between sample and duplicate sample outside the RPD acceptance limits.
S - Batch MS and/or MSD were outside acceptance limits, batch LCS was acceptable.
W - Sample temperature when recieved was out of limit as specified by method.
Z - Batch LCS and/or LCSD were outside acceptance limits.

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Reno, NV 89502
(775) 857-2400
www.ssalabs.com

September 15, 2023
Workorder **23090330**

Amy Baur
Stillwater Sciences
279 Costeau Place #400
Davis, CA 95618

Project: Bact - LV - B1

Dear Amy Baur:

It is the policy of SGS Silver State Analytical Laboratory - Reno to strictly adhere to a comprehensive Quality Assurance Plan that ensures the data presented in this report are both accurate and precise. SGS Silver State Analytical Laboratory - Reno maintains accreditation in the State of Nevada (NV-00015) and the State of California (ELAP 2990).

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Sincerely,

CarlyWood

Carly Wood
Laboratory Director
1135 Financial Blvd
Reno, NV 89502

Client: Stillwater Sciences
Project Name: Bact - LV - B1
PO #:

Sampled By: E. Allen

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	**Client Sample ID**	**Date/Time Sampled**	**Date Received**
23090330-01	Bact - LV - B1	09/07/2023 9:50	9/7/2023

Parameter	**Method**	**Result**	**Units**	**PQL**	**Analyst**	**Date/Time Analyzed**	**Data Flag**
Coliform, Fecal	SM 9222 D	< 2	CFU/100ml	2	IF	09/07/2023 15:32	
E. coli	SM 9221 F	< 1.8	MPN/100mL	1.8	IF	09/07/2023 17:00	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	**Client Sample ID**	**Date/Time Sampled**	**Date Received**
23090330-02	Bact - LV - B2	09/07/2023 10:10	9/7/2023

Parameter	**Method**	**Result**	**Units**	**PQL**	**Analyst**	**Date/Time Analyzed**	**Data Flag**
Coliform, Fecal	SM 9222 D	< 2	CFU/100ml	2	IF	09/07/2023 15:32	
E. coli	SM 9221 F	< 1.8	MPN/100mL	1.8	IF	09/07/2023 17:00	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	**Client Sample ID**	**Date/Time Sampled**	**Date Received**
23090330-03	Bact - LV - B3	09/07/2023 10:20	9/7/2023

Parameter	**Method**	**Result**	**Units**	**PQL**	**Analyst**	**Date/Time Analyzed**	**Data Flag**
Coliform, Fecal	SM 9222 D	< 2	CFU/100ml	2	IF	09/07/2023 15:32	
E. coli	SM 9221 F	< 1.8	MPN/100mL	1.8	IF	09/07/2023 17:00	

SGS **SilverState** Analytical Laboratories
sgs.com

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Phone (702) 873-4478 (EPA#: NV00930, CA2885)

■ 1135 FINANCIAL BOULEVARD, RENO, NV 89502
Phone (775) 857-2400 (EPA#: NV00015, CA2526)

CHAIN-OF-CUSTODY-RECORD

Page 1 of 1

23090330

Report Results To:

Report Attention: Heather Neff
Company: Stillwater Sciences
Mailing Address: 279 Cousteau Place #400
City, State, Zip: Davis, Ca 95618
Phone: 530-751-7550 x322

Send Invoice To:

Invoice Attention:
Company: Stillwater Sciences
Mailing Address: 279 Cousteau Place #400
City, State, Zip: Davis, Ca. 95618
Phone: 530-751-7550
Email / Fax: heather@stillwatersci.com

COMPLIANCE MONITORING? Yes ☐ No ☒

NEW ADDRESS? Results: ☐ Invoice: ☐

Applicable Program
SDWA ☐ CWA ☐ RCRA ☐
Mining ☐ Other ______

QC Level Report
I II III IV
NOTE: Surcharges apply to Level II, III and IV reports

Send Results Via:
Mail: ☐ Email: ☒ EDD: ☐

Send Invoice Via:
Mail: ☐ Email: ☒

Field Measurements
On-Site pH: Chlorine:
Temperature: Other:

COMMENTS:

Sampled by: Elliott Allen

I attest to the validity and authenticity of the sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time is considered fraud and may be grounds for legal action. Samples may be subcontracted as necessary.

Standard: ☒ Standard TAT 7-10 Business Days. Note that some tests vary.
Rush
☐ Same Day: ☐ 3 Day: ☐ Other (specify): ______
☐ 1 Day: ☐ 4 Day: Rush results will be issued after 4:00 p.m.
☐ 2 Day: ☐ 5 Day:

NOTE: A Rush Surcharge is applied for rush samples

Other Pertinent Information / Special Instructions
8°c

ANALYSES REQUESTED

Date* Sampled	Time Sampled	Sample Identification		Comp. Grab	Matrix*	Preservative**	Number / Type of Containers ***	Fecal Coliform (SM 9222D)	E. coli (SM 9221F) MPN
9/7	09:50	Bact-LV-B1					2	1	1
9/~~3~~7	10:10	Bact-LV-B2					2	1	1
9/~~3~~7	10:20	Bact-LV-B3					2	1	1

	Signature	Print Name	Company	Date	Time
Relinquished By:		Michael Schweiker N/A	Stillwater Sciences	9/7/	13:55
Received By:		Kayla	SSAL	9/7/23	1355
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Authorized By:					

Authorization is required to process samples. This obligates your organization for service fees. SSAL Standard T & C's or other written agreement applies. If collections or legal services are required to recover said fees, your organization will be responsible for all fees and costs in addition to service fees.

Samples are discarded 30 days after results are reported unless other arrangements are made and storage fees may apply. The analytical results associated with this COC apply only to these samples as they are received by the laboratory. The liability of the laboratory is limited to the amount paid for the report.

Matrix* DW-Drinking Water, WW-Waste Water, GW-Ground Water, SW-Surface Water, SS-Soil, S-Solid, OT-Other

Container*** P-Plastic, G-Glass, V-Voa Vial, OT-Other

Definitions & Qualifiers

WO#: **23090330**
Date: **9/15/2023**

Definitions:

LCS: Laboratory Control Sample; prepared by adding a known mass of target analytes to a specified amount of de-ionized water and prepared with the batch of samples, used to calculate Accuracy (%REC).

LCSD: LCS Duplicate; used to calculate both Accuracy (%REC) and Precision (%RPD)

MBLK: Method Blank; a sample of similar matrix that is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedure, and in which no target analytes
or interferences are present at concentrations that impact the analytical results for sample analyses.

MS: Matrix Spike; prepared by adding a known mass of target analytes to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available, used to calculate Accuracy (%REC)

MSD: Matrix Spike Duplicate; used to calculate both Accuracy (%REC) and Precision (%RPD)

RPD: Relative Percent Difference; comparison between sample and duplicate and/or MS and MSD.

PQL: Practical Quantitation Limit; the limit to which data is quantitated for reporting.

MDL: Method Detection Limit; the limit to which the instrument can reliably detect.

MCL: Maximum Contaminant Level; value set according to EPA guidelines.

Qualifiers:

* - Analyte exceeds Safe Drinking Water Act MCL, does not meet drinking water standards.
C - Analyte value below Safe Drinking Water Act MCL, does not meet drinking water standards.
B - Analyte found above the PQL in associated method blank.
G - Calibration blank analyte detected above PQL.
H - Sample analyzed beyond holding time for this parameter.
J - Estimated Value; Analyte found between MDL and PQL limits.
L - Sample concentration is at least 5 times greater than spike contribution. Spike recovery criteria do not apply.
R - RPD between sample and duplicate sample outside the RPD acceptance limits.
S - Batch MS and/or MSD were outside acceptance limits, batch LCS was acceptable.
W - Sample temperature when recieved was out of limit as specified by method.
Z - Batch LCS and/or LCSD were outside acceptance limits.

SGS Silver State Analytical Laboratories
1135 Financial Blvd
Reno, NV 89502
(775) 857-2400
www.ssalabs.com

October 03, 2023
Workorder **23090721**

Amy Baur
Stillwater Sciences
279 Costeau Place #400
Davis, CA 95618

Project: Bact - LV - B1 (Saddlebag)

Dear Amy Baur:

It is the policy of SGS Silver State Analytical Laboratory - Reno to strictly adhere to a comprehensive Quality Assurance Plan that ensures the data presented in this report are both accurate and precise. SGS Silver State Analytical Laboratory - Reno maintains accreditation in the State of Nevada (NV-00015) and the State of California (ELAP 2990).

The data presented in this report was obtained from the analysis of samples received under a chain of custody. Unless otherwise noted below, samples were received in good condition, properly preserved and within the hold time for the requested analyses. Any anomalies associated with the analysis of the samples have been flagged in the Analytical Report with an appropriate explanation in the Definitions & Qualifiers.

Sincerely,

Carly Wood

Carly Wood
Laboratory Director
1135 Financial Blvd
Reno, NV 89502

SGS Silver State Analytical Laboratories
1135 Financial Blvd
Reno, NV 89502
(775) 857-2400
www.ssalabs.com

Analytical Report

Workorder#: **23090721**
Date Reported: **10/3/2023**

Client: Stillwater Sciences
Project Name: Bact - LV - B1 (Saddlebag)
PO #:

Sampled By: Bethany Leach

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	**Client Sample ID**	**Date/Time Sampled**	**Date Received**
23090721-01	Bact - LV - B1 (Saddlebag)	09/14/2023 10:15	9/14/2023

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9221 E	< 1.8	MPN/100mL	1.8	IF	09/14/2023 15:00	
E. coli	SM 9221 F	< 1.8	MPN/100mL	1.8	IF	09/14/2023 15:00	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	**Client Sample ID**	**Date/Time Sampled**	**Date Received**
23090721-02	Bact - LV - B2 (Tioga)	09/14/2023 11:05	9/14/2023

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9221 E	< 1.8	MPN/100mL	1.8	IF	09/14/2023 15:00	
E. coli	SM 9221 F	< 1.8	MPN/100mL	1.8	IF	09/14/2023 15:00	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	**Client Sample ID**	**Date/Time Sampled**	**Date Received**
23090721-03	Bact - LV - B3 (Ellery)	09/14/2023 11:20	9/14/2023

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9221 E	< 1.8	MPN/100mL	1.8	IF	09/14/2023 15:00	
E. coli	SM 9221 F	< 1.8	MPN/100mL	1.8	IF	09/14/2023 15:00	

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Phone (702) 873-4478 (EPA#: NV00930, CA2885)

■ 1135 FINANCIAL BOULEVARD, RENO, NV 89502
Phone (775) 857-2400 (EPA#: NV00015, CA2526)

2309072l

CHAIN-OF-CUSTODY-RECOR

Page 1 of 1

Report Results To:
Report Attention: Heather Neff
Company: Stillwater Sciences
Mailing Address: 279 Costeau Place #400
City, State, Zip: Davis, CA 95618
Phone: 530-751-7550 x322

Send Invoice To:
Invoice Attention: Stillwater Sciences
Company: 279 Costeau Place #400
Mailing Address: Davis, CA 9518
City, State, Zip:
Phone: 530-751-7550 x322
Email / Fax: heather@stillwatersci.com

COMPLIANCE MONITORING? Yes ☐ No ☒
NEW ADDRE… Results ☐ Invoice ☐

Applicable Program
SDWA ☐ CWA ☐ RCRA ☐
Mining ☐ Other ______

QC Level Report
I II III IV
NOTE: Surcharges apply to Level II, III and IV re…

Send Results Via:
Mail ☐ Email ☒ EDD ☐

Send Invoice Via:
Mail ☐ Email ☒

Field Measurements
On-Site pH: Chlorine:
Temperature: Other:

COMMENTS:

Sampled by: Bethany Leach

I attest to the validity and authenticity of the sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time is considered fraud and may be grounds for legal action. Samples may be subcontracted as necessary.

Standard: ☒ Standard TAT 7-10 Business Days. Note that some tests vary.

Rush
☐ Same Day: ☐ 3 Day: ☐ Other (specify): ______
☐ 1 Day: ☐ 4 Day:
☐ 2 Day: ☐ 5 Day:

Rush results will be issued after 4:00 p.m.

NOTE: A Rush Surcharge is applied for rush samples

Other Pertinent Information / Special Instructions
8°c 5°c

ANALYSES REQUESTED

Date Sampled	Time Sampled	Sample Identification	Comp. Grab	Matrix*	Preservative**	Number / Type of Containers***	Fecal Coliform (Sm ~~[illegible]~~ 9221 E)	E. Coli (Sm 9221 F MPN)
9/14/23	10:15	Bact - LV - B1 (Saddlebag)		AQ	5	2	1	1
9/14/23	11:05	Bact - LV - B2 (Tioga)		|	|	2	1	1
9/14/23	11:20	Bact - LV - B3 (Ellery)		AQ	5	2	1	1

	Signature	Print Name	Company	Date	Time
Relinquished By:		Bethany Leach N/A	Stillwater Sciences	9/14/23	14:51
Received By:		Cydnee McGuire	SSA	9/14/23	1451
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Authorized By:					

Authorization is required to process samples. This obligates your organization for service fees. SSAL Standard T & C's or other written agreement applies. If collections or legal services are required to recover said fees, your organization will be responsible for all fees and costs in addition to service fees.

Samples are discarded 30 days after results are reported unless other arrangements are made and storage fees may apply. The analytical results associated with this COC apply only to these samples as they are received by the laboratory. The liability of the laboratory is limited to the amount paid for the report.

Matrix* DW-Drinking Water, WW-Waste Water, GW-Ground Water, SW-Surface Water, SS-Soil, S-Solid, OT-Other

Container*** P-Plastic, G-Glass, V-Voa Vial, OT-

Definitions & Qualifiers

WO#: **23090721**
Date: **10/3/2023**

Definitions:

LCS: Laboratory Control Sample; prepared by adding a known mass of target analytes to a specified amount of de-ionized water and prepared with the batch of samples, used to calculate Accuracy (%REC).

LCSD: LCS Duplicate; used to calculate both Accuracy (%REC) and Precision (%RPD)

MBLK: Method Blank; a sample of similar matrix that is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedure, and in which no target analytes
or interferences are present at concentrations that impact the analytical results for sample analyses.

MS: Matrix Spike; prepared by adding a known mass of target analytes to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available, used to calculate Accuracy (%REC)

MSD: Matrix Spike Duplicate; used to calculate both Accuracy (%REC) and Precision (%RPD)

RPD: Relative Percent Difference; comparison between sample and duplicate and/or MS and MSD.

PQL: Practical Quantitation Limit; the limit to which data is quantitated for reporting.

MDL: Method Detection Limit; the limit to which the instrument can reliably detect.

MCL: Maximum Contaminant Level; value set according to EPA guidelines.

Qualifiers:

* - Analyte exceeds Safe Drinking Water Act MCL, does not meet drinking water standards.
C - Analyte value below Safe Drinking Water Act MCL, does not meet drinking water standards.
B - Analyte found above the PQL in associated method blank.
G - Calibration blank analyte detected above PQL.
H - Sample analyzed beyond holding time for this parameter.
J - Estimated Value; Analyte found between MDL and PQL limits.
L - Sample concentration is at least 5 times greater than spike contribution. Spike recovery criteria do not apply.
R - RPD between sample and duplicate sample outside the RPD acceptance limits.
S - Batch MS and/or MSD were outside acceptance limits, batch LCS was acceptable.
W - Sample temperature when recieved was out of limit as specified by method.
Z - Batch LCS and/or LCSD were outside acceptance limits.

SGS Silver State Analytical Laboratories
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Reno, NV 89502
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October 04, 2023
Workorder **23090973**

Heather Nett
Stillwater Sciences
279 Costeau Place #400
Davis, CA 95618

Project: Bact-LV-1

Dear Heather Nett:

It is the policy of SGS Silver State Analytical Laboratory - Reno to strictly adhere to a comprehensive Quality Assurance Plan that ensures the data presented in this report are both accurate and precise. SGS Silver State Analytical Laboratory - Reno maintains accreditation in the State of Nevada (NV-00015) and the State of California (ELAP 2990).

The data presented in this report was obtained from the analysis of samples received under a chain of custody. Unless otherwise noted below, samples were received in good condition, properly preserved and within the hold time for the requested analyses. Any anomalies associated with the analysis of the samples have been flagged in the Analytical Report with an appropriate explanation in the Definitions & Qualifiers.

Sincerely,

Carly Wood

Carly Wood
Laboratory Director
1135 Financial Blvd
Reno, NV 89502

Analytical Report

Workorder#: **23090973**
Date Reported: **10/4/2023**

Client: Stillwater Sciences
Project Name: Bact-LV-1
PO #:

Sampled By: Elliott Allen

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
23090973-01	Bact-LV-1	09/20/2023 9:05	9/20/2023

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9221 E	< 1.8	MPN/100mL	1.8	IF	09/20/2023 14:00	
E. coli	SM 9221 F	< 1.8	MPN/100mL	1.8	IF	09/20/2023 14:00	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
23090973-02	Bact-LV-2	09/20/2023 8:55	9/20/2023

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9221 E	< 1.8	MPN/100mL	1.8	IF	09/20/2023 14:00	
E. coli	SM 9221 F	< 1.8	MPN/100mL	1.8	IF	09/20/2023 14:00	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
23090973-03	Bact-LV-3	09/20/2023 9:30	9/20/2023

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9221 E	2	MPN/100mL	1.8	IF	09/20/2023 14:00	
E. coli	SM 9221 F	< 1.8	MPN/100mL	1.8	IF	09/20/2023 14:00	

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■ 1135 FINANCIAL BOULEVARD, RENO, NV 89502
Phone (775) 857-2400 (EPA#: NV00015, CA2526)

CHAIN-OF-CUSTODY-RECORD

Page ____ of ____

23090973

Report Results To:
Report Attention: Heather Neff
Company: Stillwater Sciences
Mailing Address: 279 Cousteau Place #400
City, State, Zip: Davis, Ca 95618
Phone: 530-756-7550

Send Invoice To:
Invoice Attention:
Company: Stillwater Sciences
Mailing Address: 279 Cousteau Place #400
City, State, Zip: Davis, Ca 95618
Phone: 530-756-7550
Email / Fax: heather@stillwatersci.com

COMPLIANCE MONITORING?
Yes ☐
No ☒

NEW ADDRESS?
Results: ☐
Invoice: ☐

Applicable Program
SDWA ☐ CWA ☐ RCRA ☐
Mining ☐ Other ______

QC Level Report
I II III IV
NOTE: Surcharges apply to Level II, III and IV reports

Send Results Via:
Mail: ☐ Email: ☒ EDD: ☐

Send Invoice Via:
Mail: ☐ Email: ☒

Field Measurements
On-Site pH:
Chlorine:
Temperature:
Other:

Sampled by: Elliott Allen

I attest to the validity and authenticity of the sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time is considered fraud and may be grounds for legal action. Samples may be subcontracted as necessary.

Standard: ☒ Standard TAT 7-10 Business Days. Note that some tests vary.

Rush
☐ Same Day: ☐ 3 Day: ☐ Other (specify): ______
☐ 1 Day: ☐ 4 Day:
☐ 2 Day: ☐ 5 Day:

Rush results will be issued after 4:00 p.m.

NOTE: A Rush Surcharge is applied for rush samples

Other Pertinent Information / Special Instructions
TEMP 5.0 °C

ANALYSES REQUESTED

Date Sampled	Time Sampled	Sample Identification	Comp. Grab	Matrix*	Preservative**	Number / Type of Containers ***	Fecal coliform (SM9221E)	E.coli (SM9221F)
9/20/23	9:05	Bact-LV-1		AQ	5	2	1	1
9/20/23	8:55	Bact-LV-2		|	|	2	1	1
9/20/23	9:30	Bact-LV-3		AQ	5	2	1	1

COMMENTS:

	Signature	Print Name	Company	Date	Time
Relinquished By:		N/A	Stillwater Sciences	9/20/23	13:10
Received By:		SGS J. Frangston	SGS	9.20.23	1340
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Authorized By:					

Authorization is required to process samples. This obligates your organization for service fees. SSAL Standard T & C's or other written agreement applies. If collections or legal services are required to recover said fees, your organization will be responsible for all fees and costs in addition to service fees.

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The liability of the laboratory is limited to the amount paid for the report.

Matrix* DW-Drinking Water, WW-Waste Water, GW-Ground Water, SW-Surface Water, SS-Soil, S-Solid, OT-Other

Container*** P-Plastic, G-Glass, V-Voa Vial, OT-Other

Definitions & Qualifiers

WO#: **23090973**
Date: **10/4/2023**

Definitions:

LCS: Laboratory Control Sample; prepared by adding a known mass of target analytes to a specified amount of de-ionized water and prepared with the batch of samples, used to calculate Accuracy (%REC).

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MBLK: Method Blank; a sample of similar matrix that is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedure, and in which no target analytes
or interferences are present at concentrations that impact the analytical results for sample analyses.

MS: Matrix Spike; prepared by adding a known mass of target analytes to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available, used to calculate Accuracy (%REC)

MSD: Matrix Spike Duplicate; used to calculate both Accuracy (%REC) and Precision (%RPD)

RPD: Relative Percent Difference; comparison between sample and duplicate and/or MS and MSD.

PQL: Practical Quantitation Limit; the limit to which data is quantitated for reporting.

MDL: Method Detection Limit; the limit to which the instrument can reliably detect.

MCL: Maximum Contaminant Level; value set according to EPA guidelines.

Qualifiers:

* - Analyte exceeds Safe Drinking Water Act MCL, does not meet drinking water standards.
C - Analyte value below Safe Drinking Water Act MCL, does not meet drinking water standards.
B - Analyte found above the PQL in associated method blank.
G - Calibration blank analyte detected above PQL.
H - Sample analyzed beyond holding time for this parameter.
J - Estimated Value; Analyte found between MDL and PQL limits.
L - Sample concentration is at least 5 times greater than spike contribution. Spike recovery criteria do not apply.
R - RPD between sample and duplicate sample outside the RPD acceptance limits.
S - Batch MS and/or MSD were outside acceptance limits, batch LCS was acceptable.
W - Sample temperature when recieved was out of limit as specified by method.
Z - Batch LCS and/or LCSD were outside acceptance limits.

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(775) 857-2400
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October 12, 2023
Workorder **23091233**

Amy Baur
Stillwater Sciences
279 Costeau Place #400
Davis, CA 95618

Project: LV-BacT-1

Dear Amy Baur:

It is the policy of SGS Silver State Analytical Laboratory - Reno to strictly adhere to a comprehensive Quality Assurance Plan that ensures the data presented in this report are both accurate and precise. SGS Silver State Analytical Laboratory - Reno maintains accreditation in the State of Nevada (NV-00015) and the State of California (ELAP 2990).

The data presented in this report was obtained from the analysis of samples received under a chain of custody. Unless otherwise noted below, samples were received in good condition, properly preserved and within the hold time for the requested analyses. Any anomalies associated with the analysis of the samples have been flagged in the Analytical Report with an appropriate explanation in the Definitions & Qualifiers.

Sincerely,

Carly Wood

Carly Wood
Laboratory Director
1135 Financial Blvd
Reno, NV 89502

Analytical Report

Workorder#: **23091233**
Date Reported: **10/12/2023**

Client: Stillwater Sciences
Project Name: LV-BacT-1
PO #:

Sampled By: Michael S.

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
23091233-01	LV-BacT-1	09/26/2023 9:30	9/26/2023

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9221 E	< 1.8	MPN/100mL	1.8	IF	09/26/2023 16:50	
E. coli	SM 9221 F	< 1.8	MPN/100mL	1.8	IF	09/26/2023 16:50	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
23091233-02	LV-BacT-2	09/26/2023 9:45	9/26/2023

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9221 E	< 1.8	MPN/100mL	1.8	IF	09/26/2023 16:50	
E. coli	SM 9221 F	< 1.8	MPN/100mL	1.8	IF	09/26/2023 16:50	

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
23091233-03	LV-Bact-3	09/26/2023 9:55	9/26/2023

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Coliform, Fecal	SM 9221 E	< 1.8	MPN/100mL	1.8	IF	09/26/2023 16:50	
E. coli	SM 9221 F	< 1.8	MPN/100mL	1.8	IF	09/26/2023 16:50	

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Phone (702) 873-4478 (EPA#: NV00930, CA2885)

■ 1135 FINANCIAL BOULEVARD, RENO, NV 89502
Phone (775) 857-2400 (EPA#: NV00015, CA2526)

CHAIN-OF-CUSTODY-RECORD

Page 1 of 1

23091233

Report Results To:
Report Attention: Heather Neff
Company: Stillwater Sciences
Mailing Address: 279 Cousteau Place #400
City, State, Zip: Davis, Ca 95618
Phone: 530-756-7550

Send Invoice To:
Invoice Attention: Heather Neff
Company: Stillwater Sciences
Mailing Address: 279 Cousteau Place #400
City, State, Zip: Davis, Ca 95618
Phone: 530-756-7550
Email / Fax: heather@stillwatersci.com

COMPLIANCE MONITORING? Yes ☐ No ☒
NEW ADDRESS? Results: ☐ Invoice: ☐

Applicable Program
SDWA ☐ CWA ☐ RCRA ☐
Mining ☐ Other ____

QC Level Report
I II III IV
NOTE: Surcharges apply to Level II, III and IV reports

Sampled by: Michael Schweiker

I attest to the validity and authenticity of the sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time is considered fraud and may be grounds for legal action. Samples may be subcontracted as necessary.

Standard: ☒ Standard TAT 7-10 Business Days. Note that some tests vary

Rush
☐ Same Day: ☐ 3 Day: ☐ Other (specify): ____
☐ 1 Day: ☐ 4 Day:
☐ 2 Day: ☐ 5 Day:

Rush results will be issued after 4:00 p.m.

NOTE: A Rush Surcharge is applied for rush samples

Other Pertinent Information / Special Instructions
4°C

ANALYSES REQUESTED

Date Sampled	Time Sampled	Sample Identification	Comp. Grab	Matrix*	Preservative**	Number / Type of Containers ***	Fecal Coliform (SM9221E) mpn	E.coli (SM9221F) mpn
9/26	930	LV-BacT-1	G	Soil	6	2	1	1
9/26	945	LV-BacT-2	G	Soil	6	2	1	1
9/26	955	LV-BacT-3	G	Soil	6	2	1	1

Send Results Via:
Mail: ☐ Email: ☒ EDD: ☐

Send Invoice Via:
Mail: ☐ Email: ☒

Field Measurements
On-Site pH: Chlorine:
Temperature: Other:

COMMENTS:

	Signature	Print Name	Company	Date	Time
Relinquished By:	Michael	N/A	Stillwater Sciences	9/26/23	13:20
Received By:	J Nam	Joe Nam	SGS	9/26/23	1320
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Authorized By:					

Authorization is required to process samples. This obligates your organization for service fees. SSAL Standard T & C's or other written agreement applies. If collections or legal services are required to recover said fees, your organization will be responsible for all fees and costs in addition to service fees.

Samples are discarded 30 days after results are reported unless other arrangements are made and storage fees may apply. The analytical results associated with this COC apply only to these samples as they are received by the laboratory. The liability of the laboratory is limited to the amount paid for the report.

Matrix* DW-Drinking Water, WW-Waste Water, GW-Ground Water, SW-Surface Water, SS-Soil, S-Solid, OT-Other

Container*** P-Plastic, G-Glass, V-Voa Vial, OT-Other

SGS Silver State Analytical Laboratories
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Reno, NV 89502
(775) 857-2400
www.ssalabs.com

Definitions & Qualifiers

WO#: **23091233**
Date: **10/12/2023**

Definitions:

LCS: Laboratory Control Sample; prepared by adding a known mass of target analytes to a specified amount of de-ionized water and prepared with the batch of samples, used to calculate Accuracy (%REC).

LCSD: LCS Duplicate; used to calculate both Accuracy (%REC) and Precision (%RPD)

MBLK: Method Blank; a sample of similar matrix that is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedure, and in which no target analytes
or interferences are present at concentrations that impact the analytical results for sample analyses.

MS: Matrix Spike; prepared by adding a known mass of target analytes to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available, used to calculate Accuracy (%REC)

MSD: Matrix Spike Duplicate; used to calculate both Accuracy (%REC) and Precision (%RPD)

RPD: Relative Percent Difference; comparison between sample and duplicate and/or MS and MSD.

PQL: Practical Quantitation Limit; the limit to which data is quantitated for reporting.

MDL: Method Detection Limit; the limit to which the instrument can reliably detect.

MCL: Maximum Contaminant Level; value set according to EPA guidelines.

Qualifiers:

* - Analyte exceeds Safe Drinking Water Act MCL, does not meet drinking water standards.
C - Analyte value below Safe Drinking Water Act MCL, does not meet drinking water standards.
B - Analyte found above the PQL in associated method blank.
G - Calibration blank analyte detected above PQL.
H - Sample analyzed beyond holding time for this parameter.
J - Estimated Value; Analyte found between MDL and PQL limits.
L - Sample concentration is at least 5 times greater than spike contribution. Spike recovery criteria do not apply.
R - RPD between sample and duplicate sample outside the RPD acceptance limits.
S - Batch MS and/or MSD were outside acceptance limits, batch LCS was acceptable.
W - Sample temperature when recieved was out of limit as specified by method.
Z - Batch LCS and/or LCSD were outside acceptance limits.

APPENDIX H
MERCURY IN FISH TISSUE RESULTS

Table H-1. Fish Captured in Project Reservoirs, August 2022

Reservoir	**Trout Species**	**Total Number** of Fish	**Fork** Length (mm)		**Total Length (mm)**	
			Min	**Max**	**Min**	**Max**
Saddlebag Lake	Brook	43	160	364	169	380
	All	**43**	**160**	**364**	**169**	**380**
Tioga Lake	Brook	30	114	269	120	285
	Rainbow	12	220	425	234	440
	All	**42**	**114**	**425**	**120**	**440**
Ellery Lake	Brook	9	43	310	46	324
	Brown	22	137	388	145	405
	Rainbow	2	225	287	235	301
	All	33	43	388	46	405
All Reservoirs	**All**	**118**	**43**	**425**	**46**	**440**

mm = millimeters

Table H-2. Fish Species and Tissue Total Mercury Data, August 2022

Reservoir [a]	Date	Sample ID	Species	Total Mercury (µg/g ww)	Laboratory		Sex	Fork Length (mm)	Total Length (mm)	Weight (gram)
					MDL	RL				
Saddlebag Lake	8/4/2022	SB-BK-1	Brook trout	0.057	0.003	0.010	M	262	274	170
	8/4/2022	SB-BK-2	Brook trout	0.091	0.003	0.010	F	265	276	220
	8/4/2022	SB-BK-3	Brook trout	0.028	0.003	0.010	F	255	265	180
	8/4/2022	SB-BK-4	Brook trout	0.039	0.003	0.010	F	270	280	200
	8/4/2022	SB-BK-5	Brook trout	0.308	0.003	0.010	F	324	334	430
	8/4/2022	SB-BK-6	Brook trout	0.286	0.003	0.010	M	305	320	300
	8/4/2022	SB-BK-7	Brook trout	0.048	0.003	0.010	F	261	270	180
	8/4/2022	SB-BK-8	Brook trout	0.151	0.003	0.010	M	305	323	320
	8/4/2022	SB-BK-9	Brook trout	0.078	0.003	0.010	M	262	275	230
Tioga Lake	8/3/2022	T-BK-1	Brook trout	0.056	0.003	0.010	M	225	237	136
	8/3/2022	T-BK-2	Brook trout	0.050	0.003	0.010	F	231	241	143
	8/3/2022	T-BK-3	Brook trout	**0.092**	0.003	0.010	M	257	268	154
	8/3/2022	T-BK-4	Brook trout	0.070	0.003	0.010	F	250	264	177
	8/3/2022	T-BK-5	Brook trout	**0.093**	0.003	0.010	F	243	250	130
	8/3/2022	T-BK-6	Brook trout	0.056	0.003	0.010	M	262	275	186
	8/3/2022	T-BK-7	Brook trout	0.077	0.003	0.010	F	242	252	140
	8/3/2022	T-BK-8	Brook trout	0.034	0.003	0.010	M	208	218	95
	8/3/2022	T-BK-9	Brook trout	0.034	0.003	0.010	F	215	224	118
	8/3/2022	T-RBT-1	Rainbow trout	0.065	0.003	0.010	M	425	440	480
	8/3/2022	T-RBT-2	Rainbow trout	0.047	0.003	0.010	M	380	394	665
	8/3/2022	T-RBT-3	Rainbow trout	0.043	0.003	0.010	F	226	246	112

Reservoir [a]	**Date**	**Sample ID**	**Species**	**Total Mercury (µg/g ww)**	**Laboratory**		**Sex**	**Fork Length (mm)**	**Total Length (mm)**	**Weight (gram)**
					MDL	**RL**				
	8/3/2022	T-RBT-4	Rainbow trout	0.042	0.003	0.010	M	239	256	124
	8/3/2022	T-RBT-5	Rainbow trout	0.041	0.003	0.010	F	253	270	181
	8/3/2022	T-RBT-6	Rainbow trout	0.043	0.003	0.010	M	220	234	123
	8/3/2022	T-RBT-7	Rainbow trout	0.046	0.003	0.010	F	248	264	159
	8/3/2022	T-RBT-8	Rainbow trout	0.056	0.003	0.010	F	413	430	1401
Ellery Lake	8/2/2022	E-BK-1	Brook trout	0.016	0.003	0.010	M	244	253	165
	8/2/2022	E-BK-2	Brook trout	0.013	0.003	0.010	M	299	307	345
	8/2/2022	E-BK-3	Brook trout	0.015	0.003	0.010	F	310	324	385
	8/2/2022	E-BK-4	Brook trout	0.009^{DNQ}	0.003	0.010	F	304	315	335
	8/2/2022	E-BK-5	Brook trout	0.010	0.003	0.010	F	256	268	240
	8/2/2022	E-BRN-1	Brown trout	0.014	0.003	0.010	F	276	290	230
	8/2/2022	E-BRN-2	Brown trout	0.019	0.003	0.010	F	282	292	270
	8/2/2022	E-BRN-3	Brown trout	0.016	0.003	0.010	M	282	300	256
	8/2/2022	E-BRN-4	Brown trout	0.014	0.003	0.010	F	235	252	140
	8/2/2022	E-BRN-5	Brown trout	0.022	0.003	0.010	M	285	295	240
	8/2/2022	E-BRN-6	Brown trout	0.017	0.003	0.010	M	280	295	250
	8/2/2022	E-BRN-7	Brown trout	0.015	0.003	0.010	M	195	205	71
	8/2/2022	E-BRN-8	Brown trout	0.018	0.003	0.010	F	223	237	112
	8/2/2022	E-BRN-9	Brown trout	0.015	0.003	0.010	F	268	284	225
	8/2/2022	E-RBT-1	Rainbow trout	0.020	0.003	0.010	M	225	235	104
	8/2/2022	E-RBT-2	Rainbow trout	0.012	0.003	0.010	M	287	301	220

µg/g ww = microgram per gram wet weight; DNQ = detected, not quantifiable; F = female; ID = identification; M = male; MDL = method detection limit; mm = millimeter; RL = reporting limit

[a] Details on fish sampling methods and locations are provided in the *Draft Technical Report Reservoir Fish Population AQ-1* (SCE, 2023a).

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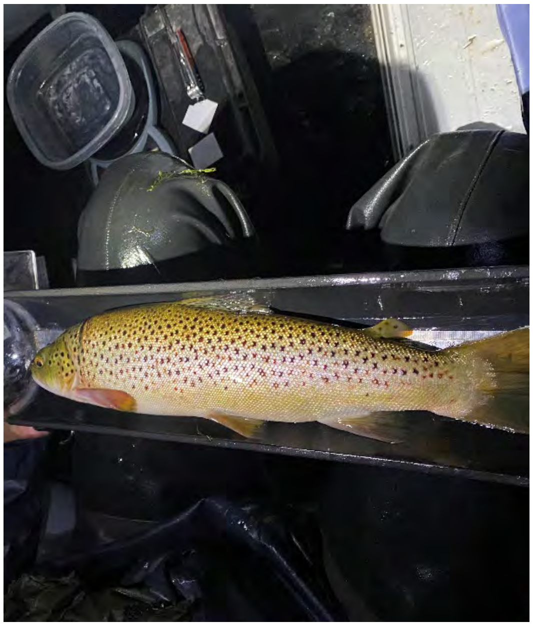
(FERC Project No. 1388)



RESERVOIR FISH POPULATIONS (AQ-1)
FINAL TECHNICAL REPORT

SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead®

SEPTEMBER 2024

SOUTHERN CALIFORNIA EDISON

Lee Vining Hydroelectric Project
(FERC Project No. 1388)

RESERVOIR FISH POPULATIONS (AQ-1) FINAL TECHNICAL REPORT

Southern California Edison
2244 Walnut Grove Avenue
Rosemead, CA 91770

September 2024

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LIST OF ACRONYMS AND ABBREVIATIONS

CDFW	California Department of Fish and Wildlife
CPUE	catch per unit effort
FERC	Federal Energy Regulatory Commission
FL	fork length
GPS	Global Positioning System
mm	millimeter
Project	Lee Vining Hydroelectric Project (FERC Project No. 1388)
SCE	Southern California Edison
TL	total length
TWG	Technical Working Group
YOY	young-of-year

1.0 INTRODUCTION

The Lee Vining Hydroelectric Project (Project) includes three reservoirs (Ellery Lake, Tioga Lake, and Saddlebag Lake) that support several coldwater game fish species.

Project operations may potentially affect environmental conditions within Project reservoirs including water quality and water surface elevation fluctuations. Project operations may therefore affect the abundance, distribution, and structure of fish populations.

Study AQ-1 *Reservoir Fish Populations* characterizes fish species composition and distribution within the three Project reservoirs following methods described in Study AQ-1, filed with the Federal Energy Regulatory Commission (FERC) in April 2022 (SCE, 2022). This report includes the results of reservoir fish sampling completed in Ellery Lake, Tioga Lake, and Saddlebag Lake during 2022.

1.1. EXISTING INFORMATION

Fish resources in Project reservoirs are dominated by naturally reproducing populations of non-native, introduced brown (*Salmo trutta*) and brook trout (*Salvelinus fontinalis*), and stocked rainbow trout (*Oncorhynchus mykiss*). Lahontan redside (*Richardsonius egregious*), a cyprinid species native to other eastern Sierra watersheds to the north, have been introduced and appear to be established in Saddlebag Lake (Moyle, 2002); however, their occurrence has not been reported in either Ellery Lake or Tioga Lake.

Brown trout are native to Europe, North Africa, and western Asia, and were introduced to North America in the late 19th century. Brown trout were introduced in the Mono Lake Basin in 1919, with stocking continuing until 1942. After 1942, brown trout planting in the Mono Lake Basin was replaced by annual plants of catchable rainbow trout (Salamunovich, 2017).

Brook trout are native to the northeastern United States, west to eastern Minnesota and northeastern Iowa, and eastern Canada. They were first introduced to California in 1871, and by 1872 were distributed throughout the state by the California Fish Commission (Moyle, 2002). Brook trout have become established in mountain streams and lakes throughout California from the San Bernardino Mountains to the Oregon border and are most abundant in watersheds within the Sierra Nevada. Brook trout were introduced in the Mono Lake Basin in 1931.

Catchable rainbow trout (i.e., 0.5 pound or larger) have been planted in each of the three Project reservoirs to support a put-and-take fishery management strategy. Triploid (sterile) rainbow trout were added to the releases in 2011, and since 2013, all planted rainbow trout have been sterile (Salamunovich, 2017). Recent planting efforts by California Department of Fish and Wildlife (CDFW) have ranged from 0 to over 13,000 fish per reservoir per year and included a large release of small sub-catchable fingerling rainbow trout in 2021 (Table 1.1-1). Fish planting was not conducted by the CDFW in

2020 due to the COVID-19 pandemic nor in 2022 due to disease outbreaks at CDFW hatcheries (Salamunovich, 2021; CDFW, 2022) (Table 1.1-1).

Table 1.1-1. Rainbow Trout Stocking Information for Project Reservoirs, 2017 through 2022

Year	Waterbody	Number	Pounds	Average Weight per Fish (pounds)
2017	Saddlebag Lake	12,825	6,475	0.50
	Tioga Lake	13,150	6,690	0.51
	Ellery Lake	13,150	6,690	0.51
2018	Saddlebag Lake	800	400	0.50
	Tioga Lake	3,560	1,700	0.48
	Ellery Lake	3,980	1,900	0.48
2019	Saddlebag Lake	4,000	2,000	0.50
	Tioga Lake	4,000	2,000	0.50
	Ellery Lake	4,200	2,100	0.50
2020	Saddlebag Lake	None	None	None
	Tioga Lake	None	None	None
	Ellery Lake	None	None	None
2021	Saddlebag Lake	None	None	None
	Tioga Lake	4,800	600	0.13 [a]
	Ellery Lake	9,600	1,200	0.13 [a]
2022	Saddlebag Lake	-- [b]	-- [b]	-- [b]
	Tioga Lake	-- [b]	-- [b]	-- [b]
	Ellery Lake	-- [b]	-- [b]	-- [b]

Source: CDFW as cited in Salamunovich, 2021

[a] Sub-catchable fingerling rainbow trout from the American River Hatchery were planted in Tioga and Ellery Lakes in 2021 (Salamunovich, 2021).

[b] Fish stocking by CDFW did not occur in Project reservoirs in 2022 due to disease outbreak at CDFW hatcheries (CDFW, 2022). Records of fish stocking by other entities during 2022 could not be obtained prior to this report but was likely limited in numbers and only occurred in Tioga Lake (Tioga Lake Campground Camp Host, Pers. Comm., August 3, 2022).

2.0 STUDY GOALS AND OBJECTIVES

Study goals and objectives were determined during the February 22, 2021, and March 29, 2021, Aquatic Resources Technical Working Group meetings. Stakeholders expressed a need for information regarding the distribution of fish species in the Project Area. The goal of this study was to document the current fish populations within Project reservoirs. The objective of this study was to obtain information on reservoir fish populations where background data are lacking. Additionally, a subset of fish captured during this study was collected for lab analysis to assess mercury bioaccumulation in accordance with Study *WQ-1 Reservoir and Stream Water Quality*.

2.1. STUDY AREA

Fish population sampling was conducted at three Project reservoirs: Saddlebag Lake, Ellery Lake, and Tioga Lake.

Within each Project reservoir, sample locations were established to include a representative subset of available habitats. Boat electrofishing was restricted to nearshore (i.e., shallow) areas and generally included one location near a major reservoir tributary (Figures 2.1-1, 2.1-2, and 2.1-3). Gill nets designed individually for adult and juvenile fish capture were generally paired and distributed in the reservoir to sample near a major reservoir tributary, a deepwater location, and a location near the dam.

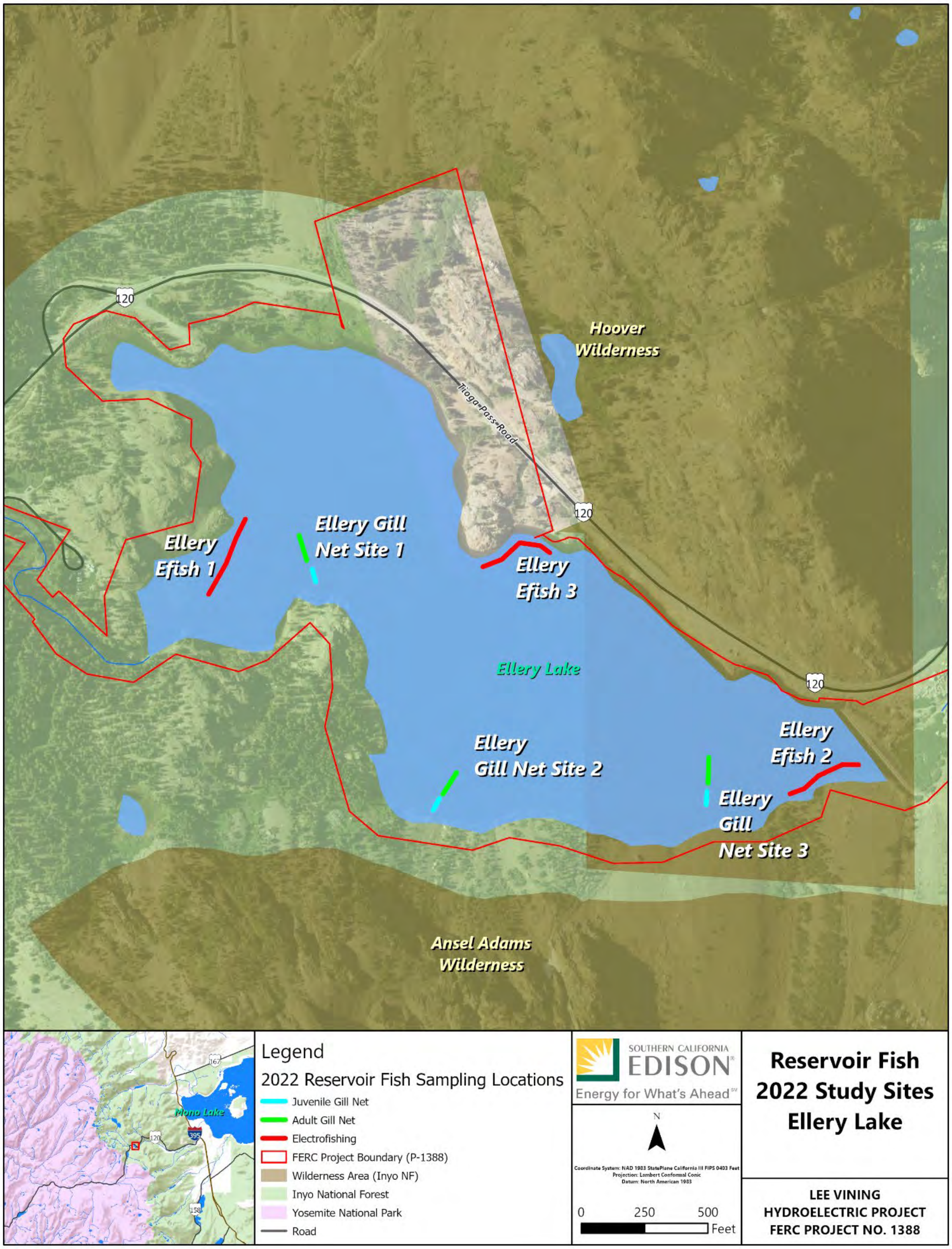


Figure 2.1-1. Reservoir Fish 2022 Study Sites—Ellery Lake.

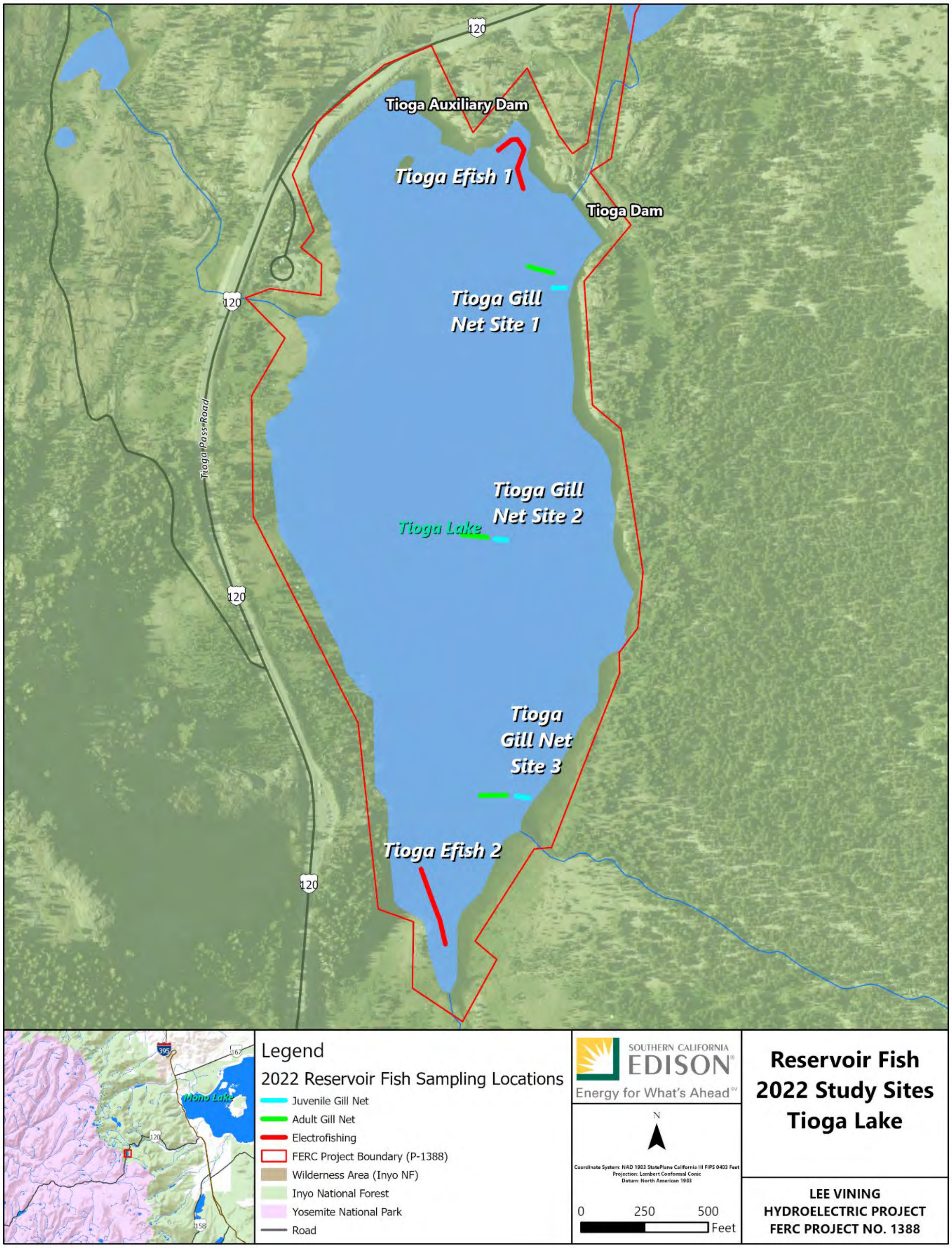


Figure 2.1-2. Reservoir Fish 2022 Study Sites—Tioga Lake.

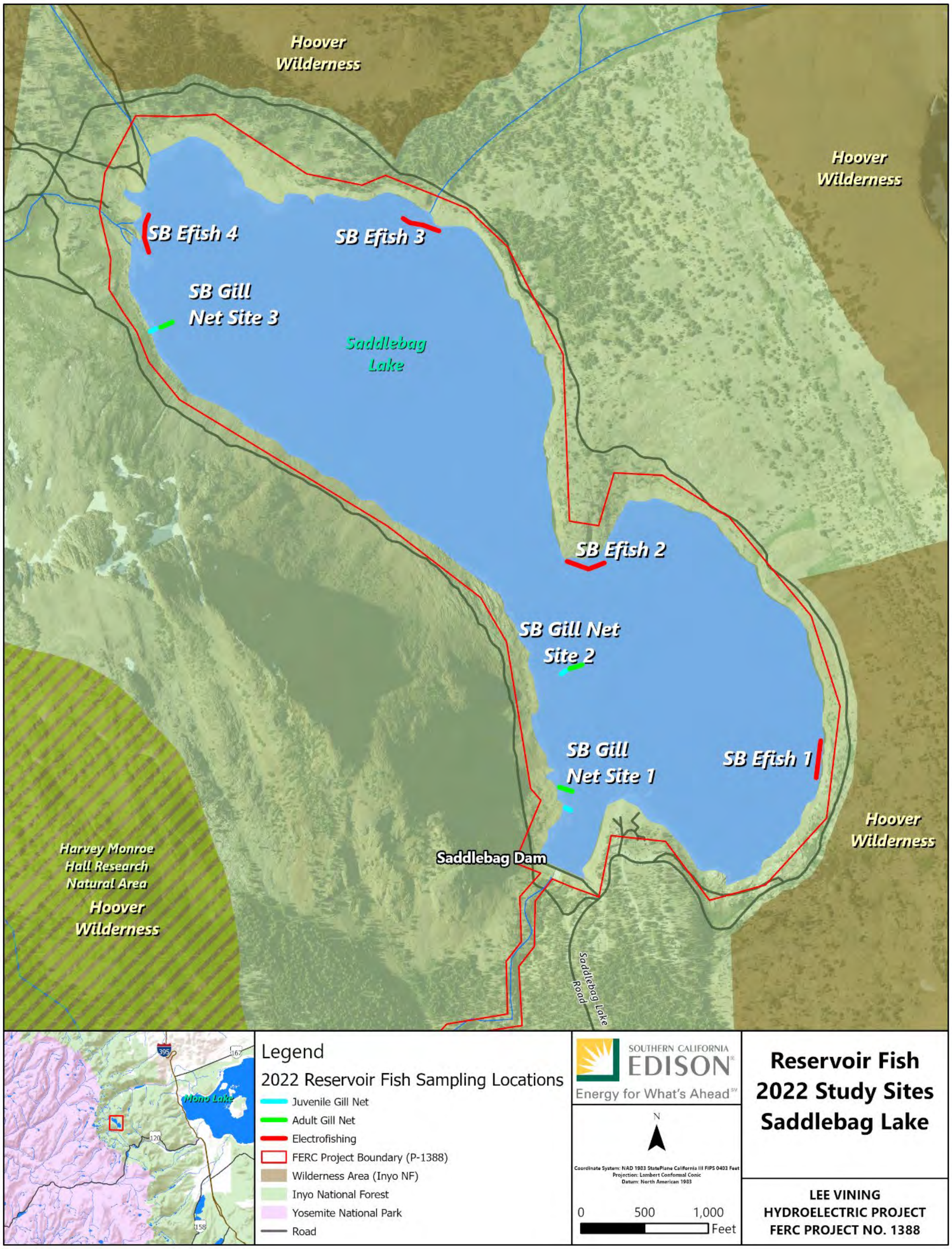


Figure 2.1-3. Reservoir Fish 2022 Study Sites—Saddlebag Lake.

3.0 METHODS

Reservoir fish surveys were conducted using a combination of gill netting and boat electrofishing techniques. Surveys occurred during the summer from August 2 through August 4, 2022.

Captured fish were placed in an aerated container with ambient reservoir water for processing. Fish were measured on a wetted measuring board and weighed using a digital scale before being released. Fish data recorded included species identification, fork length (FL; millimeters [mm]), total length (TL; mm), and weight (grams [g]). All trout were inspected for visual abnormalities and fin erosion, which could suggest fish of hatchery origin. When possible, scale samples were collected from up to 20 fish of each game species in each reservoir to assess age composition.

In addition to fish data, general location conditions were recorded for each study site including Global Positioning System (GPS) coordinates, depth (minimum, maximum, and mean), and water quality measurements (water temperature, dissolved oxygen, pH, and conductivity, measured at the mean sample depth at each gill net and electrofishing site). Water quality was measured using a calibrated YSI™ Pro Plus multiparameter meter.

3.1. MODIFICATIONS TO METHODS

One modification to study methods was made during sampling to reduce the potential for fish mortality during gill-netting efforts. After fish mortalities were observed on the first night at Ellery Lake, gill net soak times during the night sampling period were decreased from approximately 8 hours to approximately 4 hours for all gill net locations at Tioga Lake and at two gill net locations at Saddlebag Lake. Gill net soak times during the day remained at approximately 8 hours for all locations sampled. No other method modifications occurred during study implementation.

3.2. GILL NETTING

Variable-mesh gill nets were used to assess fish species composition and distribution in Project reservoirs. Two sizes of variable-mesh gill nets, adult and juvenile, were deployed at each of three locations within Ellery, Tioga, and Saddlebag Lakes (Figures 2.1-1 through 2.1-3). The nets were placed perpendicular to the reservoir shoreline (Figure 3.1-1) and were deployed along the gradient of the reservoir bottom. The sample locations were selected to cover a range of habitat conditions within each reservoir including both shallow and deep water areas and locations distributed along the length of the reservoir.

Adult-mesh gill nets measured between approximately 75 and 120 feet long by 6 feet tall, with variable-mesh sizes ranging from 0.75 inch to 2.50 inches. Juvenile-mesh gill nets measured 30 feet long and 6 feet deep and consist of three 10-foot panels with mesh sizes of 0.25, 0.5, and 0.75 inches. Gill nets were initially set for two, approximately 8-hour net-set periods; however, net-set times were adjusted to reduce potential for fish injury. Gill nets were consecutively fished for 1 day and 1 night period set within an approximate

24-hour period within each reservoir to facilitate good coverage and to separate diel periods.

The time of deployment, location, minimum and maximum water depths, and net type were recorded at each gill net station. General site conditions discussed in Section 3.0 were also recorded at each gill net station.

Figure 3.2-1. Deploying Gill Nets in Saddlebag Lake, August 2022.

3.3. BOAT ELECTROFISHING

Boat electrofishing was conducted in coordination with gill-netting efforts and used standard methods (Reynolds, 1996) to sample reservoir nearshore habitat. Sampling was conducted at night using a 14-foot Zodiac boat equipped with a Smith-Root Inc. 1.5 kilovolt-ampere electrofisher control box, two anode booms, and a cathode array (Figure 3.2-1). Electrofisher settings during sampling were set to direct current at 400 volts. Three sites on Ellery Lake, two sites on Tioga Lake, and four sites on Saddlebag Lake were sampled during this study (Figures 2.1-1 through 2.1-3). Electrofishing and gill net sampling sites were located sufficiently far apart to avoid frightening fish into or away from deployed gill nets. Electrofishing sites were approximately 300 to 700 feet in length and were established around the perimeter of each Project reservoir, targeting a diversity of nearshore habitats. Start and end points for each sample site were documented using hand-held GPS. Electrofishing shock time was recorded.

Figure 3.3-1. Boat Electrofishing in Ellery Lake, August 2022.

3.4. ANALYSIS

Data were entered into an Excel spreadsheet for reduction, tabulation, and summary. Capture data was summarized by species composition for the whole lake and all gear types, as well as by gear type and site. In addition, length-frequency histograms were developed for all trout species captured to estimate age-class structure, which was further refined using ages estimated from scale readings from a subset of fish.

Fish capture results were reported both as total catch and in terms of catch per unit effort (CPUE). CPUE for fish captured by electrofishing was calculated by dividing the number of fish of each species captured by the total surface area of water sampled using lengths obtained with the hand-held GPS and widths that were estimated based on the boat's distance from shore and the effective shock area around the anodes, multiplied by the length of time fished (e.g., fish/ [feet^2 x hour]). CPUE for fish captured by gill net was calculated by dividing the number of fish captured by the dimensions of the gill net, multiplied by the length of the time fished (e.g., fish/ [feet^2 x hour]). CPUE was summarized by reservoir location, method, and species.

To evaluate trout condition at each site, the weight-to-length relationship of individual trout was assessed using Fulton's condition factor (Ricker, 1975) as a method of identifying the nutritional state or health of the fish related to size and growth. Fulton's condition factor (*k*) was calculated for each trout captured using the following formula:

$$\text{Individual condition factor } (k) = \frac{\text{Wet Weight (g)} \times 10^5}{\text{Fork Length (mm)}^3}$$

Condition factors typically range from 0.8 to 2.0, with a mean condition factor generally between 0.8 and 1.2 (Beak, 1991; EA, 1986; Ebasco Environmental, 1993; Wilcox, 1994). However, condition is dependent on the time of sampling, the species, the strain of trout, state of sexual maturity, and particularly the way the fish is measured (e.g., FL vs. TL), which is not often documented with the results.

4.0 STUDY RESULTS

Surveys occurred August 2 through August 4, 2022. Adult and juvenile gill nets were deployed, and boat electrofishing was conducted in all Project reservoirs. Sampling under Study AQ-1 is complete.

4.1. SITE CONDITIONS

Water quality conditions had little variation between Project reservoirs sampled during August 2022. Water temperatures were cool and dissolved oxygen levels were high throughout the study area. Conditions observed in each reservoir are summarized in Table 4.1-1 and detailed in Appendix A and Appendix B. Focused efforts to document water quality conditions throughout the Project Area are more thoroughly discussed in the WQ-1 Final Technical Report.

Table 4.1-1. Water Quality Conditions at Fish Sampling Locations in Project Reservoirs during August 2022

Reservoir	Survey Date	Survey Method	Water Temperature (°C)		Dissolved Oxygen (mg/L)		Specific Conductivity (µS/cm)		pH (s.u.)	
			min	max	min	max	min	max	min	max
Ellery Lake	8/2/2022	Gill Net	15.9	17.8	6.31	6.56	20.1	20.7	6.42	7.88
		Boat Electrofishing	17.8	17.8	6.31	6.31	20.1	20.1	7.88	7.88
Tioga Lake	8/3/2022	Gill Net	16.9	17.8	5.24	6.14	24.3	24.5	7.92	8.16
		Boat Electrofishing	16.9	16.9	6.14	6.14	24.3	24.3	8.16	8.16
Saddlebag Lake	8/4/2022	Gill Net	16.6	16.6	6.92	6.92	18.9	18.9	7.57	7.57
		Boat Electrofishing	16.3	16.3	6.28	6.28	18.8	18.8	7.77	7.77

°C = degrees Celsius; mg/L = milligrams per liter; µS/cm = microsiemens per centimeter; s.u. = standard units

4.2. FISH SPECIES COMPOSITION

Based on the individuals captured, the fish assemblage is composed of brook trout, brown trout, and rainbow trout in Ellery Lake; brook trout and rainbow trout in Tioga Lake; and brook trout and Lahontan redside in Saddlebag Lake (Figure 4.2-1 and Figure 4.2-2).

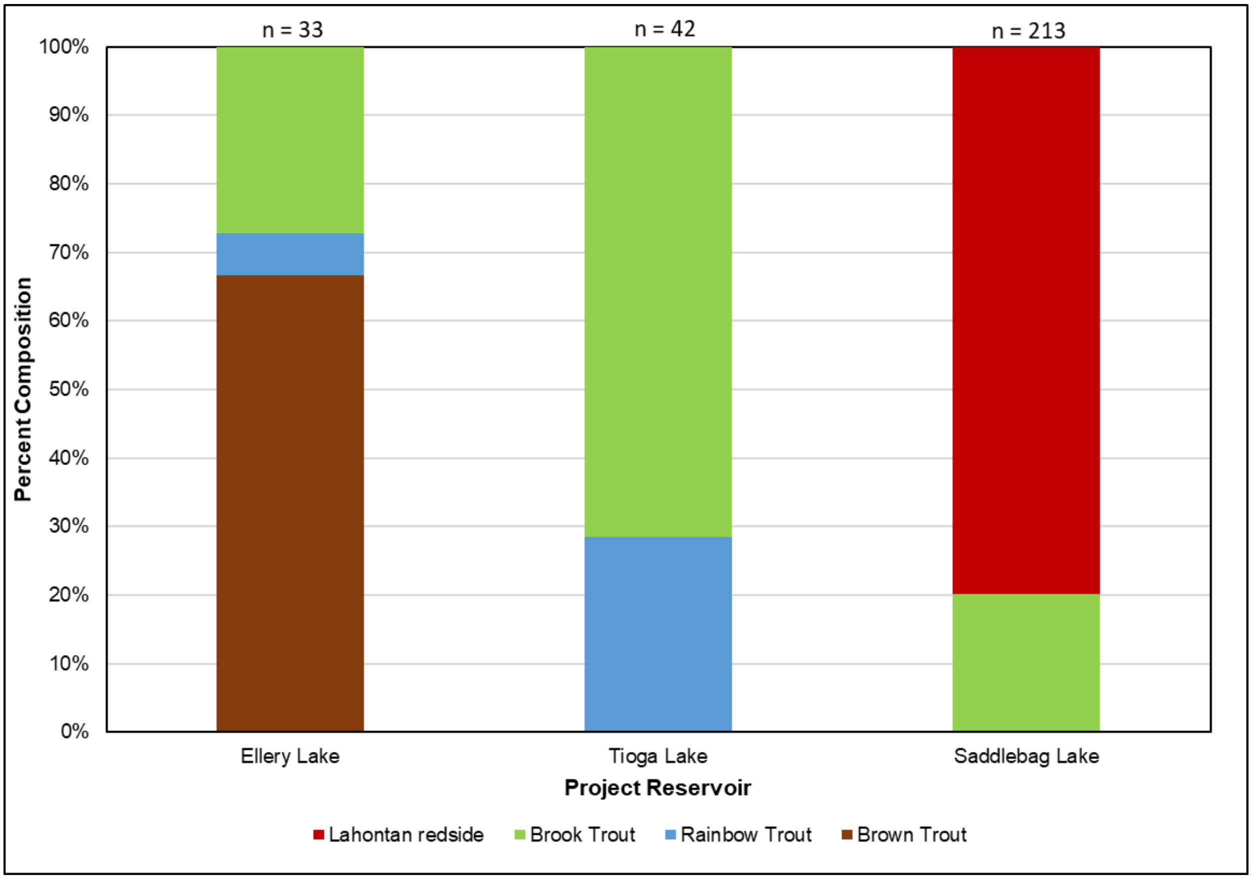


Figure 4.2-1. Fish Species Composition Observed in Project Reservoirs during August 2022.

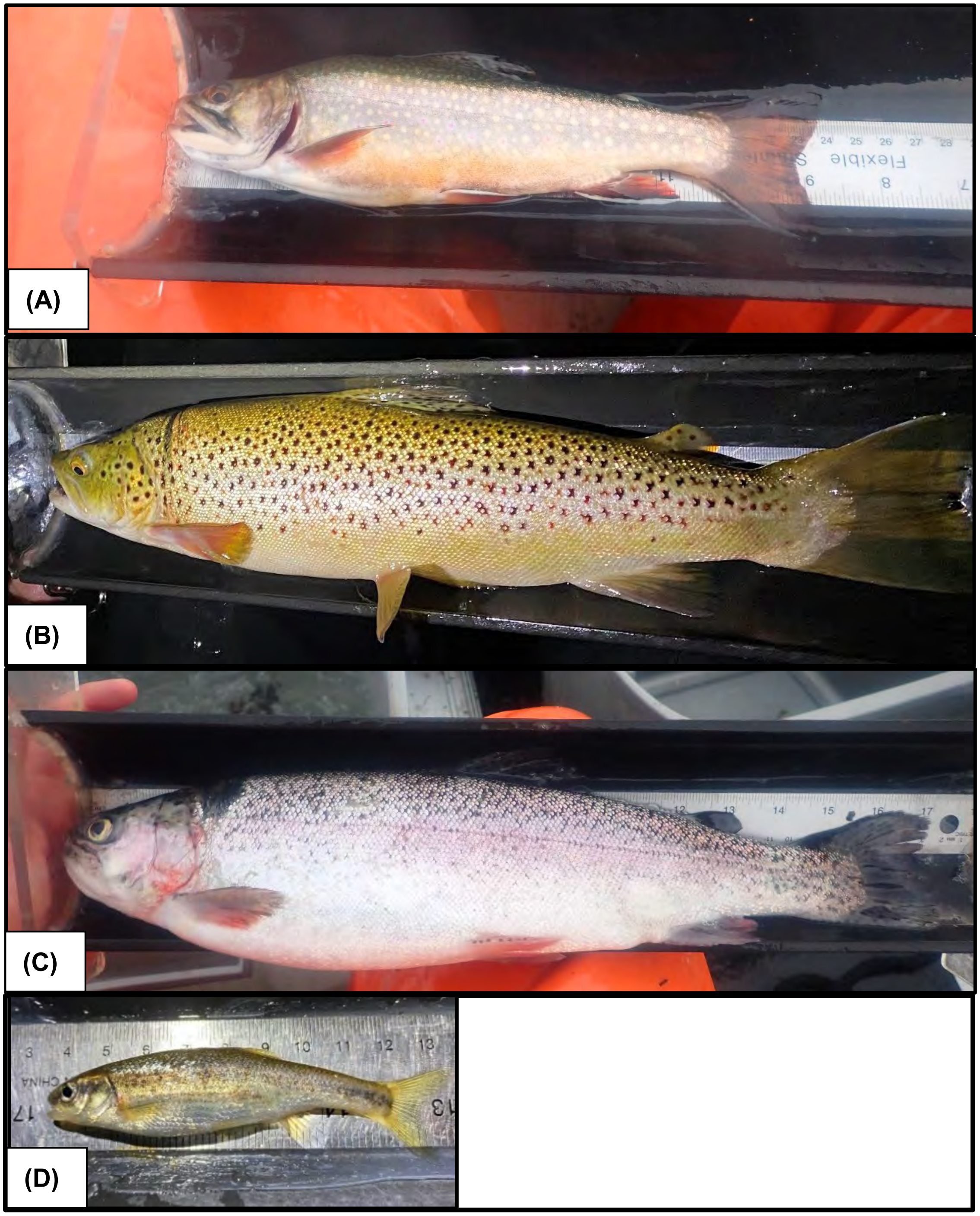


Figure 4.2-2. Fish Species Captured in Lee Vining Hydroelectric Project Reservoirs: Brook Trout (A), Brown Trout (B), Rainbow Trout (C), and Lahontan Redside (D), August 2022.

A total of 288 fish from four species were captured during the 2022 reservoir fish surveys. The captured fish species indicate that the fishery in Ellery, Tioga, and Saddlebag Lakes is composed of coldwater trout species. Saddlebag Lake also supports a large self-sustaining population of Lahontan redside, which were numerically the most abundant fish species captured in Saddlebag Lake. Lahontan redside were not observed in Ellery or Tioga Lakes.

Of trout species observed, brown trout were the most abundant in Ellery Lake while brook trout were most abundant in Tioga and Saddlebag Lakes (Figure 4.2-1). Rainbow trout were the least abundant trout species observed in Ellery and Tioga Lakes, and no rainbow trout were captured in Saddlebag Lake. The low abundance of rainbow trout is likely a result of no stocking by CDFW in the three Project reservoirs during 2022 (Table 1.1-1). However, an alternative party (not from CDFW) stocked limited numbers of rainbow trout in Tioga Lake during summer of 2022 (Tioga Lake Campground Camp Host, Pers. Comm., August 3, 2022), but information on the specific number of fish stocked was not available.

CPUE for fish captured showed some variability by gear type, and location (Table 4.2-1). CPUE was higher for boat electrofishing compared to gill netting. Tioga Lake had the highest CPUE for both gill netting and boat electrofishing compared to the other Project reservoirs.

Table 4.2-1. Catch Per Unit Effort for Fish Species Captured by Survey Method, August 2022

Reservoir	Method	No. of Sample Sites	Sample Area (ft^2)	Sample Time (hours)	CPUE x 1,000 (fish/ [ft^2 x hour])			
					Brook Trout	Brown Trout	Rainbow Trout	Total Trout
Ellery Lake	Gill Net	3	2,160	80.12	0.029	0.058	0.006	0.092
	Boat Electrofishing	3	30,300	0.41	0.325	0.975	0.081	1.382
Tioga Lake	Gill Net	3	2,160	65.18	0.085	0.000	0.021	0.107
	Boat Electrofishing	2	9,000	0.19	10.811	0.000	5.405	16.216
Saddlebag Lake	Gill Net	3	2,160	80.60	0.224	0.000	0.000	0.224
	Boat Electrofishing	4	24,900	0.33	0.486	0.000	0.000	0.486

CPUE = catch per unit effort; ft^2 = square feet

4.3. AGE-CLASS DISTRIBUTION

Length-frequency histograms were generated to assess age-classes for fish species captured. In total, 118 trout were captured during reservoir fish surveys and plotted on length-frequency histograms. Of those 118 trout, scales were aged from 71 fish of numerous age-classes to refine age estimates. Length-frequency and scale results indicate multiple age-classes of trout species are present in each of the three Project reservoirs with brook and brown trout aged from young-of-year (YOY) to fish over 5+ while rainbow trout were aged from 3+ to over 6+. Catchable rainbow trout stocked in Project reservoirs generally are within the 1+ age class (14 to 16 months) at time of release (Fish Springs Hatchery, CDFW, Pers. Comm., June 5, 2023); therefore, rainbow trout captured during this study were likely holdovers from previous years stocking efforts. Age-class results are presented by reservoir and species in the following sections.

4.3.1. ELLERY LAKE

Fish captured in Ellery Lake included fish from the family Salmonidae, including brook trout, brown trout, and rainbow trout. Since sample numbers are relatively small, length frequencies lacked distinct nodes; however, the range in sizes of fish captured confirms multiple age-classes were present. Brook trout captured in Ellery Lake ranged in size from 43 to 310 mm FL. Scale analysis of fish captured in Ellery Lake indicates most brook trout captured fall within the 3+ and 4+ age-classes (Figures 4.3-1 and 4.3-2; Appendix C), while fish less than 100 mm likely represent YOY fish based on growth rates reported in Moyle (2002) (Table 4.3-1). Brown trout captured in Ellery Lake ranged in size from 137 to 388 mm FL and included fish within age-classes ranging from 2+ up to 6+ based on scale analysis. Rainbow trout captured in Ellery Lake ranged in size from 225 to 287 mm FL and included fish in the 3+ and 4+ age-classes based on scale analysis (Figure 4.3-3). Of the two rainbow trout captured in Ellery Lake during this study, one showed possible signs of hatchery origin (e.g., worn fins).

Table 4.3-1. Length-at-Age Summary

Age Class	Brown Trout (mm TL)[a]	Brook Trout (mm TL)[a]	Rainbow Trout (mm FL)[a]	Lahontan Redside (mm SL)[a]
YOY	<80	<150	<100	0–55
1+	70–160	150–200	100–160	34–63
2+	130–280	180–250	130–200	51–73
3+	190–410	230–300	190–220	65–80

Source: Moyle, 2002

mm = millimeter; TL = total length; FL = fork length; SL = standard length; YOY = young-of-year

[a] Moyle (2002) presents growth information for brown trout and brook trout based on TL, rainbow trout based on FL, and Lahontan redside based on SL.

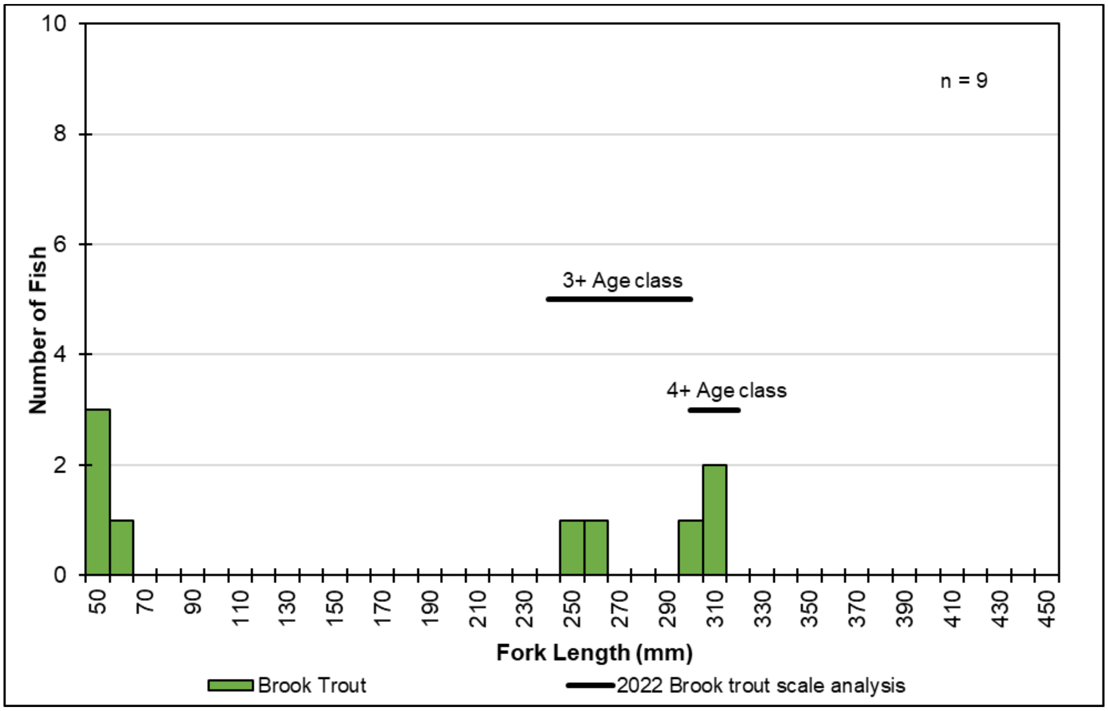


Figure 4.3-1. Length-frequency and Age-Class Distribution for Brook Trout Captured in Ellery Lake during 2022 Sampling.

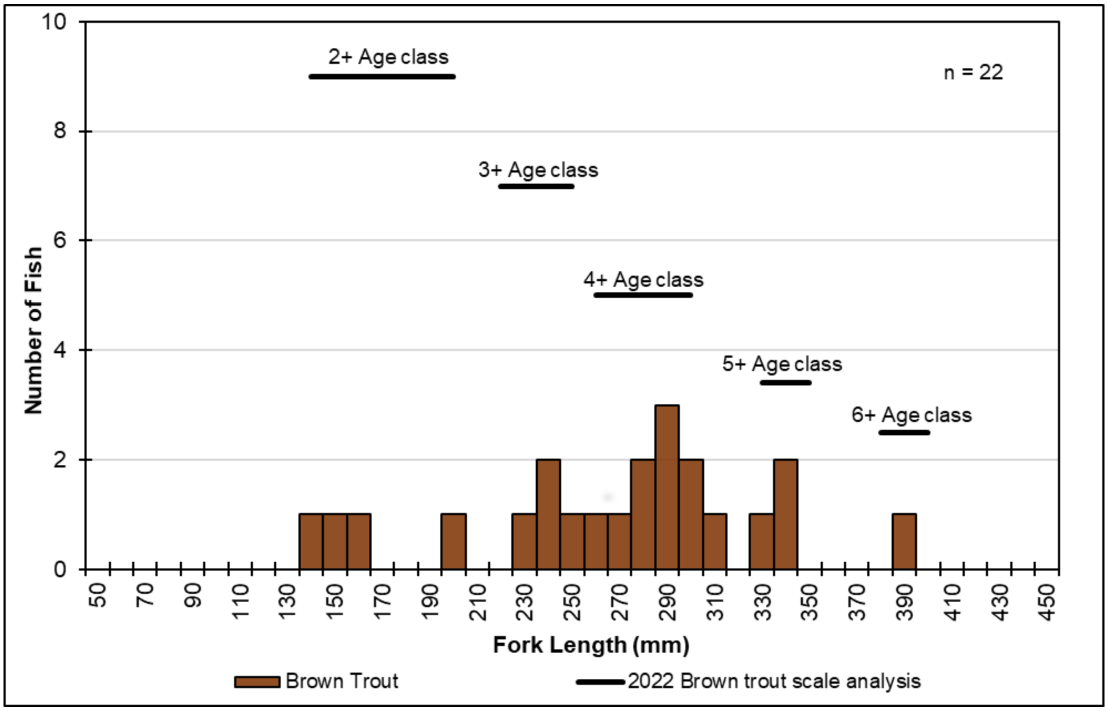


Figure 4.3-2. Length-Frequency and Age-Class Distribution for Brown Trout Captured in Ellery Lake during 2022 Sampling.

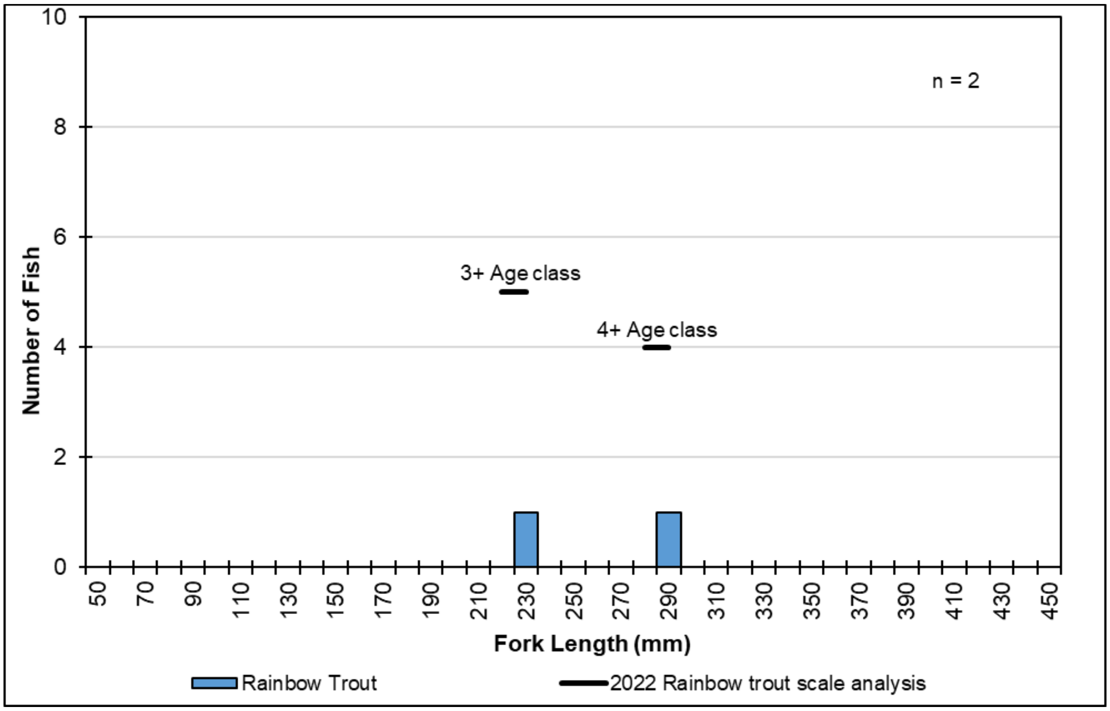


Figure 4.3-3. Length-Frequency and Age-Class Distribution for Rainbow Trout Captured in Ellery Lake during 2022 Sampling.

4.3.2. TIOGA LAKE

Fish captured in Tioga Lake were from the family Salmonidae, including brook trout and rainbow trout. Due to small sample sizes, length frequencies lacked distinct nodes; however, the range in sizes of fish captured confirms multiple age-classes were present (Figures 4.3-4 and 4.3-5). Brook trout captured in Tioga Lake ranged in size from 114 to 269 mm FL. Scale analysis of fish captured in Tioga Lake indicates brook trout included fish from each age class between 1+ and 4+ (Appendix C). Rainbow trout captured in Tioga Lake ranged in size from 220 to 425 mm FL and included fish within age-classes ranging from 3+ to 6+ based on scale analysis (Figure 4.3-5). Of the 12 rainbow trout captured in Tioga Lake during this study, 5 showed clear signs of hatchery origin (e.g., worn fins).

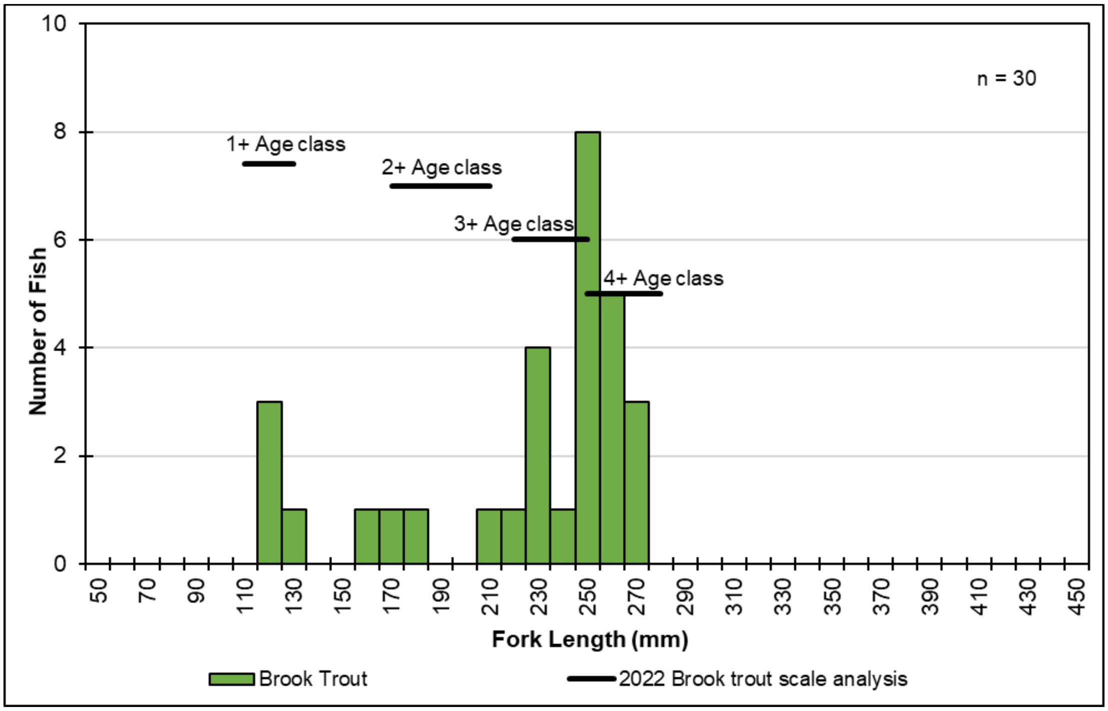


Figure 4.3-4. Length-Frequency and Age-Class Distribution for Brook Trout Captured in Tioga Lake during 2022 Sampling.

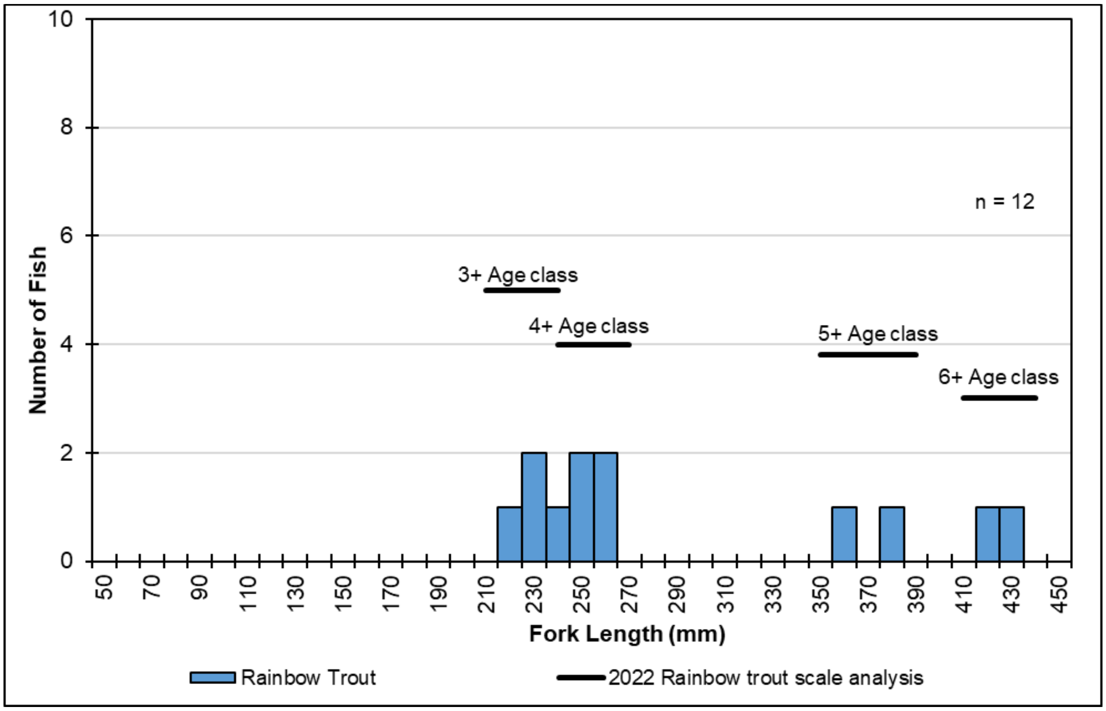


Figure 4.3-5. Length-Frequency and Age-Class Distribution for Rainbow Trout Captured in Tioga Lake during 2022 Sampling.

4.3.3. SADDLEBAG LAKE

Fish captured in Saddlebag Lake included brook trout from the family Salmonidae and Lahontan redside from the family Cyprinidae. Brook trout captured ranged from 160 to 364 mm FL and Lahontan redside ranged from 52 to 107 mm FL. Length frequencies for both species lack distinct nodes; however, the range in sizes of fish captured confirms multiple age-classes were present (Figures 4.3-6 and 4.3-7). Scale analysis of brook trout captured in Saddlebag Lake documented fish from each age class between the 3+ and 5+ age-classes (Appendix C). A single brook trout measuring approximately 160 mm FL was not aged using scale analysis but is likely to fall within the 1+ age class based on growth rates reported in Moyle (2002) (Table 4.3-1). The distribution of sizes of Lahontan redside captured in Saddlebag Lake are likely to include fish in the YOY through 4+ age-classes based on size-at-age estimates reported in Moyle (2002) (Table 4.3-1).

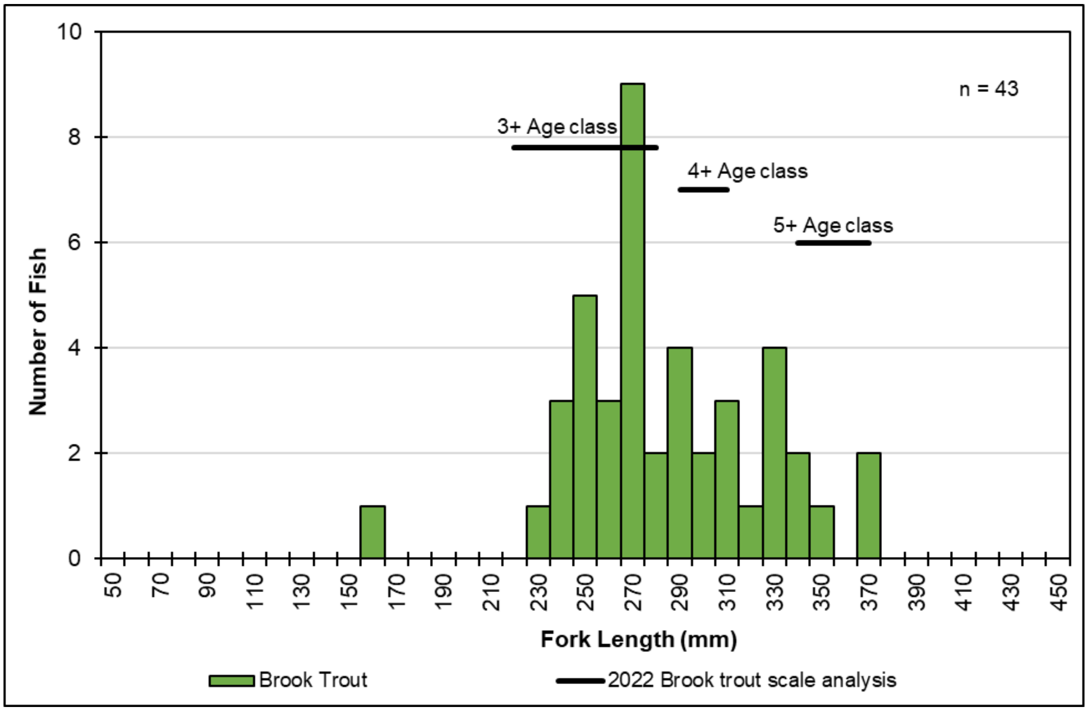
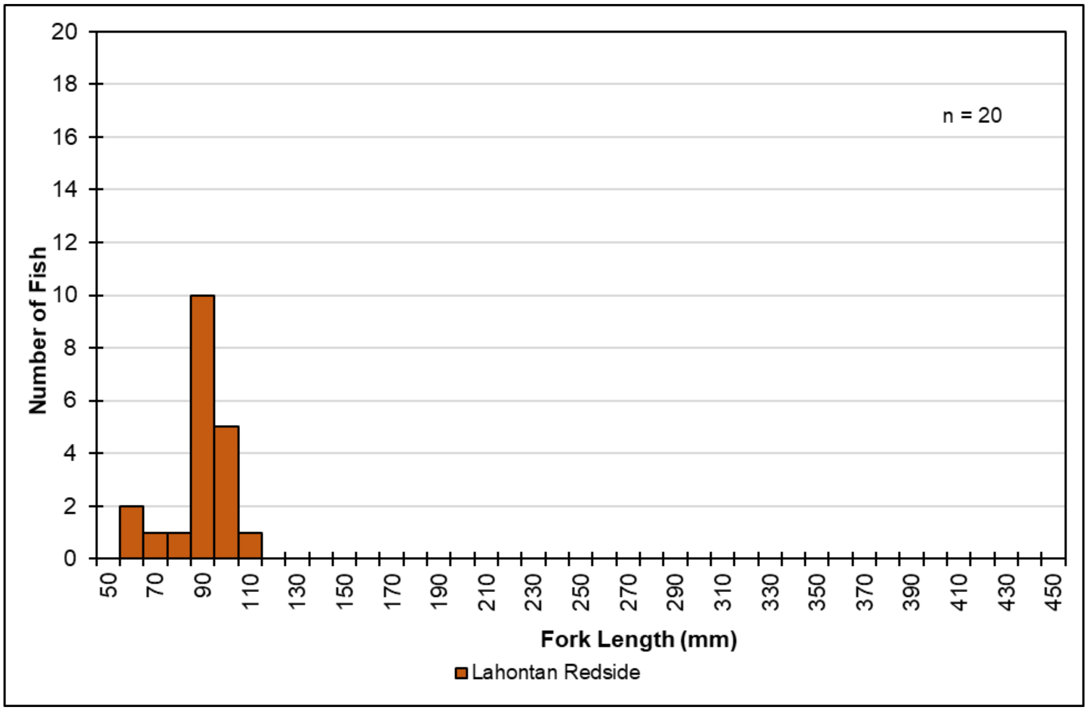


Figure 4.3-6. Length-Frequency and Age-Class Distribution for Brook Trout Captured in Saddlebag Lake during 2022 Sampling.



Note: Due to the large number of Lahontan redside captured, only a subsample of 20 individuals were measured.

Figure 4.3-7. Length-Frequency and Age-Class Distribution for Lahontan Redside Captured in Saddlebag Lake during 2022 Sampling.

4.4. FISH CONDITION

The mean trout condition (k-value) within the Project reservoirs sampled in 2022 ranged from 0.92 to 1.28,[1] indicating that trout were generally in good condition (Table 4.4-1). Length and weight data for all fish captured during this study are provided in Appendix D.

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[1] The typical mean condition factors for wild trout range from 0.8 to 1.2 (Beak, 1991; EA, 1987; Ebasco Environmental, 1993; Wilcox, 1994); however, condition is dependent on the sampling season, species, strain of trout, state of sexual maturity, and the way fish length is defined (e.g., fork length, total length, or standard length), which is not often documented with the results.

Table 4.4-1. Fish Condition for Trout Captured in Project Reservoirs during August 2022

Project Reservoir	Species	Number Captured	Fork Length (mm)		Average k-value
			min	max	
Ellery Lake	Brook trout	9	43	310	1.28
	Brown trout	22	137	388	1.10
	Rainbow trout	2	225	287	0.92
Tioga Lake	Brook trout	30	114	269	1.06
	Rainbow trout	12	220	425	1.24
Saddlebag Lake	Brook trout	43	160	364	1.13

mm = millimeter

5.0 CONSULTATION SUMMARY

In preparation of the Pre-Application Document and Notice of Intent filed in August 2021, Southern California Edison (SCE) hosted Aquatic and Hydrology Technical Working Group (TWG) meetings on January 25, February 22, March 29, and May 24, 2021. These TWG meetings resulted in study requests from Stakeholders to address questions regarding aquatic habitat and sediment characteristics. Notes and materials from these meetings are available on SCE's Project website (www.sce.com/leevining).

SCE filed draft Study Plans with the Pre-Application Document and Notice of Intent on August 12, 2021, to address issues discussed with the TWG. The Stakeholder comment period ended on January 18, 2022. Per conditions included in Stillwater Sciences' Scientific Collection Permit (S-190250002-21292-002), Stillwater Sciences emailed a request for approval to conduct electrofishing and gill-netting surveys in Project reservoirs to CDFW District Biologist Nick Buckmaster on May 23, 2022. Approval was provided by email from Nick Buckmaster on June 17, 2022.

Initial study results were provided to relicensing Stakeholders on February 1, 2023. Preliminary data collected in this study was analyzed, and a Draft Technical Report was produced and distributed to Stakeholders for review for a 60-day review in September 2023. No comments were received from Stakeholders regarding this study.

On May 14, 2024, SCE held a public meeting at the Lee Vining Community Center to discuss the draft reports and study findings to date. No written comments were received for the AQ-1 Study following the meeting.

6.0 REFERENCES

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APPENDIX A
RESERVOIR FISH POPULATIONS
SAMPLE LOCATION DOCUMENTATION

Table A-1. Reservoir Fish Sample Location Documentation, August 2022

Reservoir	Site ID	Gear Type	Sample Period	GPS Coordinates (WGS 84)		Date in	Start Time	End Time	Total Gill Net Soak Time (hours)	Total Gill Net Soak Time (minutes)	Total E-fishing Time (seconds)
				Latitude	Longitude						
Ellery	E1A	Gill net	Night	37.937070	-119.240100	8/2/2022	17:25	23:36	6:11	371	NA
Ellery	E1J	Gill net	Night			8/2/2022	17:16	23:32	6:16	376	NA
Ellery	E2A	Gill net	Night	37.934582	-119.238274	8/2/2022	17:03	23:17	6:14	374	NA
Ellery	E2J	Gill net	Night			8/2/2022	16:55	23:28	6:33	393	NA
Ellery	E3A	Gill net	Night	37.934602	-119.234548	8/2/2022	16:49	22:53	6:04	364	NA
Ellery	E3J	Gill net	Night			8/2/2022	16:43	23:08	6:25	385	NA
Ellery	E1A	Gill net	Day	37.937070	-119.240100	8/2/2022	10:18	17:18	7:00	420	NA
Ellery	E1J	Gill net	Day			8/2/2022	10:15	17:15	7:00	420	NA
Ellery	E2A	Gill net	Day	37.934582	-119.238274	8/2/2022	10:00	16:56	6:56	446	NA
Ellery	E2J	Gill net	Day			8/2/2022	9:57	16:54	6:57	417	NA
Ellery	E3A	Gill net	Day	37.934602	-119.234548	8/2/2022	9:40	16:44	7:04	424	NA
Ellery	E3J	Gill net	Day			8/2/2022	9:45	16:42	6:57	417	NA
Ellery	EE1	E-fish	Night	37.93739	-119.24096	8/2/2022	20:25	20:40	NA	NA	469
Ellery	EE2	E-fish	Night	37.93430	-119.234290	8/2/2022	21:10	21:20	NA	NA	554
Ellery	EE3	E-fish	Night	37.93704	-119.236210	8/2/2022	22:08	22:18	NA	NA	439
Tioga	T1A	Gill net	Day	37.927031	-119.251355	8/3/2022	11:57	18:59	7:02	422	NA
Tioga	T1J	Gill net	Day			8/3/2022	11:50	18:54	7:04	424	NA
Tioga	T2A	Gill net	Day	37.924255	-119.252420	8/3/2022	12:30	19:27	6:57	417	NA
Tioga	T2J	Gill net	Day			8/3/2022	12:48	19:40	6:52	412	NA
Tioga	T3A	Gill net	Day	37.921482	-119.252194	8/3/2022	12:57	19:45	6:48	408	NA
Tioga	T3J	Gill net	Day			8/3/2022	12:58	19:50	6:52	412	NA
Tioga	T1A	Gill net	Night	37.927031	-119.251355	8/3/2022	19:10	23:10	4:00	240	NA
Tioga	T1J	Gill net	Night			8/3/2022	18:56	22:51	3:55	235	NA
Tioga	T2A	Gill net	Night	37.924255	-119.252420	8/3/2022	19:31	23:29	3:58	238	NA

Reservoir	Site ID	Gear Type	Sample Period	GPS Coordinates (WGS 84)		Date in	Start Time	End Time	Total Gill Net Soak Time (hours)	Total Gill Net Soak Time (minutes)	Total E-fishing Time (seconds)
				Latitude	Longitude						
Tioga	T2J	Gill net	Night			8/3/2022	19:41	23:33	3:52	232	NA
Tioga	T3A	Gill net	Night	37.921482	-119.252194	8/3/2022	19:48	23:49	4:01	241	NA
Tioga	T3J	Gill net	Night			8/3/2022	19:52	23:42	3:50	230	NA
Tioga	TE1	E-fish	Night	37.928651	-119.251961	8/3/2022	20:50	20:56	NA	NA	396
Tioga	TE2	E-fish	Night	37.920655	-119.253376	8/3/2022	21:24	21:32	NA	NA	270
Saddle Bag	SB1A	Gill net	Day	37.967241	-119.273392	8/4/2022	11:40	19:00	7:20	440	NA
Saddle Bag	SB1J	Gill net	Day			8/4/2022	11:35	18:57	7:22	442	NA
Saddle Bag	SB2A	Gill net	Day	37.969925	-119.272854	8/4/2022	11:58	19:22	7:24	444	NA
Saddle Bag	SB2J	Gill net	Day			8/4/2022	11:54	19:19	7:25	445	NA
Saddle Bag	SB3A	Gill net	Day	37.977342	-119.283857	8/4/2022	12:10	20:10	8:00	480	NA
Saddle Bag	SB3J	Gill net	Day			8/4/2022	12:08	19:48	7:40	460	NA
Saddle Bag	SB1A	Gill net	Night	37.967241	-119.273392	8/4/2022	17:06	0:48	7:42	462	NA
Saddle Bag	SB1J	Gill net	Night			8/4/2022	18:59	0:55	6:46	406	NA
Saddle Bag	SB2A	Gill net	Night	37.969925	-119.272854	8/4/2022	19:32	1:40	6:08	368	NA
Saddle Bag	SB2J	Gill net	Night			8/4/2022	19:21	1:16	6:45	405	NA
Saddle Bag	SB3A	Gill net	Night	37.967241	-119.273392	8/4/2022	20:30	0:14	4:24	264	NA
Saddle Bag	SB3J	Gill net	Night			8/4/2022	19:50	23:30	3:40	220	NA
Saddlebag	SBE1	E-fish	Night	37.96829	-119.26617	8/4/2022	22:06	22:12	NA	NA	227
Saddlebag	SBE2	E-fish	Night	37.97230	-119.27158	8/4/2022	22:20	22:30	NA	NA	441
Saddlebag	SBE3	E-fish	Night	37.97912	-119.27625	8/4/2022	22:53	22:58	NA	NA	236
Saddlebag	SBE4	E-fish	Night	37.97863	-119.28401	8/4/2022	23:06	23:14	NA	NA	285

e-fish = electrofish; NA = not applicable

APPENDIX B
RESERVOIR FISH POPULATIONS
WATER QUALITY DATA

Table B-1. Reservoir Fish Water Quality Data, August 2022

Reservoir	Site ID	Gear Type	Dissolved Oxygen		Specific Conductivity (µS/cm)	Water Temperature (°C)	pH (s.u.)	Water Depth (ft)		
			mg/L	%				Max	Avg	Min
Ellery	E1A	Gill net	6.31	92.9	20.1	17.8	7.88	10.3	9.2	8.0
Ellery	E1J	Gill net	6.31	92.9	20.1	17.8	7.88	8.0	8.0	8.0
Ellery	E2A	Gill net	6.31	92.9	20.1	17.8	7.88	12.0	12.0	12.0
Ellery	E2J	Gill net	6.31	92.9	20.1	17.8	7.88	12.0	12.0	12.0
Ellery	E3A	Gill net	6.31	92.9	20.1	17.8	7.88	12.5	12.3	12.0
Ellery	E3J	Gill net	6.31	92.9	20.1	17.8	7.88	13.0	12.8	12.5
Ellery	E1A	Gill net	6.56	91.9	20.6	15.9	7.56	10.3	9.2	8.0
Ellery	E1J	Gill net	6.56	91.9	20.6	15.9	7.56	8.0	8.0	8.0
Ellery	E2A	Gill net	6.45	90.5	20.7	16.1	7.56	12.0	12.0	12.0
Ellery	E2J	Gill net	6.45	90.5	20.7	16.1	7.56	12.0	12.0	12.0
Ellery	E3A	Gill net	6.45	90.8	20.5	16.0	6.42	12.5	12.3	12.0
Ellery	E3J	Gill net	6.45	90.8	20.5	16.0	6.42	13.0	12.8	12.5
Ellery	EE1	E-fish	6.31	92.9	20.1	17.8	7.88	6.0	4.0	1.0
Ellery	EE2	E-fish	6.31	92.9	20.1	17.8	7.88	12.0	6.0	1.0
Ellery	EE3	E-fish	6.31	92.9	20.1	17.8	7.88	10.0	5.0	2.0
Tioga	T1A	Gill net	6.02	88.8	24.5	17.0	7.92	48.0	35.0	25.0
Tioga	T1A	Gill net	6.14	89.4	24.3	16.9	8.16	48.0	35.0	25.0
Tioga	T1J	Gill net	6.02	88.8	24.5	17.0	7.92	25.0	16.0	6.0
Tioga	T1J	Gill net	6.14	89.4	24.3	16.9	8.16	25.0	16.0	6.0
Tioga	T2A	Gill net	5.85	85.3	24.4	17.1	8.11	55.0	48.0	41.0
Tioga	T2A	Gill net	6.14	89.4	24.3	16.9	8.16	55.0	48.0	41.0
Tioga	T2J	Gill net	5.95	87.0	24.4	17.1	8.00	40.0	40.0	35.0
Tioga	T2J	Gill net	6.14	89.4	24.3	16.9	8.16	40.0	40.0	35.0
Tioga	T3A	Gill net	5.24	84.0	24.4	17.8	8.02	11.0	10.0	8.8
Tioga	T3A	Gill net	6.14	89.4	24.3	16.9	8.16	11.0	10.0	8.8

Reservoir	Site ID	Gear Type	Dissolved Oxygen		Specific Conductivity (µS/cm)	Water Temperature (°C)	pH (s.u.)	Water Depth (ft)		
			mg/L	%				Max	Avg	Min
Tioga	T3J	Gill net	5.24	84.0	24.4	17.8	8.02	8.8	8.5	8.0
Tioga	T3J	Gill net	6.14	89.4	24.3	16.9	8.16	8.8	8.5	8.0
Tioga	TE1	E-fish	6.14	89.4	24.3	16.9	8.16	15.0	6.0	2.0
Tioga	TE2	E-fish	6.14	89.4	24.3	16.9	8.16	8.0	4.0	2.0
Saddle Bag	SB1A	Gill net	6.92	101.2	18.9	16.6	7.57	9.5	9.3	9.0
Saddle Bag	SB1A	Gill net	6.92	101.2	18.9	16.6	7.57	9.5	9.3	9.0
Saddle Bag	SB1J	Gill net	6.92	101.2	18.9	16.6	7.57	9.0	8.0	7.0
Saddle Bag	SB1J	Gill net	6.92	101.2	18.9	16.6	7.57	9.0	8.0	7.0
Saddle Bag	SB2A	Gill net	6.92	101.2	18.9	16.6	7.57	27.0	25.0	23.0
Saddle Bag	SB2A	Gill net	6.92	101.2	18.9	16.6	7.57	27.0	25.0	23.0
Saddle Bag	SB2J	Gill net	6.92	101.2	18.9	16.6	7.57	12.0	10.5	9.0
Saddle Bag	SB2J	Gill net	6.92	101.2	18.9	16.6	7.57	12.0	10.5	9.0
Saddle Bag	SB3A	Gill net	6.92	101.2	18.9	16.6	7.57	16.0	15.5	15.0
Saddle Bag	SB3A	Gill net	6.92	101.2	18.9	16.6	7.57	16.0	15.5	15.0
Saddle Bag	SB3J	Gill net	6.92	101.2	18.9	16.6	7.57	11.0	10.5	10.0
Saddle Bag	SB3J	Gill net	6.92	101.2	18.9	16.6	7.57	11.0	10.5	10.0
Saddle Bag	SBE1	E-fish	6.28	92.4	18.8	16.3	7.77	20.0	6.0	1.0
Saddle Bag	SBE2	E-fish	6.28	92.4	18.8	16.3	7.77	>20.0	5.0	1.0
Saddle Bag	SBE3	E-fish	6.28	92.4	18.8	16.3	7.77	20.0	8.0	3.0
Saddle Bag	SBE4	E-fish	6.28	92.4	18.8	16.3	7.77	15.0	7.0	1.0

% = percent; °C = degrees Celsius; µs/cm = microsiemens per centimeter; e-fish = electrofish; ft = feet; mg/L = milligrams per liter; s.u. = standard units

APPENDIX C
RESERVOIR FISH POPULATIONS
SCALE DATA

Table C-1. Trout Ages Based on Scale Analysis of Trout Captured in Ellery Lake, Tioga Lake, and Saddlebag Lake, August 2022.

Reservoir	Species	Fork Length (mm)	Age Class
Ellery Lake	Brook Trout	244	3+
Ellery Lake	Brook Trout	256	3+
Ellery Lake	Brook Trout	299	3+
Ellery Lake	Brook Trout	304	4+
Ellery Lake	Brook Trout	310	4+
Ellery Lake	Brown Trout	145	2+
Ellery Lake	Brown Trout	158	2+
Ellery Lake	Brown Trout	195	2+
Ellery Lake	Brown Trout	223	3+
Ellery Lake	Brown Trout	235	3+
Ellery Lake	Brown Trout	240	3+
Ellery Lake	Brown Trout	268	4+
Ellery Lake	Brown Trout	276	4+
Ellery Lake	Brown Trout	280	4+
Ellery Lake	Brown Trout	282	4+
Ellery Lake	Brown Trout	282	4+
Ellery Lake	Brown Trout	285	4+
Ellery Lake	Brown Trout	340	5+
Ellery Lake	Brown Trout	388	6+
Ellery Lake	Rainbow Trout	225	3+
Ellery Lake	Rainbow Trout	287	4+
Tioga Lake	Brook Trout	114	1+
Tioga Lake	Brook Trout	126	1+
Tioga Lake	Brook Trout	166	2+
Tioga Lake	Brook Trout	208	2+

Reservoir	**Species**	**Fork Length (mm)**	**Age Class**
Tioga Lake	Brook Trout	215	3+
Tioga Lake	Brook Trout	222	3+
Tioga Lake	Brook Trout	225	3+
Tioga Lake	Brook Trout	225	3+
Tioga Lake	Brook Trout	231	3+
Tioga Lake	Brook Trout	242	3+
Tioga Lake	Brook Trout	243	3+
Tioga Lake	Brook Trout	250	4+
Tioga Lake	Brook Trout	250	4+
Tioga Lake	Brook Trout	250	4+
Tioga Lake	Brook Trout	255	4+
Tioga Lake	Brook Trout	256	4+
Tioga Lake	Brook Trout	262	4+
Tioga Lake	Brook Trout	269	4+
Tioga Lake	Rainbow Trout	220	3+
Tioga Lake	Rainbow Trout	226	3+
Tioga Lake	Rainbow Trout	227	3+
Tioga Lake	Rainbow Trout	239	4+
Tioga Lake	Rainbow Trout	243	4+
Tioga Lake	Rainbow Trout	248	4+
Tioga Lake	Rainbow Trout	253	4+
Tioga Lake	Rainbow Trout	258	4+
Tioga Lake	Rainbow Trout	355	5+
Tioga Lake	Rainbow Trout	380	5+
Tioga Lake	Rainbow Trout	413	6+
Tioga Lake	Rainbow Trout	425	6+
Saddlebag Lake	Brook Trout	231	3+
Saddlebag Lake	Brook Trout	252	3+

Reservoir	Species	Fork Length (mm)	Age Class
Saddlebag Lake	Brook Trout	255	3+
Saddlebag Lake	Brook Trout	261	3+
Saddlebag Lake	Brook Trout	262	3+
Saddlebag Lake	Brook Trout	262	3+
Saddlebag Lake	Brook Trout	265	3+
Saddlebag Lake	Brook Trout	270	3+
Saddlebag Lake	Brook Trout	285	4+
Saddlebag Lake	Brook Trout	296	4+
Saddlebag Lake	Brook Trout	300	4+
Saddlebag Lake	Brook Trout	305	4+
Saddlebag Lake	Brook Trout	305	4+
Saddlebag Lake	Brook Trout	306	4+
Saddlebag Lake	Brook Trout	322	4+
Saddlebag Lake	Brook Trout	324	4+
Saddlebag Lake	Brook Trout	332	5+
Saddlebag Lake	Brook Trout	332	5+
Saddlebag Lake	Brook Trout	364	5+
Saddlebag Lake	Brook Trout	364	5+

mm = millimeter

APPENDIX D
RESERVOIR FISH POPULATIONS CAPTURE DATA

Table D-1. Reservoir Fish Capture Data, August 2022

Reservoir	Site Location	Sample Method	Sample Period (Day/Night)	Species	Fork Length (mm)	Total Length (mm)	Weight [a] (g)	k-value	Sample ID	Origin
Ellery	E1A	Gill net	Night	Brown trout	388	405	635	1.09	E-BRN-X4	Wild
Ellery	E1A	Gill net	Night	Brown trout	325	341	365	1.06	--	Wild
Ellery	E1A	Gill net	Night	Brown trout	335	355	395	1.05	--	Wild
Ellery	E1A	Gill net	Day	Brook trout	244	253	164.8	1.13	E-BK-1	Wild
Ellery	E1A	Gill net	Day	Brook trout	299	307	345	1.29	E-BK-2	Wild
Ellery	E1A	Gill net	Night	Brook trout	304	315	335	1.19	E-BK-4	Wild
Ellery	E1A	Gill net	Night	Brook trout	256	268	240	1.43	E-BK-5	Wild
Ellery	E1A	Gill net	Night	Rainbow trout	287	301	220	0.93	E-RBT-2	Unknown
Ellery	E1J	Gill net	Night	Brown trout	137	145	33.0	1.28	E-BK-X	Wild
Ellery	E2A	Gill net	Night	Brown trout	295	306	280	1.09	--	Wild
Ellery	E2A	Gill net	Night	Brown trout	291	306	280	1.14	--	Wild
Ellery	E2A	Gill net	Night	Brown trout	310	325	315	1.06	--	Wild
Ellery	E2A	Gill net	Day	Brown trout	276	290	230	1.09	E-BRN-1	Unknown
Ellery	E3A	Gill net	Night	Brown trout	340	360	445	1.13	E-BRN-X2	Wild
Ellery	E3A	Gill net	Night	Brook trout	310	324	385	1.29	E-BK-3	Wild
Ellery	E3J	Gill net	Night	Brown trout	145	155	32.7	1.07	E-BRN-X3	Wild
Ellery	EE1	E-fish	Night	Brook trout	60	64	2.6	1.20	--	Wild
Ellery	EE1	E-fish	Night	Brook trout	43	46	1.0	1.26	--	Wild
Ellery	EE1	E-fish	Night	Brook trout	46	49	1.4	1.44	--	Wild
Ellery	EE1	E-fish	Night	Brook trout	47	50	1.3	1.25	--	Wild
Ellery	EE2	E-fish	Night	Brown trout	282	292	270	1.20	E-BRN-2	Wild
Ellery	EE2	E-fish	Night	Brown trout	282	300	256	1.14	E-BRN-3	Wild
Ellery	EE2	E-fish	Night	Brown trout	235	252	140	1.08	E-BRN-4	Wild
Ellery	EE2	E-fish	Night	Brown trout	285	295	240	1.04	E-BRN-5	Wild
Ellery	EE2	E-fish	Night	Brown trout	280	295	250	1.14	E-BRN-6	Wild
Ellery	EE2	E-fish	Night	Brown trout	195	205	70.5	0.95	E-BRN-7	Wild
Ellery	EE2	E-fish	Night	Brown trout	223	237	111.9	1.01	E-BRN-8	Wild

Reservoir	Site Location	Sample Method	Sample Period (Day/Night)	Species	Fork Length (mm)	Total Length (mm)	Weight [a] (g)	k-value	Sample ID	Origin
Ellery	EE2	E-fish	Night	Brown trout	158	170	41.3	1.05	E-BRN-X	Wild
Ellery	EE2	E-fish	Night	Brown trout	268	284	225	1.17	E-BRN-9	Wild
Ellery	EE2	E-fish	Night	Brown trout	260	275	195	1.11	--	Wild
Ellery	EE2	E-fish	Night	Brown trout	240	252	175	1.27	E-BRN-X1	Wild
Ellery	EE2	E-fish	Night	Brown trout	250	263	165	1.06	--	Wild
Ellery	EE2	E-fish	Night	Rainbow trout	225	235	104.1	0.91	E-RBT-1	Hatchery
Tioga	T1A	Gill net	Night	Brook trout	263	275	209.1	1.15	--	Wild
Tioga	T1A	Gill net	Night	Brook trout	252	267	182.8	1.14	--	Wild
Tioga	T1A	Gill net	Night	Rainbow trout	413	430	1,401	1.99	T-RBT-8	Hatchery
Tioga	T1J	Gill net	Night	Brook trout	208	218	94.9	1.05	T-BK-8	Wild
Tioga	T1J	Gill net	Night	Brook trout	254	270	160.7	0.98	--	Wild
Tioga	T1J	Gill net	Night	Brook trout	250	262	150.1	0.96	--	Wild
Tioga	T1J	Gill net	Night	Brook trout	230	241	129.6	1.07	--	Wild
Tioga	T1J	Gill net	Night	Brook trout	120	126	18.9	1.09	--	Wild
Tioga	T1J	Gill net	Night	Brook trout	115	120	16.1	1.06	--	Wild
Tioga	T1J	Gill net	Night	Brook trout	215	224	118.2	1.19	T-BK-9	Wild
Tioga	T2A	Gill net	Day	Brook trout	231	241	142.7	1.16	T-BK-2	Wild
Tioga	T3A	Gill net	Night	Brook trout	245	257	153.2	1.04	--	Wild
Tioga	TG1A	Gill net	Day	Brook trout	225	237	135.5	1.19	T-BK-1	Wild
Tioga	TG1A	Gill net	Day	Rainbow trout	425	440	480	0.63	T-RBT-1	Hatchery
Tioga	TG1A	Gill net	Day	Rainbow trout	380	394	665	1.21	T-RBT-2	Hatchery
Tioga	TE1	E-fish	Night	Brook trout	114	121	16.4	1.11	T-BK-X1	Wild
Tioga	TE1	E-fish	Night	Brook trout	126	132	22.6	1.13	T-BK-X2	Wild
Tioga	TE1	E-fish	Night	Brook trout	166	173	43.9	0.96	T-BK-X3	Wild
Tioga	TE1	E-fish	Night	Rainbow trout	226	246	111.6	0.97	T-RBT-3	Unknown
Tioga	TE1	E-fish	Night	Rainbow trout	239	256	124.4	0.91	T-RBT-4	Unknown
Tioga	TE2	E-fish	Night	Brook trout	257	268	154	0.91	T-BK-3	Wild
Tioga	TE2	E-fish	Night	Brook trout	250	264	176.6	1.13	T-BK-4	Wild
Tioga	TE2	E-fish	Night	Brook trout	243	250	129.7	0.90	T-BK-5	Wild
Tioga	TE2	E-fish	Night	Brook trout	262	275	186	1.03	T-BK-6	Wild

Reservoir	Site Location	Sample Method	Sample Period (Day/Night)	Species	Fork Length (mm)	Total Length (mm)	Weight [a] (g)	k-value	Sample ID	Origin
Tioga	TE2	E-fish	Night	Brook trout	242	252	140.1	0.99	T-BK-7	Wild
Tioga	TE2	E-fish	Night	Brook trout	255	265	203.1	1.22	T-BK-X5	Wild
Tioga	TE2	E-fish	Night	Brook trout	269	285	167.4	0.86	T-BK-X6	Wild
Tioga	TE2	E-fish	Night	Brook trout	250	260	146.9	0.94	T-BK-X7	Wild
Tioga	TE2	E-fish	Night	Brook trout	225	234	119.0	1.04	T-BK-X8	Wild
Tioga	TE2	E-fish	Night	Brook trout	256	269	206.2	1.23	T-BK-X9	Wild
Tioga	TE2	E-fish	Night	Brook trout	222	233	131.3	1.20	T-BK-X10	Wild
Tioga	TE2	E-fish	Night	Brook trout	176	183	67.9	1.25	--	Wild
Tioga	TE2	E-fish	Night	Brook trout	250	261	173	1.11	T-BK-X11	Wild
Tioga	TE2	E-fish	Night	Brook trout	160	170	41.2	1.01	--	Wild
Tioga	TE2	E-fish	Night	Brook trout	245	253	113.6	0.77	--	Wild
Tioga	TE2	E-fish	Night	Rainbow trout	253	270	181.3	1.12	T-RBT-5	Unknown
Tioga	TE2	E-fish	Night	Rainbow trout	248	264	159.2	1.04	T-RBT-7	Unknown
Tioga	TE2	E-fish	Night	Rainbow trout	243	262	126.6	0.88	T-RBT-X4	Unknown
Tioga	TE2	E-fish	Night	Rainbow trout	227	244	123.2	1.05	T-RBT-X2	Unknown
Tioga	TE2	E-fish	Night	Rainbow trout	258	275	172.2	1.00	T-RBT-X3	Unknown
Tioga	TE2	E-fish	Night	Rainbow trout	220	234	123.0	1.16	T-RBT-6	Hatchery
Tioga	TE2	E-fish	Night	Rainbow trout	355	365	1,325	2.96	T-RBT-X1	Hatchery
Saddlebag	SB1A	Gill net	Day	Brook trout	262	274	170	0.95	SB-BK-1	Wild
Saddlebag	SB1A	Gill net	Night	Brook trout	245	260	150	1.02	--	Wild
Saddlebag	SB1A	Gill net	Night	Brook trout	248	258	190	1.25	--	Wild
Saddlebag	SB1J	Gill net	Night	Lahontan redside	--	--	--	--	--	Wild
Saddlebag	SB2A	Gill net	Day	Brook trout	265	276	220	1.18	SB-BK-2	Wild
Saddlebag	SB2A	Gill net	Day	Brook trout	255	265	180	1.09	SB-BK-3	Wild
Saddlebag	SB2A	Gill net	Day	Brook trout	270	280	200	1.02	SB-BK-4	Wild
Saddlebag	SB2J	Gill net	Night	Lahontan redside	--	--	--	--	--	Wild
Saddlebag	SB2J	Gill net	Night	Lahontan redside	--	--	--	--	--	Wild
Saddlebag	SB2J	Gill net	Night	Brook trout	250	263	180	1.15	--	Wild
Saddlebag	SB2J	Gill net	Night	Brook trout	266	279	200	1.06	--	Wild

Reservoir	Site Location	Sample Method	Sample Period (Day/Night)	Species	Fork Length (mm)	Total Length (mm)	Weight [a] (g)	k-value	Sample ID	Origin
Saddlebag	SB2J	Gill net	Night	Brook trout	160	169	41.1	1.00	--	Wild
Saddlebag	SB2J	Gill net	Night	Brook trout	221	232	112.5	1.04	--	Wild
Saddlebag	SB3A	Gill net	Day	Brook trout	330	342	430	1.20	SB-BK-X2	Wild
Saddlebag	SB3A	Gill net	Day	Brook trout	364	380	590	1.22	SB-BK-X3	Wild
Saddlebag	SB3A	Gill net	Day	Brook trout	322	338	420	1.26	SB-BK-X4	Wild
Saddlebag	SB3A	Gill net	Day	Brook trout	275	290	230	1.11	--	Wild
Saddlebag	SB3A	Gill net	Day	Brook trout	300	305	330	1.22	SB-BK-X5	Wild
Saddlebag	SB3A	Gill net	Day	Brook trout	279	292	240	1.11	--	Wild
Saddlebag	SB3A	Gill net	Day	Brook trout	240	254	180	1.30	--	Wild
Saddlebag	SB3A	Gill net	Day	Brook trout	248	258	130.0	0.85	--	Wild
Saddlebag	SB3A	Gill net	Day	Brook trout	289	295	260	1.08	--	Wild
Saddlebag	SB3A	Gill net	Day	Brook trout	285	298	270	1.17	--	Wild
Saddlebag	SB3A	Gill net	Day	Brook trout	332	350	430	1.18	SB-BK-X6	Wild
Saddlebag	SB3A	Gill net	Day	Brook trout	332	346	410	1.12	SB-BK-X7	Wild
Saddlebag	SB3A	Gill net	Day	Brook trout	266	280	240	1.28	--	Wild
Saddlebag	SB3A	Gill net	Day	Brook trout	306	318	330	1.15	SB-BK-X8	Wild
Saddlebag	SB3A	Gill net	Day	Brook trout	296	310	290	1.12	SB-BK-X9	Wild
Saddlebag	SB3A	Gill net	Day	Brook trout	263	273	220	1.21	--	Wild
Saddlebag	SB3J	Gill net	Night	Lahontan redside	100	108	8.9	--	--	Wild
Saddlebag	SB3J	Gill net	Night	Lahontan redside	90	100	8.5	--	--	Wild
Saddlebag	SB3J	Gill net	Night	Lahontan redside	82	91	6.5	--	--	Wild
Saddlebag	SB3J	Gill net	Night	Lahontan redside	107	117	14.2	--	--	Wild
Saddlebag	SB3J	Gill net	Night	Lahontan redside	85	93	6.9	--	--	Wild
Saddlebag	SB3J	Gill net	Night	Lahontan redside	95	105	10.0	--	--	Wild
Saddlebag	SB3J	Gill net	Night	Lahontan redside	84	94	6.7	--	--	Wild

Reservoir	Site Location	Sample Method	Sample Period (Day/Night)	Species	Fork Length (mm)	Total Length (mm)	Weight [a] (g)	k-value	Sample ID	Origin
Saddlebag	SB3J	Gill net	Night	Lahontan redside	93	100	7.6	--	--	Wild
Saddlebag	SB3J	Gill net	Night	Lahontan redside	89	96	7.0	--	--	Wild
Saddlebag	SB3J	Gill net	Night	Lahontan redside	85	94	7.4	--	--	Wild
Saddlebag	SB3J	Gill net	Night	Lahontan redside	--	--	--	--	--	Wild
Saddlebag	SB3J	Gill net	Night	Lahontan redside	--	--	--	--	--	Wild
Saddlebag	SB3J	Gill net	Day	Brook trout	324	334	430	1.26	SB-BK-5	Wild
Saddlebag	SB3J	Gill net	Day	Brook trout	305	320	300	1.06	SB-BK-6	Wild
Saddlebag	SB3J	Gill net	Day	Brook trout	261	270	180	1.01	SB-BK-7	Wild
Saddlebag	SB3J	Gill net	Day	Brook trout	305	323	320	1.13	SB-BK-8	Wild
Saddlebag	SB3J	Gill net	Day	Brook trout	262	275	230	1.28	SB-BK-9	Wild
Saddlebag	SB3J	Gill net	Day	Brook trout	285	299	280	1.21	SB-BK-X1	Wild
Saddlebag	SB3J	Gill net	Night	Brook trout	262	275	180	1.00	--	Wild
Saddlebag	SB3J	Gill net	Night	Brook trout	330	345	390	1.09	--	Wild
Saddlebag	SB3J	Gill net	Night	Brook trout	345	360	610	1.49	--	Wild
Saddlebag	SB3J	Gill net	Night	Brook trout	313	323	350	1.14	--	Wild
Saddlebag	SB3J	Gill net	Night	Brook trout	242	258	160	1.13	--	Wild
Saddlebag	SB3J	Gill net	Night	Brook trout	260	272	180	1.02	--	Wild
Saddlebag	SB3J	Gill net	Night	Brook trout	324	340	320	0.94	--	Wild
Saddlebag	SBE2	E-fish	Night	Lahontan redside	91	100	9.6	1.27	--	Wild
Saddlebag	SBE2	E-fish	Night	Lahontan redside	90	98	8.9	1.22	--	Wild
Saddlebag	SBE2	E-fish	Night	Lahontan redside	90	99	8.6	1.18	--	Wild
Saddlebag	SBE2	E-fish	Night	Lahontan redside	94	104	8.4	1.01	--	Wild
Saddlebag	SBE2	E-fish	Night	Brook trout	290	309	270	1.11	--	Wild
Saddlebag	SBE2	E-fish	Night	Brook trout	231	244	131.9	1.07	SB-BK-10	Wild

Reservoir	Site Location	Sample Method	Sample Period (Day/Night)	Species	Fork Length (mm)	Total Length (mm)	Weight [a] (g)	k-value	Sample ID	Origin
Saddlebag	SBE4	E-fish	Night	Lahontan redside	57	62	1.8	0.97	--	Wild
Saddlebag	SBE4	E-fish	Night	Lahontan redside	86	95	7.7	1.21	--	Wild
Saddlebag	SBE4	E-fish	Night	Lahontan redside	75	83	4.8	1.14	--	Wild
Saddlebag	SBE4	E-fish	Night	Lahontan redside	83	94	6.9	1.21	--	Wild
Saddlebag	SBE4	E-fish	Night	Lahontan redside	65	75	3.6	1.31	--	Wild
Saddlebag	SBE4	E-fish	Night	Lahontan redside	52	59	1.3	0.92	--	Wild
Saddlebag	SBE4	E-fish	Night	Brook trout	252	261	180	1.12	SB-BK-11	Wild
Saddlebag	SBE4	E-fish	Night	Brook trout	235	246	157	1.21	--	Wild

e-fish = electrofish; g = gram; mm = millimeter; -- = no data

[a] Fish weights up to approximately 150 g were weighed to the nearest 0.1 g; fish over 150 g weighed to the nearest 1 g.

SOUTHERN CALIFORNIA EDISON
Lee Vining Hydroelectric Project
(FERC Project No. 1388)

STREAM FISH POPULATIONS (AQ-2)
FINAL TECHNICAL REPORT

SOUTHERN CALIFORNIA
EDISON
Energy for What's Ahead

SEPTEMBER 2024

SOUTHERN CALIFORNIA EDISON

Lee Vining Hydroelectric Project
(FERC Project No. 1388)

STREAM FISH POPULATIONS (AQ-2) FINAL TECHNICAL REPORT

Southern California Edison
2244 Walnut Grove Avenue
Rosemead, CA 91770

September 2024

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CDFW	California Department of Fish and Wildlife
FERC	Federal Energy Regulatory Commission
FL	fork length
GPS	Global Positioning System
g	gram
g/m^2	grams per square meter
mm	millimeter
Project	Lee Vining Hydroelectric Project (FERC Project No. 1388)
SCE	Southern California Edison
TWG	Technical Working Group
YOY	young-of-year

1.0 INTRODUCTION

The Lee Vining Hydroelectric Project (Project) includes three Project-affected stream reaches that support coldwater game fish species: lower Lee Vining Creek between Poole Powerhouse and the Los Angeles Department of Water and Power Lee Vining Creek Diversion Dam impoundment, upper Lee Vining Creek between Saddlebag Dam and Ellery Lake, and Glacier Creek between Tioga Dam and its confluence with Lee Vining Creek.

Project operations may potentially affect fish populations, their habitat, and environmental conditions within Project-affected stream reaches including water temperature, quantity, and quality. Project operations may affect the abundance, distribution, and structure of fish communities.

Study AQ-2 Stream Fish Populations characterizes fish populations and distribution within the three Project-affected stream reaches following methods described in the Final Technical Study Plan filed with the Federal Energy Regulatory Commission (FERC) in April 2022 (SCE, 2022). This report includes the results of stream fish populations sampling completed in lower Lee Vining Creek (downstream of Poole Powerhouse), upper Lee Vining Creek (between Saddlebag Dam and Ellery Lake), and Glacier Creek (downstream of Tioga Lake) during 2022.

1.1. EXISTING INFORMATION

Fish resources in Project-affected stream reaches 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*). Lahontan redside (*Richardsonius egregious*), a cyprinid species native to other eastern Sierra watersheds to the north of the Project, have been introduced and appear to have become established in Saddlebag Lake (Moyle, 2002). While uncommon, Lahontan redside have occasionally been captured during fish monitoring efforts in Lee Vining Creek downstream of Saddlebag Lake (Salamunovich, 2021).

Lee Vining Creek fish population studies conducted in 1984 and 1986 in support of the previous relicensing effort 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, 1987). 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]) (73.9 pounds per acre), followed by the reach between the confluence of Slate Creek and Ellery Lake (7.2 g/m^2 [63.9 pounds per acre]). In the reach downstream of Poole Powerhouse, trout biomass was estimated to be 6.7 g/m^2 (59.7 pounds per acre) (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, resulting in greater brown trout biomass (128 pounds per mile versus 39 pounds per mile, respectively). Between the confluence of Glacier Creek and Ellery Lake, 6 of the 74 trout captured were brook trout and the remainder were brown trout. Brown trout abundance in this reach was estimated to be 1,210 trout per mile and biomass was estimated to be 108 pounds per mile (EA, 1987). 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, 1987).

Brown trout were in good condition based on Fulton-type condition factors, with a mean condition factor of 1.06; brook trout had a mean condition factor of 0.80 (EA, 1987), which is within the typical 0.8 to 1.2 range of mean condition factors reported for wild trout (Beak, 1991; EA, 1987; Ebasco Environmental, 1993; Wilcox, 1994).

Southern California Edison (SCE) has 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 conducted in spring, summer, and fall from 1999 to 2001, and in the fall of every fifth year thereafter (2006, 2011, 2016, and 2021) (Sada, 2007; Sada and Hogle, 2011; Salamunovich, 2017; Salamunovich, 2021). 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. Average abundance and biomass for brown and brook trout combined ranged from approximately 601 to 3,520 fish per mile and 1.1 to 13.4 g/m^2 (9.8 to 119.4 pounds per acre) (Table 1.1-1) (Salamunovich, 2021). Young-of-year (YOY) brook trout were present during each summer and autumn sample event, indicating annual spawning in Lee Vining Creek within this reach; however, YOY brown trout were rare during most survey years from 1999 through 2006 (Sada, 2007).

More recent fish population surveys conducted in Lee Vining Creek between Saddlebag Dam and the confluence of Slate Creek in 2016 and 2021 documented naturally produced brown and brook trout populations in good physical condition, with multiple age-classes present, satisfactory condition factors, and an abundance of YOY fish from both species (Salamunovich, 2017; Salamunovich, 2021). 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 five to six age-classes of brown trout and five to six age-classes of brook trout (Salamunovich, 2017; Salamunovich, 2021). The average abundance, density, and biomass of brook and brown trout during 2016 and 2021 were the highest observed throughout the monitoring period from 1999 through 2021 (Table 1.1-1; Salamunovich, 2017; Salamunovich, 2021). Brown trout were the numerically dominant trout species in the reach during 2016 and 2021; however, biomass was split more evenly between the two species (Salamunovich, 2017; Salamunovich, 2021). Brown trout density in 2016 and 2021 greatly exceeded that of brook trout, which was opposite from previous years of the study. One hatchery-reared rainbow was captured in 2016 and none were captured in 2021 (Salamunovich, 2017; Salamunovich, 2021).

Table 1.1-1. 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, 1999–2021

Survey Year [a]	Abundance (trout per mile)	Density (trout per square meter)	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
2021	2,828	0.33	7.5

Sources: Sada, 2007; Sada and Hogle, 2011; Salamunovich, 2017; Salamunovich, 2021

g/m^2 = grams per square meter

[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, 2016, and 2021).

2.0 STUDY OBJECTIVES AND OBJECTIVES

Study goals and objectives were determined during the February 22, 2021, and March 29, 2021, Aquatic Resources Technical Working Group Meetings. The goal of this study was to supplement the existing available information to assess fish populations in Project-affected stream reaches. The objective of this study was to obtain information on existing fish populations downstream of Project reservoirs.

2.1. STUDY AREA

The study area included Project-affected stream reaches of Lee Vining and Glacier creeks. Three study sites between Saddlebag Dam and Slate Creek were previously established and sampled in 1999 to 2001, 2006, 2011, 2016, and 2021 (Salamunovich, 2021). These study sites were re-sampled for comparison to historical data, and four additional study sites were selected during a pre-survey reconnaissance visit (Table 2.1-1). Study site locations are depicted on Figure 2.1-1.

Table 2.1-1. 2022 Lee Vining Stream Fish Sampling Locations

Reach Description	2022 Study Site Code	Historical Site Code
Lee Vining Creek between Poole Powerhouse and the pool upstream of the Los Angeles Department of Water and Power Diversion Dam	LLVC-F1	NA
Lee Vining Creek between Glacier Creek and Ellery Lake	ULVC-F1	NA
Lee Vining Creek between Slate Creek and Glacier Creek	ULVC-F2	NA
Lee Vining Creek upstream of Slate Creek	ULVC-F3	Reach 1
	ULVC-F4	Reach 2
	ULVC-F5	Reach 3
Glacier Creek downstream of Tioga Dam	GC-F1	NA

NA = not applicable

Figure 2.1-1. Stream Fish 2022 Study Sites.

3.0 METHODS

3.1. MODIFICATIONS TO METHODS

No modifications to the methods as outlined in the AQ-2 Final Technical Study Plan (SCE, 2022) occurred during study implementation.

3.2. FISH SURVEYS

Fish surveys were conducted from September 16 to 22, 2022. Survey methods included multiple-pass depletion backpack electrofishing at each study site consistent with procedures described by Reynolds (1996).

Study sites were approximately 100 meters long and separated by block nets into two segments to improve sampling efficiency. Fifty-foot block nets with 1/8-inch diameter mesh were used to prevent migration into and out of the sample segment and to facilitate an accurate assessment of the sample population. The electrofishing crew consisted of one to two biologists with Smith-Root Inc. LR-24 backpack electrofishers and two to three netters, depending on the width of the wetted stream channel within the study site. Water conductivity of each study site was measured in situ with a calibrated YSI™ Pro Plus multiparameter meter to help determine the appropriate power output for fish capture. Backpack electrofishers used direct current with settings ranging from 350 volts and 30 hertz, up to 450 volts and 30 hertz.

The electrofishing crew began sampling at the downstream block net and proceeded slowly and deliberately upstream, moving from the center of the channel out to the stream margin, and made simultaneous and parallel passes through the sampling area. As trout were captured (netted), they were placed in buckets and periodically transferred to a live car to be held until the completion of the pass; aeration was provided as needed. A minimum of three passes were conducted within each segment. If there was poor fish depletion after three passes (e.g., number of fish captured on the third pass was similar to the number captured on the second pass), a fourth pass was performed. Upon completion of each pass, the following data were recorded for individuals captured: species identification, total length (millimeters [mm]), weight (grams [g]), and, if applicable, notes on the general condition of the fish, including any parasites that were present. Any visual abnormalities in fish condition were documented during the survey. After processing, fish were placed in an aerated bucket of cool river water. Fish in the recovery bucket were regularly transferred to a live car (1/8-inch mesh net) located in the creek outside of the study site. After completion of the survey, all fish were released back into the area of capture. All trout were inspected for visual markings and fin erosion, which could suggest hatchery origin. At each study site, scale samples were collected from up to 20 fish of each game species (e.g., rainbow trout, brown trout, brook trout) across a variety of sizes ≥100 mm fork length (FL) to assess age and growth relationships.

Habitat characteristics and water quality parameters were measured at all study sites at the time of sampling. Each segment was characterized by habitat type (e.g., pool, run, or riffle). The length of each segment was measured along the thalweg to the nearest tenth of a meter, and the mean width of each sampling segment was calculated by measuring the width of the wetted channel to the nearest tenth of a meter at six or more evenly spaced transects. The area of each sampling segment was calculated by multiplying the site length by mean width. The maximum depth and the stream discharge of the sample site were recorded. Dominant and subdominant substrate types along with fish cover were visually estimated at each sample site. Water temperature, dissolved oxygen, pH, electrical conductivity, and specific conductance were measured using a YSI™ Pro Plus multiparameter meter at the time of sampling. The YSI™ meter was calibrated each day for dissolved oxygen to adjust for site elevation and calibrated using factory standards for pH and conductivity.

Observations of invasive aquatic plants and algae, including Didymo (*Didymosphenia geminata*), were recorded during stream fish surveys. Photographs were also taken to document the specific location of the top and bottom block nets and condition of the study site (Appendix A).

Additionally, during the fish surveys, fish reproductive state was recorded for captured fish and redd surveys were conducted in lower Lee Vining Creek downstream of Poole Powerhouse and in upper Lee Vining Creek between Glacier Creek and Slate Creek. Redd surveys consisted of crews of two walking the stream channel looking for indications of redds such as signs of recent substrate scour and clean patches of suitable spawning gravels. The upstream and downstream extents of the channel surveyed for redds was documented by recording Global Positioning System (GPS) coordinates.

3.3. ANALYSIS

Data collected during the Study AQ-2 were entered into an Excel database for data reduction, tabulation, and summary. Data collected in this study were compared with data collected during previously conducted studies, where possible. Trout densities (number per square meter), biomass (g/m^2), and 95 percent confidence intervals were computed for each study site using the Zippin estimator within the multiple-pass regression analysis software developed by Van Deventer and Platts (1989).

Trout size distribution was evaluated at all study sites. Length frequency histograms were developed for each trout species captured and used to estimate age-class distribution. Age-class was estimated based on breaks and modalities within the histograms, and compared with results from scale age analysis, age data reported from previous monitoring in upper Lee Vining Creek (Sada, 2003, as cited in Salamunovich 2017), and trout growth rates reported in Moyle (2002). Results of the scale analysis were combined for hydrologically connected study sites in upper Lee Vining Creek (Sites ULVC-F1 through ULVC-F5).

To evaluate trout condition at each study site, the weight-to-length relationship of individual trout was assessed as a method of identifying the nutritional state or health of the fish related to size and growth. Fulton's condition factor (Ricker, 1975), a measure of nutritional state, was calculated for each trout using the fish's FL for comparison to earlier datasets. The condition factor (*k*) for each individual captured was calculated by the following formula:

$$\text{Individual condition factors } (k) = \frac{\text{Wet Weight (g)} \times 10^5}{[\text{Fork Length (mm)}]^3}$$

The typical mean condition factors for wild trout range from 0.8 to 1.2 (Beak, 1991; EA, 1987; Ebasco Environmental, 1993; Wilcox, 1994); however, condition is dependent on the sampling season, species, strain of trout, state of sexual maturity, and the way fish length is defined (e.g., FL, total length, or standard length), which is not often documented with the results.

4.0 STUDY RESULTS

4.1. FISH SPECIES COMPOSITION AND DISTRIBUTION

Four species of fish were observed during the stream fish sampling efforts: brown trout, brook trout, rainbow trout, and a cutthroat trout-rainbow trout hybrid (*Oncorhynchus clarkii × mykiss [cutbow]*) (Figure 4.1-1). Brown trout were the most abundant species throughout all study sites, followed by brook trout (Figure 4.1-1). Two rainbow trout and one hybrid cutbow trout were captured during sampling; all were captured within the study site on Lee Vining Creek downstream of Poole Powerhouse (Site LLVC-F1) (Figure 4.1-1).

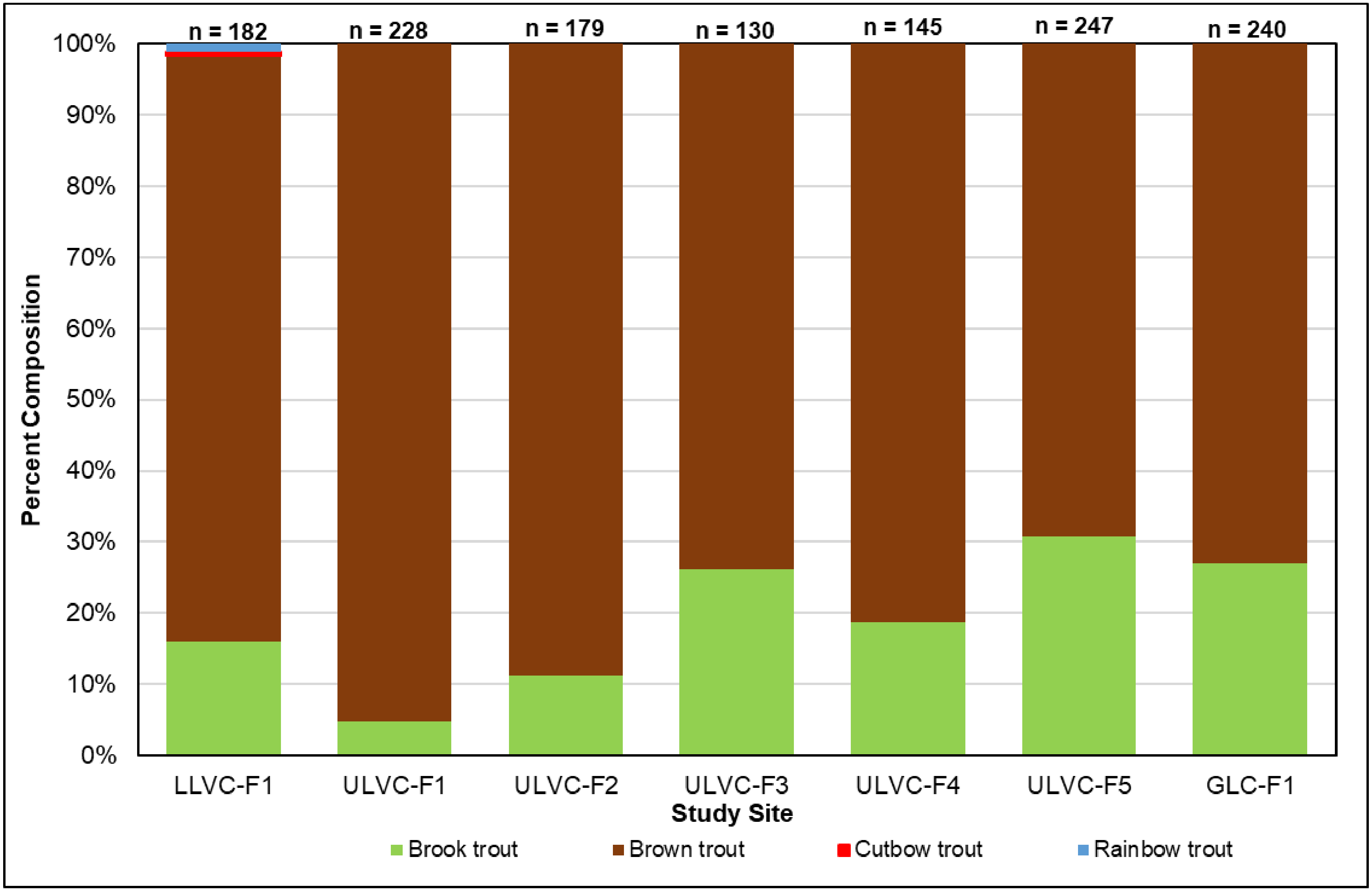

Figure 4.1-1. Fish Species Composition during 2022 Stream Surveys.

4.2. FISH ABUNDANCE, DENSITY, AND BIOMASS

Overall, estimated fish abundance varied by sample site, with all trout abundance estimates ranging from 2,256 to 4,136 fish per mile (Table 4.2-1). Brown trout accounted for the highest abundance at all sites ranging between 1,801 and 4,029 fish per mile compared to 177 to 1,230 fish per mile for brook trout. Estimated abundance was highest for all trout in upper Lee Vining Creek downstream of Glacier Creek at Site ULVC-F1 (Figure 4.2-1).

Fish densities varied by sample site, with density estimates for all trout ranging between 0.19 and 0.69 trout per square meter (trout/m^2) while estimates were generally similar between sites in upper Lee Vining Creek ranging from 0.27 to 0.34 trout/m^2 (Table 4.2-1 and Figure 4.2-2). Brown trout densities generally drove overall densities, ranging between 0.15 and 0.51 trout/m^2 compared to 0.01 to 0.18 trout/m^2 for brook trout. Estimated densities were highest for both species in Glacier Creek.

Estimated overall biomass varied by sample site, ranging between 4.85 and 25.63 g/m^2 across sample sites (Table 4.2-1). Brown trout biomass drove overall biomass in sites LLVC-F1, ULVC-F1, and ULVC-F2, whereas biomass was similar for brook and brown trout in the remaining sites. Biomass was highest for both species in Glacier Creek (Figure 4.2-3).

Table 4.2-1. Fish Population Estimated Abundance, Density, and Biomass at All Fish Study Sites Sampled in September 2022

Study Site ID	Site Length (m)	Avg. Site Width (m)	Trout Species	Removal Pattern	Total Captured	Abundance (trout per mile)			Density (trout per square meter)			Biomass (g/m^2)		
						Est.	Lower 95% C.I.	Upper 95% C.I.	Est.	Lower 95% C.I.	Upper 95% C.I.	Est.	Lower 95% C.I.	Upper 95% C.I.
LLVC-F1	121.0	9.0	Brook	16, 5, 8	29	534	425[c]	837	0.04	0.03[c]	0.06	0.27	0.19[c]	0.43
			Brown	89, 45, 16	150	2,189	2,010	2,369	0.15	0.14	0.16	6.97	6.40	7.54
			All Trout[a]	108, 50, 24	182	2,699	2,471	2,927	0.19	0.17	0.20	10.74	9.83	11.65
ULVC-F1	100.2	7.9	Brook	11, 0, 0	11	177	--[b]	--[b]	0.01	--[b]	--[b]	0.04	--[b]	--[b]
			Brown	119, 69, 29	217	4,029	3,634	4,423	0.31	0.28	0.35	4.92	4.44	5.40
			All Trout	130, 69, 29	228	4,136	3,794	4,478	0.32	0.30	0.35	4.85	4.45	5.25
ULVC-F2	91.4	7.7	Brook	12, 4, 3, 1	20	367	322	413	0.03	0.03	0.03	1.70	1.49	1.91
			Brown	75, 54, 21, 9	159	3,025	2,819	3,230	0.24	0.23	0.26	11.75	10.95	12.54
			All Trout	87, 58, 24, 10	179	3,389	3,182	3,596	0.27	0.26	0.29	13.45	12.62	14.27
ULVC-F3	93.0	5.6	Brook	13, 8, 7, 6	34	903	649[c]	1,525	0.10	0.07[c]	0.17	5.01	3.27[c]	8.47
			Brown	55, 18, 12, 11	96	1,801	1,640	1,962	0.20	0.18	0.22	4.51	4.10	4.91
			All Trout	68, 26, 19, 17	130	2,256	2,273	2,839	0.28	0.25	0.31	8.44	7.50	9.37
ULVC-F4	100.2	5.7	Brook	10, 12, 5	27	759	478[c]	1,585	0.08	0.05[c]	0.17	2.79	1.59[c]	5.83
			Brown	72, 36, 10	118	2,036	1,881	2,191	0.22	0.20	0.24	4.63	4.28	4.98
			All Trout	82, 48, 15	145	2,594	2,351	2,838	0.28	0.25	0.31	6.58	5.96	7.20
ULVC-F5	110.9	7.4	Brook	44, 23, 9	76	1,230	1,069	1,392	0.10	0.09	0.12	4.79	4.16	5.41
			Brown	86, 70, 15	171	2,865	2,551	3,179	0.24	0.21	0.27	5.67	5.05	6.29
			All Trout	130, 93, 24	247	4,091	3,743	4,440	0.34	0.31	0.37	10.50	9.61	11.40
GC-F1	100.0	3.7	Brook	48, 11, 6	65	1,078	1,018	1,137	0.18	0.17	0.19	13.02	12.30	13.73
			Brown	116, 39, 20	175	2,996	2,828	3,163	0.51	0.48	0.54	12.46	11.77	13.16
			All Trout	164, 50, 26	240	4,066	3,897	4,235	0.69	0.66	0.72	25.63	24.57	26.70

C.I. = Confidence Interval; g/m2 = grams per square meter; m = meter

[a] Rainbow trout and cutbow were included in all trout estimates due to low capture numbers (i.e., two rainbow and one cutbow).

[b] Depletion pattern did not allow for calculation of confidence intervals.

[c] Lower C.I. was adjusted to value observed at sample site.

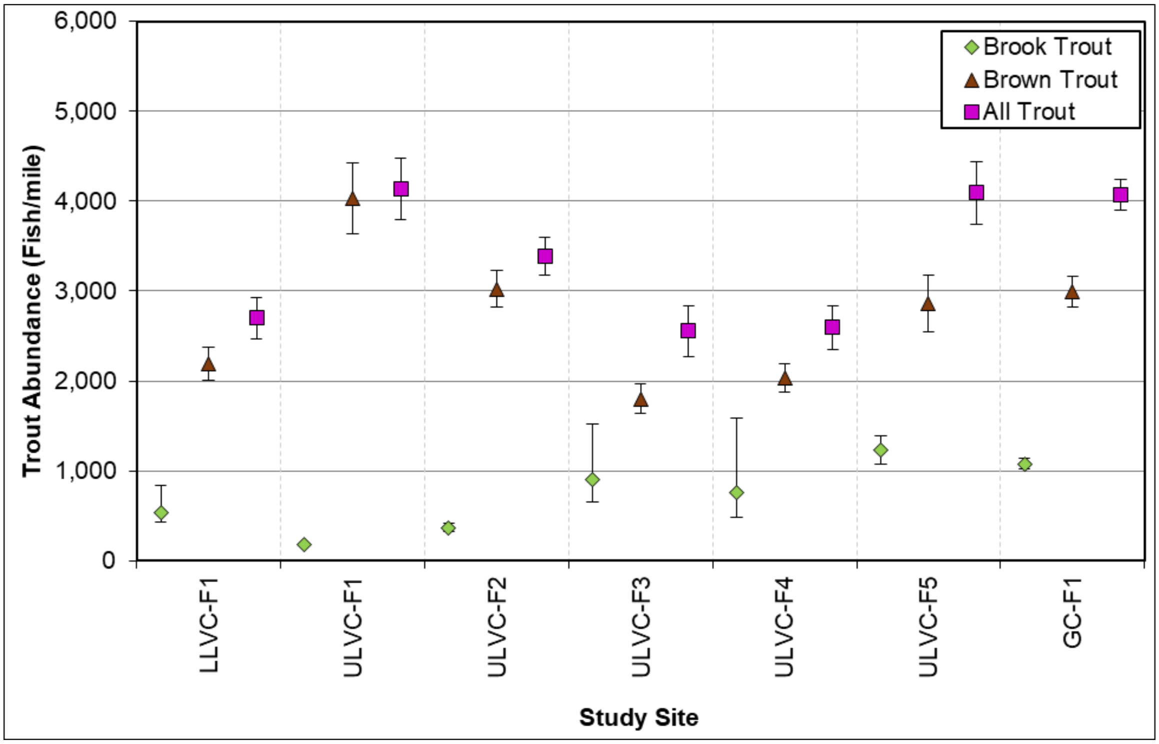

Figure 4.2-1. Estimated Trout Abundance (with 95% Confidence Intervals) for Brown Trout, Brook Trout, and All Trout at All Study Sites in September 2022.

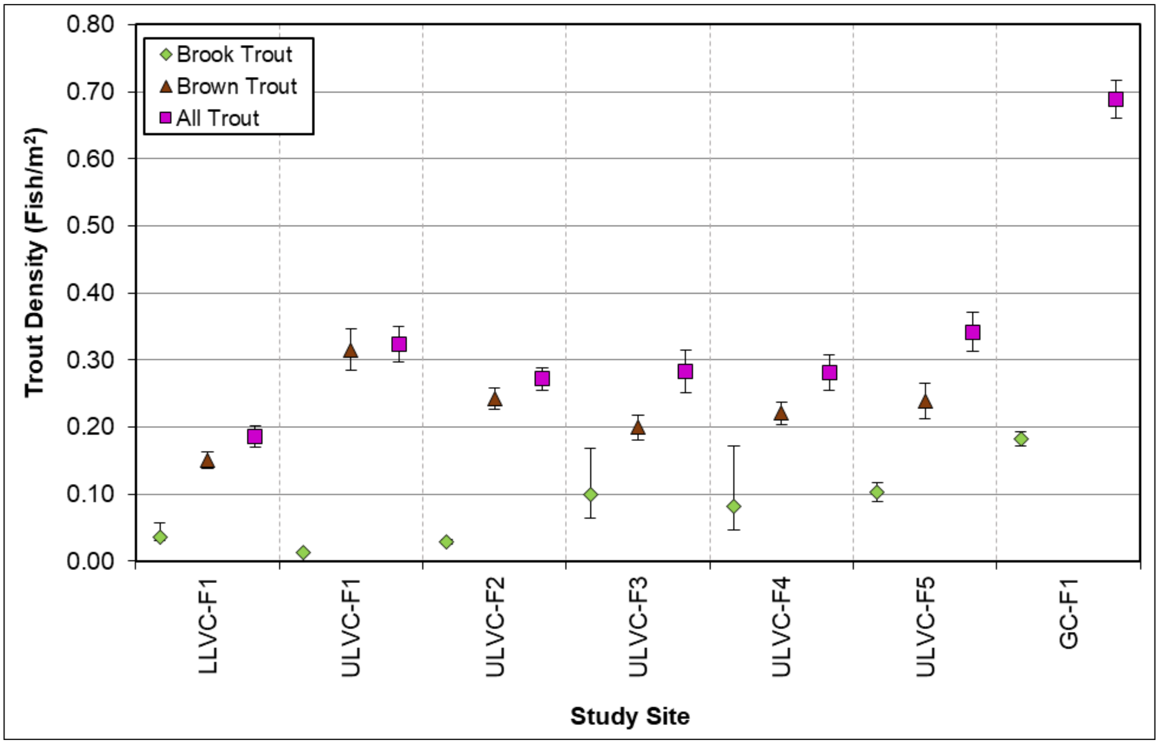

Figure 4.2-2. Estimated Trout Density (with 95% Confidence Intervals) for Brown Trout, Brook Trout, and All Trout at All Study Sites in September 2022.

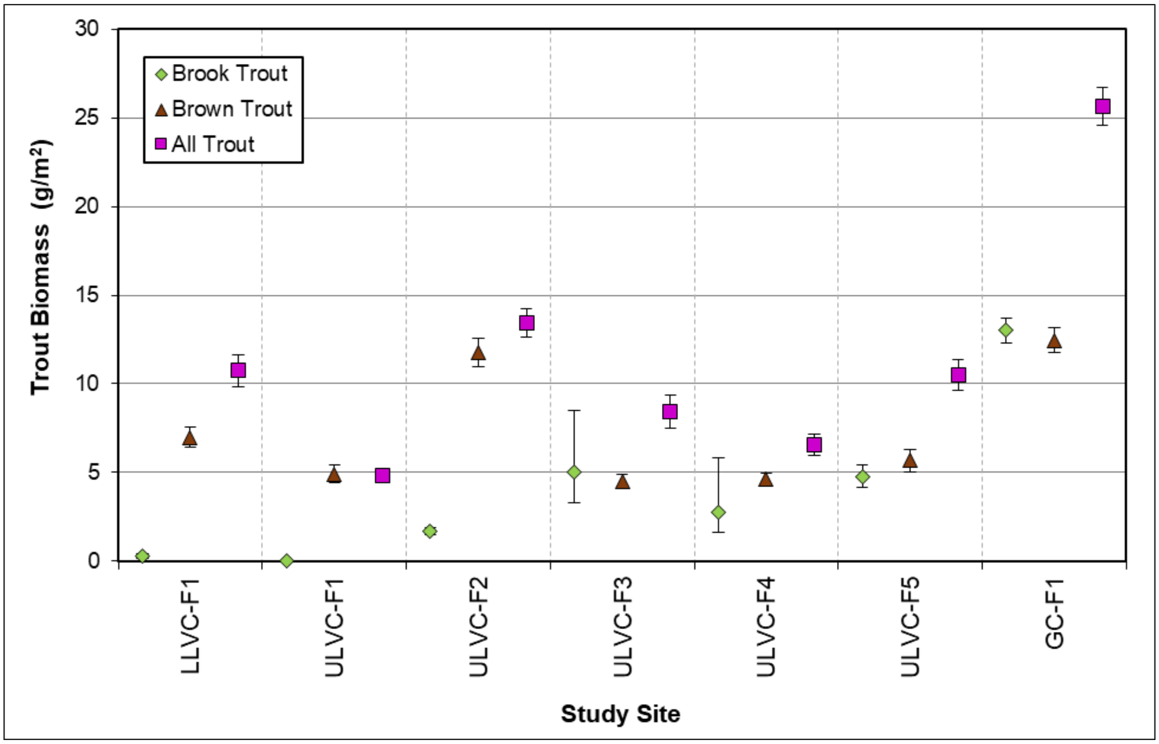

Figure 4.2-3. Estimated Trout Biomass (with 95% Confidence Intervals) for Brown Trout, Brook Trout, and All Trout at All Study Sites in September 2022.

4.3. AGE-CLASS DISTRIBUTION

4.3.1. LOWER LEE VINING CREEK (SITE LLVC-F1)

Fish captured in lower Lee Vining Creek downstream of Poole Powerhouse (Site LLVC-F1) included brown trout, brook trout, rainbow trout, and cutbow. Brown trout captured at Site LLVC-F1 ranged in length from 49 to 343 mm FL. These fish represent multiple age-classes ranging from YOY to the 4+ age-class (Figure 4.3-1 and Table 4.3-1). Brook trout captured from Site LLVC-F1 ranged in length from 50 to 179 mm FL, which are likely represent age-classes from YOY to the 3+ age-class (Figure 4.3-2). Two rainbow trout and one cutbow were captured at Site LLVC-F1 and ranged in size from 360 to 550 mm FL; all were within 4+ and 5+ age-classes based on scale analysis (Figure 4.3-2 and Table 4.3-1). These age-class estimates are supported by length-at-age values from relevant literature summarized in Table 4.3-2.

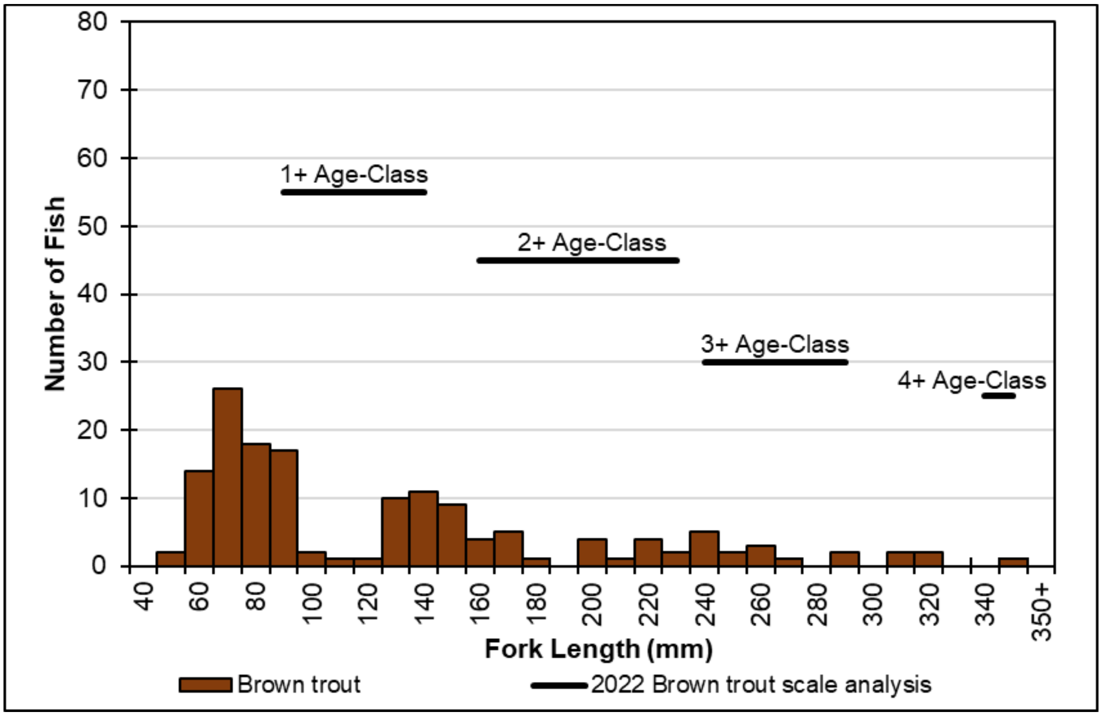

Figure 4.3-1. Length Frequency Histogram for Brown Trout Captured in Lee Vining Creek downstream of Poole Powerhouse (Site LLVC-F1) during 2022 Sampling.

Table 4.3-1. Length Ranges Determined from 2022 Scale Analysis

Age	Lower Lee Vining Creek		Upper Lee Vining Creek		Glacier Creek	
	Brown Trout FL (mm) (n=7)	Rainbow/ Cutbow FL (mm) (n = 3)	Brown Trout FL (mm) (n = 45)	Brook Trout FL (mm) (n = 15)	Brown Trout FL (mm) (n = 13)	Brook Trout FL (mm) (n = 15)
YOY	--	--	--	--	--	--
1+	84–135	--	94–134	124–132	118–130	114–144
2+	150–225	--	125–203	145–204	141–191	156–196
3+	237–287	--	174–240	230–245	215	211–287
4+	343	360	227–308	275–295	299	294–325
5+	--	450–550	300–410	305	500	--
6+	--	--	375	--	--	--

-- = no data; FL = fork length; mm = millimeter; YOY = young-of-year

Table 4.3-2. Length-at-Age Summary [a]

Age-class	Sada, 2003		Moyle, 2002		
	Brown Trout (mm FL)	Brook Trout (mm FL)	Brown Trout (mm TL)	Brook Trout (mm TL)	Rainbow Trout (mm FL)
YOY	34–43	52–65	<80	<150	<100
1+	88–101	95–110	70–160	150–200	100–160
2+	175–178	144–161	130–280	180–250	130–200
3+	195–203	174–198	190–410	230–300	190–220
4+	225	--	--	--	--

Source: Moyle, 2002; Sada, 2003 as cited in Salamunovich, 2017

-- = no data; FL = fork length; mm = millimeters; TL = total length; YOY = young-of-year

[a] Sada (2003, as cited in Salamunovich, 2017) presents length data for brown trout and brook trout based on FL. Moyle (2002) presents length data for brown trout and brook trout based on TL and rainbow trout based on FL.

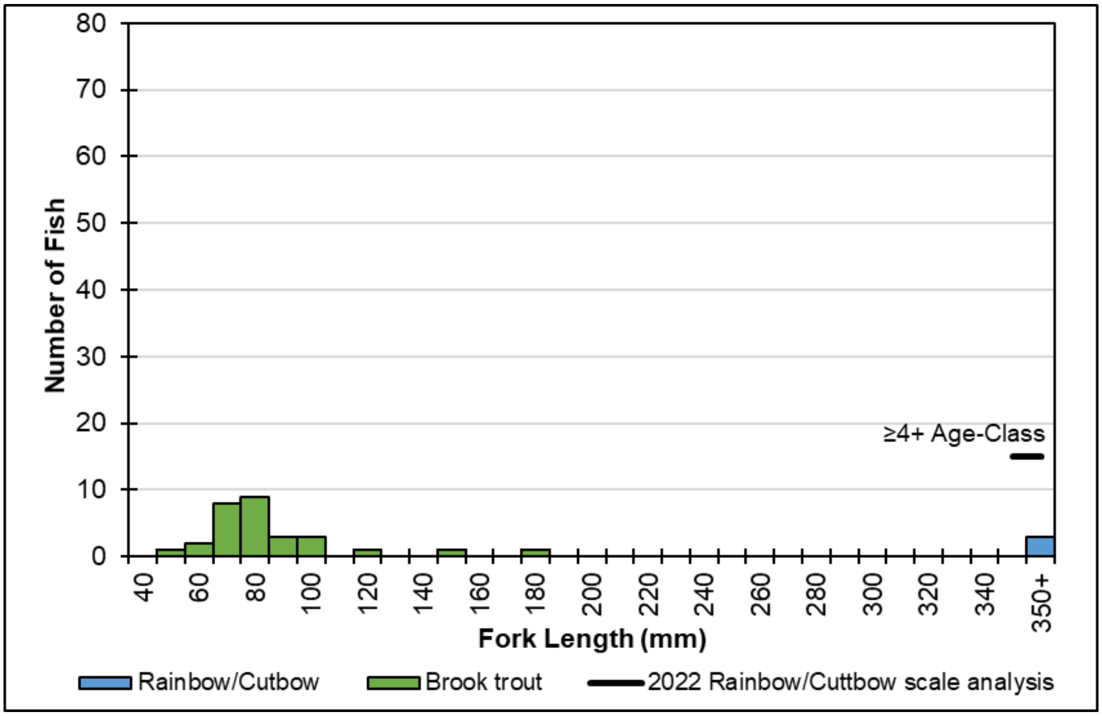

Figure 4.3-2. Length Frequency Histogram for Brook Trout, Rainbow Trout, and Cutbow Captured in Lee Vining Creek downstream of Poole Powerhouse (Site LLVC-F1) during 2022 Sampling.

4.3.2. LEE VINING CREEK DOWNSTREAM OF GLACIER CREEK (SITE ULVC-F1)

Fish captured in lower Lee Vining Creek downstream of Glacier Creek (Site ULVC-F1) included brown trout and brook trout. Brown trout captured at Site ULVC-F1 ranged in length from 34 to 410 mm FL. Scale results for all upper Lee Vining Creek sites combined suggest brown trout at Site ULVC-F1 represent multiple age-classes ranging from YOY to the 5+ age-class (Figure 4.3-3 and Table 4.3-1). These age-class estimates are supported by length-at-age values from relevant literature summarized in Table 4.3-2. Brook trout captured at Site ULVC-F1 ranged in length from 49 to 105 mm FL (Figure 4.3-4), which represent fish in the YOY and 1+ age-classes based on age data reported from previous monitoring in Lee Vining Creek (Table 4.3-2).

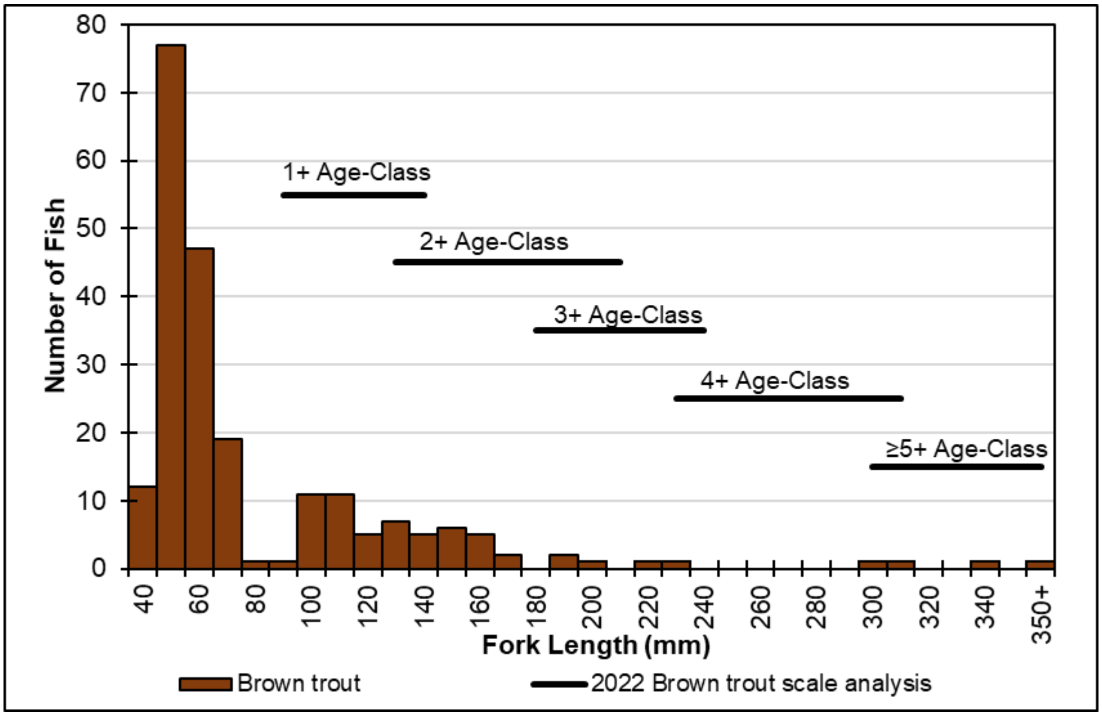

Figure 4.3-3. Length Frequency Histogram for Brown Trout Captured in Lee Vining Creek downstream of Glacier Creek (Site ULVC-F1) during 2022 Sampling.

Figure 4.3-4. Length Frequency Histogram for Brook Trout Captured in Lee Vining Creek downstream of Glacier Creek (Site ULVC-F1) during 2022 Sampling.

4.3.3. LEE VINING CREEK UPSTREAM OF GLACIER CREEK (SITE ULVC-F2)

Fish captured in lower Lee Vining Creek upstream of Glacier Creek (Site ULVC-F2) included brown trout and brook trout. Brown trout captured at Site ULVC-F2 ranged in length from 34 to 375 mm FL. Scale results for all upper Lee Vining Creek sites combined suggest brown trout at Site ULVC-F2 represent multiple age-classes ranging from YOY up to the 5+ age-class with one fish at 375 mm FL estimated to be in the 6+ age-class (Figure 4.3-5 and Table 4.3-1). Brook trout captured at Site ULVC-F2 ranged in length from 36 to 320 mm FL and are expected to represent fish from multiple age-classes ranging from YOY to the 4+ age-class (Figure 4.3-6 and Table 4.3-1). These age-class estimates for brown trout and brook trout are supported by length-at-age values from relevant literature summarized in Table 4.3-2.

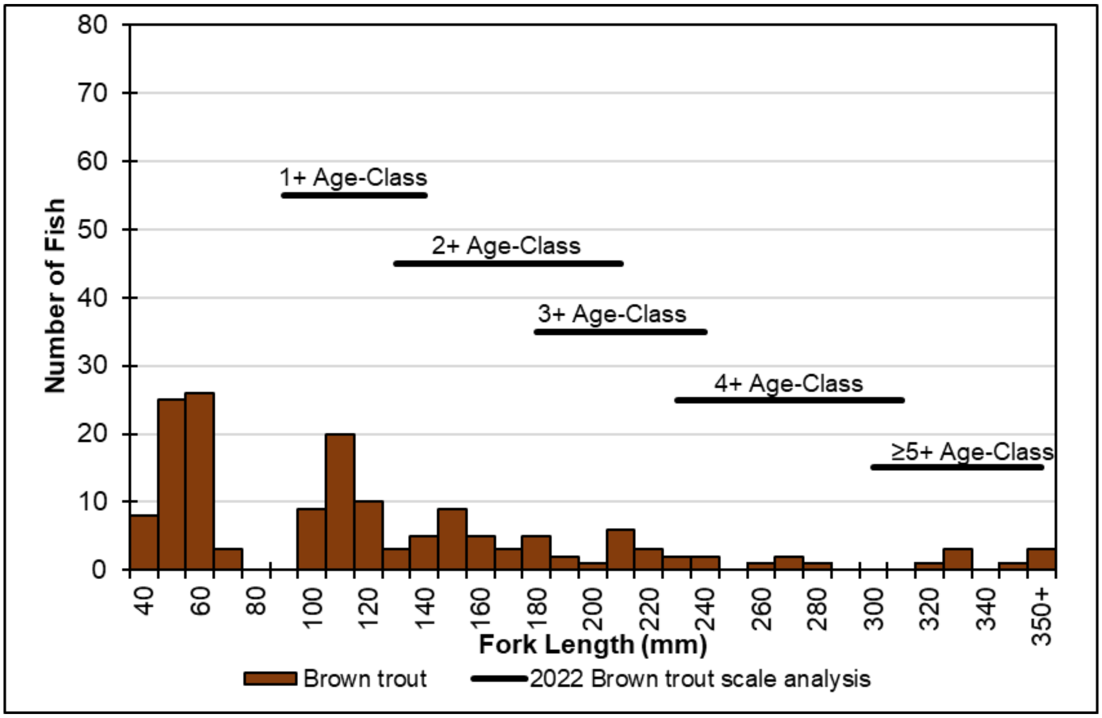

Figure 4.3-5. Length Frequency Histogram for Brown Trout Captured in Lee Vining Creek upstream of Glacier Creek (Site ULVC-F2) during 2022 Sampling.

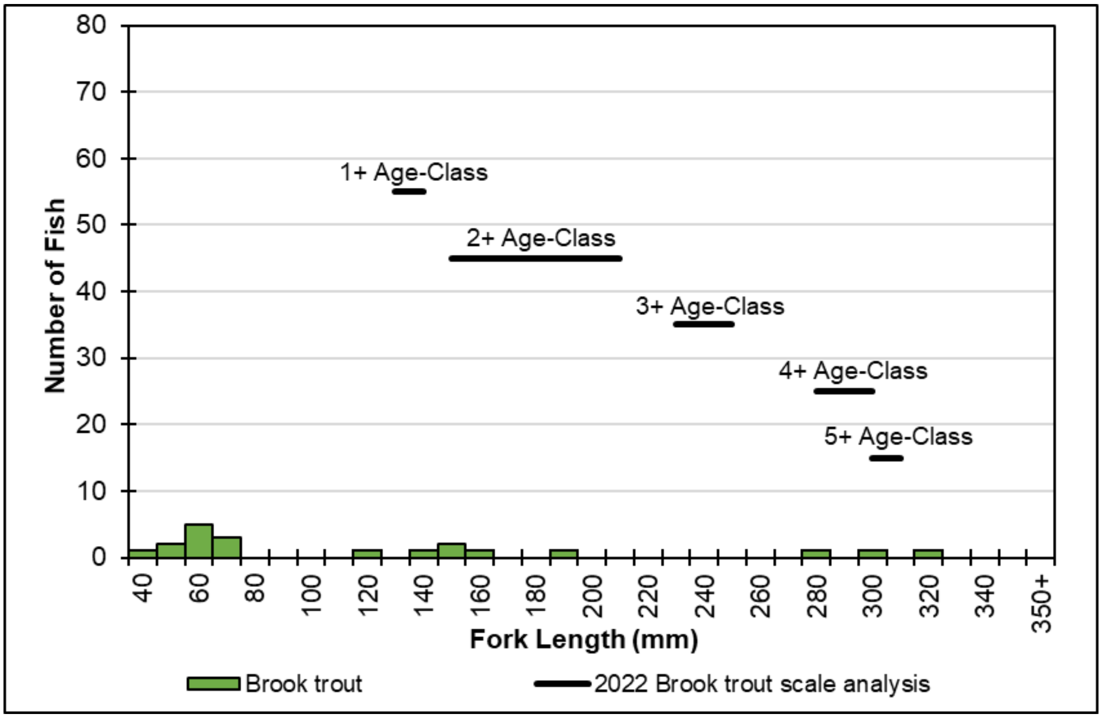

Figure 4.3-6. Length Frequency Histogram for Brook Trout Captured in Lee Vining Creek upstream of Glacier Creek (Site ULVC-F2) during 2022 Sampling.

4.3.4. LEE VINING CREEK DOWNSTREAM OF SADDLEBAG LAKE (SITES ULVC-F3 THROUGH ULVC-F5)

Fish captured in Lee Vining Creek downstream of Saddlebag Lake at sites ULVC-F3 through ULVC-F5 are grouped together for this summary because these three study sites are contiguous. Fish captured in lower Lee Vining Creek at sites ULVC-F3 through ULVC-F5 included brown trout and brook trout. Brown trout captured at these sites ranged in length from 43 to 325 mm FL. Scale results for all upper Lee Vining Creek sites combined suggest brown trout at sites ULVC-F3 through ULVC-F5 represent multiple age-classes ranging from YOY to the 5+ age-class (Figure 4.3-7 and Table 4.3-1). Brook trout captured at sites ULVC-F3 through ULVC-F5 ranged in length from 44 to 305 mm FL and are expected to represent fish from multiple age-classes ranging from YOY to 5+ age-classes (Figure 4.3-8 and Table 4.3-1). These age-class estimates for brown trout and brook trout are supported by length-at-age values from relevant literature summarized in Table 4.3-2.

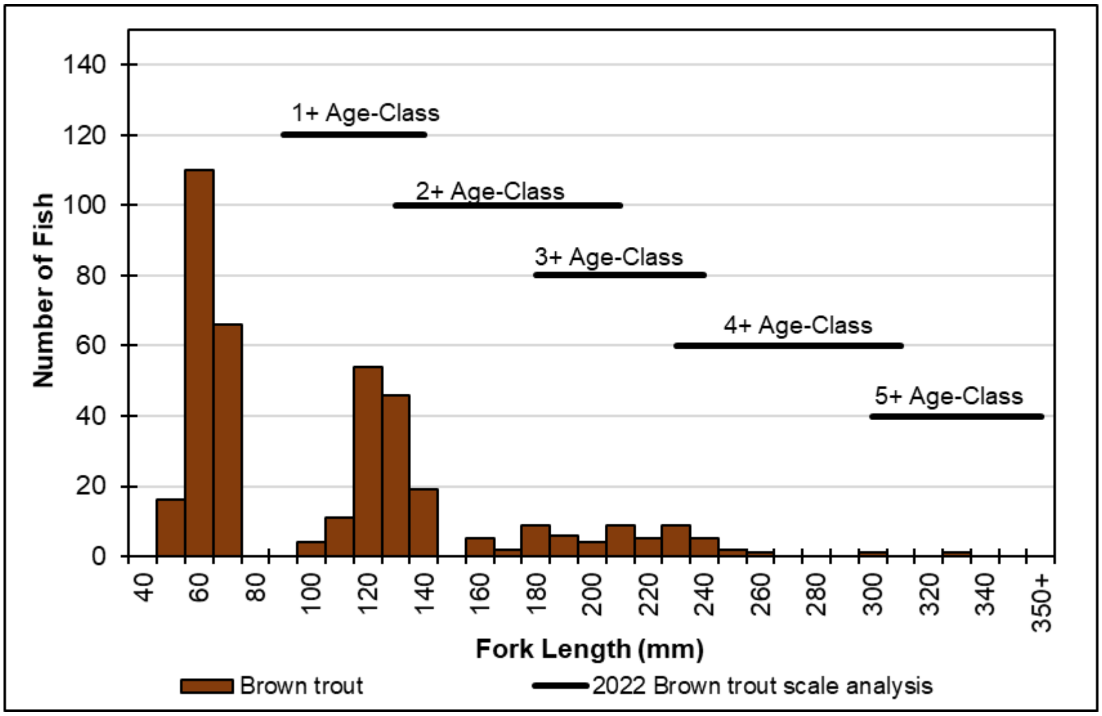

Figure 4.3-7. Length Frequency Histogram for Brown Trout Captured in Lee Vining Creek downstream of Saddlebag Lake at Sites ULVC-F3 through ULVC-F5 during 2022 Sampling.

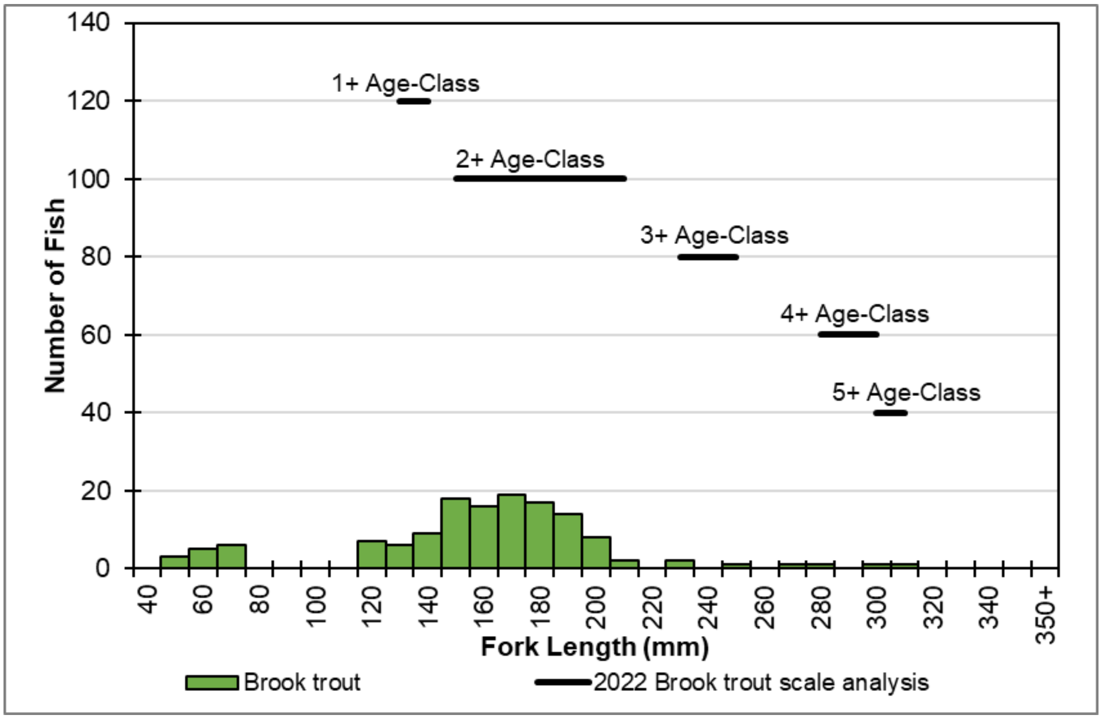

Figure 4.3-8. Length Frequency Histogram for Brook Trout Captured in Lee Vining Creek downstream of Saddlebag Lake at Sites ULVC-F3 through ULVC-F5 during 2022 Sampling.

4.3.5. GLACIER CREEK (SITE GLC-F1)

Fish captured in Glacier Creek (Site GLC-F1) included brown trout and brook trout. Brown trout captured at Site GLC-F1 ranged in length from 51 to 500 mm FL. These fish represent multiple age-classes ranging from YOY up to the 5+ age-class (Figure 4.3-9 and Table 4.3-1). Brook trout captured at Site GLC-F1 ranged in length from 50 to 325 mm FL and are expected to represent fish from multiple age-classes ranging from YOY to 4+ age-classes (Figure 4.3-10 and Table 4.3-1). These age-class estimates for brown trout and brook trout are supported by length-at-age values from relevant literature summarized in Table 4.3-2.

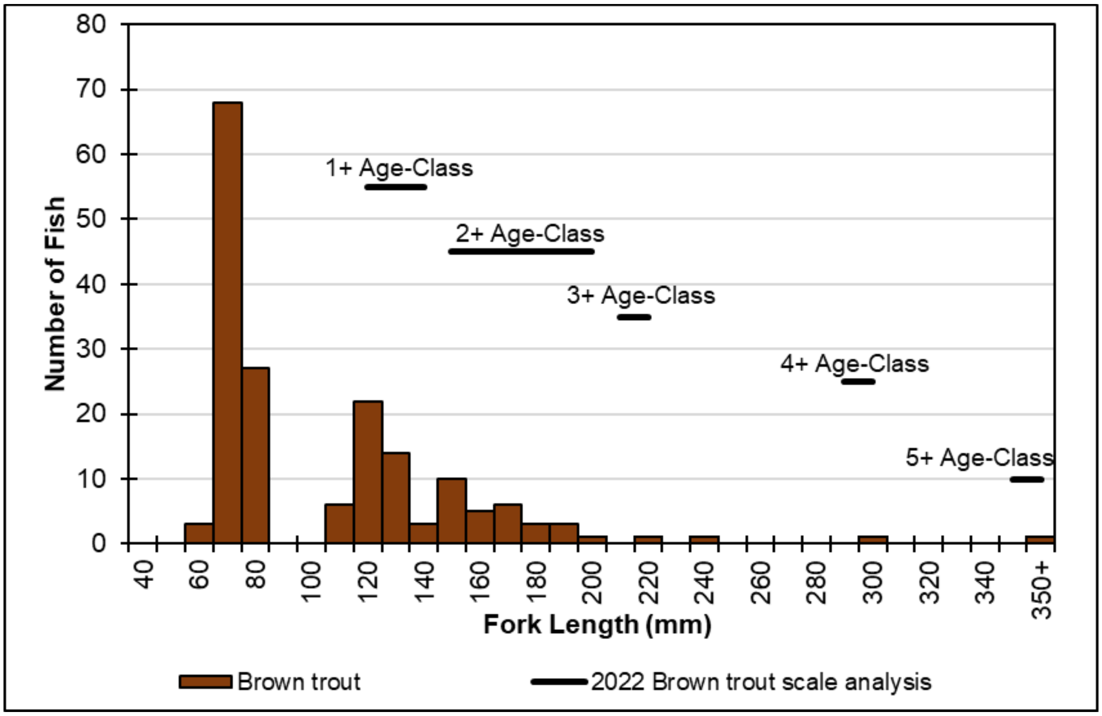

Figure 4.3-9. Length Frequency Histogram for Brown Trout Captured in Glacier Creek downstream of Tioga Lake (Site GLC-F1) during 2022 Sampling.

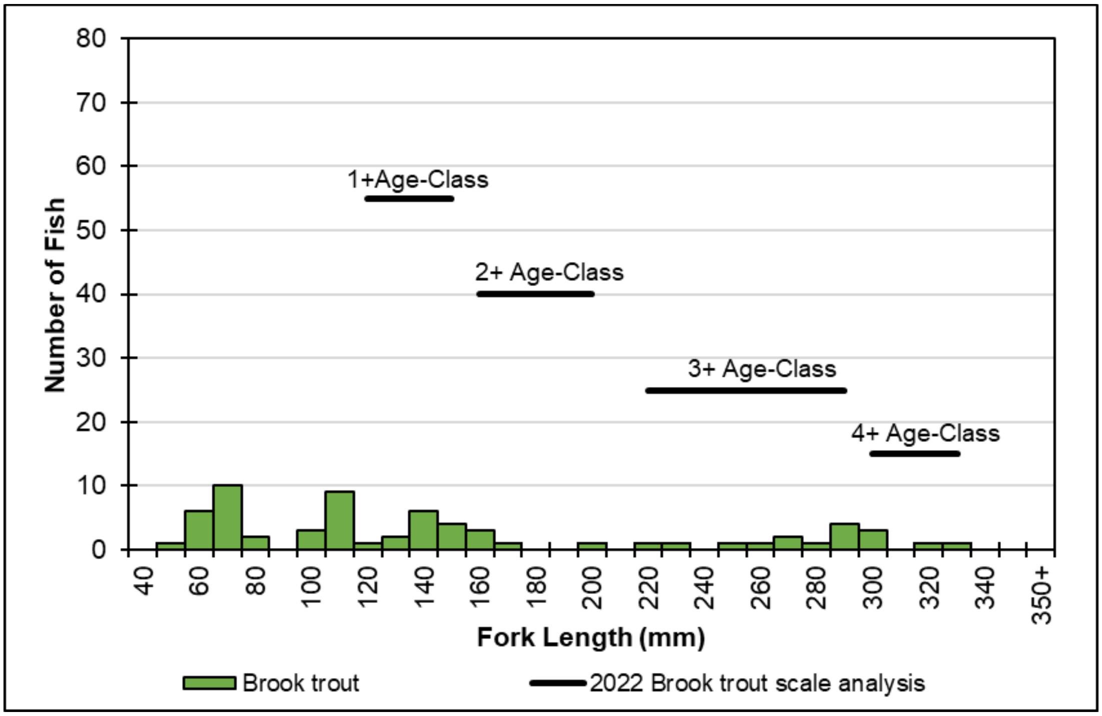

Figure 4.3-10. Length Frequency Histogram for Brook Trout Captured in Glacier Creek downstream of Tioga Lake (Site GLC-F1) during 2022 Sampling.

4.4. FISH CONDITION

Mean condition factors (k-values) of all species sampled in 2022 ranged between 0.88 and 1.15[1] (Table 4.4-1) and were similar across sample sites, indicating that trout were generally in good condition. Mean k-values of brown trout were slightly higher than those of brook trout across sample sites, ranging between 1.0 and 1.23 and 0.88 and 1.04, respectively, (Figure 4.4-1) which are generally consistent with historic k-values for brown and brook trout in Lee Vining Creek (EA, 1987; Salamunovich, 2021). Rainbow trout and the cutbow captured at Site LLVC-F1 were likewise in good condition, with k-values ranging between 0.9 and 1.54. Length and weight data for all fish captured during this study are provided in Appendix B.

Figure 4.4-1. Captured Brown (left) and Brook (right) Trout from Site ULVC-F3 with Average Condition Factors.

Table 4.4-1. Trout Condition (k-value) Calculated for Fish Captured September 2022

Stream	Study Site	Trout Species	(n)[a]	Mean k-value	k-value Range
Lower Lee Vining Creek	LLVC-F1	Rainbow trout	3	1.15	0.90–1.54
		Brook trout	18	0.99	0.80–1.13
		Brown trout	108	1.09	0.62–1.32
Upper Lee Vining Creek	ULVC-F1	Brook trout	1	0.96	0.96–0.96
		Brown trout	63	1.05	0.78–1.23
	ULVC-F2	Brook trout	9	1.09	0.90–1.29
		Brown trout	97	1.07	0.74–1.32
	ULVC-F3	Brook trout	31	1.04	0.85–1.15
		Brown trout	47	1.08	0.88–1.20
	ULVC-F4	Brook trout	23	0.95	0.76–1.10

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[1] Condition factors in western Sierra Nevada streams typically range from 0.8 to 2.0, with a mean condition factor generally 1.2 or below (Beak, 1991; EA, 1987; Ebasco Environmental, 1993; Wilcox, 1994; Hanson Environmental, 2005), while Rabe (1967) reported the condition factor to be between 0.9 and 1.1 for rainbow trout in alpine lakes. Arismendi et al. (2011) cites broader ranges (0.5 to 2.0); however, condition is dependent on the sampling season, species, strain of trout, state of sexual maturity, and the way fish length is defined (e.g., fork length, total length, or standard length), which is not often documented with the results.

Stream	Study Site	Trout Species	(n)[a]	Mean k-value	k-value Range
		Brown trout	68	1.08	0.77–1.37
	ULVC-F5	Brook trout	67	0.97	0.55–1.98
		Brown trout	77	1.08	0.86–1.21
Glacier Creek	GC-F1	Brook trout	48	1.04	0.89–1.27
		Brown trout	104	1.10	0.77–1.50

FL = fork length; k-value = condition factor; mm = millimeter

[a] Fish less than 70 mm FL were excluded from k-value calculations due to the sensitivity of the scale during poor weather conditions.

4.5. HABITAT CONDITIONS

Stream discharge during the fish survey effort was around 20 cubic feet per second (cfs) at the study sites on lower and upper Lee Vining Creek and just under 2 cfs on Glacier Creek. Habitat types were equally represented in lower Lee Vining Creek with similar amount of riffle, pool, and run habitat. At all other study sites, riffle was the dominant habitat type (Table 4.5-1). Substrate size increased in an upstream direction with the smallest substrate (sand) observed in lower Lee Vining Creek (Site LLVC-F1) and the largest substrate (cobble and boulder) observed in the upper study sites (sites ULVC-F1 through ULVC-F5).

Water quality conditions measured during the study indicated highly oxygenated stream conditions with water temperatures between 10 and 16 degrees Celsius (°C) (Table 4.5-2). Didymo was not observed at stream fish study sites during fish survey efforts. Habitat condition data and water chemistry are provided in Appendix C.

Table 4.5-1. Habitat Conditions at Stream Fish Study Sites

Survey Date	Study Site	Habitat Type (%)				Substrate [a]		Discharge (cfs)
		Pool	Run	Low Gradient Riffle	High Gradient Riffle	Dom [b]	Sub [b]	
9/19/2022	LLVC-F1	32.5	35.0	32.5	0.0	SAND	COB	24.07
9/20/2022	ULVC-F1	0.0	20.0	60.0	20.0	COB	GRVL	23.88
9/22/2022	ULVC-F2	11.0	16.5	72.5	0.0	GRVL	COB	21.83
9/16/2022	ULVC-F3	2.5	0.0	47.5	50.0	COB	BLD	21.26
9/17/2022	ULVC-F4	0.0	0.0	0.0	100.0	BLD	COB	22.03
9/18/2022	ULVC-F5	2.5	5.0	2.5	90.0	COB	BLD	18.38
9/21/2022	GC-F1	2.5	27.5	50.0	20.0	COB	GRVL	1.85

cfs = cubic feet per second

[a] Substrate codes: SAND = sand, COB = cobble, GRVL = gravel, BLD = boulder

[b] Dom = dominant, Sub = subdominant

Table 4.5-2. Water Quality at Stream Fish Study Sites in 2022

Survey Date	Study Site	Water Temperature (°C)	Dissolved Oxygen		Conductivity (µS/cm)	pH (s.u.)
			(%)	(mg/l)		
9/19/2022	LLVC-F1	10.3	99.3	8.40	34.1	7.04
9/20/2022	ULVC-F1	13.0	90.8	6.76	17.6	7.18
9/22/2022	ULVC-F2	14.8	110.2	7.92	17.8	6.9
9/16/2022	ULVC-F3	15.4	94.6	6.66	21.2	7.33
9/17/2022	ULVC-F4	14.7	95.7	6.78	17.0	7.14
9/18/2022	ULVC-F5	13.1	95.9	7.01	16.4	6.96
9/21/2022	GC-F1	11.9	95.4	7.31	21.4	7.15

°C = degrees Celsius; mg/L = milligrams per liter; µS/cm = microsiemens per centimeter; s.u. = standard units

4.6. ADDITIONAL OBSERVATIONS

Brown and brook trout captured in upper Lee Vining and Glacier creeks showed signs of reproductive activity during fish survey efforts, with male fish actively milting during fish processing (Table 4.6-1). One redd was observed in upper Lee Vining Creek at Site ULVC-F2 during fish survey efforts (Table 4.6-2).

Table 4.6-1. Spawning Observations

Stream	Study Site ID	Sample Date	Number of Milting Fish	Species
Lower Lee Vining Creek	LLVC-F1	9/19/2022	0	--
Upper Lee Vining Creek	ULVC-F1	9/20/2022	1	Brown trout
	ULVC-F2	9/22/2022	2	Brown trout
	ULVC-F3	9/16/2022	0	--
	ULVC-F4	9/17/2022	0	--
	ULVC-F5	9/18/2022	2	Brown trout
	ULVC-F5	9/18/2022	1	Brook trout
Glacier Creek	GLC-F1	9/21/2022	1	Brown trout
	GLC-F1	9/21/2022	4	Brook trout

-- = no data

Table 4.6-1. Redd Survey Data

Reach Description	Sample Date	Survey Distance (mile)	Number of Redds Observed
Lee Vining Creek between Glacier Creek and Slate Creek	9/17/2022	0.43	0
	9/21/2022	0.40	0
	9/22/2022	0.34	1
Lee Vining Creek Downstream of Poole Powerhouse	9/21/2022	0.72	0

5.0 CONSULTATION SUMMARY

In preparation of the Pre-Application Document and Notice of Intent filed in August 2021, SCE hosted Aquatic and Hydrology Technical Working Group (TWG) meetings on January 25, February 22, March 29, and May 24, 2021. These TWG meetings resulted in study requests from Stakeholders to address questions regarding aquatic habitat and sediment characteristics. Notes and materials from these meetings are available on SCE's Project website (www.sce.com/leevining).

SCE filed draft Study Plans with the Pre-Application Document and Notice of Intent on August 12, 2021, to address issues discussed with the TWG. The Stakeholder comment period ended on January 18, 2022. No comments were received related to this Study Plan, and the final Study Plan was submitted to FERC in April 2022. Per conditions included in Stillwater Sciences' Scientific Collection Permit (S-190250002-21292-002), Stillwater Sciences emailed a request for approval to conduct backpack electrofishing surveys in stream reaches downstream of Project reservoirs to CDFW District Biologist Nick Buckmaster on May 23, 2022. Approval was provided by email from Nick Buckmaster on June 17, 2022.

Initial study results were provided to relicensing Stakeholders on February 1, 2023. Preliminary data collected in this study was analyzed, and a Draft Technical Report was produced and distributed to Stakeholders for review for a 60-day review in September 2023. No comments were received from Stakeholders regarding this study.

On May 14, 2024, SCE held a public meeting at the Lee Vining Community Center to discuss the draft reports and study findings to date. Responses to Stakeholder comments on the Draft Technical Report are included in Table 1-1 in Volume III of the DLA.

6.0 REFERENCES

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APPENDIX A
STREAM FISH POPULATIONS
SITE PHOTOS

Figure A-1. Lee Vining Creek Reach 1, downstream net of lower segment. Photo looking upstream. September 16, 2022.

Figure A-2. Lee Vining Creek Reach 1, upstream net of lower segment. Photo looking downstream. September 16, 2022.

Figure A-3. Lee Vining Creek Reach 1, downstream net of upper segment. Photo looking upstream. September 16, 2022.

Figure A-4. Lee Vining Creek Reach 1, upstream net of upper segment. Photo looking downstream. September 16, 2022.

Figure A-5. Lee Vining Creek Reach 2, downstream net of lower segment. Photo looking upstream. September 17, 2022.

Figure A-6. Lee Vining Creek Reach 2, upstream net of lower segment. Photo looking downstream. September 17, 2022.

Figure A-7. Lee Vining Creek Reach 2, downstream net of upper segment. Photo looking upstream. September 17, 2022.

Figure A-8. Lee Vining Creek Reach 2, upstream net of upper segment. Photo looking downstream. September 17, 2022.

Figure A-9. Lee Vining Creek Reach 3, downstream net of lower segment. Photo looking upstream. September 17, 2022.

Figure A-10. Lee Vining Creek Reach 3, upstream net of lower segment. Photo looking downstream. September 18, 2022.

Figure A-11. Lee Vining Creek Reach 3, downstream net of upper segment. Photo looking upstream. September 18, 2022.

Figure A-12. Lee Vining Creek Reach 3, upstream net of upper segment. Photo looking downstream. September 18, 2022.

Figure A-13. Lee Vining Creek PH Reach, downstream net of lower segment. Photo looking upstream. September 19, 2022.

Figure A-14. Lee Vining Creek PH Reach, upstream net of lower segment. Photo looking downstream. September 19, 2022.

Figure A-15. Lee Vining Creek PH Reach, downstream net of upper segment. Photo looking upstream. September 19, 2022.

Figure A-16. Lee Vining Creek PH Reach, upstream net of upper segment. Photo looking downstream. September 19, 2022.

Figure A-17. Lee Vining Creek downstream of Glacier Creek, downstream net of lower segment. Photo looking upstream. September 20, 2022.

Figure A-18. Lee Vining Creek downstream of Glacier Creek, upstream net of lower segment. Photo looking downstream. September 20, 2022.

Figure A-19. Lee Vining Creek downstream of Glacier Creek, downstream net of upper segment. Photo looking upstream. September 20, 2022.

Figure A-20. Lee Vining Creek downstream of Glacier Creek, upstream net of upper segment. Photo looking downstream. September 20, 2022.

Figure A-21. Glacier Creek, downstream net of lower segment. Photo looking upstream. September 21, 2022.

Figure A-22. Glacier Creek, upstream net of lower segment. Photo looking downstream. September 21, 2022.

Figure A-23. Glacier Creek, downstream net of upper segment. Photo looking upstream. September 21, 2022.

Figure A-24. Glacier Creek, upstream net of upper segment. Photo looking downstream. September 21, 2022.

Figure A-25. Lee Vining Creek upstream of Glacier Creek, downstream net of lower segment. Photo looking upstream. September 22, 2022.

Figure A-26. Lee Vining Creek upstream of Glacier Creek, upstream net of lower segment. Photo looking downstream. September 22, 2022.

Figure A-27. Lee Vining Creek upstream of Glacier Creek, downstream net of upper segment. Photo looking upstream. September 22, 2022.

Figure A-28. Lee Vining Creek upstream of Glacier Creek, upstream net of upper segment. Photo looking downstream. September 22, 2022.

APPENDIX B
STREAM FISH POPULATIONS
FISH CAPTURE DATA

Table B-1. Stream Fish Capture Data, September 2022

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BK	68	72	3.4	--	1.081	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BK	80	85	5.8	--	1.133	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BK	76	82	4.2	--	0.957	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BK	65	69	1.5	--	0.546	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BK	57	59	1.3	--	--	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BK	65	69	1.6	--	0.583	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BK	70	74	3.3	--	0.962	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	3	BK	80	84	5.0	--	0.977	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	3	BK	69	72	3.2	--	0.974	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	3	BK	90	95	6.8	--	0.933	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	3	BK	71	74	4.0	--	1.118	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	3	BK	50	52	0.6	--	--	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BK	75	79	3.8	--	0.901	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BK	60	63	1.6	--	--	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BK	76	80	3.5	--	0.797	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BK	120	126	18.2	--	1.053	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BK	179	186	62.4	--	1.088	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BK	68	73	3.2	--	1.018	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BK	146	155	29.4	--	0.945	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BK	70	73	3.3	--	0.962	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BK	83	88	5.4	--	0.944	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BK	96	101	8.1	--	0.916	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BK	78	82	5.1	--	1.075	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BK	67	71	2.7	--	0.898	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	2	BK	71	75	3.3	--	0.922	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	2	BK	83	90	5.7	--	0.997	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	3	BK	95	102	9.7	--	1.131	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	3	BK	74	78	3.8	--	0.938	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	3	BK	91	96	7.1	--	0.942	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	343	357	465.0	BRN-1C	--	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	258	272	187.8	BRN-2C	1.094	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	130	137	23.0	BRN-3C	1.047	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	124	131	18.9	BRN-4C	0.991	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	193	207	77.7	BRN-5C	1.081	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	110	116	14.8	BRN-6C	1.112	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	135	143	25.0	BRN-7C	1.016	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	133	140	23.2	BRN-8C	0.986	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	76	80	4.6	--	1.048	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	158	167	36.8	BRN-9C	0.933	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	49	51	2.0	--	--	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	256	268	190.0	BRN-10C	1.132	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	237	247	149.6	BRN-11C	1.124	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	246	255	170.5	BRN-12C	1.145	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	198	208	95.8	BRN-13C	1.234	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	75	79	3.9	--	0.924	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	66	69	2.5	--	0.870	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	60	64	1.6	--	--	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	225	234	125.4	BRN-14C	1.101	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	65	68	3.1	--	1.129	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	67	70	3.3	--	1.097	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	71	75	4.0	--	1.118	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	84	89	6.9	BRN-15C	1.164	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	66	69	3.1	--	1.078	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	63	66	3.1	--	1.240	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	58	61	1.9	--	--	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	90	95	8.8	BRN-16C	1.207	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	59	62	1.7	--	--	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	85	90	6.7	--	1.091	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	90	95	8.1	--	1.111	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	151	160	37.9	BRN-17C	1.101	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	121	127	17.5	--	0.988	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	89	95	7.1	--	1.007	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	73	77	4.2	--	1.080	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	72	77	4.3	--	--	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	66	70	3.7	--	1.287	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	71	74	4.0	--	1.118	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	60	63	2.1	--	--	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	150	157	34.9	BRN-18C	1.034	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	65	68	3.3	--	1.202	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	BRN	55	58	1.5	--	--	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	117	124	19.0	--	1.186	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	239	251	149.2	BRN-19C	1.093	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	150	159	37.2	--	1.102	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	220	233	121.6	--	1.142	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	66	70	3.2	--	1.113	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	63	66	2.3	--	0.920	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	139	146	29.9	--	1.113	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	135	142	24.7	--	1.004	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	130	136	23.6	--	1.074	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	143	152	30.9	--	1.057	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	214	225	127.5	--	1.301	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	64	67	2.1	--	0.801	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	134	141	24.3	--	1.010	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	49	51	1.0	--	--	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	65	67	3.6	--	1.311	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	57	60	2.3	--	--	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	60	62	2.6	--	--	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	139	146	27.5	--	1.024	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	57	60	1.8	--	--	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	205	216	100.2	--	1.163	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	142	149	31.9	--	1.114	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	194	204	83.9	--	1.149	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	129	136	27.6	--	1.286	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	64	68	3.4	--	1.297	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	2	BRN	79	82	4.5	--	0.913	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	3	BRN	287	301	250.0	BRN-20C	1.058	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	3	BRN	171	181	56.2	--	1.124	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	3	BRN	212	223	106.8	--	1.121	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	3	BRN	75	78	4.7	--	1.114	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	3	BRN	138	144	27.9	--	1.062	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	3	BRN	84	86	6.7	--	1.130	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	3	BRN	90	96	9.5	--	1.303	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	3	BRN	61	64	2.6	--	1.145	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	3	BRN	63	68	2.8	--	1.120	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	3	BRN	83	87	6.1	--	1.067	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	75	80	5.2	--	1.233	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	195	218	81.8	--	1.103	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	149	157	34.5	--	1.043	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	86	90	7.2	--	1.132	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	73	76	2.4	--	0.617	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	67	71	1.6	--	0.532	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	163	172	47.5	--	1.097	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	155	163	38.3	--	1.028	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	64	68	3.4	--	1.297	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	124	130	20.1	--	1.054	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	72	75	3.6	--	0.965	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	70	73	3.2	--	0.933	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	71	75	3.8	--	1.062	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	64	66	3.9	--	1.488	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	62	64	2.3	--	0.965	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	52	54	1.1	--	--	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	123	131	19.7	--	1.059	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	163	170	44.7	--	1.032	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	147	155	36.0	--	1.133	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	86	89	6.3	--	0.990	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	74	78	4.8	--	1.185	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	88	93	7.8	--	1.145	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	85	90	6.8	--	1.107	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	73	77	4.1	--	1.054	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	67	70	3.3	--	1.097	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	67	69	3.4	--	1.130	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	82	87	6.7	--	1.215	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	60	63	--	--	--	No weight
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	67	70	3.3	--	1.097	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	84	88	6.7	--	1.130	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	78	82	5.3	--	1.117	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	69	72	3.3	--	1.005	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	310	322	330.0	--	1.108	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	311	324	310.0	--	1.031	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	239	250	170.0	--	1.245	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	288	300	280.0	--	1.172	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	63	65	2.4	--	0.960	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	241	251	154.7	--	1.105	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	232	245	156.7	--	1.255	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	221	231	121.4	--	1.125	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	263	275	190.0	--	1.044	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	128	135	23.7	--	1.130	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	143	151	30.7	--	1.050	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	234	241	140.0	--	1.093	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	253	262	140.0	--	0.865	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	135	142	24.1	--	0.980	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	57	59	2.1	--	--	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	1	BRN	57	60	2.0	--	--	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	2	BRN	316	326	360.0	--	1.141	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	2	BRN	147	154	36.1	--	1.136	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	2	BRN	89	93	7.4	--	1.050	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	2	BRN	211	222	107.4	--	1.143	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	2	BRN	159	170	47.5	--	1.182	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	2	BRN	144	151	31.4	--	1.052	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	2	BRN	93	97	8.9	--	1.106	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	2	BRN	127	135	21.4	--	1.045	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	2	BRN	134	140	24.7	--	1.027	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	2	BRN	91	96	9.6	--	1.274	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	2	BRN	80	84	5.9	--	1.152	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	2	BRN	79	82	4.7	--	0.953	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	2	BRN	134	140	24.5	--	1.018	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	2	BRN	70	74	3.9	--	1.137	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	2	BRN	56	60	1.5	--	--	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	2	BRN	58	61	1.8	--	--	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	2	BRN	140	148	29.3	--	1.068	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	2	BRN	83	86	6.0	--	1.049	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	2	BRN	85	90	6.0	--	0.977	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	2	BRN	70	74	3.5	--	1.020	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	3	BRN	301	311	360.0	--	1.320	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	3	BRN	164	174	55.5	--	1.258	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	3	BRN	162	170	52.9	--	1.244	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	3	BRN	169	176	52.7	--	1.092	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	3	BRN	127	134	24.3	--	1.186	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Upper	3	BRN	76	82	5.2	--	1.185	
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	CTH	550	555	1490.0	CTR1	0.896	Photos on phone/no fin wear
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	RT	450	455	1400.0	RT1	1.536	Slight wear on caudal fin
9/19/2022	Lower Lee Vining Creek	LLVC-F1	Lower	1	RT	360	380	480.0	RT2	1.029	Growth at base of caudal
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BK	105	111	11.1	--	0.959	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BK	53	56	0.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BK	64	68	2.5	--	0.954	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BK	61	65	2.1	--	0.925	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BK	70	74	3.5	--	1.020	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BK	64	66	2.5	--	0.954	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BK	52	55	1.4	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BK	64	68	2.5	--	0.954	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BK	62	65	1.5	--	0.629	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BK	49	50	1.0	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BK	56	59	1.5	--	--	Deformed caudal
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	155	164	34.1	--	0.916	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	53	55	1.5	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	410	420	540.0	BRN-1C	0.784	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	48	52	1.1	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	125	130	18.0	BRN-2C	0.922	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	61	63	2.5	--	1.101	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	133	142	26.5	BRN-3C	1.126	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	300	314	330.0	BRN-4C	1.222	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	61	63	1.9	--	0.837	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	109	115	13.0	BRN-5C	1.004	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	48	49	1.6	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	124	128	20.1	BRN-6C	1.054	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	160	164	42.5	BRN-7C	1.038	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	54	50	1.4	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	53	56	1.2	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	44	46	0.5	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	105	109	12.5	--	1.080	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	47	50	1.1	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	147	158	32.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	47	50	1.0	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	48	50	0.8	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	340	350	440.0	BRN-8C	1.119	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	47	49	0.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	43	45	1.1	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	56	59	1.1	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	128	135	19.6	BRN-9C	0.935	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	52	54	1.2	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	61	64	2.4	--	1.057	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	95	102	9.0	--	1.050	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	38	40	0.5	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	124	129	17.8	--	0.934	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	47	48	0.8	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	62	64	2.2	--	0.923	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	63	65	2.3	--	0.920	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	53	56	1.6	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	129	138	20.6	--	0.960	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	102	107	13.0	--	1.225	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	35	36	0.4	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	66	70	3.2	--	1.113	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	48	52	0.8	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	53	56	1.4	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	52	55	1.4	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	55	57	1.2	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	54	56	1.3	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	48	51	1.2	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	48	50	0.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	53	55	1.1	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	49	51	1.0	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	48	50	1.5	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	1	BRN	47	50	0.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	51	53	1.3	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	43	45	0.8	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	41	42	0.5	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	50	51	1.2	--	--	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	49	51	0.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	41	43	0.5	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	41	42	0.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	42	43	0.6	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	127	135	20.3	--	0.991	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	105	111	11.1	--	0.959	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	62	65	2.5	--	1.049	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	71	75	3.6	--	1.006	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	37	39	0.5	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	138	143	28.1	--	1.069	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	104	110	11.7	--	1.040	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	63	66	2.8	--	1.120	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	66	70	3.2	--	1.113	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	59	63	1.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	63	67	2.8	--	1.120	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	48	50	1.0	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	54	57	1.5	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	40	42	0.4	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	44	48	0.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	50	52	1.2	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	46	48	0.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	49	52	1.3	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	38	40	0.6	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	43	45	0.7	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	54	56	1.7	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	46	48	0.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	49	52	1.1	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	58	61	2.0	--	--	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	52	55	1.2	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	46	50	1.1	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	49	52	1.3	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	38	40	0.5	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	55	60	1.8	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	45	47	1.0	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	49	52	1.5	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	41	43	0.7	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	2	BRN	51	54	1.6	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	3	BRN	63	65	2.6	--	1.040	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	3	BRN	60	62	1.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	3	BRN	60	64	2.3	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	3	BRN	43	45	1.2	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	3	BRN	51	56	1.6	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	3	BRN	227	240	118.4	BRN-10C	1.012	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	3	BRN	67	70	3.2	--	1.064	Chunky
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	3	BRN	54	56	1.5	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	3	BRN	54	56	1.8	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	3	BRN	47	50	1.1	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	3	BRN	50	52	1.3	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	3	BRN	53	55	1.4	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	3	BRN	43	45	0.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	3	BRN	34	35	0.4	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	3	BRN	43	45	0.8	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	3	BRN	42	44	0.5	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	3	BRN	55	58	1.6	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	3	BRN	38	41	0.3	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Lower	3	BRN	47	50	1.2	--	--	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	50	53	1.0	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	47	49	1.1	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	45	47	0.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	39	41	0.5	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	110	115	15.5	--	1.165	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	136	146	27.9	--	1.109	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	119	125	18.2	--	1.080	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	105	111	12.9	--	1.114	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	140	147	28.5	--	1.039	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	161	172	44.0	BRN-11C	1.054	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	112	120	14.8	--	1.053	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	98	105	10.0	--	1.062	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	160	168	42.4	BRN-12C	1.035	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	99	103	10.8	--	1.113	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	167	179	51.4	BRN-13C	1.104	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	155	164	39.7	BRN-14C	1.066	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	186	195	67.4	--	1.047	Deformed caudal
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	200	214	90.3	BRN-15C	1.129	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	220	230	120.4	BRN-16C	1.131	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	142	148	30.1	--	1.051	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	308	321	310.0	BRN-17C	1.061	Ripe male, milting
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	148	155	34.9	--	1.077	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	110	118	15.2	--	1.142	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	98	106	10.7	--	1.137	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	115	124	16.3	--	1.072	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	114	119	15.0	--	1.012	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	103	107	10.9	--	0.998	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	96	102	9.1	--	1.029	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	95	98	8.2	--	0.956	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	96	101	9.2	--	1.040	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	61	65	2.1	--	0.925	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	66	69	3.4	--	1.183	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	46	48	1.3	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	53	55	2.0	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	95	101	8.9	--	1.038	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	60	64	1.6	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	59	63	2.8	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	57	60	1.7	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	62	65	2.2	--	0.923	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	49	50	1.0	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	55	57	1.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	45	47	1.1	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	45	46	0.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	50	52	1.0	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	63	65	2.7	--	1.080	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	61	65	2.3	--	1.013	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	54	56	1.5	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	46	48	0.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	60	64	2.4	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	53	55	1.1	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	50	51	1.1	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	44	45	0.6	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	43	45	0.8	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	42	44	0.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	47	49	1.0	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	42	43	0.6	--	--	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	54	56	1.4	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	68	72	--	--	--	Deformed caudal, no weight
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	47	50	1.2	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	45	46	1.1	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	57	61	2.4	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	41	42	0.7	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	47	49	1.0	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	44	46	0.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	47	50	1.0	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	55	57	1.1	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	54	57	1.5	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	48	50	0.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	1	BRN	45	46	0.6	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	40	42	0.8	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	145	153	33.3	--	1.092	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	189	194	68.9	--	1.021	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	148	156	35.1	--	1.083	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	133	142	23.6	--	1.003	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	123	131	20.1	--	1.080	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	85	90	7.1	--	1.156	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	43	45	0.6	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	59	62	2.0	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	147	155	33.1	--	1.042	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	50	53	1.2	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	52	55	1.4	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	39	41	0.8	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	42	43	0.5	--	--	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	110	115	14.0	--	1.052	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	95	101	9.2	--	1.073	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	61	64	2.3	--	1.013	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	52	54	1.4	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	45	47	0.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	100	105	9.7	--	0.970	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	55	58	1.4	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	49	51	1.1	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	106	112	13.6	--	1.142	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	49	51	1.0	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	45	48	0.6	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	43	45	0.6	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	43	44	0.7	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	2	BRN	45	46	0.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	3	BRN	156	167	42.9	--	1.130	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	3	BRN	112	120	15.0	--	1.068	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	3	BRN	91	96	8.4	--	1.115	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	3	BRN	59	62	1.9	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	3	BRN	60	62	2.0	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	3	BRN	55	58	2.4	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	3	BRN	41	42	0.8	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	3	BRN	52	55	1.4	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	3	BRN	44	45	0.8	--	--	
9/20/2022	Upper Lee Vining Creek	ULVC-F1	Upper	3	BRN	38	39	0.5	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BK	64	68	2.3	--	0.877	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BK	295	305	330.0	BK-1D	1.285	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BK	275	280	220.0	BK-2D	1.058	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BK	137	142	30.1	--	1.171	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BK	112	120	15.2	--	1.082	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BK	184	194	58.1	--	0.933	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	3	BK	61	65	1.5	--	0.661	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	3	BK	146	156	33.9	--	1.089	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BK	150	158	30.4	--	0.901	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BK	65	69	2.3	--	0.838	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BK	320	330	380.0	--	1.160	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BK	47	49	1.1	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BK	55	57	1.4	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BK	44	46	0.9	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BK	59	62	1.8	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BK	52	55	1.4	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BK	51	54	1.0	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BK	36	37	0.4	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	3	BK	158	164	43.4	--	1.100	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	4	BK	56	58	1.1	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	375	390	640.0	BRN-1D	1.214	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	365	380	540.0	BRN-2D	1.110	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	352	365	430.0	BRN-3D	0.986	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	343	355	430.0	BRN-4D	1.066	Ripe male, milting
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	325	340	430.0	BRN-5D	1.253	Probably female
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	330	345	430.0	BRN-6D	1.197	Ripe male, milting
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	205	217	85.7	--	0.995	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	125	132	21.4	--	1.096	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	103	110	13.6	--	1.245	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	264	275	157.6	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	214	225	86.4	--	0.882	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	57	60	1.4	--	--	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	48	50	1.0	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	57	60	1.1	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	53	55	1.2	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	108	115	14.8	--	1.175	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	61	65	2.0	--	0.881	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	97	105	9.7	--	1.063	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	61	65	1.8	--	0.793	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	270	287	230.0	BRN-7D	1.169	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	57	61	2.1	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	53	56	--	--	--	No weight
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	44	47	0.8	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	212	224	101.9	--	1.069	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	325	335	400.0	--	1.165	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	202	210	84.0	--	1.019	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	275	285	240.0	--	1.154	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	133	142	24.0	--	1.020	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	142	152	32.6	--	1.139	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	235	254	170.0	--	1.310	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	155	167	38.3	--	1.028	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	260	268	220.0	--	1.252	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	182	192	57.4	--	0.952	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	148	156	34.5	--	1.064	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	158	162	42.4	--	1.075	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	53	57	1.4	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	139	145	24.4	--	0.909	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	144	154	28.2	--	0.944	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	115	123	15.3	--	1.006	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	97	105	12.0	--	1.315	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	47	50	1.0	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	205	213	90.3	--	1.048	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	233	248	148.5	--	1.174	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	204	215	87.8	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	225	234	113.6	--	0.997	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	176	198	58.5	--	1.073	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	132	142	24.6	--	1.070	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	53	56	1.6	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	162	170	42.1	--	0.990	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	47	49	1.3	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	152	160	34.3	--	0.977	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	103	110	12.7	--	1.162	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	122	132	19.0	--	1.046	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	1	BRN	104	112	12.6	--	1.120	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	221	231	109.1	--	1.011	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	164	176	49.4	--	1.120	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	112	120	16.4	--	1.167	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	108	115	12.8	--	1.016	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	58	61	2.6	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	148	158	35.0	--	1.080	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	198	208	76.2	--	0.982	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	109	117	15.8	--	1.220	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	177	187	55.6	--	1.003	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	179	190	59.5	--	1.037	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	137	146	25.9	--	1.007	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	201	212	83.6	--	1.029	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	175	186	55.3	--	1.032	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	314	325	340.0	--	1.098	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	100	107	8.3	--	0.830	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	115	122	15.8	--	1.039	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	98	103	7.8	--	0.829	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	100	106	10.7	--	1.070	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	53	56	2.0	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	102	110	12.8	--	1.206	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	143	150	33.2	--	1.135	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	45	48	1.1	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	45	46	0.7	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	112	120	16.5	--	1.174	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	2	BRN	54	57	1.6	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	3	BRN	167	176	46.5	--	0.998	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	3	BRN	99	105	10.6	--	1.092	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	3	BRN	177	187	55.6	--	1.003	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	3	BRN	142	150	30.9	--	1.079	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	3	BRN	105	112	13.2	--	1.140	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	3	BRN	46	48	0.9	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Lower	3	BRN	144	154	32.4	--	1.085	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BRN	134	141	28.7	--	1.193	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BRN	156	165	42.3	--	1.114	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BRN	149	156	35.4	--	1.070	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BRN	127	134	21.5	--	1.050	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BRN	201	212	60.4	--	0.744	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BRN	190	200	65.2	--	0.951	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BRN	108	112	14.0	--	1.111	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BRN	51	53	2.1	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BRN	94	98	8.2	--	0.987	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BRN	106	111	12.3	--	1.033	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BRN	113	119	15.9	--	1.102	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BRN	60	63	2.4	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BRN	47	49	1.4	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BRN	54	56	1.6	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BRN	56	58	1.6	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BRN	36	37	0.4	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BRN	108	112	12.1	--	0.961	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BRN	213	222	101.1	--	1.046	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BRN	49	51	0.8	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BRN	35	36	0.4	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	1	BRN	49	51	0.4	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	155	162	41.6	--	1.117	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	105	111	11.6	--	1.002	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	100	106	9.6	--	0.960	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	115	120	16.1	--	1.059	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	111	116	14.1	--	1.031	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	51	54	1.2	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	56	59	2.3	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	54	56	1.6	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	40	41	0.9	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	48	50	0.9	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	109	114	13.1	--	1.012	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	110	116	13.9	--	1.044	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	113	120	14.3	--	0.991	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	106	112	11.2	--	0.940	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	56	59	1.8	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	41	44	0.5	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	52	55	1.5	--	--	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	54	56	1.6	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	61	65	2.1	--	0.925	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	49	51	1.0	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	56	59	2.3	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	48	50	0.8	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	42	44	0.6	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	44	46	1.0	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	53	55	1.3	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	52	54	1.8	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	45	46	1.0	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	44	45	1.2	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	2	BRN	42	45	0.8	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	3	BRN	106	111	12.4	--	1.041	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	3	BRN	45	47	1.1	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	3	BRN	100	107	11.1	--	1.110	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	3	BRN	102	108	12.0	--	1.131	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	3	BRN	104	109	11.7	--	1.040	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	3	BRN	102	107	12.2	--	1.150	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	3	BRN	111	118	15.4	--	1.126	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	3	BRN	47	49	1.0	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	3	BRN	43	45	1.0	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	3	BRN	39	40	0.6	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	3	BRN	34	36	0.5	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	3	BRN	48	50	1.1	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	3	BRN	40	42	0.7	--	--	Damaged Caudal
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	3	BRN	42	44	0.5	--	--	Damaged Caudal
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	4	BRN	55	57	1.9	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	4	BRN	54	57	2.0	--	--	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	4	BRN	116	122	17.3	--	1.108	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	4	BRN	147	156	36.4	--	1.146	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	4	BRN	49	51	1.0	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	4	BRN	35	36	0.5	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	4	BRN	102	108	14.0	--	1.319	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	4	BRN	38	41	1.0	--	--	
9/22/220	Upper Lee Vining Creek	ULVC-F2	Upper	4	BRN	51	53	1.2	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BK	178	185	60.5	BK1	1.073	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BK	182	189	68.0	BK2	1.128	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BK	155	161	35.7	BK3	0.959	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BK	166	177	49.9	BK4	1.091	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BK	185	192	53.9	BK5	0.851	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BK	161	169	45.0	BK6	1.078	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BK	150	160	38.7	BK7	1.147	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BK	130	130	23.0	BK8	1.047	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BK	305	316	316.1	BK9	1.114	Photo 1586–1587
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	2	BK	149	156	37.4	BK10	1.131	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	2	BK	157	164	38.0	--	0.982	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	2	BK	145	152	34.7	BK11	1.138	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	2	BK	124	131	19.9	BK12	1.044	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	2	BK	181	186	63.2	--	1.066	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	3	BK	60	63	1.8	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	3	BK	50	52	1.3	--	--	Photo 5236
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	3	BK	151	156	33.7	--	0.979	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	3	BK	145	152	31.6	--	1.037	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	3	BK	132	136	23.2	BK13	1.009	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	3	BK	194	201	75.5	--	1.034	Photo 5241
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	4	BK	204	210	75.9	BK14	0.894	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	4	BK	180	188	63.7	--	1.092	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	4	BK	168	176	49.0	--	1.033	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BK	191	200	75.0	--	1.076	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BK	147	152	34.1	--	1.074	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BK	179	182	60.4	--	1.053	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BK	161	169	43.7	--	1.047	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	2	BK	189	196	67.0	--	0.992	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	2	BK	161	166	36.8	--	0.882	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	2	BK	120	130	--	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	3	BK	150	154	38.8	--	1.150	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	4	BK	171	179	52.7	--	1.054	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	4	BK	150	155	28.9	--	0.856	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	4	BK	136	142	29.0	--	1.153	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	200	215	83.4	BRN1	1.043	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	52	54	1.4	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	117	124	17.9	BRN2	1.118	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	160	170	42.0	BRN3	1.025	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	134	142	27.9	BRN4	1.160	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	180	190	58.0	BRN5	0.995	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	112	118	14.9	BRN6	1.061	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	65	69	3.0	--	1.092	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	52	55	1.2	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	54	57	2.0	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	237	247	135.4	BRN7	1.017	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	126	133	21.6	BRN8	1.080	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	113	120	16.3	BRN9	1.130	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	54	56	2.1	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	58	61	1.8	--	--	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	58	61	2.8	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	58	61	2.5	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	56	59	2.5	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	59	62	2.4	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	129	137	23.3	--	1.085	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	48	50	1.3	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	195	206	73.6	BRN10	0.993	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	252	264	146.9	BRN11	0.918	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	114	120	15.4	--	1.039	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	118	125	18.1	--	1.102	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	56	60	2.2	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	55	58	1.2	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	1	BRN	240	248	135.9	BRN12	0.983	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	2	BRN	52	54	1.9	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	2	BRN	133	142	--	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	2	BRN	128	135	23.0	--	1.097	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	2	BRN	124	129	21.2	--	1.112	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	2	BRN	127	133	20.0	--	0.976	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	2	BRN	54	55	1.0	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	2	BRN	51	53	0.9	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	2	BRN	100	105	10.3	BRN13	1.030	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	3	BRN	61	65	2.3	--	1.013	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	3	BRN	63	65	2.3	--	0.920	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	3	BRN	94	98	8.8	BRN14	1.059	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	3	BRN	116	123	18.7	--	1.198	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	3	BRN	116	123	17.3	--	1.108	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	3	BRN	226	229	117.6	--	1.019	Photo 5240
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	4	BRN	57	59	2.2	--	--	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	4	BRN	203	209	83.8	BRN15	1.002	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	4	BRN	57	60	2.0	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	4	BRN	55	59	1.5	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Lower	4	BRN	51	53	1.2	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	214	223	90.1	--	0.919	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	203	209	74.0	--	0.885	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	116	124	18.3	--	1.172	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	124	133	20.9	--	1.096	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	124	130	21.8	--	1.143	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	112	120	16.2	--	1.153	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	240	250	149.3	--	1.080	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	56	60	2.0	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	56	59	1.9	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	116	124	18.2	--	1.166	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	215	225	104.7	--	1.053	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	111	121	16.3	--	1.192	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	180	193	64.8	--	1.111	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	122	130	21.1	--	1.162	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	114	122	16.6	--	1.120	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	55	58	1.9	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	115	124	18.2	--	1.197	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	61	65	1.8	--	0.793	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	58	61	1.4	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	52	54	1.2	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	55	57	1.4	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	115	120	17.2	--	1.131	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	51	55	1.2	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	56	58	1.7	--	--	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	50	52	1.1	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	53	55	1.7	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	1	BRN	51	53	1.0	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	2	BRN	117	125	18.8	--	1.174	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	2	BRN	119	126	19.4	--	1.151	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	2	BRN	65	68	2.6	--	0.947	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	2	BRN	58	61	2.2	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	2	BRN	53	55	1.8	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	2	BRN	50	53	0.9	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	2	BRN	50	52	1.1	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	2	BRN	56	60	2.1	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	2	BRN	61	64	2.0	--	0.881	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	2	BRN	56	60	1.4	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	3	BRN	57	60	2.0	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	3	BRN	177	188	54.9	--	0.990	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	3	BRN	105	111	13.2	--	1.140	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	3	BRN	56	59	1.6	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	3	BRN	126	135	22.4	--	1.120	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	3	BRN	51	53	1.0	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	4	BRN	205	212	84.9	--	0.985	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	4	BRN	110	118	15.9	--	1.195	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	4	BRN	121	130	20.6	--	1.163	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	4	BRN	49	50	1.0	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	4	BRN	54	57	1.2	--	--	
9/16/2022	Upper Lee Vining Creek	ULVC-F3	Upper	4	BRN	63	67	2.6	--	1.040	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BK	177	185	48.0	--	0.866	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BK	175	180	45.2	--	0.843	Skinny, caudal fin missing.

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BK	164	168	35.5	--	0.805	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BK	157	169	41.3	--	1.067	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BK	172	179	38.7	--	0.761	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BK	128	136	16.9	--	0.806	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BK	200	209	79.3	--	0.991	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BK	61	64	2.3	--	1.013	Photos 1163–1164
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BK	170	179	48.6	--	0.989	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BK	127	135	21.4	--	1.045	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BK	145	155	30.8	--	1.010	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BK	162	174	43.0	--	1.011	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BK	59	62	2.1	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BK	148	155	31.6	--	0.975	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BK	137	143	25.1	--	0.976	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	3	BK	163	165	44.9	--	1.037	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	3	BK	50	52	1.8	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BK	153	161	33.3	--	0.930	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BK	135	142	26.1	--	1.061	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BK	174	186	50.4	--	0.957	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BK	155	163	37.5	--	1.007	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BK	166	171	38.0	--	0.831	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BK	132	141	25.2	--	1.096	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BK	177	183	48.8	--	0.880	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	3	BK	65	69	2.6	--	0.947	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	3	BK	183	196	59.6	--	0.973	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	3	BK	165	171	38.6	--	0.859	Worn caudal fin.
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	129	136	22.0	--	1.025	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	221	225	83.6	--	0.775	Skinny
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	209	214	86.0	--	--	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	158	166	45.5	--	1.154	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	117	123	18.6	--	1.161	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	181	192	57.6	--	0.971	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	203	212	79.2	--	0.947	Photos 1161–1162
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	168	182	49.6	--	1.046	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	208	219	90.7	--	1.008	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	115	122	15.5	--	1.019	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	168	171	45.6	--	0.962	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	116	122	16.2	--	1.038	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	121	129	20.0	--	1.129	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	116	121	19.4	--	1.243	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	106	113	14.6	--	1.226	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	118	125	17.9	--	1.089	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	116	122	17.5	--	1.121	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	117	126	18.0	--	1.124	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	56	58	1.9	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	59	62	2.2	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	122	116	16.5	--	0.909	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	115	120	18.0	--	1.184	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	53	56	1.2	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	49	52	1.3	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	118	123	15.5	--	0.943	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	65	67	2.4	--	0.874	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	44	46	0.4	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	110	116	14.1	--	1.059	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	64	68	2.0	--	0.763	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	56	58	1.8	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	63	65	2.0	--	0.800	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	61	63	1.9	--	0.837	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	57	60	1.8	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	58	60	1.8	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	57	60	2.1	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	56	58	1.4	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	51	53	1.1	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	65	68	2.9	--	1.056	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	50	53	1.2	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	1	BRN	58	61	1.9	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BRN	110	116	16.0	--	1.202	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BRN	104	108	13.1	--	1.165	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BRN	203	211	91.4	--	1.093	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BRN	117	124	18.6	--	1.161	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BRN	120	125	18.5	--	1.071	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BRN	110	120	14.1	--	1.059	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BRN	245	254	136.2	--	0.926	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BRN	100	106	11.1	--	1.110	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BRN	125	134	21.7	--	1.111	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BRN	125	133	21.1	--	1.080	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BRN	123	129	19.9	--	1.069	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BRN	133	140	26.3	--	1.118	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BRN	118	127	19.3	--	1.175	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BRN	123	130	25.5	--	1.370	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BRN	51	55	1.9	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BRN	58	60	2.2	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BRN	117	126	18.1	--	1.130	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	2	BRN	54	57	1.6	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	3	BRN	56	58	1.8	--	--	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	3	BRN	139	146	27.4	--	1.020	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Lower	3	BRN	51	52	1.2	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	128	137	23.9	--	1.140	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	118	125	18.4	--	1.120	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	186	198	71.6	--	1.113	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	133	140	24.3	--	1.033	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	119	127	18.4	--	1.092	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	122	129	19.4	--	1.068	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	119	126	17.7	--	1.050	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	107	113	13.0	--	1.061	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	58	61	2.2	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	115	123	16.6	--	1.091	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	115	120	17.3	--	1.138	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	51	54	1.9	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	195	203	74.0	--	0.998	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	114	122	15.8	--	1.066	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	182	190	56.7	--	0.941	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	111	119	16.7	--	1.221	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	118	125	18.1	--	1.102	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	120	130	18.3	--	1.059	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	50	52	1.4	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	52	55	1.6	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	48	50	1.2	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	117	123	15.8	--	0.987	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	127	135	21.2	--	1.035	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	50	53	1.0	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	61	64	2.6	--	1.145	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	65	70	2.9	--	1.056	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	60	63	2.0	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	50	53	1.6	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	58	61	2.2	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	55	58	2.1	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	55	58	2.0	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	1	BRN	58	61	2.4	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BRN	115	122	17.2	--	1.131	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BRN	123	132	21.0	--	1.129	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BRN	152	167	36.4	--	1.037	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BRN	224	236	120.0	BRN-1A	1.068	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BRN	151	156	40.5	--	1.176	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BRN	110	118	15.6	--	1.172	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BRN	128	137	22.0	--	1.049	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BRN	228	237	111.4	BRN-2A	0.940	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BRN	123	130	20.0	--	1.075	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BRN	129	138	24.4	--	1.137	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BRN	49	52	2.3	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BRN	58	61	1.8	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BRN	57	60	1.9	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BRN	60	64	2.3	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BRN	63	67	2.7	--	1.080	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BRN	64	67	3.0	--	1.144	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BRN	50	53	2.0	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	2	BRN	57	61	1.6	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	3	BRN	123	132	19.5	--	1.048	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	3	BRN	53	56	1.2	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	3	BRN	58	61	1.8	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	3	BRN	43	44	0.7	--	--	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	3	BRN	63	67	3.1	--	1.240	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	3	BRN	56	59	1.7	--	--	
9/17/2022	Upper Lee Vining Creek	ULVC-F4	Upper	3	BRN	196	204	78.5	--	1.043	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	222	231	72.4	--	0.662	Skinny. photo on phone
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	150	155	32.6	--	0.966	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	140	145	28.6	--	1.042	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	122	129	17.3	--	0.953	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	230	245	75.0	BK-1B	0.616	Skinny. photo on phone
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	180	189	53.7	--	0.921	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	117	124	16.6	--	1.036	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	145	153	27.9	--	0.915	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	167	171	40.8	--	0.876	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	187	194	--	--	--	No weight
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	169	179	43.2	--	0.895	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	292	303	340.0	BK-2B	1.366	Photo on phone
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	245	256	101.6	BK-3B	0.691	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	157	164	37.0	--	0.956	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	115	122	15.3	--	1.006	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	187	198	73.2	--	1.119	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	148	156	37.7	--	1.163	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	178	185	55.6	--	0.986	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	156	163	40.7	--	1.072	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	175	182	45.9	--	0.856	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	148	157	34.5	--	1.064	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	175	183	47.6	--	0.888	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	153	161	34.0	--	0.949	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	44	46	1.2	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	153	162	37.4	--	1.044	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	155	161	37.9	--	1.018	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	182	188	48.2	--	0.800	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	204	211	73.4	BK-4B	0.865	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	180	188	56.8	--	0.974	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	139	144	29.2	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BK	62	65	1.8	--	0.755	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BK	182	190	33.0	--	0.547	Skinny
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BK	195	207	72.0	--	0.971	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BK	168	173	50.4	--	1.063	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BK	140	146	27.2	--	0.991	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BK	174	178	44.4	--	0.843	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BK	117	122	15.1	--	0.943	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BK	185	192	59.4	--	0.938	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BK	142	150	31.4	--	1.097	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BK	150	158	34.5	--	1.022	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BK	275	285	190.0	BK-5B	0.914	Ripe male, milting
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BK	188	200	63.2	--	0.951	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BK	154	162	35.6	--	0.975	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BK	178	181	49.7	--	0.881	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	3	BK	191	198	86.1	--	1.236	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	3	BK	155	161	31.3	--	0.841	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	3	BK	69	73	2.4	--	0.731	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	3	BK	117	121	17.5	--	1.093	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	3	BK	56	60	2.2	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	3	BK	52	56	1.5	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	3	BK	158	163	41.4	--	1.050	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BK	152	160	34.4	--	0.980	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BK	183	193	56.5	--	0.922	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BK	135	144	25.1	--	1.020	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BK	200	210	62.0	--	0.775	Skinny
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BK	165	170	43.0	--	0.957	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BK	185	195	50.3	--	0.794	Very skinny
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BK	200	210	57.5	--	0.719	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BK	195	203	70.1	--	0.945	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BK	162	170	41.4	--	0.974	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BK	190	200	60.3	--	0.879	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BK	111	115	14.0	--	1.024	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BK	61	65	2.0	--	0.881	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BK	60	62	1.8	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BK	124	132	19.8	--	1.038	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BK	62	63	2.1	--	0.881	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BK	148	152	28.4	--	0.876	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BK	145	151	29.2	--	0.958	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BK	148	154	32.4	--	0.999	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BK	164	170	47.7	--	1.081	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BK	169	173	44.8	--	0.928	Caudal damaged
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BK	153	156	35.5	--	0.991	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BK	165	172	48.8	--	1.086	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BK	114	148	29.4	--	1.984	Caudal damaged
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	3	BK	173	178	45.8	--	0.885	Skinny
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	3	BK	266	272	210.0	--	1.116	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	118	125	16.2	--	0.986	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	115	123	16.9	--	1.111	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	325	338	350.0	BRN-1B	1.020	Ripe male, milting

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	224	232	112.1	--	0.997	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	127	134	22.9	--	1.118	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	127	136	23.7	--	1.157	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	130	139	26.0	--	1.183	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	122	129	20.2	--	1.112	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	118	125	16.2	--	0.986	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	174	186	57.5	BRN-2B	1.091	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	157	167	36.6	BRN-3B	0.946	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	205	213	95.0	--	1.103	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	103	110	11.2	--	1.025	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	121	129	19.9	--	1.123	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	65	69	3.1	--	1.129	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	64	68	2.5	--	0.954	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	128	137	23.1	--	1.101	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	115	124	17.7	--	1.164	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	63	67	3.2	--	1.280	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	64	67	2.6	--	0.992	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	58	61	2.2	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	61	64	2.5	--	1.101	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	56	59	1.5	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	46	47	1.0	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	51	54	1.4	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	94	100	7.4	--	0.891	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	61	64	2.2	--	0.969	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	178	189	59.2	--	1.050	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	124	132	22.0	--	1.154	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	62	65	2.7	--	1.133	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	58	61	1.7	--	--	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	61	64	1.9	--	0.837	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	55	58	1.1	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	61	65	2.1	--	0.925	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	67	71	3.5	--	1.164	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	62	66	2.2	--	0.923	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	67	71	3.0	--	0.997	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	57	60	1.9	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	54	57	1.3	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	61	65	1.2	--	0.529	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	66	70	3.0	--	1.043	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	59	62	1.7	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	58	61	1.7	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	54	57	1.4	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	69	72	2.8	--	0.852	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	61	65	2.1	--	0.925	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	55	59	2.1	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	58	61	2.1	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	57	60	1.9	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	54	57	1.5	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	1	BRN	65	69	2.5	--	0.910	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	63	67	3.2	--	1.280	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	117	123	16.4	--	1.024	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	126	134	23.1	--	1.155	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	106	112	12.4	--	1.041	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	122	131	20.2	--	1.112	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	137	147	28.1	--	1.093	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	61	64	2.1	--	0.925	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	62	65	2.2	--	0.923	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	63	67	2.5	--	1.000	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	135	144	24.5	--	0.996	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	54	57	1.4	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	115	123	16.5	--	1.085	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	243	253	133.3	--	0.929	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	121	129	19.7	--	1.112	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	125	132	23.0	--	1.178	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	117	124	16.2	--	1.011	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	60	63	2.0	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	61	65	2.1	--	0.925	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	185	197	73.4	--	1.159	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	136	145	27.9	--	1.109	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	60	64	2.3	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	60	63	2.5	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	135	145	27.3	--	1.110	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	58	61	1.6	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	60	63	2.2	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	176	190	57.0	--	1.046	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	111	118	13.8	--	1.009	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	135	144	26.8	--	1.089	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	69	73	3.3	--	1.005	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	55	58	1.8	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	134	142	26.5	--	1.101	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	114	121	15.2	--	1.026	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	184	194	67.2	--	1.079	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	233	242	125.1	--	0.989	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	205	215	90.2	--	1.047	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	132	140	24.7	--	1.074	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	132	138	24.4	--	1.061	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	52	55	0.9	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	56	59	1.9	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	58	61	1.9	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	55	58	1.6	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	125	133	23.1	--	1.183	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	53	56	1.0	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	61	64	2.5	--	1.101	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	63	67	2.6	--	1.040	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	63	66	3.0	--	1.200	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	56	58	1.6	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	2	BRN	55	58	1.9	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	3	BRN	64	69	2.7	--	1.030	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	3	BRN	135	146	28.6	--	1.162	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	3	BRN	64	67	3.0	--	1.144	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	3	BRN	54	57	1.4	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	3	BRN	61	64	1.6	--	0.705	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	3	BRN	66	71	3.1	--	1.078	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	3	BRN	51	54	1.2	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Lower	3	BRN	300	309	320.0	BRN-4B	1.185	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	212	221	99.4	--	1.043	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	124	130	20.7	--	1.086	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	125	134	21.6	--	1.106	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	132	141	27.4	--	1.191	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	127	135	23.5	--	1.147	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	190	198	67.9	--	0.990	Male; milting
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	180	190	69.8	--	1.197	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	220	229	114.8	--	1.078	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	235	245	140.0	--	1.079	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	134	142	27.1	--	1.126	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	214	222	110.7	--	1.130	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	134	144	28.1	--	1.168	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	124	131	20.1	--	1.054	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	123	132	20.4	--	1.096	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	224	233	104.7	--	0.932	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	64	66	2.7	--	1.030	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	119	127	20.4	--	1.211	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	65	67	3.0	--	1.092	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	59	63	2.3	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	58	61	2.1	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	63	66	3.0	--	1.200	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	65	68	3.1	--	1.129	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	64	66	2.5	--	0.954	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	57	60	2.0	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	57	60	1.8	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	55	58	1.8	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	63	66	2.4	--	0.960	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	116	125	17.4	--	1.115	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	62	65	2.0	--	0.839	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	57	60	2.1	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	64	66	2.6	--	0.992	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	55	58	2.0	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	60	63	2.3	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	62	65	2.6	--	1.091	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	1	BRN	60	64	2.4	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BRN	221	228	120.5	--	1.116	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BRN	172	182	59.8	--	1.175	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BRN	222	226	94.0	--	0.859	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BRN	125	131	21.1	--	1.080	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BRN	64	66	2.6	--	0.992	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BRN	68	72	3.4	--	1.081	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BRN	132	139	24.3	--	1.057	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BRN	126	133	23.0	--	1.150	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BRN	65	68	2.8	--	1.020	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BRN	119	126	17.6	--	1.044	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BRN	125	132	21.7	--	1.111	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BRN	70	73	3.2	--	0.933	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BRN	125	131	21.8	--	1.116	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BRN	63	66	2.4	--	0.960	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BRN	176	185	55.8	--	1.024	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BRN	67	70	3.3	--	1.097	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BRN	62	64	2.6	--	1.091	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BRN	60	63	2.7	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BRN	59	62	2.1	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BRN	60	63	2.3	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BRN	62	64	2.4	--	1.007	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	2	BRN	52	55	1.5	--	--	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	3	BRN	228	235	124.1	--	1.047	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	3	BRN	64	66	2.8	--	1.068	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	3	BRN	119	124	18.9	--	1.122	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	3	BRN	119	125	19.6	--	1.163	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	3	BRN	62	65	2.8	--	1.175	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	3	BRN	131	139	23.9	--	1.063	
9/18/2022	Upper Lee Vining Creek	ULVC-F5	Upper	3	BRN	54	57	1.5	--	--	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	281	290	210.0	BK-GL1	0.946	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	279	288	230.0	BK-GL2	1.059	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	287	292	270.0	BK-GL3	1.142	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	325	333	360.0	BK-GL4	1.049	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	270	279	250.0	BK-GL5	1.270	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	75	79	4.2	--	0.996	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	93	99	7.5	--	0.932	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	313	321	390.0	BK-GL6	1.272	Ripe male, milting
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	196	204	75.5	BK-GL7	1.003	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	136	142	23.3	BK-GL8	0.926	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	284	293	260.0	BK-GL9	1.135	Ripe male, milting
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	291	300	260.0	--	1.055	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	230	235	136.2	BK-GL10	1.119	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	298	308	280.0	BK-GL11	1.058	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	260	267	220.0	--	1.252	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	245	252	161.0	--	1.095	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	65	70	2.8	--	1.020	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	144	152	27.0	BK-GL12	0.904	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	160	167	38.8	BK-GL13	0.947	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	74	79	4.6	--	1.135	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	166	173	49.3	BK-GL14	1.078	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	50	53	1.4	--	--	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	135	140	26.0	BK-GL15	1.057	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	114	120	15.2	BK-GL16	1.026	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	149	159	31.8	--	0.961	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	96	101	8.4	--	0.949	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	137	145	26.1	BK-GL17	1.015	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	62	65	--	--	--	No weight

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	64	67	2.7	--	1.030	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BK	63	67	2.5	--	--	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BK	294	303	290.0	BK-GL18	1.141	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BK	285	298	250.0	--	1.080	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BK	101	107	9.4	--	0.912	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BK	55	58	1.7	--	--	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BK	108	114	12.1	--	0.961	
9/21/2022	Glacier Creek	GC-F1	Lower	3	BK	65	67	2.0	--	0.728	
9/21/2022	Glacier Creek	GC-F1	Lower	3	BK	156	163	41.9	BK-GL19	1.104	Male, milting
9/21/2022	Glacier Creek	GC-F1	Upper	1	BK	53	56	1.3	--	--	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BK	104	110	11.5	--	1.022	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BK	110	118	13.6	--	1.022	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BK	66	69	2.9	--	1.009	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BK	106	112	12.6	--	1.058	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BK	211	219	106.1	BK-GL20	1.129	Ripe Male, milting
9/21/2022	Glacier Creek	GC-F1	Upper	1	BK	122	128	18.4	--	1.013	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BK	108	115	13.8	--	1.095	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BK	138	145	26.0	--	0.989	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BK	52	54	1.3	--	--	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BK	63	67	2.6	--	1.040	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BK	59	62	2.1	--	--	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BK	137	145	26.2	--	1.019	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BK	144	149	28.9	--	0.968	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BK	134	140	26.4	--	1.097	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BK	127	134	20.3	--	0.991	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BK	146	150	33.6	--	1.080	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BK	58	62	2.5	--	--	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BK	155	162	40.3	--	1.082	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/21/2022	Glacier Creek	GC-F1	Upper	2	BK	101	106	9.7	--	0.941	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BK	62	65	2.6	--	1.091	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BK	108	114	11.2	--	0.889	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BK	68	71	1.8	--	0.572	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BK	59	61	2.4	--	--	
9/21/2022	Glacier Creek	GC-F1	Upper	3	BK	70	74	3.8	--	1.108	
9/21/2022	Glacier Creek	GC-F1	Upper	3	BK	106	112	11.6	--	0.974	
9/21/2022	Glacier Creek	GC-F1	Upper	3	BK	100	104	8.9	--	--	
9/21/2022	Glacier Creek	GC-F1	Upper	3	BK	265	275	210.0	--	1.128	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	130	138	24.3	BRN-GL1	1.106	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	141	149	30.1	BRN-GL2	1.074	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	191	200	67.0	BRN-GL3	0.962	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	166	172	45.7	BRN-GL4	0.999	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	299	305	240.0	BRN-GL5	0.898	Male, milting
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	73	75	3.1	--	0.797	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	118	125	18.2	BRN-GL6	1.108	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	157	164	38.5	BRN-GL7	0.995	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	157	163	37.1	BRN-GL8	0.959	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	67	71	3.5	--	1.164	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	66	69	3.3	--	1.148	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	150	160	35.0	BRN-GL9	1.037	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	164	170	45.5	--	1.032	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	150	158	34.4	--	1.019	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	145	153	31.9	--	1.046	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	125	132	22.3	BRN-GL10	1.142	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	71	76	4.1	--	1.146	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	118	126	18.0	BRN-GL11	1.096	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	147	156	32.7	--	1.029	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	68	72	4.1	--	1.304	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	71	76	4.1	--	1.146	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	68	72	3.7	--	1.177	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	108	116	14.5	--	1.151	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	121	131	22.8	--	1.287	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	125	134	21.8	--	1.116	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	61	66	2.2	--	0.969	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	51	68	2.3	--	--	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	123	132	21.3	--	1.145	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	115	122	17.9	--	1.177	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	119	126	17.4	--	1.033	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	65	68	2.7	--	0.983	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	67	70	2.5	--	0.831	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	113	119	16.3	--	1.130	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	61	63	2.5	--	1.101	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	115	122	16.5	--	1.085	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	63	65	2.4	--	0.960	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	102	111	12.8	--	1.206	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	65	68	3.0	--	1.092	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	72	76	4.3	--	1.152	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	114	122	17.9	--	1.208	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	71	75	4.5	--	1.257	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	64	69	3.2	--	1.221	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	70	74	3.5	--	1.020	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	67	72	3.7	--	1.230	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	129	138	23.9	--	1.113	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	67	70	4.2	--	1.396	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	69	72	3.1	--	0.944	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	65	69	2.9	--	1.056	
9/21/2022	Glacier Creek	GC-F1	Lower	1	BRN	70	74	4.0	--	1.166	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BRN	177	185	55.8	--	1.006	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BRN	150	160	34.7	--	1.028	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BRN	123	133	18.5	--	0.994	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BRN	115	122	18.2	--	1.197	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BRN	74	81	3.8	--	0.938	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BRN	118	126	19.4	--	1.181	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BRN	70	73	4.6	--	1.341	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BRN	65	69	2.8	--	1.020	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BRN	65	70	3.1	--	1.129	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BRN	64	67	2.7	--	1.030	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BRN	63	67	3.0	--	1.200	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BRN	73	78	4.2	--	1.080	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BRN	71	74	3.8	--	1.062	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BRN	73	76	4.4	--	1.131	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BRN	65	71	2.7	--	0.983	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BRN	62	65	2.6	--	1.091	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BRN	80	84	5.8	--	1.133	
9/21/2022	Glacier Creek	GC-F1	Lower	2	BRN	63	67	3.2	--	1.280	
9/21/2022	Glacier Creek	GC-F1	Lower	3	BRN	185	194	63.4	--	1.001	
9/21/2022	Glacier Creek	GC-F1	Lower	3	BRN	126	135	23.5	--	1.175	
9/21/2022	Glacier Creek	GC-F1	Lower	3	BRN	119	126	19.4	--	1.151	
9/21/2022	Glacier Creek	GC-F1	Lower	3	BRN	72	76	3.2	--	0.857	
9/21/2022	Glacier Creek	GC-F1	Lower	3	BRN	62	66	2.4	--	1.007	
9/21/2022	Glacier Creek	GC-F1	Lower	3	BRN	69	73	3.4	--	1.035	
9/21/2022	Glacier Creek	GC-F1	Lower	3	BRN	133	140	26.7	--	1.135	
9/21/2022	Glacier Creek	GC-F1	Lower	3	BRN	145	152	32.4	--	1.063	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/21/2022	Glacier Creek	GC-F1	Lower	3	BRN	69	73	4.0	--	1.218	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	68	72	3.7	--	1.177	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	63	66	2.9	--	1.160	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	168	178	51.9	--	1.095	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	136	146	27.4	--	1.089	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	128	135	23.4	--	1.116	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	115	123	17.0	--	1.118	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	63	66	2.9	--	1.160	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	119	127	20.4	--	1.211	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	76	81	5.4	--	1.230	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	119	126	20.6	--	1.222	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	103	121	16.4	--	1.501	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	107	115	13.6	--	1.110	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	64	68	3.2	--	1.221	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	64	69	3.1	--	1.183	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	66	71	3.3	--	1.148	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	67	72	3.9	--	1.297	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	69	73	3.9	--	1.187	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	68	72	3.4	--	1.081	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	67	71	3.7	--	1.230	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	130	139	25.0	--	1.138	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	187	195	67.1	--	1.026	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	117	125	18.8	--	1.174	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	67	71	3.6	--	1.197	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	71	76	4.3	--	1.201	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	107	115	14.9	--	1.216	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	65	68	3.0	--	1.092	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	67	70	3.5	--	1.164	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	67	71	3.1	--	1.031	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	126	135	22.7	--	1.135	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	78	82	5.2	--	1.096	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	124	131	20.3	--	1.065	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	70	74	3.8	--	1.108	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	110	118	15.4	--	1.157	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	74	79	4.1	--	1.012	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	61	65	2.8	--	1.234	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	500	510	960.0	BRN-GL12	0.768	Picture on phone
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	173	183	57.0	--	1.101	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	119	127	18.1	--	1.074	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	117	126	17.9	--	1.118	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	65	69	3.9	--	1.420	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	70	75	4.3	--	1.254	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	154	163	41.2	--	1.128	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	156	167	43.1	--	1.135	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	215	225	95.5	BRN-GL13	0.961	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	232	244	132.6	BRN-GL14	1.062	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	64	67	4.1	--	1.564	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	70	74	4.8	--	1.399	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	68	71	4.4	--	1.399	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	65	70	3.3	--	1.202	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	68	72	3.5	--	1.113	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	70	75	4.4	--	1.283	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	68	73	3.3	--	1.050	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	120	128	19.9	--	1.152	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	115	123	18.1	--	1.190	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	63	65	3.3	--	1.320	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	72	76	4.1	--	1.098	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	66	69	3.0	--	1.043	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	59	62	2.4	--	--	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	72	76	4.2	--	1.125	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	69	74	3.7	--	1.126	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	64	68	3.0	--	1.144	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	164	172	45.9	--	1.041	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	62	64	2.0	--	0.839	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	69	72	3.9	--	1.187	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	65	68	2.8	--	1.020	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	76	79	3.5	--	0.797	
9/21/2022	Glacier Creek	GC-F1	Upper	1	BRN	74	76	3.1	--	0.765	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BRN	146	159	35.9	--	1.154	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BRN	149	159	33.7	--	1.019	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BRN	162	171	45.7	--	1.075	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BRN	65	68	2.9	--	1.056	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BRN	58	62	2.7	--	--	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BRN	184	190	62.8	--	1.008	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BRN	74	76	3.2	--	0.790	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BRN	155	166	38.4	--	1.031	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BRN	145	155	33.5	--	1.099	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BRN	121	128	18.2	--	1.027	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BRN	179	187	59.4	--	1.036	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BRN	113	119	15.3	--	1.060	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BRN	138	147	30.0	--	1.142	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BRN	111	118	14.0	--	1.024	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BRN	112	121	14.1	--	1.004	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BRN	128	135	21.8	--	1.040	

Survey Date	Stream	Site	Segment	Pass #	Species Code	FL (mm)	TL (mm)	Weight (g)	scale sample #	K-value (fish >60 mm)	Notes
9/21/2022	Glacier Creek	GC-F1	Upper	2	BRN	78	82	5.2	--	1.096	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BRN	67	70	2.8	--	0.931	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BRN	74	77	4.0	--	0.987	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BRN	65	69	2.4	--	0.874	
9/21/2022	Glacier Creek	GC-F1	Upper	2	BRN	61	64	2.5	--	1.101	
9/21/2022	Glacier Creek	GC-F1	Upper	3	BRN	71	75	3.7	--	1.034	
9/21/2022	Glacier Creek	GC-F1	Upper	3	BRN	61	64	1.6	--	0.705	
9/21/2022	Glacier Creek	GC-F1	Upper	3	BRN	64	69	1.4	--	0.534	
9/21/2022	Glacier Creek	GC-F1	Upper	3	BRN	72	76	3.5	--	0.938	
9/21/2022	Glacier Creek	GC-F1	Upper	3	BRN	73	77	3.6	--	0.925	
9/21/2022	Glacier Creek	GC-F1	Upper	3	BRN	116	125	17.2	--	1.102	
9/21/2022	Glacier Creek	GC-F1	Upper	3	BRN	75	78	4.7	--	1.114	
9/21/2022	Glacier Creek	GC-F1	Upper	3	BRN	161	169	47.9	--	1.148	
9/21/2022	Glacier Creek	GC-F1	Upper	3	BRN	70	74	3.4	--	0.991	
9/21/2022	Glacier Creek	GC-F1	Upper	3	BRN	75	77	4.4	--	1.043	
9/21/2022	Glacier Creek	GC-F1	Upper	3	BRN	67	70	3.0	--	0.997	

FL = fork length; g = gram; mm = millimeter; TL = total length

APPENDIX C
STREAM FISH POPULATIONS
STUDY SITE HABITAT DATA

Table C-1. Stream Fish Populations Study Site Habitat Data, September 2022

Sample site ID	Segment	Length (feet)	Max depth (feet)	Avg. width (feet)	Segment width (feet)					Habitat type (%)				Substrate composition (%)						Cover % [a]						
					1	**2**	**3**	**4**	**5**	**Pool**	**Low gradient riffle**	**High gradient riffle**	**Run**	**Bedrock**	**Boulder**	**Cobble**	**Gravel**	**Sand**	**Silt**	**Undercut bank**	**Instream veg.**	**Over-hangin**	**Large woody**	**Large. boulder**	**Bubble**	**No cover**
LLVC-F1	Lower	163	4.1	30.6	23.2	33.1	49.0	29.2	18.5	40	30	0	30	0	5	20	25	50	0	10	25	10	5	10	5	35
	Upper	234	3.2	26.6	36.0	24.0	34.4	19.3	19.5	25	40	0	35	0	10	30	20	40	0	35	10	35	25	5	5	0
ULVC-F1	Lower	166	2.3	26.7	24.3	32.6	17.0	27.3	32.1	0	60	0	40	0	5	60	25	10	0	5	0	10	0	5	20	60
	Upper	163	1.3	25.5	26.0	23.2	23.5	28.8	26.0	0	60	40	0	0	10	70	20	0	0	0	0	15	0	5	15	65
ULVC-F2	Lower	175	3.2	22.5	18.7	23.6	26.9	16.3	26.8	20	50	0	30	0	2	50	38	10	0	10	0	5	0	0	0	85
	Upper	125	1.4	28.4	26.8	33.3	24.1	37.7	20.0	2	95	0	3	0	5	10	80	5	0	5	2	5	0	0	2	86
ULVC-F3	Lower	170	1.2	21.0	22.1	13.4	21.8	14.7	33	5	95	0	0	0	5	90	5	0	0	15	5	30	2	0	30	18
	Upper	135	1.7	15.8	19.1	14.9	13	10.4	21.8	0	0	100	0	0	40	60	0	0	0	0	0	30	0	50	60	0
ULVC-F4	Lower	166	1.6	16.3	13.7	14.8	14	19.7	19.2	0	0	100	0	0	60	40	0	0	0	5	0	10	0	75	75	0
	Upper	172	1.8	21.4	12.8	16.9	24	23	30.1	0	0	100	0	0	55	35	10	0	0	5	2	15	3	30	80	0
ULVC-F5	Lower	183	1.6	26.6	25.0	23.0	27.4	25.5	32.0	5	0	85	10	0	20	70	10	0	0	5	0	15	10	10	60	0
	Upper	131	1.4	22.2	25.0	19.0	22.0	21.0	24.0	0	5	95	0	0	50	50	0	0	0	5	0	10	0	50	60	0
GLC-F1	Lower	154	1.7	12.9	15.2	16.8	11.7	12.3	8.5	5	70	10	15	0	15	55	30	0	0	15	0	10	5	10	5	55
	Upper	174	1.2	11.2	14.2	8.5	9.2	10.4	13.5	0	20	30	40	0	30	50	20	0	0	10	0	10	0	30	20	30

[a] Cover is reported for each segment. In cases where cover types overlap (e.g., overhanging vegetation above bubbles) both were reported, which can lead to totals equaling over 100 percent.

SOUTHERN CALIFORNIA EDISON
Lee Vining Hydroelectric Project
(FERC Project No. 1388)

AQUATIC HABITAT MAPPING AND SEDIMENT CHARACTERIZATION (AQ-3)
FINAL TECHNICAL REPORT

SEPTEMBER 2024

SOUTHERN CALIFORNIA EDISON

Lee Vining Hydroelectric Project
(FERC Project No. 1388)

AQUATIC HABITAT MAPPING AND SEDIMENT CHARACTERIZATION (AQ-3) FINAL TECHNICAL REPORT

Southern California Edison
2244 Walnut Grove Avenue
Rosemead, CA 91770

September 2024

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LIST OF ACRONYMS AND ABBREVIATIONS

CDFW	California Department of Fish and Wildlife
FERC	Federal Energy Regulatory Commission
ft^2	square feet
ft^3	cubic feet
GPS	Global Positioning System
LADWP	Los Angeles Department of Water and Power
PAD	Pre-Application Document
Project	Lee Vining Hydroelectric Project (FERC Project No. 1388)
SCE	Southern California Edison
TWG	Technical Working Group

1.0 INTRODUCTION

The Lee Vining Hydroelectric Project, Federal Energy Regulatory Commission (FERC) Project No. 1388 (Project), includes three Project-affected stream reaches that support coldwater game fish species: upper Lee Vining Creek between Saddlebag Dam and Ellery Lake, lower Lee Vining Creek between Poole Powerhouse and the Los Angeles Department of Water and Power's (LADWP) Lee Vining Creek Diversion Dam, and Glacier Creek between Tioga Dam and its confluence with Lee Vining Creek (Figure 1-1). 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 and their habitats.

The Aquatic Habitat Mapping and Sediment Characterization Study (AQ-3) was conducted to characterize habitat conditions in Project-affected stream reaches following methods described in the AQ-3 Final Technical Study Plan filed with FERC in April 2022 (SCE, 2022). This report includes the results of stream habitat and spawning gravel mapping surveys conducted under Study AQ-3.

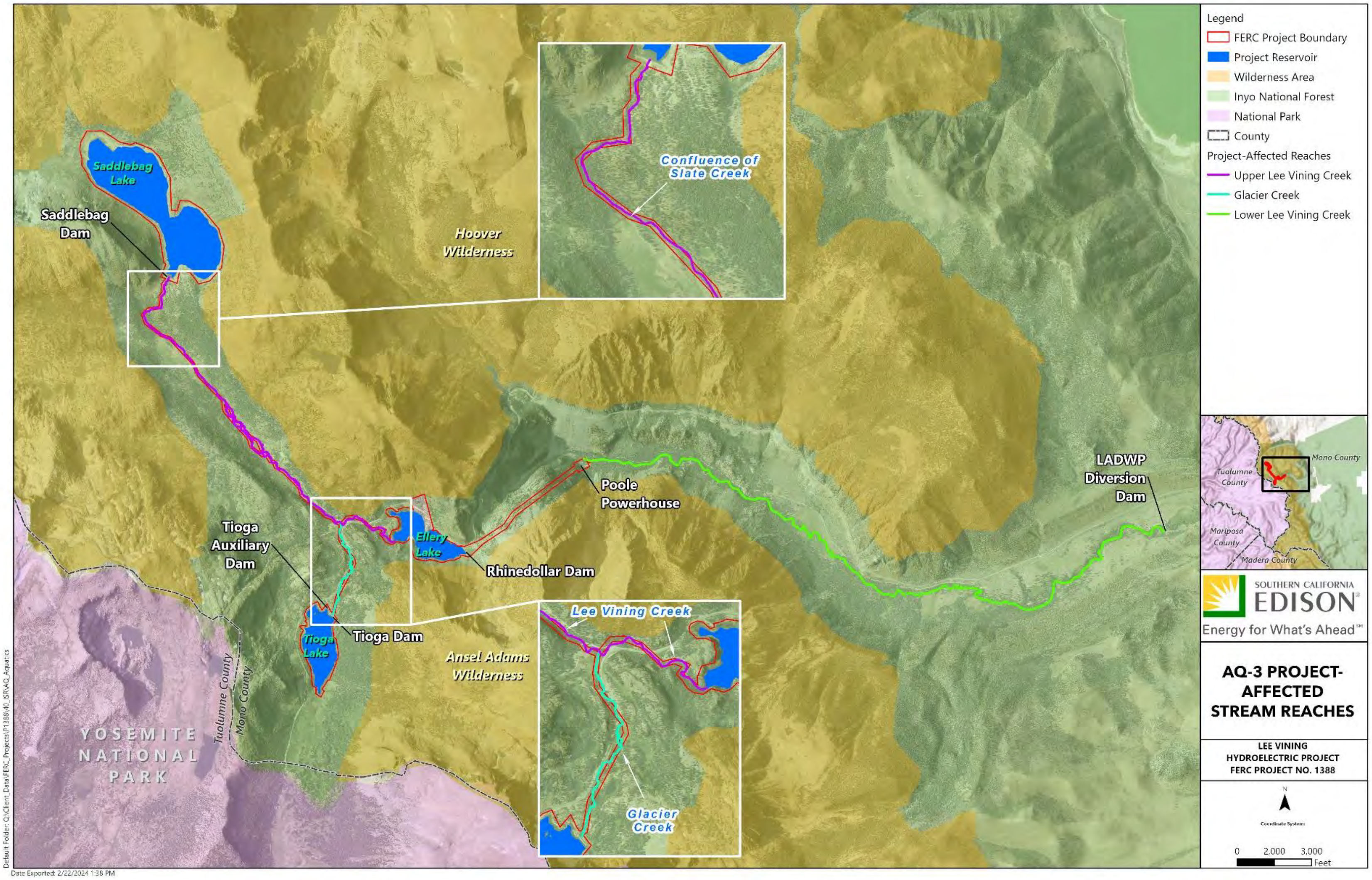


Figure 1-1. Project-Affected Stream Reaches.

1.1. EXISTING INFORMATION

Lee Vining Creek between Saddlebag Dam and Ellery Lake is composed of mostly run and riffle habitat with relatively few pools. Aquatic habitat surveys conducted in 1986 indicate that the upper reach of Lee Vining Creek between Saddlebag Dam and the confluence of Slate Creek is characterized by moderate-gradient riffle habitat (approximately 85 percent), some of which is 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 characterized by two low-gradient channel sections that flow through meadows within a wide floodplain area and are separated by a steeper gradient canyon and a section of broad riffles and runs as the creek approaches Glacier Creek. The reach between the confluence of Glacier Creek and Ellery Lake is characterized by a wide and relatively shallow channel that includes a mixture of riffle and run habitat (EA, 1986). No aquatic habitat surveys have been conducted in downstream reaches of Lee Vining Creek or in Glacier Creek.

More recent studies have documented spawning gravel within Lee Vining Creek between Saddlebag Dam and Slate Creek; however, no information was reported regarding spawning gravel within Glacier Creek or Lee Vining Creek downstream of Slate Creek (Sada, 2007; Sada and Rosamond, 2011, as cited in Salamunovich, 2017).

Additional information on aquatic habitat conditions within Project-affected stream reaches is presented in Section 5.3.4, *Aquatic Habitat*, of the Pre-Application Document (PAD; SCE, 2021).

2.0 STUDY GOALS AND OBJECTIVES

Study goals and objectives were determined during the February 22 and March 29, 2021, Aquatic Resources Technical Working Group (TWG) meetings. Goals of this study were to determine habitat conditions for fisheries within Project-affected stream reaches and to characterize baseline conditions of channel substrate (e.g., fines and coarse sediments). Objectives of this study were to (1) characterize aquatic habitat types, (2) characterize spawning gravel patches (i.e., coarse sediment), and (3) determine potential habitat-related limiting factors for the trout population within Project-affected stream reaches.

2.1. STUDY AREA

The Study Area included the following Project-affected stream reaches of Lee Vining and Glacier Creeks:

- Upper Lee Vining Creek between Saddlebag Dam and the confluence of Slate Creek
- Upper Lee Vining Creek between the confluence of Slate Creek and Ellery Lake
- Lower Lee Vining Creek between Poole Powerhouse and the LADWP Diversion Dam
- Glacier Creek between Tioga Dam and the confluence with Lee Vining Creek

3.0 METHODS

Stream habitat surveys were conducted from August 29 to September 7, 2023, using methods described in the AQ-3 Final Technical Study Plan (SCE, 2022).

3.1. HABITAT MAPPING

Habitat mapping was conducted in safely accessible sections of Project-affected stream reaches during late-summer/fall baseflow conditions in 2023. Two teams of two individuals conducted pedestrian surveys to map aquatic habitat by delineating distinct habitat units within each Project-affected stream reach. A three-tiered habitat mapping classification system developed by Hawkins et al. (1993) was used to assist in the identification of individual habitat units in the field. Level I categorizes habitats as either “fast water” or “slow water.” Level II subdivides “fast water” into “turbulent” or “non-turbulent” and “slow water” into either “scour pool” or “dammed pool.” Habitat types classified in Level III are generally modified/adopted from McCain et al. (1990).

Habitat units were designated using the habitat-type definitions identified in Table 3.1-1. Habitat units were separately identified when the unit length was at least equal to one to two times the active channel width (McCain et al., 1990; Flosi et al., 2010) and/or when habitat types were distinctive. Mapping was contiguous within accessible portions of the channel—each habitat unit abutted to the next unit—and each distinct habitat unit was numbered consecutively in an upstream direction, beginning at the downstream end of each sampling reach. The upstream and downstream extent of each habitat unit was recorded using a tablet equipped with Global Positioning System (GPS) software (ArcGIS Collector) to an accuracy of approximately 1 to 10 meters (3 to 32 feet). In addition to habitat typing, other habitat attributes identified in Table 3.1-2 were quantified and recorded.

Table 3.1-1. Stream Habitat-Type Classifications Used in Mapping

Classification	Description
I. Fast Water:	**Riffles, rapid, shallow stream sections with steep water surface gradient.**
A. Turbulent:	**Channel units having swift current, high channel roughness (large substrate), steep gradient, and non-laminar flow and characterized by surface turbulence.**
1. Fall:	Steep vertical drop in water surface elevation.
2. Cascade:	Series of alternating small falls and shallow pools; substrate usually bedrock and boulders. Gradient high (more than 4%).
3. Chute:	Narrow, confined channel with rapid, relatively unobstructed flow and bedrock substrate.
4. Rapid:	Deeper stream section with considerable surface agitation and swift current; large boulder and standing waves often present.

Classification	Description
5. Riffles:	Shallow, lower-gradient channel units with moderate current velocity and some partially exposed substrate (usually cobble). • **Low gradient**—Shallow with swift flowing, turbulent water. Partially exposed substrate dominated by cobble. Gradient moderate (less than 4%) • **High gradient**—Moderately deep with swift flowing, turbulent water. Partially exposed substrate dominated by boulder. Gradient steep (greater than 4%).
B. Non-turbulent:	**Channel units having low channel roughness, moderate gradient, laminar flow, and lack of surface turbulence.**
1. Sheet:	Shallow water flowing over smooth bedrock.
2. Run/Glide:	Shallow (glide) to deep (run) water flowing over a variety of different substrates.
3. Step run:	A sequence of runs separated by short riffle steps. Substrates are usually cobble and boulder dominated.
4. Pocket water:	Swift flowing water with large boulder or bedrock obstructions creating eddies, small backwater, or scour holes. Gradient low to moderate.
II. Slow Water:	**Pools; slow, deep stream sections with nearly flat-water surface gradient.**
A. Scour Pool:	**Formed by scouring action of current.**
1. Trench:	Formed by scouring of bedrock.
2. Mid-channel:	Formed by channel constriction or downstream hydraulic control.
3. Convergence:	Formed where two stream channels meet.
4. Lateral:	Formed where flow is deflected by a partial channel obstruction (streambank, rootwad, log, or boulder).
5. Plunge:	Formed by water dropping vertically over channel obstruction.
B. Dammed Pool:	**Water impounded by channel blockage.**
1. Debris:	Formed by rootwads and logs.
2. Beaver:	Formed by beaver dam.
3. Landslide:	Formed by large boulders.
4. Backwater:	Formed by obstructions along banks (Recorded as a comment or note to mapping).
5. Abandoned Channel:	Formed along main channel, usually associated with gravel bars (Not part of the main active channel; recorded as a comment or note to mapping).

Sources: Adapted from Armantrout, 1998: Hawkins et al., 1993: McCain et al., 1990; McMahon et al., 1996; and Payne, 1992

Table 3.1-2. Habitat Unit Attributes Assessed During Habitat Mapping

Attribute	Description
Substrate	Dominant streambed and stream bank substrate types include bedrock, boulder (> 10 inches), cobble (2.5 to 10 inches), gravel (0.12 to 2.5 inch), sand, and silt.
Stream width	Average wetted width of a unit: On-the-ground mapping estimated by eye, periodically checking the estimates with a rangefinder, stadia rod, or tape.

Attribute	Description
Average stream depth	Average depth of each unit estimated from instream measurements with a stadia rod.
Maximum stream depth	The maximum depth of each unit, measured instream with a stadia rod.
Pool depth	Average depth estimate and measured maximum depth for each pool reach.
Channel Confinement	Ratio of width of active (wetted) channel to total stream channel (floodplain) width: • Confined shallow = channel width confined and stream shallow (< 4 feet) • Confined deep = channel width confined and stream deep (> 4 feet) • Moderate confined = total stream channel width < 2 wetted channel widths • Unconfined = total stream channel width ≥ to 2 wetted channel widths
Pool tail embeddedness	Percent in which gravel or larger substrates are vertically embedded in sand or smaller substrates at the downstream end of pool habitat.
Spawning gravel	Spawning gravel for trout species includes a sediment size composition between 0.2 and 3.9 inches located in an area with adequate water depth and velocity (i.e., greater than 9.4 inches and 15.7 to 35.8 inches per second, respectively) during flows with a recurrence interval of up to 1.5 years (Bjornn and Reiser, 1991).
Cover type	Significant cover types in a unit if cover is > 25 percent of the surface area. Cover type categories include: • Boulder cover • Vegetation cover • Wood cover
Fish migration barrier	Description and location of any potential barrier to upstream or downstream fish migration at approximately bankfull flows, including waterfalls, high velocity chutes or cascades.
Temperature	Grab samples of water temperature.
Tributary inflow	Estimate of any tributary inflow.
Landmarks	Description and location of any feature that might provide a location reference point.

3.2. SPAWNING GRAVEL MAPPING

Concurrent with habitat mapping, the location, size, quality, and particle distribution of spawning gravel patches were recorded. Spawning gravel for trout species includes a sediment size composition between 0.2 and 3.9 inches (6 to 100 millimeters) located in an area with adequate water depth and velocity (i.e., greater than 9.4 inches [24 centimeters] and 15.7 to 35.8 inches per second [40 to 91 centimeters per second], respectively) during flows with a recurrence interval of up to 1.5 years (Bjornn and Reiser, 1991).

The location of each spawning gravel patch was identified with a GPS point and given a quality score based on embeddedness and particle characteristics (e.g., size, shape, angularity, roundness) to evaluate overall quality of available spawning gravel within each reach. The length and width of each patch were measured with a laser rangefinder, tape, or stadia rod, and sediment depth was measured with a Silvy rod. Each patch was described in geomorphic terms and assigned an activity class (e.g., active, semiactive, nonactive) based on relative position and indicators of sediment residence time. The D50 (median particle size), D84 (particle size at which 84 percent of the grain size distribution is finer), and D16 (particle size at which 16 percent of the grain size distribution is finer) were visually estimated for each patch.

Spawning gravel patches were identified as being potentially spawnable under observed (i.e., low-flow) conditions or potentially spawnable under higher-flow conditions. The potential for gravel patch inundation under spill-flow conditions was assessed using channel bed indicators (e.g., position/elevation of bankfull stage, presence of a floodplain, or evidence of inundation features such as the staining of rocks).

3.3. PASSAGE BARRIER MAPPING

Barriers to upstream fish passage were documented during the pedestrian habitat-typing surveys. Surveyors used a tablet to record the location of each barrier along with other information that included the reach in which the barrier occurred, a description of the feature, and whether a barrier occurred only at low flows or at all flows.

3.4. ANALYSIS

All habitat mapping data were exported into a Microsoft Excel spreadsheet and reviewed for quality control. The relative abundance of stream habitat types was calculated, and pertinent stream habitat-attribute values (e.g., confinement, channel width, and dominant substrate) were summarized by stream reach. Habitat-type composition was calculated using the individual unit lengths as well as the number of representative habitat units.

Spawning gravel area and distribution were evaluated. The volume of spawning gravel by quality and total potentially suitable spawning gravel per mile or reach of stream were also calculated. Information gathered regarding channel morphology and coarse sediment supply and storage was assessed in consideration of influences of the Project on hydrology and sediment supply downstream of Project dams.

3.5. MODIFICATIONS TO METHODS

No modifications to the methods as outlined in the AQ-3 Final Technical Study Plan (SCE, 2022) occurred during study implementation.

4.0 STUDY RESULTS

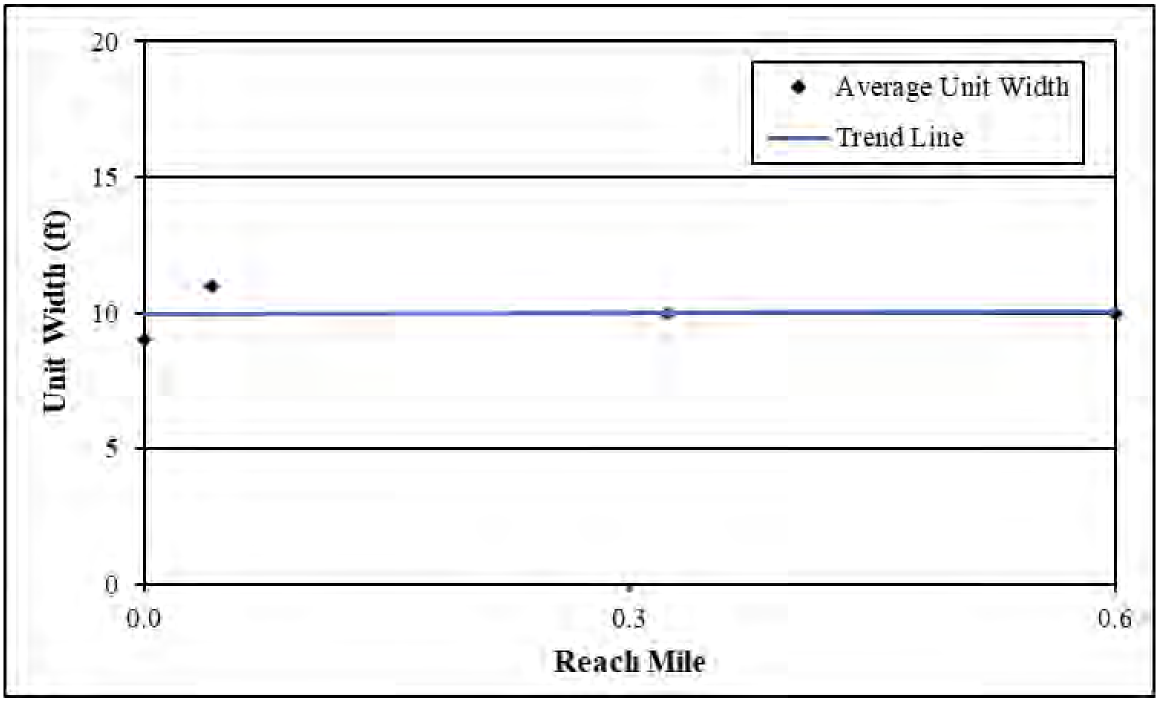
4.1. STREAM HABITAT

Upper Lee Vining Creek between Saddlebag Dam and the confluence of Slate Creek includes approximately 0.6 mile of Lee Vining Creek. This reach primarily consists of high-gradient riffles and cascades (Table 4.1-1). Representative photos of habitat conditions within this reach are included in Appendix A. Approximately 0.3 mile upstream of the confluence with Slate Creek, Lee Vining Creek becomes deeply confined as it enters a narrow canyon with multiple cascades and falls; field crews were unable to safely walk this section of the reach due to steep canyon walls. Field crews typed habitat in this section by looking downstream from the upstream end of the canyon. Stream widths are narrow within this reach and consistent throughout (Figure 4.1-1). Dominant substrate types within this reach are boulder and cobble substrate with minimal amounts of smaller substrates (Figure 4.1-2). Habitat-typing data are included in Appendix B, and habitat-attribute data are included in Appendix C.

Table 4.1-1. Stream Habitat-Typing Summary for Lee Vining Creek Between Saddlebag Dam and the Confluence of Slate Creek, 2023

Habitat Type	Total Length (feet)	Length Relative Frequency (%)	Number of Units	Unit Relative Frequency (%)	Average Width (feet)	Average Pool Depth (feet)
Cascade	1,488	47.9	1	25.0	10.0	--
High-gradient riffle	1,523	49.0	2	50.0	10.5	--
Step run	97	3.1	1	25.0	9.0	--
Total	**3,108**	**100.0**	**4**	**100.0**	**--**	**--**

% = percent; -- = no data



Reach Miles begin at the upstream end of the reach and the mapped linear distance of each habitat unit was calculated to get Reach Mile.

Figure 4.1-1. Average Stream Channel Width of Lee Vining Creek Between Saddlebag Dam (Reach Mile 0.0) and the Confluence of Slate Creek (Reach Mile 0.6), 2023.

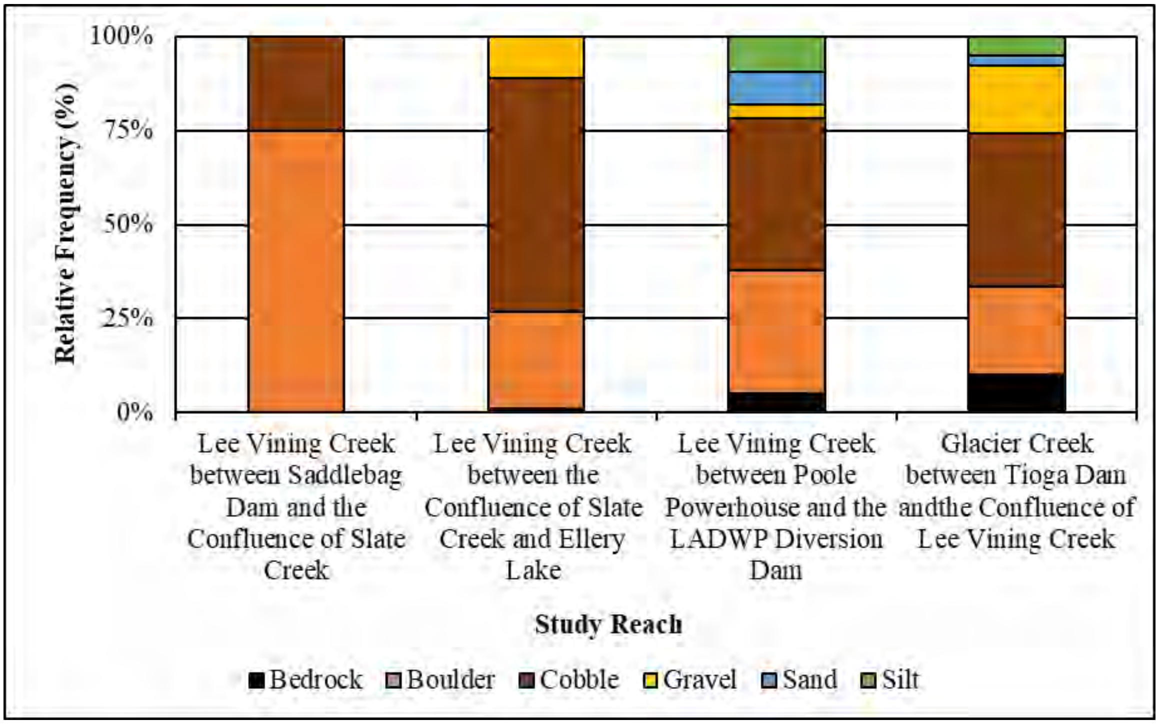


Figure 4.1-2. Dominant Substrate Types in Lee Vining Creek and Glacier Creek, 2023.

Upper Lee Vining Creek between the confluence of Slate Creek and Ellery Lake includes approximately 3.1 miles of Lee Vining Creek. This reach is composed of two low-gradient meadow sections separated by brief high-gradient canyon sections; habitat within this reach is characterized by low-gradient riffles and step runs (Table 4.1-2). Representative photos of habitat conditions within this reach are included in Appendix A. The channel within this reach narrows near Slate Creek but is primarily unconfined as it flows through the meadow sections (Figure 4.1-3). Dominant substrate types in this reach are cobble and boulder substrate with large deposits of gravel within the meadow sections (Figure 4.1-2). Habitat-typing data are included in Appendix B, and habitat-attribute data are included in Appendix C.

Table 4.1-2. Habitat-Typing Summary for Lee Vining Creek Between the Confluence of Slate Creek and Ellery Lake, 2023

Habitat Type	Total Length (feet)	Length Relative Frequency (%)	Number of Units	Unit Relative Frequency (%)	Average Width (feet)	Average Pool Depth (feet)
Cascade	92	0.6	1	1.1	11.0	--
High-gradient riffle	2,794	17.1	12	13.3	17.1	--
Low-gradient riffle	6,506	39.8	29	32.2	20.0	--
Run	2,608	16.0	20	22.2	18.2	--
Step run	3,333	20.4	15	16.7	18.1	--
Scour pool	1,009	6.2	13	14.4	20.2	3.3
Total	**16,342**	**100.0**	**90**	**100.0**	**--**	**--**

% = percent; -- = no data

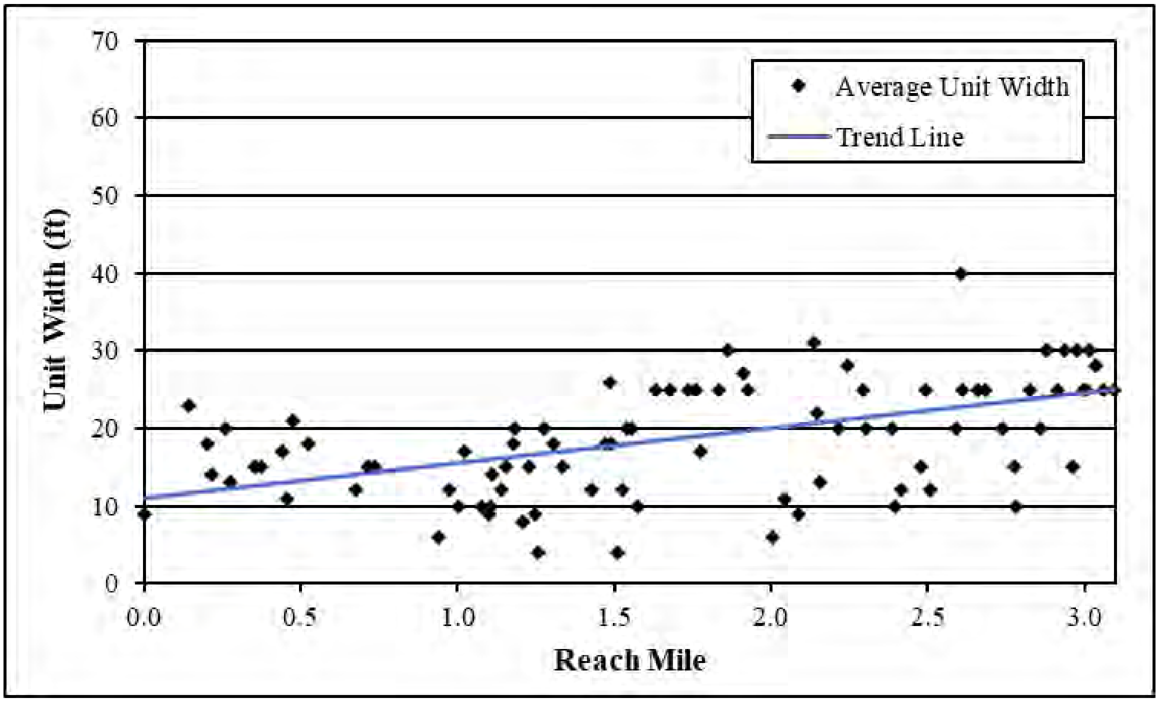


Figure 4.1-3. Average Stream Channel Width of Lee Vining Creek Between the Confluence of Slate Creek (Reach Mile 0.0) and Ellery Lake (Reach Mile 3.0), 2023.

Lower Lee Vining Creek between Poole Powerhouse and the LADWP Diversion Dam includes approximately 6.6 miles of Lee Vining Creek. Within this reach, Lee Vining Creek primarily consists of high-gradient riffles and runs but also contains a high frequency of pool habitat (Table 4.1-3). Approximately 3 miles downstream of Poole Powerhouse, Lee Vining Creek enters a large meadow where habitat consists of contiguous run habitat for more than 0.6 mile. At the upstream and downstream ends of the reach, Lee Vining Creek flows through confined canyon sections, while the middle section of the reach runs through a large unconfined meadow. Overall, Lee Vining Creek is moderately confined in this reach, and the stream width narrows near Poole Powerhouse (Figure 4.1-4). Representative photos of habitat conditions within this reach are included in Appendix A. Dominant substrate types within the reach are primarily cobble and boulder substrate; however, the low-gradient habitat types in the reach primarily contained sand, silt, and gravel substrates (Figure 4.1-2). Habitat-typing data are included in Appendix B, and habitat-attribute data are included in Appendix C.

Table 4.1-3. Stream Habitat-Typing Summary for Lee Vining Creek Between Poole Powerhouse and the LADWP Diversion Dam, 2023

Habitat Type	Total Length (feet)	Length Relative Frequency (%)	Number of Units	Unit Relative Frequency (%)	Average Width (feet)	Average Pool Depth (feet)
Cascade	2,248	6.5	9	4.1	26.7	--
Fall	111	0.3	3	1.4	50.0	--
High-gradient riffle	8,056	23.3	39	17.7	24.5	--

Habitat Type	**Total Length (feet)**	**Length Relative Frequency (%)**	**Number of Units**	**Unit Relative Frequency (%)**	**Average Width (feet)**	**Average Pool Depth (feet)**
Low-gradient riffle	4,934	14.3	36	16.4	28.3	--
Run	7,987	23.1	47	21.4	23.8	--
Step run	6,311	18.2	29	13.2	23.7	--
Scour pool	3,656	10.6	45	20.5	29.3	3.9
Dammed pool	1,295	3.7	12	5.5	58.3	4.2
Total	**34,598**	**100.0**	**220**	**100.0**	**--**	**--**

% = percent; -- = no data

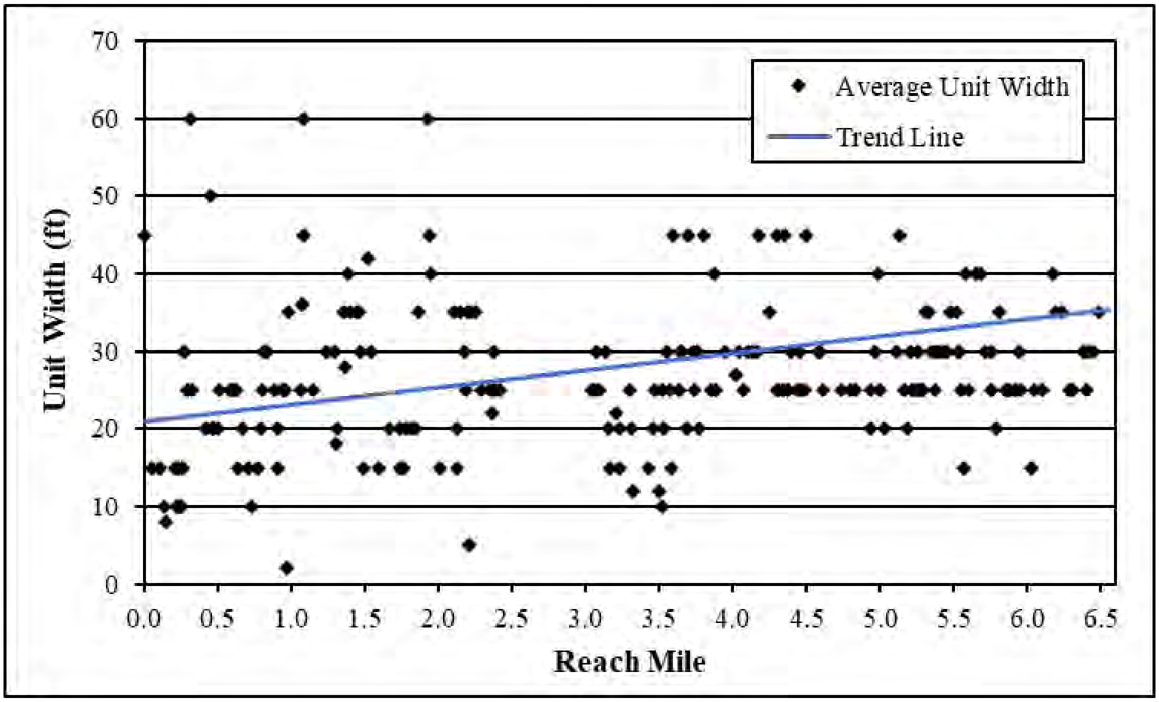


Figure 4.1-4. Average Stream Channel Width of Lee Vining Creek Between Poole Powerhouse (Reach Mile 0.0) and the LADWP Diversion Dam (Reach Mile 6.5), 2023.

Glacier Creek between Tioga Dam and the confluence of Lee Vining Creek includes approximately 0.8 mile of Glacier Creek. This reach consists of similar amounts of low- and high-gradient riffle, run, and pool habitats (Table 4.1-4). Representative photos of habitat conditions within this reach are included in Appendix A. The stream channel is largely unconfined and is relatively narrow throughout the reach, except for a nearly 300-foot-wide ponded section located approximately 0.7 mile upstream of the confluence with Lee Vining Creek (Figure 4.1-5). Dominant substrate types consist primarily of cobble and boulder, although large gravel deposits were present within the low-gradient habitats throughout the reach (Figure 4.1-2). Habitat-typing data are included in Appendix B, and habitat-attribute data are included in Appendix C.

Table 4.1-4. Stream Habitat-Typing Summary for Glacier Creek Between Tioga Dam and the Confluence of Lee Vining Creek, 2023

Habitat Type	Total Length (feet)	Length Relative Frequency (%)	Number of Units	Unit Relative Frequency (%)	Average Width (feet)	Average Pool Depth (feet)
Cascade	190	4.3	3	7.7	11	--
Fall	67	1.5	1	2.6	7	--
High-gradient riffle	902	20.4	6	15.4	9	--
Low-gradient riffle	1,291	29.2	11	28.2	13	--
Run	731	16.5	8	20.5	15	--
Step run	539	12.2	3	7.7	9	--
Scour pool	696	15.8	7	17.9	52	3.4
Total	**4,416**	**100.0**	**39**	**100.0**	**--**	**--**

% = percent; -- = no data

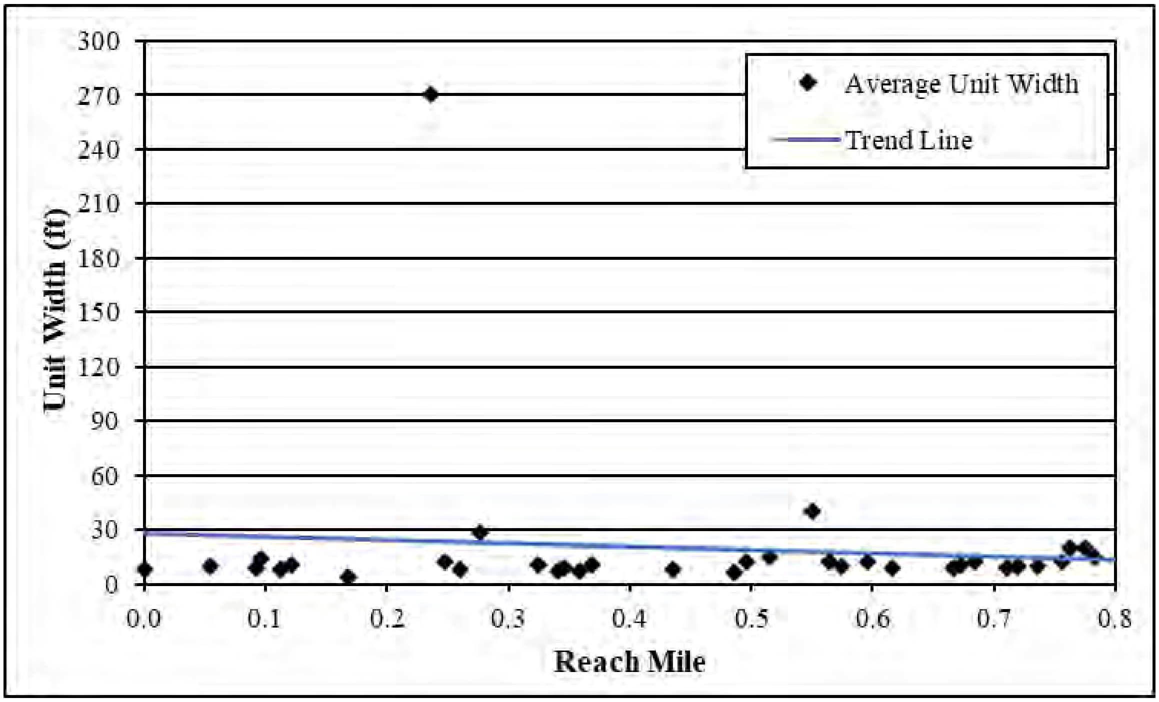


Figure 4.1-5. Average Stream Channel Width of Glacier Creek Between Tioga Dam (Reach Mile 0.0) and the Confluence with Lee Vining Creek (Reach Mile 0.7), 2023.

4.2. SPAWNING GRAVEL

Spawning gravel is present in most Project-affected stream reaches except for upper Lee Vining Creek between Saddlebag Dam and the confluence of Slate Creek, which did not have any suitable spawning gravel (Table 4.2-1, Figure 4.2-1, and Figure 4.2-2).

Spawning gravel total area and volume were highest in upper Lee Vining Creek between Slate Creek and Ellery Lake followed by lower Lee Vining Creek between Poole Powerhouse and the LADWP Diversion Dam (Table 4.2-1). The highest abundance of spawning gravel was observed in upper Lee Vining Creek between the confluence of Slate Creek and Ellery Lake, followed by Glacier Creek (Table 4.2-1). Average gravel quality was greatest in Glacier Creek followed by upper Lee Vining Creek between the confluence of Slate Creek and Ellery Lake (Table 4.2-1 and Figure 4.2-1). In upper Lee Vining Creek between the confluence of Slate Creek and Ellery Lake, spawning gravel patches were primarily semiactive and abundance and quality were highest in the last 1.6 miles of the reach, with large excellent quality spawning gravel patches present in the large low-gradient meadow sections (Figure 4.2-3). Spawning gravel in lower Lee Vining Creek decreased in abundance from upstream to downstream, but the quality was lower in the upstream section of the reach (Figure 4.2-4). Gravel deposits in lower Lee Vining Creek were primarily semiactive. In Glacier Creek, large, deep deposits of excellent and good quality spawning gravel were evenly distributed and mostly active throughout the reach (Figure 4.2-5). Spawning gravel particle size distribution and individual patch size are included in Appendix D.

Table 4.2-1. Total Gravel Area, Volume, Average Quality, and Abundance by Study Reach for Lee Vining and Glacier Creeks, 2023

Reach	Reach Length (miles)	Total Spawning Gravel Area (ft^2)	Total Spawning Gravel Volume (ft^3)	Average Quality Score (1–4)	Abundance (ft^2/mile)
Upper Lee Vining Creek between Saddlebag Dam and the confluence of Slate Creek	0.6	0	0	--	0
Upper Lee Vining Creek between the confluence of Slate Creek and Ellery Lake	3.1	18,640	1,193	2.5	6,013
Lower Lee Vining Creek between Poole Powerhouse and the LADWP Diversion Dam	6.6	7,309	404	1.8	1,107
Glacier Creek between Tioga Dam and the confluence of Lee Vining Creek	0.8	1,998	169	3.1	2,498

-- = no data; ft^2 = square feet; ft^3 = cubic feet; LADWP = Los Angeles Department of Water and Power

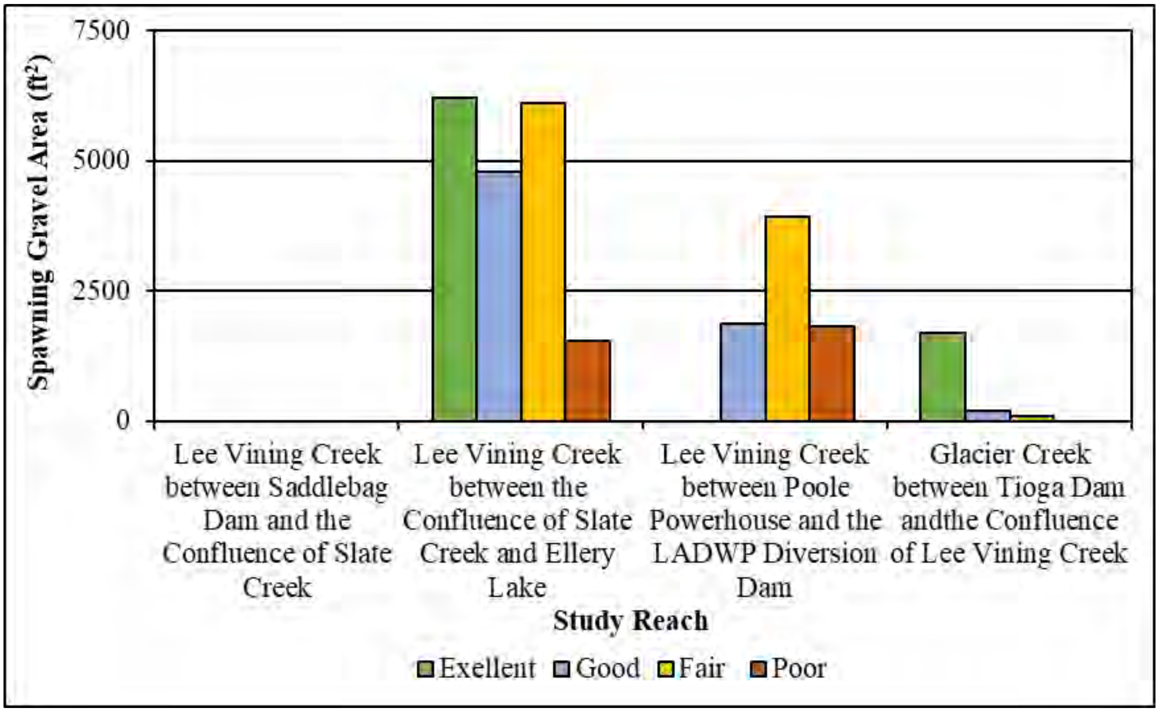


Figure 4.2-1. Spawning Gravel Area by Quality in Project-Affected Stream Reaches of the Lee Vining Creek Hydroelectric Project, 2023.

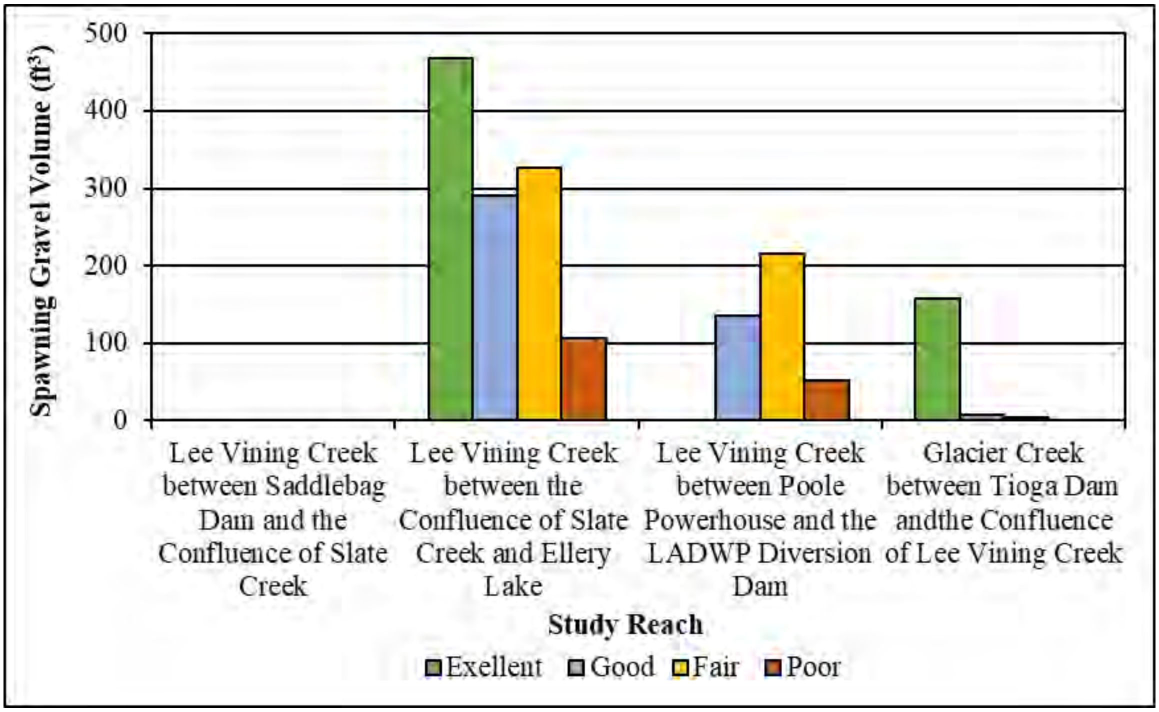


Figure 4.2-2. Spawning Gravel Volume by Quality in Project-Affected Stream Reaches of the Lee Vining Creek Hydroelectric Project, 2023.

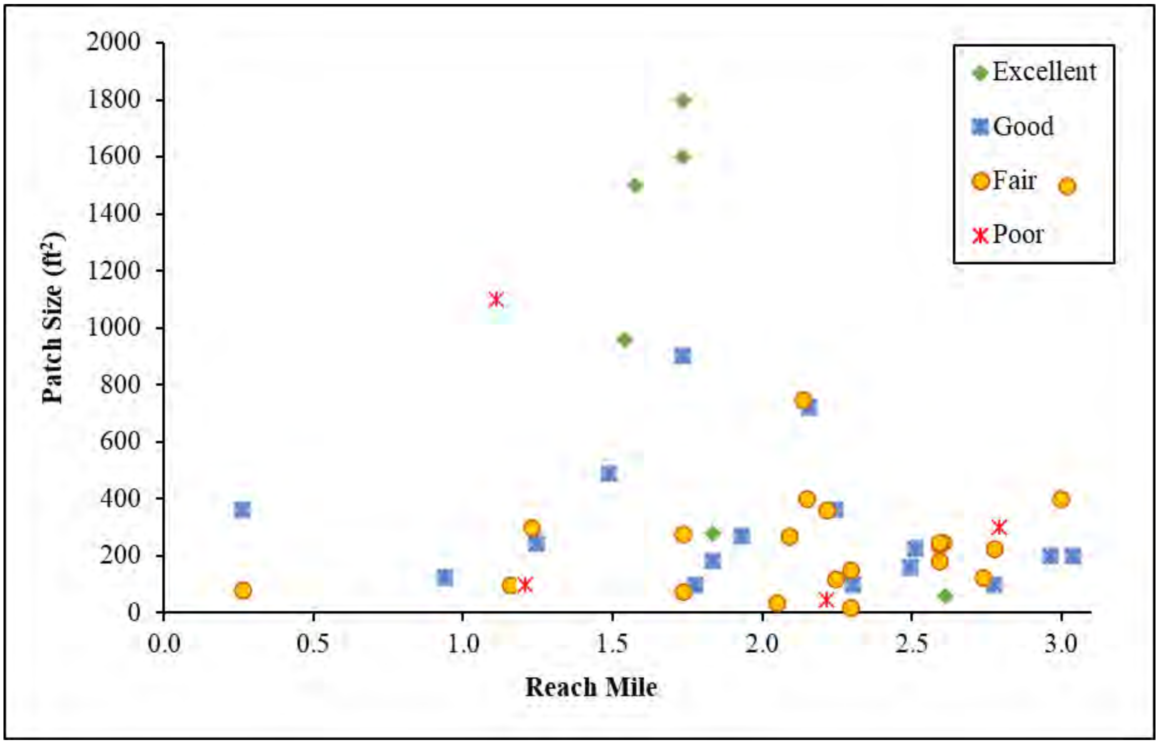


Figure 4.2-3. Spawning Gravel Patch Size and Quality in Lee Vining Creek Between the Confluence of Slate Creek and Ellery Lake, 2023.

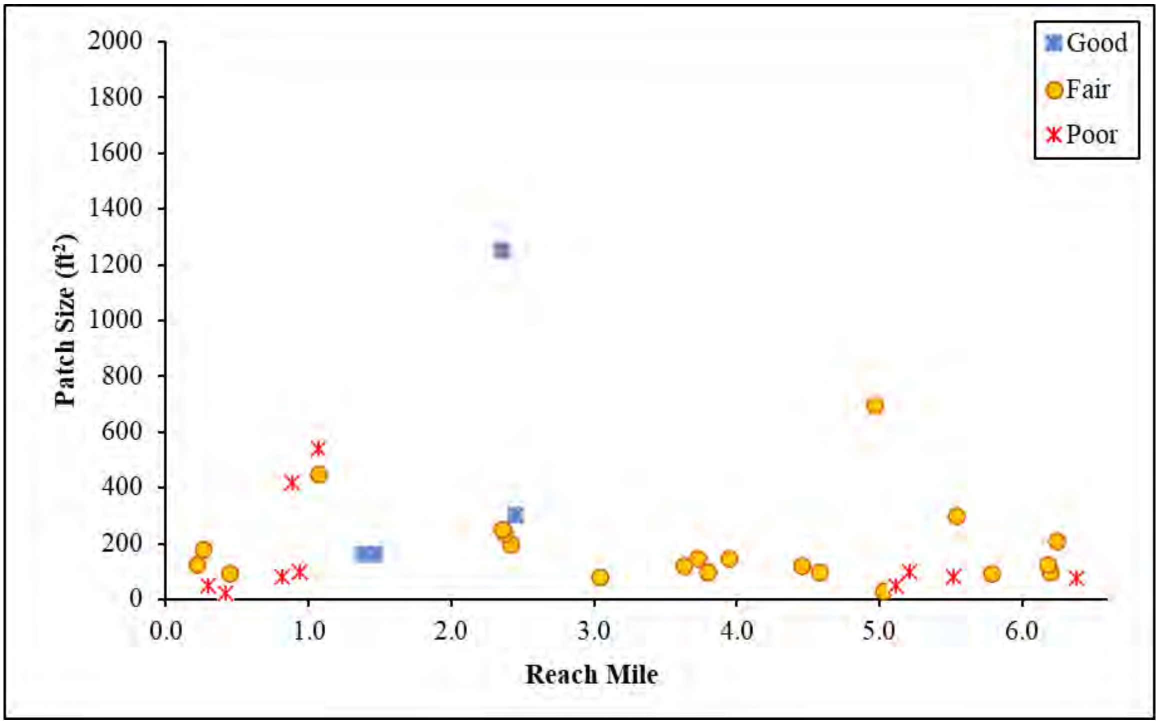


Figure 4.2-4. Spawning Gravel Patch Size and Quality in Lee Vining Creek Between Poole Powerhouse and the LADWP Diversion Dam, 2023.

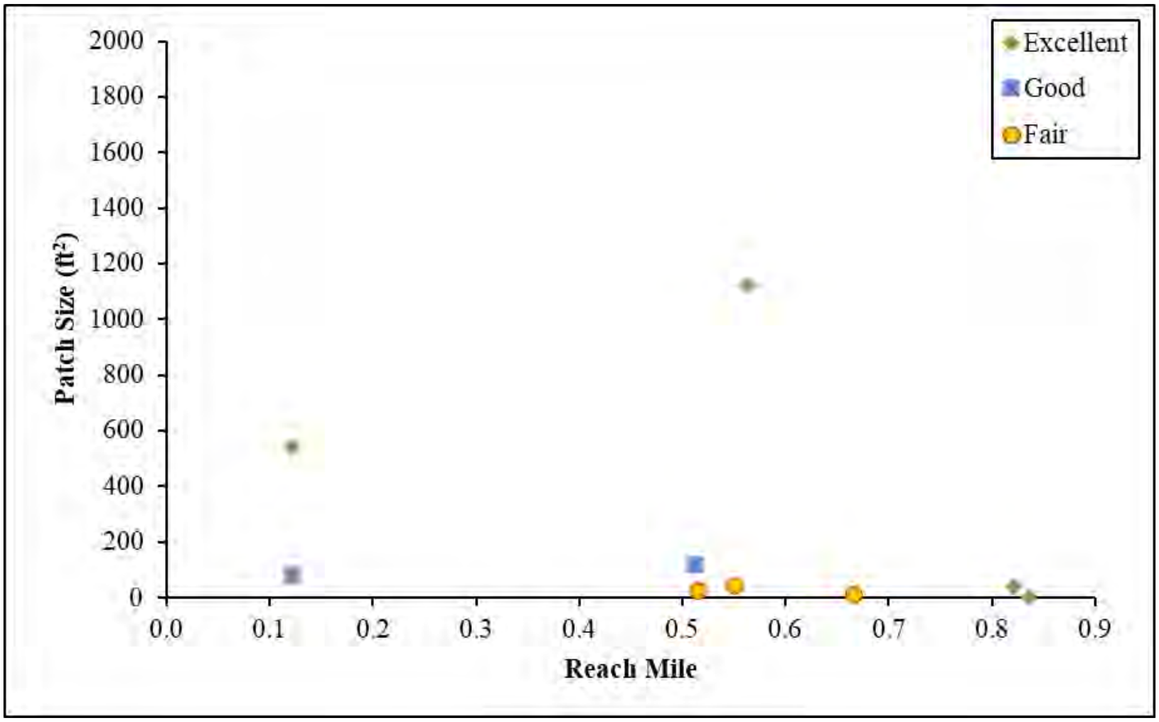


Figure 4.2-5. Spawning Gravel Patch Size and Quality in Glacier Creek Between Tioga Dam and the Confluence of Lee Vining Creek, 2023.

4.3. PASSAGE BARRIERS

Six passage barriers were identified in Project-affected stream reaches (Table 4.3-1). Most of these features were natural bedrock waterfalls or cascades (Figure 4.3-1), with the exception of culverts located under State Route 120 (also referred to as Tioga Pass Road) on Lee Vining and Glacier Creeks. These culverts could pose potential migration barriers during high flows (i.e., bankfull flows) due to high water velocities (Figure 4.3-2).

Table 4.3-1. Passage Barriers Identified in Project-Affected Stream Reaches, 2023

Reach	Unit Number	Reach Mile	Habitat Type	Description
Lee Vining Creek between Saddlebag Dam and the confluence of Slate Creek	93	0.3	Cascade	Series of cascades and small bedrock falls
Lee Vining Creek between the confluence of Slate Creek and Ellery Lake	14	2.8	Scour Pool	Large culvert under State Route 120 may pose velocity barrier at high flows
Lee Vining Creek between Poole Powerhouse and the LADWP Diversion Dam	140	1.9	Falls	Large bedrock falls
	166	1.1	Falls	Large bedrock falls

Reach	Unit Number	Reach Mile	Habitat Type	Description
Glacier Creek between Tioga Dam and the confluence of Lee Vining Creek	18	0.6	Low-gradient riffle	Three parallel culverts under State Route 120 may pose velocity barrier at high flows
	25	0.4	Falls	Large bedrock falls

LADWP = Los Angeles Department of Water and Power

Figure 4.3-1. Natural Fish Passage Barriers Identified in Lee Vining Creek Between the LADWP Diversion Dam and Poole Powerhouse (top left and top right), Lee Vining Creek Between the Confluence of Slate Creek and Saddlebag Dam (bottom left), and Glacier Creek Between the Confluence of Lee Vining Creek and Tioga Dam (bottom right).

Figure 4.3-2. Potential Fish Passage Barriers Identified in Lee Vining Creek Between Ellery Lake and the Confluence of Slate Creek (left), and Glacier Creek Between the Confluence of Lee Vining Creek and Tioga Dam (right).

5.0 CONSULTATION SUMMARY

In preparation of the PAD and Notice of Intent filed in August 2021, Southern California Edison (SCE) hosted Aquatic Resources TWG meetings on January 25, February 22, March 29, and May 24, 2021. These TWG meetings resulted in study requests from Stakeholders to address questions regarding aquatic habitat and sediment characteristics. Notes and materials from these meetings are available on SCE's Project website (www.sce.com/leevining).

SCE filed draft Study Plans with the PAD and Notice of Intent on August 12, 2021, to address issues discussed with the TWG. The Stakeholder comment period ended on January 18, 2022. No comments were received related to this Study Plan, and the final Study Plan was submitted to FERC in April 2022.

Initial study results were provided to relicensing Stakeholders on February 1, 2023. Preliminary data collected in this study was analyzed and a Draft Technical Report was produced and distributed to Stakeholders for review for a 60-day review in September 2023. No comments were received from Stakeholders regarding this study. Comments received for the AQ-3 2022 Progress Report are included in Table 5-1 below.

Draft Technical Reports were distributed to TWGs on April 16, 2024, for a 60-day comment period. On May 14, 2024, SCE held a public meeting at the Lee Vining Community Center to discuss the draft reports and study findings to date. On June 12, 2024, at the end of the comment period, comments were received from U.S. Forest Service, U.S. Fish and Wildlife Service, California Department of Fish and Wildlife, State Water Resources Control Board, and MLC. Responses to Stakeholder comments on the 2023 Draft Technical Report are included in Table 1-1 in Volume III of the DLA.

Table 5-1. Consultation Summary—Response to Comments

Comment Number	Entity	Date/Forum	Comment	SCE Response
1	CDFW	2/23/2023 Comments on 2022 Progress Report	The aquatic habitat mapping and sediment characterization study has not been implemented yet and CDFW has no comments.	Comment noted.

CDFW = California Department of Fish and Wildlife; SCE = Southern California Edison

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APPENDIX A
REPRESENTATIVE HABITAT PHOTOS

Figure A-1. Run Habitat (Unit 120), Lee Vining Creek between the LADWP Diversion Dam and Poole Powerhouse.

Figure A-2. Low-Gradient Riffle Habitat (Unit 26), Lee Vining Creek between the LADWP Diversion Dam and Poole Powerhouse.

Figure A-3. Dammed Pool Habitat (Unit 24), Lee Vining Creek between the LADWP Diversion Dam and Poole Powerhouse.

Figure A-4. High-Gradient Riffle Habitat (Unit 137), Lee Vining Creek between the LADWP Diversion Dam and Poole Powerhouse.

Figure A-5. Bedrock Falls and Fish Passage Barrier (Unit 140), Lee Vining Creek between the LADWP Diversion Dam and Poole Powerhouse.

Figure A-6. Scour Pool Habitat (Unit 152), Lee Vining Creek between the LADWP Diversion Dam and Poole Powerhouse.

Figure A-7. Cascade Habitat (Unit 55), Lee Vining Creek between the LADWP Diversion Dam and Poole Powerhouse.

Figure A-8. Step Run Habitat (Unit 142), Lee Vining Creek between the LADWP Diversion Dam and Poole Powerhouse.

Figure A-9. Fair Quality Spawning Gravel (Unit 126), Lee Vining Creek between the LADWP Diversion Dam and Poole Powerhouse.

Figure A-10. Large Woody Debris (Unit 157), Lee Vining Creek between the LADWP Diversion Dam and Poole Powerhouse.

Figure A-11. Run Habitat (Unit 54), Lee Vining Creek between Ellery Lake and the Confluence of Slate Creek.

Figure A-12. Low Gradient Riffle Habitat (Unit 25), Lee Vining Creek between Ellery Lake and the Confluence of Slate Creek.

Figure A-13. Scour Pool Habitat (Unit 65), Lee Vining Creek between Ellery Lake and the Confluence of Slate Creek.

Figure A-14. Step Run Habitat (Unit 18), Lee Vining Creek between Ellery Lake and the Confluence of Slate Creek.

Figure A-15. High Gradient Riffle Habitat (Unit 79), Lee Vining Creek between Ellery Lake and the Confluence of Slate Creek.

Figure A-16. Short Bedrock Cascade Habitat (Unit 82), Lee Vining Creek between Ellery Lake and the Confluence of Slate Creek.

Figure A-17. Excellent Quality Spawning Gravel (Unit 46), Lee Vining Creek between Ellery Lake and the Confluence of Slate Creek.

Figure A-18. Backwater Habitat (Unit 66), Lee Vining Creek between Ellery Lake and the Confluence of Slate Creek.

Figure A-19. Braided, Unconfined Channel (Unit 76), Lee Vining Creek between Ellery Lake and the Confluence of Slate Creek.

Figure A-20. High Gradient Riffle Habitat (Unit 92) Lee Vining Creek between the Confluence of Slate Creek and Saddlebag Dam.

Figure A-21. Cascade Habitat (Unit 93) Lee Vining Creek between the Confluence of Slate Creek and Saddlebag Dam.

Figure A-22. Step Run Habitat (Unit 95) Lee Vining Creek between the Confluence of Slate Creek and Saddlebag Dam.

Figure A-23. Bedrock Falls (Unit 93) Lee Vining Creek between the Confluence of Slate Creek and Saddlebag Dam.

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Figure A-24. Run habitat (Unit 19), Glacier Creek between the Confluence of Lee Vining Creek and Tioga Dam.

Figure A-25. Low-Gradient Riffle Habitat (Unit 8), Glacier Creek between the Confluence of Lee Vining Creek and Tioga Dam.

Figure A-26. Scour Pool Habitat (Unit 29), Glacier Creek between the Confluence of Lee Vining Creek and Tioga Dam.

Figure A-27. High Gradient Riffle Habitat (Unit 23), Glacier Creek between the Confluence of Lee Vining Creek and Tioga Dam.

Figure A-28. Bedrock Falls and Fish Passage Barrier (Unit 25), Glacier Creek between the Confluence of Lee Vining Creek and Tioga Dam.

Figure A-29. Cascade Habitat (Unit 16), Glacier Creek between the Confluence of Lee Vining Creek and Tioga Dam.

Figure A-30. Excellent Quality Spawning Gravel (Unit 18), Glacier Creek between the Confluence of Lee Vining Creek and Tioga Dam.

Figure A-31. Large Ponded Section (Unit 29), Glacier Creek between the Confluence of Lee Vining Creek and Tioga Dam.

APPENDIX B
HABITAT-TYPING DATA

Table B-1. Stream Habitat Mapping Data, Lee Vining and Glacier Creeks, 2023

Unit No. [a]	Habitat Type	Reach Mile	Length (feet)	Avg. Width (feet)	Avg. Depth (feet)	Max. Depth (feet)	Substrate	Pool Tail Embeddedness (%)
Lee Vining Creek between the Los Angeles Department of Water and Power Diversion Dam and Poole Powerhouse								
1	Dammed pool	6.6	384.9	340	1.4	4	Silt	--
2	Low-gradient riffle	6.5	170	35	--	--	Cobble	--
3	High-gradient riffle	6.4	199.4	30	1.3	--	Cobble	--
4	Scour pool	6.4	50.6	30	6	--	Cobble	40
5	Run	6.4	123.9	25	1.5	3.5	Cobble	--
6	Low-gradient riffle	6.4	383.6	30	1.8	--	Cobble	--
7	High-gradient riffle	6.3	82.4	25	--	--	Cobble	--
8	High-gradient riffle	6.3	258.7	25	--	--	Cobble	--
9	Low-gradient riffle	6.2	238.8	35	1.6	--	Cobble	--
10	Run	6.2	89.3	35	2.5	--	Boulder	--
11	Low-gradient riffle	6.2	387.8	40	1.7	--	Cobble	--
12	Scour pool	6.1	32.4	25	4	5.5	Cobble	10
13	Low-gradient riffle	6.1	289.3	25	1.2	2	Cobble	--
14	Run	6.0	87.3	25	3	3.5	Boulder	15
15	Step run	6.0	362.5	15	1.5	3	Cobble	--
15	High-gradient riffle	6.0	65.4	25	1.3	1.8	Boulder	--
16	Step run	5.9	109.9	30	1.8	2.5	Cobble	--
17	High-gradient riffle	5.9	231.2	25	2.2	3.2	Boulder	--
18	Run	5.9	91.1	25	2.5	3.2	Boulder	--
19	Scour pool	5.9	87.5	25	--	--	Boulder	15
19	Step run	5.8	207.7	25	--	--	Cobble	--
20	Scour pool	5.8	116.2	35	--	--	Cobble	5
21	Scour pool	5.8	135.7	20	--	--	Cobble	45
22	Low-gradient riffle	5.8	18.4	25	0.75	1.5	Cobble	--
22	Scour pool	5.8	24.5	30	2.5	--	Cobble	15
23	High-gradient riffle	5.8	209	25	1.2	4	Boulder	--
24	Step run	5.7	171.8	30	--	3.8	Boulder	--
24	Dammed pool	5.7	143.7	40	3	--	Silt	--

Unit No. ^{a}	Habitat Type	Reach Mile	Length (feet)	Avg. Width (feet)	Avg. Depth (feet)	Max. Depth (feet)	Substrate	Pool Tail Embeddedness (%)
25	Run	5.7	258.7	40	3	4.2	Silt	--
26	Low-gradient riffle	5.6	121.1	25	0.8	1.4	Cobble	--
27	Run	5.6	79.9	40	2	3	Cobble	--
28	Low-gradient riffle	5.6	92.7	15	1.2	2.3	Boulder	--
29	Scour pool	5.5	51.7	25	--	--	Silt	10
30	Low-gradient riffle	5.5	51.4	30	1.3	2	Cobble	--
31	Run	5.5	58	30	2	3	Cobble	--
32	Low-gradient riffle	5.5	236.4	35	1.5	2.5	Cobble	--
33	High-gradient riffle	5.5	118.4	35	1.2	1.5	Cobble	--
34	Run	5.5	84.9	30	1.5	2.8	Cobble	--
35	High-gradient riffle	5.4	186.7	30	1.2	2.3	Boulder	--
36	Run	5.4	105.5	30	1.2	2.3	Cobble	--
37	High-gradient riffle	5.4	49.6	30	1	3	Cobble	--
38	Run	5.4	99.3	25	1.8	2.6	Boulder	--
39	Low-gradient riffle	5.4	109.1	30	1.2	2	Cobble	--
39	High-gradient riffle	5.3	133.2	35	1.5	2.3	Cobble	--
40	Run	5.3	68.2	35	2	2.2	Cobble	--
41	Scour pool	5.3	42	25	3	3.4	Boulder	30
42	High-gradient riffle	5.3	104.4	25	2.5	2.5	Boulder	--
42	Scour pool	5.3	36.7	25	3.5	4.5	Boulder	50
44	Low-gradient riffle	5.3	69.3	30	0.8	1.1	Cobble	--
45	Run	5.2	55.9	25	1.8	2.3	Cobble	--
46	High-gradient riffle	5.2	82.8	25	1.2	2	Boulder	--
47	Scour pool	5.2	49.9	25	4	4.5	Boulder	50
47	Low-gradient riffle	5.2	151.8	30	1.2	1.5	Cobble	--
48	Run	5.2	60.3	20	2	3	Boulder	--
48	Low-gradient riffle	5.2	170.7	25	1.2	2.3	Cobble	--
49	Step run	5.1	133.5	45	2	3	Boulder	--
50	High-gradient riffle	5.1	447.4	30	2	3.5	Boulder	--
51	Step run	5.0	146.6	20	2	3	Boulder	--
52	Dammed pool	5.0	43.1	25	--	--	Silt	40
53	Run	5.0	148.2	40	1.6	2.7	Cobble	35

Unit No. [a]	Habitat Type	Reach Mile	Length (feet)	Avg. Width (feet)	Avg. Depth (feet)	Max. Depth (feet)	Substrate	Pool Tail Embeddedness (%)
53	Low-gradient riffle	5.0	141.3	30	1	2	Boulder	--
54	Run	4.9	21.1	20	2	3	Boulder	--
54	High-gradient riffle	4.9	508	25	2	3.5	Boulder	--
55	Cascade	4.8	164.2	25	3	3	Bedrock	--
56	High-gradient riffle	4.8	366.6	25	1.5	2.5	Boulder	--
57	Cascade	4.7	655.3	25	2.5	3.5	Bedrock	--
58	Low-gradient riffle	4.6	121.1	25	1	1.8	Boulder	--
59	Run	4.6	50.5	30	2.5	3.5	Boulder	--
60	Low-gradient riffle	4.6	418.5	30	1.8	2.5	Cobble	--
61	Scour pool	4.5	60.6	45	3.5	--	Silt	45
62	Run	4.5	164.7	25	1.6	2.1	Cobble	--
63	Low-gradient riffle	4.5	18.7	25	1.6	1.9	Cobble	--
64	Scour pool	4.5	83.7	30	--	--	Sand	10
65	Run	4.4	216.2	25	--	--	Gravel	45
66	Low-gradient riffle	4.4	113	30	1	1.3	Cobble	25
67	Scour pool	4.4	19.9	25	2.3	3.5	Sand	35
68	Run	4.4	107.5	25	1.4	1.8	Cobble	45
69	Scour pool	4.3	21.8	45	3.5	4.5	Silt	60
70	High-gradient riffle	4.3	171.7	25	0.9	1.5	Boulder	--
71	Low-gradient riffle	4.3	48.3	25	1.7	2.2	Cobble	35
72	Run	4.3	42.3	25	1.5	2.4	Cobble	35
73	Low-gradient riffle	4.3	251.8	45	1.4	2	Cobble	25
74	Step run	4.2	401.3	35	2.5	3.5	Cobble	25
75	Dammed pool	4.2	47.8	45	3	4.5	Silt	30
76	Run	4.2	168.5	30	2	2.8	Sand	25
77	Dammed pool	4.1	157	30	2.5	4.6	Gravel	25
78	Step run	4.1	189	30	1.8	2.5	Cobble	30
79	High-gradient riffle	4.1	117.8	25	1.5	2.3	Boulder	--
80	Low-gradient riffle	4.0	112.8	30	0.9	1.3	Cobble	15
81	High-gradient riffle	4.0	423.9	27	1.8	2.4	Boulder	--
82	Step run	3.9	316.8	30	--	--	Cobble	--
83	High-gradient riffle	3.9	63.9	25	--	--	Boulder	25

Unit No. [a]	Habitat Type	Reach Mile	Length (feet)	Avg. Width (feet)	Avg. Depth (feet)	Max. Depth (feet)	Substrate	Pool Tail Embeddedness (%)
84	Dammed pool	3.9	80.5	40	4	--	Sand	--
85	Run	3.9	309.8	25	2	3	Sand	45
86	Scour pool	3.8	123.7	45	2.3	4	Silt	25
87	Run	3.8	49.1	20	1.8	2.1	Cobble	35
88	Scour pool	3.8	108	30	2.2	3.6	Silt	35
89	Low-gradient riffle	3.7	73.4	25	1.1	2.4	Cobble	--
90	Step run	3.7	179.3	30	2.6	3.2	Gravel	35
91	Scour pool	3.7	28.7	45	--	--	Sand	35
92	Run	3.7	196.3	20	2	2.6	Cobble	30
93	Low-gradient riffle	3.7	28.1	30	--	--	Cobble	--
94	Scour pool	3.6	52	30	2.4	2.7	Sand	45
95	High-gradient riffle	3.6	28.7	25	0.9	1.6	Boulder	--
96	Step run	3.6	189	25	2	2.6	Cobble	--
97	Scour pool	3.6	79	45	4	--	Sand	35
98	Scour pool	3.6	56.3	15	2.8	3.5	Silt	15
99	Step run	3.6	88	25	2.2	2.6	Cobble	30
100	Low-gradient riffle	3.6	108	30	1.2	1.8	Cobble	5
101	Run	3.5	53.8	20	2.4	2.6	Cobble	40
102	Low-gradient riffle	3.5	39.9	25	0.8	1.1	Cobble	--
103	Run	3.5	74.7	10	1.5	2.2	Cobble	--
104	High-gradient riffle	3.5	163.8	12	1.2	2.2	Boulder	--
105	Dammed pool	3.5	61	25	3.5	6	Cobble	--
106	Run	3.5	171.3	20	1.6	2.3	Cobble	--
107	High-gradient riffle	3.4	549.8	15	1.8	2.6	Boulder	--
108	Scour pool	3.3	53	12	3	4.2	Cobble	25
109	Run	3.3	64.7	20	2.8	3.6	Cobble	15
110	High-gradient riffle	3.3	365.2	25	1.1	2.5	Boulder	--
111	Run	3.2	35.8	15	2.5	3.5	Boulder	15
112	Cascade	3.2	112.4	20	2.5	5	Boulder	--
113	High-gradient riffle	3.2	174.7	22	1.8	2.5	Boulder	--
114	Run	3.2	71.1	15	1.8	2	Cobble	--
115	High-gradient riffle	3.2	94.1	20	1.3	1.5	Boulder	--

Unit No. ^{a}	Habitat Type	Reach Mile	Length (feet)	Avg. Width (feet)	Avg. Depth (feet)	Max. Depth (feet)	Substrate	Pool Tail Embeddedness (%)
116	Step run	3.1	240.5	30	2	3.1	Cobble	10
117	Low-gradient riffle	3.1	95.9	25	1.1	1.6	Boulder	--
118	Scour pool	3.1	52.6	30	3.5	5.2	Boulder	15
119	Run	3.1	146.5	25	3.5	4.5	Boulder	--
120	Run	3.0	3277.1	25	4.5	6.5	Sand	20
121	Scour pool	2.4	145.3	25	2	4.3	Sand	25
122	Low-gradient riffle	2.4	72.4	25	0.8	1.3	Gravel	--
123	Scour pool	2.4	52.8	30	2	2.6	Gravel	25
124	Low-gradient riffle	2.4	38.1	22	--	--	Gravel	--
125	Dammed pool	2.4	31.8	25	--	--	Silt	15
126	Run	2.4	325.2	25	--	--	Gravel	20
127	Step run	2.3	216.7	25	2	3.9	Cobble	30
128	Scour pool	2.2	151.8	35	2.6	3.9	Sand	20
129	High-gradient riffle	2.2	82.3	35	1	1.4	Boulder	--
130	Run	2.2	41.8	5	--	--	Boulder	--
131	Low-gradient riffle	2.2	29.1	35	1	1.7	Cobble	--
132	Run	2.2	88.1	25	1.7	3.1	Cobble	--
133	High-gradient riffle	2.2	172.9	30	0.9	1.4	Boulder	--
134	Scour pool	2.1	65.8	35	--	--	Cobble	--
135	High-gradient riffle	2.1	16.6	15	--	--	Boulder	--
136	Step run	2.1	112.7	20	1.3	2.3	Boulder	--
137	High-gradient riffle	2.1	493.4	35	1.3	2.5	Boulder	--
138	Cascade	2.0	355.1	15	2	3.5	Boulder	--
139	Scour pool	1.9	45.2	40	4	--	Bedrock	--
140	Fall	1.9	64.3	45	--	--	Bedrock	--
141	Cascade	1.9	298.2	60	1.8	3.8	Boulder	--
142	Step run	1.9	115.2	35	1.8	3.3	Boulder	--
143	High-gradient riffle	1.8	176.5	20	1.6	2.2	Boulder	--
144	Cascade	1.8	147.2	20	3.5	2	Boulder	--
145	Dammed pool	1.8	99.8	20	4	4.6	Silt	--
146	High-gradient riffle	1.8	107.4	15	1.3	1.8	Boulder	--
147	Run	1.7	34.7	15	1.5	2.4	Boulder	--

Unit No. [a]	Habitat Type	Reach Mile	Length (feet)	Avg. Width (feet)	Avg. Depth (feet)	Max. Depth (feet)	Substrate	Pool Tail Embeddedness (%)
148	High-gradient riffle	1.7	367.7	20	1.6	2.8	Boulder	--
149	Step run	1.7	414.7	20	3	3.6	Boulder	--
150	Scour pool	1.6	249.2	15	4.5	7	Sand	15
151	Run	1.5	128.9	30	1.2	2	Sand	25
152	Scour pool	1.5	151.1	42	4	5.5	Sand	25
153	Run	1.5	115.3	15	3.8	4.5	Sand	--
154	Scour pool	1.5	61.5	30	4	4.8	Sand	10
155	Run	1.5	80.1	35	3	4	Sand	25
156	Scour pool	1.4	227.8	35	4	--	Sand	--
157	Run	1.4	68.8	35	--	--	Sand	--
158	Scour pool	1.4	89.8	40	4	--	Cobble	10
159	Run	1.4	75.8	28	--	--	Cobble	15
160	Low-gradient riffle	1.4	222.5	35	1.1	2.2	Boulder	--
161	High-gradient riffle	1.3	62	20	1.3	2.2	Boulder	--
162	Step run	1.3	42.6	18	1.6	2.1	Boulder	--
163	Low-gradient riffle	1.3	240.5	30	1.3	2.6	Cobble	--
164	High-gradient riffle	1.2	491.7	30	1.2	2.6	Boulder	--
165	Cascade	1.2	352.9	25	2	3.8	Boulder	--
166	Fall	1.1	25.9	60	--	--	Bedrock	--
167	Fall	1.1	20.5	45	0.2	0.5	Bedrock	--
168	Scour pool	1.1	48	36	2.5	3.1	Bedrock	--
169	Step run	1.1	444.9	25	1.7	2.5	Boulder	--
170	Scour pool	1.0	53.4	35	1.9	2.1	Silt	30
171	Run	1.0	73.4	2	1.3	2.4	Cobble	--
172	Scour pool	1.0	75.7	25	2.5	3	Cobble	50
173	Run	0.9	29.7	25	0.9	1.4	Cobble	--
174	Scour pool	0.9	145.3	25	2.8	4	Cobble	45
175	Run	0.9	47.5	15	0.7	1.1	Cobble	--
176	Scour pool	0.9	104.1	20	3	4.5	Silt	35
177	Step run	0.9	228.9	25	1	2.2	Cobble	--
178	Low-gradient riffle	0.8	135.5	30	0.6	1	Cobble	--
179	Dammed pool	0.8	50.5	30	2.5	3.4	Silt	40

Unit No. [a]	Habitat Type	Reach Mile	Length (feet)	Avg. Width (feet)	Avg. Depth (feet)	Max. Depth (feet)	Substrate	Pool Tail Embeddedness (%)
180	Step run	0.8	39.5	25	1.4	1.8	Cobble	--
181	Scour pool	0.8	146.7	20	2.2	3.7	Bedrock	45
182	Step run	0.8	219.9	15	1.8	3	Bedrock	--
183	High-gradient riffle	0.7	103.3	10	1	2	Bedrock	--
184	Step run	0.7	226.5	15	1.4	2.4	Bedrock	--
185	High-gradient riffle	0.7	165.9	20	1.4	2.4	Boulder	--
186	Scour pool	0.6	50.5	15	2.6	3	Boulder	65
187	High-gradient riffle	0.6	114.2	25	1.4	2.2	Boulder	--
188	Cascade	0.6	101.8	25	2	3	Boulder	--
189	High-gradient riffle	0.6	390.2	25	1.5	2.2	Boulder	--
190	Cascade	0.5	61.5	25	1.5	2	Boulder	--
191	High-gradient riffle	0.5	114.6	20	1.3	1.6	Boulder	--
192	Step run	0.5	73.9	20	1.6	2	Boulder	--
193	Low-gradient riffle	0.5	86.8	20	0.7	0.9	Cobble	--
194	Dammed pool	0.4	140.7	50	3.6	4	Silt	30
195	Step run	0.4	517.7	20	1.4	1.9	Cobble	--
196	Low-gradient riffle	0.3	14.5	25	0.6	1.7	Cobble	--
197	Scour pool	0.3	105.7	60	5	7	Silt	--
198	Run	0.3	147.5	25	0.6	1.3	Cobble	--
199	Dammed pool	0.3	54.3	30	2.2	2.5	Silt	50
200	Scour pool	0.3	46.9	15	1.4	2	Cobble	45
201	Run	0.3	45.4	10	1	0.7	Gravel	--
202	Scour pool	0.2	27.9	10	1.5	2	Silt	45
203	Run	0.2	53.4	10	0.8	1	Cobble	--
204	Scour pool	0.2	34.1	15	1.3	2	Cobble	--
205	Low-gradient riffle	0.2	33.6	10	0.5	0.8	Cobble	--
206	Step run	0.2	357	15	1.4	2.3	Cobble	--
207	Scour pool	0.1	52.9	8	2.2	3	Silt	45
208	Step run	0.1	179.2	10	1.2	2.1	Cobble	--
209	Step run	0.1	229.8	15	1.4	1.8	Cobble	--
210	Step run	0.1	156.1	15	--	--	Boulder	--
211	Scour pool	0.0	157.9	45	6	--	Boulder	45

Unit No. [a]	Habitat Type	Reach Mile	Length (feet)	Avg. Width (feet)	Avg. Depth (feet)	Max. Depth (feet)	Substrate	Pool Tail Embeddedness (%)
Lee Vining Creek between the Confluence of Slate Creek and Ellery Lake								
1	High-gradient riffle	3.1	173.1	25	1.4	1.7	Boulder	--
2	Low-gradient riffle	3.1	139.1	25	1	1.4	Cobble	--
3	Step run	3.0	90.7	28	--	--	Cobble	15
4	Low-gradient riffle	3.0	53.3	30	0.5	1.1	Gravel	5
5	Scour pool	3.0	67.7	25	2.7	3	Gravel	15
6	Step run	3.0	106.9	25	1.5	2	Cobble	10
7	Low-gradient riffle	3.0	73.4	30	0.7	1.1	Cobble	--
8	Run	3.0	115.8	15	2.5	3.2	Cobble	10
9	Low-gradient riffle	2.9	123.6	30	1.2	1.6	Cobble	--
10	Step run	2.9	190.2	25	1.7	2.8	Cobble	10
11	Low-gradient riffle	2.9	111.6	30	0.7	1.5	Cobble	10
12	Step run	2.9	186.6	20	1.9	2.3	Boulder	15
13	Low-gradient riffle	2.8	170.5	25	1	1.5	Cobble	--
14	Scour pool	2.8	56.7	60	4.5	--	Cobble	35
15	High-gradient riffle	2.8	29.9	10	--	--	Boulder	--
16	Step run	2.8	194	15	1.8	2.2	Gravel	10
17	Low-gradient riffle	2.7	276.5	20	--	--	Gravel	20
18	Step run	2.7	132	25	1.3	1.9	Cobble	10
19	Low-gradient riffle	2.7	258.1	25	0.8	1.2	Boulder	--
20	Scour pool	2.6	39.8	25	3	4.5	Boulder	15
21	Run	2.6	65	40	0.6	1.3	Gravel	10
22	Low-gradient riffle	2.6	431.7	20	0.8	--	Cobble	--
23	Scour pool	2.5	92.8	12	--	--	Cobble	5
24	Run	2.5	73.2	25	0.7	1.3	Cobble	5
25	Low-gradient riffle	2.5	341.4	15	1	1.2	Boulder	--
26	High-gradient riffle	2.4	107.1	12	1.1	1.4	Cobble	--
27	Run	2.4	50.7	10	1.5	2.4	Boulder	5
28	High-gradient riffle	2.4	431.3	20	1	2	Boulder	--
29	Run	2.3	41.1	20	1.6	2.2	Cobble	10
30	High-gradient riffle	2.3	266.4	25	1.1	1.4	Boulder	--

Unit No. [a]	Habitat Type	Reach Mile	Length (feet)	Avg. Width (feet)	Avg. Depth (feet)	Max. Depth (feet)	Substrate	Pool Tail Embeddedness (%)
31	Run	2.2	100	22	1.2	1.4	Cobble	20
32	Low-gradient riffle	2.2	163.8	28	0.6	1	Gravel	--
33	Step run	2.2	301	20	1.1	1.5	Boulder	10
34	Scour pool	2.2	42.1	13	4	--	Boulder	5
35	Run	2.1	73.9	22	--	--	Cobble	5
36	Low-gradient riffle	2.1	235.3	31	0.6	1.4	Cobble	--
37	Run	2.1	233.5	9	1.2	1.6	Cobble	--
38	Low-gradient riffle	2.0	205.9	11	1	1.5	Cobble	--
39	Step run	2.0	411.8	6	0.8	1.2	Cobble	--
40	Run	1.9	75.5	25	1.5	2.2	Cobble	--
41	High-gradient riffle	1.9	276.1	27	0.9	1.1	Boulder	--
42	Low-gradient riffle	1.9	157.5	30	0.9	1.8	Boulder	--
43	Step run	1.8	293.2	25	1.3	1.9	Gravel	--
44	Run	1.8	95.2	17	1.4	1.8	Cobble	--
45	Low-gradient riffle	1.8	126	25	1.2	1.8	Cobble	--
46	Run	1.7	302.8	25	1	2.6	Cobble	--
47	Run	1.7	241.3	25	0.8	2.8	Cobble	--
48	Run	1.6	291	25	0.8	2	Cobble	--
49	Scour pool	1.6	122.3	10	2.5	4	Gravel	--
50	Low-gradient riffle	1.6	60.9	20	0.4	1.3	Gravel	--
51	Scour pool	1.5	92.6	20	0.9	3	Cobble	5
52	Run	1.5	71.9	12	--	--	Cobble	--
53	Low-gradient riffle	1.5	88.3	4	--	--	Gravel	--
54	Run	1.5	30.2	18	--	--	Cobble	--
55	Scour pool	1.5	76.9	26	--	--	Boulder	30
56	Low-gradient riffle	1.5	228.3	18	0.5	1.1	Cobble	--
57	Run	1.4	506.3	12	1.1	2.2	Cobble	--
58	Step run	1.3	159.5	15	1.1	2.2	Cobble	--
59	Scour pool	1.3	149.4	18	1.8	3	Cobble	--
60	High-gradient riffle	1.3	108.6	20	1.3	1.8	Boulder	--
61	Run	1.3	48.8	4	--	1.5	Cobble	--
62	Scour pool	1.2	103.6	9	1.7	2.2	Cobble	10

Unit No. [a]	Habitat Type	Reach Mile	Length (feet)	Avg. Width (feet)	Avg. Depth (feet)	Max. Depth (feet)	Substrate	Pool Tail Embeddedness (%)
63	Low-gradient riffle	1.2	96.7	15	0.7	--	Cobble	--
64	High-gradient riffle	1.2	128.4	8	1.1	1.6	Cobble	--
65	Scour pool	1.2	27.7	20	--	3.4	Cobble	10
66	Run	1.2	115.5	18	0.8	1.8	Cobble	--
67	Scour pool	1.2	98.6	15	--	--	Cobble	15
68	Low-gradient riffle	1.1	143.8	12	0.4	1.1	Cobble	--
69	Run	1.1	24.6	14	0.5	--	Cobble	--
70	Scour pool	1.1	38.7	10	1.4	3	Cobble	15
71	Low-gradient riffle	1.1	120.6	9	0.4	0.9	Cobble	--
72	Step run	1.1	284.3	10	0.7	1.6	Cobble	--
73	Low-gradient riffle	1.0	99.9	17	0.6	0.8	Boulder	--
74	High-gradient riffle	1.0	153.6	10	0.6	1.1	Cobble	--
75	Low-gradient riffle	1.0	175.9	12	0.4	0.8	Cobble	--
76	Low-gradient riffle	0.9	1082	6	0.7	2	Cobble	--
77	Step run	0.7	116.9	15	0.9	2	Boulder	--
78	High-gradient riffle	0.7	197.7	15	0.7	1	Boulder	--
79	High-gradient riffle	0.7	815.8	12	0.5	1.2	Boulder	--
80	Low-gradient riffle	0.5	237.8	18	0.7	0.7	Boulder	--
81	High-gradient riffle	0.5	105.7	21	0.8	2.1	Boulder	--
82	Cascade	0.5	91.8	11	1.5	2.5	Bedrock	--
83	Low-gradient riffle	0.4	361.5	17	0.7	1.2	Boulder	--
84	Step run	0.4	87.3	15	1	1.7	Boulder	--
85	Low-gradient riffle	0.4	419.8	15	0.7	1	Cobble	--
86	Run	0.3	77	13	1	1.7	Cobble	--
87	Low-gradient riffle	0.3	240	20	0.7	1.2	Cobble	--
88	Run	0.2	74.5	14	1.1	2.1	Cobble	5
89	Step run	0.2	309.6	18	0.9	1.7	Cobble	--
90	Low-gradient riffle	0.1	282.9	23	0.7	1.7	Cobble	--
91	Step run	0.1	468.9	9	1.7	3	Cobble	--
Lee Vining Creek between Saddlebag Dam the Confluence of Slate Creek								
92	High-gradient riffle	0.3	1397.1	10	0.7	1.7	Boulder	--

Unit No. [a]	Habitat Type	Reach Mile	Length (feet)	Avg. Width (feet)	Avg. Depth (feet)	Max. Depth (feet)	Substrate	Pool Tail Embeddedness (%)
93	Cascade	0.5	1487.8	10	0.7	1.2	Boulder	--
94	High-gradient riffle	0.6	125.4	11	0.8	1.3	Boulder	--
95	Step run	0.6	97.2	9	1	2.1	Cobble	--
Glacier Creek between Tioga Dam and the Confluence of Lee Vining Creek								
1	Run	0.8	18.5	15	--	--	Cobble	2
2	Low-gradient riffle	0.8	60.8	22	--	--	Cobble	--
3	Run	0.8	42.1	17	--	--	Gravel	15
4	Low-gradient riffle	0.8	165.8	15	--	--	Cobble	--
5	Run	0.8	41.5	15	--	--	Cobble	--
6	Low-gradient riffle	0.8	65.3	20	--	--	Cobble	--
7	Scour pool	0.8	31.2	20	--	--	Boulder	--
8	Low-gradient riffle	0.8	104.3	12	--	--	Boulder	--
9	Scour pool	0.7	88.9	10	--	--	Gravel	--
10	Run	0.7	48.9	10	--	--	Cobble	--
11	High-gradient riffle	0.7	137.1	8.5	--	--	Boulder	--
12	Scour pool	0.7	57.9	12	--	2.4	Bedrock	--
13	High-gradient riffle	0.7	37.2	10.5	--	--	Boulder	--
14	Low-gradient riffle	0.7	266.2	9	--	--	Cobble	--
15	High-gradient riffle	0.6	105.9	9	--	--	Boulder	--
16	Cascade	0.6	111.6	12	--	--	Bedrock	--
17	High-gradient riffle	0.6	53.5	10	--	--	Cobble	--
18	Low-gradient riffle	0.6	75.4	12	--	--	Cobble	--
19	Run	0.6	187.2	40	--	--	Gravel	--
20	Low-gradient riffle	0.5	96.8	15	--	--	Cobble	--
21	Scour pool	0.5	56.7	12	--	2.5	Gravel	25
22	Low-gradient riffle	0.5	265	6	--	--	Cobble	--
23	High-gradient riffle	0.4	351.5	8	0.9	--	Cobble	--
24	Cascade	0.4	51.1	11	1	--	Boulder	--
25	Fall	0.4	66.5	7	--	--	Bedrock	--
26	Cascade	0.3	27.4	9	1.2	--	Bedrock	--
27	Run	0.3	87.8	7	1.2	--	Boulder	--

Unit No. [a]	Habitat Type	Reach Mile	Length (feet)	Avg. Width (feet)	Avg. Depth (feet)	Max. Depth (feet)	Substrate	Pool Tail Embeddedness (%)
28	Step run	0.3	255.1	11	1.1	--	Gravel	5
29	Scour pool	0.3	83.7	28	2.2	2.5	Sand	55
30	Low-gradient riffle	0.3	67.3	8	--	--	Cobble	10
31	Run	0.2	60.4	12	2.5	3	Cobble	10
32	Scour pool	0.2	359.5	270	2.5	6	Silt	50
33	Run	0.2	244.2	4	1.7	2.8	Silt	--
34	Low-gradient riffle	0.1	52.2	11	--	--	Gravel	5
35	Step run	0.1	86.9	8	1.1	1.6	Cobble	--
36	Scour pool	0.1	18.4	14	--	--	Boulder	10
37	Step run	0.1	197.1	9	1.2	1.6	Gravel	--
38	Low-gradient riffle	0.1	72.4	10	0.6	1	Cobble	10
39	High-gradient riffle	0.0	216.9	8	--	--	Boulder	--

% = percent; -- = no data

Note:

[a] Habitat unit numbers start at the downstream end of the survey reach and extend upstream

APPENDIX C
HABITAT-ATTRIBUTE DATA

Table C-1. Stream Habitat Attribute Data, Lee Vining and Glacier Creeks, 2023

Unit No.[a]	Habitat Type	Cover	LWM	Split Channel	Passage Barrier	Tributary Inflow (cfs)	Notes
Lee Vining Creek between the Los Angeles Department of Water and Power Diversion Dam and Poole Powerhouse							
1	Dammed pool	--	--	--	--	--	Diversion dam. Submerged aquatic vegetation present. Debris and silt bar in front of dam. Some cobble present at start of pool.
2	Low-gradient riffle	--	--	--	--	--	Tree cover and undercut banks. Temperature: 10°C.
3	High-gradient riffle	--	--	--	--	--	Mix of mostly cobble and boulders.
4	Scour pool	--	--	--	Flow gauge	--	Estimate of depth. Pool downstream of SCE flow gauge station, which is likely a low-flow habitat barrier.
5	Run	--		--	--	--	Lots of sand. Some gravel.
6	Low-gradient riffle	--	Yes	--	--	--	Some willows over the bank and boulders, LWM.
7	High-gradient riffle	--	--	--	--	--	Temperature: 10°C. Some willow and one log across.
8	High-gradient riffle	Vegetation	Yes	--	--	--	Willow cover, log jam.
9	Low-gradient riffle	--	--	--	--	--	--
10	Run	--	--	--	--	--	--
11	Low-gradient riffle	--	--	--	--	--	--
12	Scour pool	Wood	Yes	--	--	--	Scour with LWM pile on outside bend.
13	Low-gradient riffle	--		--	--	--	Temperature: 9°C.
14	Run	--	Yes	--	--	--	Large, downed tree across channel.
15	Step run	--	Yes	Yes	--	--	Main channel of braid around island. Side channel (5 feet) on right bank similar with log jams at top creating slightly deeper segment. Nice

Unit No.[a]	Habitat Type	Cover	LWM	Split Channel	Passage Barrier	Tributary Inflow (cfs)	Notes
							pocket water on upper portion too small to map.
15	High-gradient riffle	Wood	Yes	--	--	--	LWM dam.
16	Step run	--	--	--	--	--	--
17	High-gradient riffle	--	--	--	--	--	Sections of scour along large boulders. One fast chute like section with scour pool on right bank.
18	Run	Wood	Yes	--	--	--	--
19	Scour pool	Wood	Yes	--	--	--	Mid-channel formed by LWM dam. Depths estimated by sight.
19	Step run	Wood	Yes	--	--	--	Substrate and depth estimated visually.
20	Scour pool	Wood	Yes	--	--	--	Scoured bank with steep sides. LWM dam. Depths and substrate estimated visually.
21	Scour pool	Vegetation	--	--	--	--	Gravel bar at upstream end active at higher flows and poor quality.
22	Low-gradient riffle	Wood	Yes	--	--	--	Section connects two pools.
22	Scour pool	--	--	--	--	--	Some backwater habitat.
23	High-gradient riffle	--	--	--	--	--	--
24	Step run	Wood	Yes	--	--	--	Left bank scour around log jam.
24	Dammed pool	Wood	Yes	--	Log jam	--	Possible low-flow migration barrier at downstream end with log jam.
25	Run	Vegetation	Yes	--	--	--	--
26	Low-gradient riffle	Vegetation	--	--	--	--	--
27	Run	--	--	--	--	--	--
28	Low-gradient riffle	Wood	Yes	--	--	--	Temperature: 10°C
29	Scour pool	Wood	Yes	--	--	--	Some boulders, LWM dam.

Unit No.[a]	Habitat Type	Cover	LWM	Split Channel	Passage Barrier	Tributary Inflow (cfs)	Notes
30	Low-gradient riffle	Wood	Yes	--	--	--	--
31	Run	Wood	Yes	--	--	--	--
32	Low-gradient riffle	Vegetation	--	--	--	--	Some side eddies. Some deeper, small run-like sections.
33	High-gradient riffle	Wood	Yes	--	--	--	--
34	Run	Vegetation	--	--	--	--	Bottom is small pocket water and riffle.
35	High-gradient riffle	Vegetation	--	--	--	--	--
36	Run	Vegetation	--	--	--	--	--
37	High-gradient riffle	--	Yes	--	--	--	Pool and log jam at left descending bank.
38	Run	Vegetation	--	--	--	--	Some side pocket habitat.
39	Low-gradient riffle	Vegetation	--	--	--	--	--
39	High-gradient riffle	Vegetation	--	--	--	--	--
40	Run	Vegetation	--	--	--	--	Tracer rocks found.
41	Scour pool	Vegetation	--	--	--	--	Sand embedded boulders in tail.
42	High-gradient riffle	Wood	Yes	--	--	--	--
42	Scour pool	Wood	Yes	--	--	--	Brook trout.
44	Low-gradient riffle	Vegetation	--	--	--	--	--
45	Run	--	--	--	--	--	--
46	High-gradient riffle	Wood	Yes	--	--	--	--
47	Scour pool	Wood	Yes	--	--	--	Brown trout. Boulder cover.
47	Low-gradient riffle	--	--	Yes	--	--	Side channel enters at top of unit.
48	Run	Wood	Yes	Yes	--	--	LWM. Main channel split from side.
48	Low-gradient riffle	--	--	Yes	--	--	--

Unit No.[a]	Habitat Type	Cover	LWM	Split Channel	Passage Barrier	Tributary Inflow (cfs)	Notes
49	Step run	--	--	--	--	--	Small high-gradient riffle separates run habitats.
50	High-gradient riffle	Vegetation	--	Yes	--	--	Upstream side channels with spawning gravel.
51	Step run	Wood	Yes	Yes	--	--	Complex side channel with run and pool habitats. Steps formed by fallen logs. Ends at log jam on upstream end.
52	Dammed pool	Wood	Yes	--	--	--	Depth estimated. Spawning gravel above pool.
53	Run	Vegetation	--	--	--	--	--
53	Low-gradient riffle	Vegetation	--	--	--	--	--
54	Run	Vegetation	--	--	--	--	Temperature: 10°C.
54	High-gradient riffle	Vegetation	--	--	--	--	Ends at cascades.
55	Cascade	Vegetation	--	--	8	--	Ends at upstream tributaries.
56	High-gradient riffle	Vegetation	--	--	--	--	Short cascade in section.
57	Cascade	Vegetation	Yes	--	--	--	Ends at LWM
58	Low-gradient riffle	Vegetation	--	--	--	--	--
59	Run	Vegetation	--	--	--	--	50% boulder 50% silt. Deep side pocket.
60	Low-gradient riffle	Wood	Yes	--	--	--	--
61	Scour pool	Wood	Yes	--	1	--	Silt and cobble.
62	Run	Vegetation	--	--	--	--	--
63	Low-gradient riffle	Vegetation	--	--	--	--	Short low-gradient riffle separates pool upstream from run downstream.
64	Scour pool	Wood	Yes	--	--	--	Large LWM jam at bend scoured pool. Off-channel backwater pool at left bank. Not connected at this flow.

Unit No.[a]	Habitat Type	Cover	LWM	Split Channel	Passage Barrier	Tributary Inflow (cfs)	Notes
65	Run	Vegetation	Yes	--	--	--	Pool-like in places around logs/debris but too swift, so characterized as run.
66	Low-gradient riffle	Vegetation	--	--	--	--	--
67	Scour pool	--	Yes	--	--	--	Pool formed at downstream end of low-gradient riffle, scour along right bank at root wad.
68	Run	--	--	--	--	--	Cobbles embedded in sand. Surface turbulent but characterized as run.
69	Scour pool	--	--	--	--	--	--
70	High-gradient riffle	Wood	Yes	--	--	--	Large tree fell at upstream end, end of high-gradient riffle transitions to low-gradient riffle. Not a lot of scour along trees, riffle habitat.
71	Low-gradient riffle	Wood	Yes	--	--	--	Some scour at upstream end of fallen tree, 10-foot x10-foot pocket water around root wad. Cobble embedded in sand throughout.
72	Run	Wood	Yes	--	--	--	Small run, cobbles embedded in sand. Scour along left bank.
73	Low-gradient riffle	Wood	Yes	--	--	--	Long confined low-gradient riffle with downed trees and areas of small pocket water.
74	Step run	Wood	Yes	Yes	--	--	Sand and cobble. Very short low-gradient riffle habitat separates a series of runs. Upstream end braided and complex around an island that was scoured. Large LWM jam at upstream end is separate pool.
75	Dammed pool	Wood	Yes	Yes	--	--	Large pool formed around downed tree and subsequent debris jam. Good habitat. Small

Unit No.^{a}	**Habitat Type**	**Cover**	**LWM**	**Split Channel**	**Passage Barrier**	**Tributary Inflow (cfs)**	**Notes**
							braided channel on left bank enters 100 feet downstream, mostly low-gradient riffle habitat.
76	Run	Wood	Yes	--	--	--	Sand substrate. Embedded cobbles. Scour pockets along downed trees are great habitat.
77	Dammed pool	Wood	Yes	--	--	--	Pools formed by downed trees, pool tail out is small low-gradient riffle with good gravel at head.
78	Step run	Wood	Yes	--	--	--	Small low-gradient riffle separates two runs. Lots of sand in unit. Good 10-foot x 5-foot pocket water at left bank around root wad.
79	High-gradient riffle	Vegetation	--	--	--	--	Areas of small pool habitat behind boulders, good habitat.
80	Low-gradient riffle	Vegetation	--	--	--	--	--
81	High-gradient riffle	Vegetation	Yes	--	0.8	--	Downed trees toward top of unit, which has some scour and pool-like habitat but still in high-gradient riffle habitat.
82	Step run	Vegetation	Yes	--	--	--	Small low-gradient-riffle steps separate run habitat. LWM jam toward upstream end has pool-like habitat, but included in unit due to small size.
83	High-gradient riffle	Vegetation	Yes	--	--	--	High-gradient riffle ends at LWM jam.
84	Dammed pool	Wood	Yes	--	--	--	--
85	Run	Vegetation	--	--	--	--	SCE weir structure. Small faster section at upstream end where fish site begins is end of unit. Becomes pool-like and wide.
86	Scour pool	Wood	Yes	--	--	--	Run-like at downstream end not part of a larger wide pool-like section. Upstream end scoured

Unit No.[a]	Habitat Type	Cover	LWM	Split Channel	Passage Barrier	Tributary Inflow (cfs)	Notes
							around large boulder, and flow deflected along right bank. Great habitat. Spawning gravel mid-unit toward upper end mid-channel.
87	Run	Vegetation	--	--	--	--	Downstream end has short, high-gradient step into pool. Ends at small pool. Cobbles embedded in sand.
88	Scour pool	Wood	Yes	--	--	--	Pool formed by LWM and mid-channel boulder. Temperature: 10°C.
89	Low-gradient riffle	Vegetation		--	--	--	--
90	Step run	Wood	Yes	--	--	--	Upstream end is at pool tail out.
91	Scour pool	Boulder	--	--	--	--	Pool scoured around mid-channel boulder.
92	Run	Vegetation	Yes	--	--	--	Pool like habitat at upstream end around root wads and LWM. Very mobile deposits of silt and sand preset throughout unit.
93	Low-gradient riffle	--	--	--	--	--	Short riffle between pool and run.
94	Scour pool	Wood	Yes	--	--	--	--
95	High-gradient riffle	Vegetation	--	--	--	--	--
96	Step run	Vegetation	Yes	Yes	--	--	Downstream run with good cover. Small riffle-step connects other run habitat with LWM. Small braided channel enters mid-unit.
97	Scour pool	Vegetation	Yes	--	6	--	LWM and vegetative cover. Small tributary enters at top of pool on right bank.
98	Scour pool	Vegetation	--	--	--	--	Short low-gradient riffle separates the two pools. Too small, so included in unit.

Unit No.[a]	**Habitat Type**	**Cover**	**LWM**	**Split Channel**	**Passage Barrier**	**Tributary Inflow (cfs)**	**Notes**
99	Step run	Vegetation	Yes	Yes	--	--	Small side channel primarily low-gradient riffle with LWM begins in this unit and re-enters creek downstream.
100	Low-gradient riffle	Vegetation	--	Yes	--	--	Small borderline high-gradient riffle section included in low-gradient riffle.
101	Run	--	--	Yes	--	--	Short run habitat. Lots of sand.
102	Low-gradient riffle	--	--	Yes	--	--	--
103	Run	Wood	Yes	Yes	--	--	Side channel enters at the downstream end of unit.
104	High-gradient riffle	--	Yes	Yes	--	--	Significant 10-foot-wide side channel at left bank with step run habitat, large LWM jam at upstream end of unit.
105	Dammed pool	Wood	Yes	Yes	--	--	Complex side-channels in unit, with four-plus channels caused by LWM jam on left bank.
106	Run	--	--	--	--	--	Glide like run.
107	High-gradient riffle	--	--	--	--	--	Long high-gradient riffle section. Small backwater rearing habitat at upstream end of unit.
108	Scour pool	Wood	Yes	--	--	--	--
109	Run	Wood	Yes	--	--	--	Short high-gradient riffle at downstream end of unit included in Run
110	High-gradient riffle	--	Yes	--	--	--	Large LWM jam in unit, high-gradient, long confined channel.
111	Run	--	--	--	--	--	Temperature: 11°C.
112	Cascade	--	--	--	--	--	Very confined against road.
113	High-gradient riffle	--	--	--	--	--	One small cascade included in unit.
114	Run	--	--	--	--	--	--

Unit No.[a]	Habitat Type	Cover	LWM	Split Channel	Passage Barrier	Tributary Inflow (cfs)	Notes
115	High-gradient riffle	--	--	--	--	--	--
116	Step run	--	--	--	--	--	--
117	Low-gradient riffle	--	--	--	--	--	--
118	Scour pool	Wood	Yes	--	--	--	--
119	Run	--	--	--	--	--	--
120	Run	--	Yes	--	<1	--	Very long run with pocket water at meanders, incised channel. Spawning gravel only at upstream-most extent. Temperature: 11°C.
121	Scour pool	Wood	Yes	--	<1	--	Run-like pool tail out connects two lateral scour pools around LWM features. Spawning gravel in tail out.
122	Low-gradient riffle	Vegetation		--	--	--	Short low-gradient riffle ends at pool tail out.
123	Scour pool	Wood	Yes	Yes	--	--	Braided channel converges here. Gravel and sand substrate.
124	Low-gradient riffle	Wood	Yes	Yes	--	--	Short low-gradient riffle densely vegetated at pool tail out. Split channel mapped larger channel. Left bank split is similar habitat, step run with short low-gradient riffle gravel and sand in between.
125	Dammed pool	Wood	Yes	Yes	--	--	Lateral scour and LWM jam form good pool habitat.
126	Run	Vegetation	--	Yes	--	--	At upstream meander, pool-like, but flow and substrate varied so included with run. Good habitat.
127	Step run	Vegetation	--	--	--	--	Channels split at downstream end of this run. Run habitat continues through braid, but split for mapping purposes. Even split cobble and sand.

Unit No.[a]	Habitat Type	Cover	LWM	Split Channel	Passage Barrier	Tributary Inflow (cfs)	Notes
128	Scour pool	--	--	--	--	--	Large scour pool formed by spring high flows. Significant bank erosion on left bank at bend.
129	High-gradient riffle	--	--	Yes	--	--	Lateral high gradient riffle with large step. Flow hits bank laterally, and there is a 50-foot x 5-foot run-like scour along the bank, but it is within larger riffle complex.
130	Run	--	--	Yes	--	--	Lateral scour run running parallel with Unit 129 high-gradient riffle.
131	Low-gradient riffle	--	--	--	--	--	--
132	Run	--	--	--	--	--	--
133	High-gradient riffle	--	--	--	--	--	--
134	Scour pool	Wood	Yes	--	--	--	Large LWM jam at bend caused scour in high-gradient riffle. Upstream end plunge-like scour pool that transitions to large fast-moving pool around LWM jam.
135	High-gradient riffle	--	--	--	--	--	Short high-gradient riffle
136	Step run	--	--	--	--	--	Runs with small step.
137	High-gradient riffle	Wood	Yes	Yes	--	--	Large LWM jam mid unit. Small high-gradient riffle braid above log jam.
138	Cascade	Boulder	--	--	Cascade	--	Stream enters canyon-like section. Cascade sections passage barrier at this flow.
139	Scour pool	Boulder	--	--	--	--	At base of falls.
140	Fall	Boulder	--	--	Large Falls	--	Large plunge pool at base of upstream falls mapped separately.
141	Cascade	Boulder	--	Yes	--	--	Channel splits around bedrock mid-unit. Cascade on one side, small falls on

Unit No.[a]	Habitat Type	Cover	LWM	Split Channel	Passage Barrier	Tributary Inflow (cfs)	Notes
							right bank included within cascade unit. Fish passage barriers throughout starting at falls.
142	Step run	Wood	--	--	<0.2	--	Two small runs with small high-gradient riffle in between Tributary flow at road approximately 1 cfs.
143	High-gradient riffle	Boulder	--	--	--	--	--
144	Cascade	Boulder		--	--	--	--
145	Dammed pool	Wood	Yes	--	--	--	Massive log jam at top of cascade forms deep pool section. Run-like toward the top, but slow and greater than 4-foot depth. Boulder cover on left bank is road reinforcement.
146	High-gradient riffle	Boulder	--	--	--	--	--
147	Run	--	--	--	--	--	--
148	High-gradient riffle	Boulder	--	--	--	--	--
149	Step run	Vegetation	--	--	--	--	Gradient decreases and short run steps separated by very small low-gradient-riffle steps with boulder substrate.
150	Scour pool	Wood	Yes	--	--	--	Wood and vegetative cover. Great habitat, more than 30 trout holding in pool. Excellent complex pool habitat.
151	Run	Wood	Yes	--	--	--	Too sandy for spawning gravel, though some suitable smaller sized gravels present. LWM throughout unit. Good habitat.
152	Scour pool	Wood	Yes	--	--	--	Excellent pool habitat. LWM at top great habitat. Trout throughout.

Unit No.[a]	Habitat Type	Cover	LWM	Split Channel	Passage Barrier	Tributary Inflow (cfs)	Notes
153	Run	Wood	Yes	--	--	--	Another great habitat unit with trout throughout. Great cover.
154	Scour pool	Wood	Yes	--	--	--	Pool scoured at bend and from upstream log jam. Ends at log jam.
155	Run	Wood	Yes	--	--	--	--
156	Scour pool	Wood	Yes	--	--	--	Log jam mid-pool. Pool habitat upstream and downstream of this feature. Becomes run-like at pool head.
157	Run	Wood	Yes	Yes	--	--	Upstream end of Unit 156 is massive log jam. Run-like underneath huge LWM jumble. Fast moving, so typed as run. Channel braided at top of this unit around log jam and split channel re-enters in Unit 156.
158	Scour pool	Vegetation	--	--	--	--	--
159	Run	Vegetation	Yes	--	--	--	--
160	Low-gradient riffle	Wood	Yes	--	--	--	--
161	High-gradient riffle	--	Yes	--	--	--	--
162	Step run	--	--	--	--	--	Two short runs separated by small boulder step along bedrock outcrop. Fast but split out due to run-like characteristics.
163	Low-gradient riffle	--	--	--	--	--	Low-gradient riffle ends at high-gradient riffle step.
164	High-gradient riffle	Boulder	--	--	--	--	A 60-foot lateral boulder bar; large step at bend. One short cascade toward bottom of confined section, rest is high-gradient riffle.
165	Cascade	Boulder	--	--	--	--	Good pool habitat at base of cascading features toward upstream end.

Unit No.[a]	Habitat Type	Cover	LWM	Split Channel	Passage Barrier	Tributary Inflow (cfs)	Notes
166	Fall	--	--	--	Large Falls	--	Large falls. Plunge pool at base bad habitat and small. Fish passage barrier.
167	Fall	--	--	--	--	--	Temperature: 8°C.
168	--	Vegetation	--	--	--	--	--
169	Step run	Wood	Yes	--	--	--	Long glide step run. Some deeper pool like spots with laminar flow.
170	Scour pool	Wood	Yes	--	--	--	Cobble beds.
171	Run	--	--	--	--	--	--
172	Scour pool	Boulder	--	--	--	--	--
173	Run	--	--	--	--	--	--
174	Scour pool	--	--	--	--	--	--
175	Run	Wood	--	--	--	--	Backwater with LWM on upper end.
176	Scour pool	Wood	Yes	--	--	--	Widens out to shallow backwater on downstream end. Wide to narrow with log jam at upstream end.
177	Step run	Wood	Yes	--	--	--	Some pocket water habitat. LWM pile. Upstream end has swift pool like feature.
178	Low-gradient riffle	Wood	Yes	--	--	--	--
179	Dammed pool	Wood	Yes	--	--	--	Pool under LWM jam.
180	Step run	Wood	Yes	--	--	--	--
181	Scour pool	Vegetation	--	Yes	--	--	Pools split by small bedrock dam. Numerous trout.
182	Step run	Wood	Yes	--	--	--	Long runs with small deep-water run sections.
183	High-gradient riffle	Vegetation	--	--	--	--	Some pocket water.
184	Step run	Vegetation	--	--	--	--	--
185	High-gradient riffle	Vegetation	--	--	--	--	One small plunge pool.
186	Scour pool	Wood	Yes	--	--	--	--

Unit No.[a]	Habitat Type	Cover	LWM	Split Channel	Passage Barrier	Tributary Inflow (cfs)	Notes
187	High-gradient riffle	Vegetation	--	--	--	--	--
188	Cascade	Vegetation	--	--	--	--	--
189	High-gradient riffle	Vegetation	--	--	--	--	--
190	Cascade	--	--	--	--	--	--
191	High-gradient riffle	--	--	--	--	--	--
192	Step run	--	--	--	--	--	--
193	Low-gradient riffle	--	--	--	--	--	--
194	Dammed pool	Wood	Yes	--	--	--	--
195	Step run	Boulder	--	--	--	--	Some pocket pool habitat with large boulder field creating some high velocity.
196	Low-gradient riffle	Boulder	--	--	--	--	--
197	Scour pool	Wood	Yes	--	--	--	--
198	Run	Boulder	--	--	--	--	Run with upstream partial riffle and downstream a culvert run to deep pool.
199	Dammed pool	Wood	Yes	--	--	--	Trout present.
200	Scour pool	Wood	Yes	--	--	--	Pools split by gravel dam.
201	Run	Vegetation	--	--	--	--	--
202	Scour pool	Wood	Yes	--	--	--	--
203	Run	Vegetation	--	--	--	--	Small patches of gravel but not big enough for redds.
204	Scour pool	Vegetation	--	Yes	--	--	Small side channel.
205	Low-gradient riffle	Vegetation	--	Yes	--	--	--
206	Step run	Wood	Yes	Yes	--	--	Unclear on main channel. Main channel splits at upstream end. Flows are similar between. Some shallow pools in run segments.
207	Scour pool	Wood	Yes	Yes	--	--	Just below separation of Lee Vining channel.

Unit No.[a]	Habitat Type	Cover	LWM	Split Channel	Passage Barrier	Tributary Inflow (cfs)	Notes
208	Step run	Wood	Yes	Yes	--	--	Right side channel of split Lee Vining. Similar to left channel but unable to view it due to LWM jam and dense vegetation.
209	Step run	Wood	Yes	Yes	--	--	One small pool like section with fast flow. Upstream ends with confluence of two channels and large backwater area.
210	Step run	Wood	Yes	--	--	--	Upstream ends with spill pool from pump house.
211	Scour pool	Vegetation	Yes	--	--	--	Pool spillway from pumphouse. Visual estimate for the depths.
Lee Vining Creek between the Confluence of Slate Creek and Ellery Lake							
1	High-gradient riffle	--	--	--	--	--	--
2	Low-gradient riffle	--	--	--	--	--	Temperature: 11°C
3	Step run	--	--	--	--	--	Small spawning gravel patch above small step mid-unit.
4	Low-gradient riffle	--	--	--	--	--	Great spawning gravel throughout unit, included patch with pool tail at upstream end.
5	Scour pool	--	--	--	--	--	--
6	Step run	--	--	--	--	--	Upstream end deep run, pool-like.
7	Low-gradient riffle	--	--	--	--	--	--
8	Run	--	--	--	--	--	--
9	Low-gradient riffle	--	--	--	--	--	--
10	Step run	--	--	--	--	--	Small low-gradient riffle mid unit.
11	Low-gradient riffle	--	Yes	--	--	--	Border line High-gradient riffle. Small patch of suitable gravel behind

Unit No.^{a}	Habitat Type	Cover	LWM	Split Channel	Passage Barrier	Tributary Inflow (cfs)	Notes
							LWM (10 foot x 3 foot) likely not spawnable under any flow conditions due to inadequate location.
12	Step run	--	--	--	--	--	Small low-gradient riffle separates two runs.
13	Low-gradient riffle	--	--	--	--	--	--
14	Scour pool	--	--	--	--	--	Large culvert plunge pool. Larger substrate size and embeddedness limit spawning gravel patch size.
15	High-gradient riffle	--	--	--	--	--	Canyon section above culvert.
16	Step run	--	--	--	--	--	--
17	Low-gradient riffle	--	--	--	--	--	Small run-like section at downstream end included in unit.
18	Step run	--	--	--	--	--	Borderline spawning gravel but substrate too large.
19	Low-gradient riffle	--	--	--	--	--	--
20	Scour pool	--	--	--	--	--	--
21	Run	--	--	--	--	--	Small-sized spawning gravel in unit, just upstream of culvert.
22	Low-gradient riffle	--	--	--	--	--	--
23	Scour pool	Vegetation	--	--	--	--	Eroding bank on upstream end of unit. Large gravel bar on left bank.
24	Run	--	--	Yes	--	--	Small (3-foot-wide) braided channel (low-gradient riffle) around gravel bar on left bank.
25	Low-gradient riffle	--	--	--	--	--	Sections of short run-like habitat included in unit.
26	High-gradient riffle	--	--	Yes	--	--	Small (5-foot-wide) run-like split channel at right bank.

Unit No.[a]	Habitat Type	Cover	LWM	Split Channel	Passage Barrier	Tributary Inflow (cfs)	Notes
27	Run	Boulder	--	--	--	--	Channel confined by bedrock outcrop. Run habitat.
28	High-gradient riffle	Boulder	--	--	--	--	Pocket water behind boulders is good habitat.
29	Run	--	--	--	--	--	--
30	High-gradient riffle	--	--	--	--	--	--
31	Run	--	--	--	--	--	Small backwater off-channel, some gravel, too small and sandy. Temperature: 11°C.
32	Low-gradient riffle	--	--	--	--	--	--
33	Step run	--	--	--	--	--	--
34	Scour pool	--	--	--	--	--	Deep undercut lateral scour.
35	Run	--	--	--	--	--	Low-gradient riffle in lower portion included in unit. Deeper run in upstream portion of unit along left bank.
36	Low-gradient riffle	--	--	--	--	--	Small backwater eddy.
37	Run	--	--	Yes	--	--	Channel splits in downstream portion. Undercut banks and overhanging vegetation throughout reach.
38	Low-gradient riffle	--	--	Yes	--	--	Short run-like sections interspersed in upstream portion.
39	Step run	Vegetation	--	Yes	--	--	Right channel of split.
40	Run	--	--	--	--	--	Large spawning gravel patch in segment. Temperature: 11°C.
41	High-gradient riffle	--	--	--	--	--	--
42	Low-gradient riffle	--	--	--	--	--	Small gravel patches interspersed throughout this and last segment along stream margins,

Unit No.[a]	Habitat Type	Cover	LWM	Split Channel	Passage Barrier	Tributary Inflow (cfs)	Notes
							likely too small to spawn, unmapped.
43	Step run	--	--	--	--	--	--
44	Run	--	--	--	--	--	Dry gravel bar along left bank.
45	Low-gradient riffle	--	Yes	--	--	--	Small run-like sections around LWM present in channel. Dry otherwise spawnable gravel patches along right bank.
46	Run	--	--	--	--	--	--
47	Run	--	--	Yes	--	--	Some backwater rearing habitat.
48	Run	--	--	Yes	--	--	Split channel for a small section.
49	Scour pool	--	--	--	--	--	Three lateral scour pools in succession.
50	Low-gradient riffle	--	--	--	--	--	--
51	Scour pool	--	--		--	--	Three lateral scour pools in succession.
52	Run	--	--	Yes	--	--	--
53	Low-gradient riffle	Vegetation	--	Yes	--	--	Small side channel split.
54	Run	--	--	--	--	--	--
55	Scour pool	--	--	--	--	--	Two lateral scour pools, some backwater habitat, channel splits at the top of the upstream lateral scour pool.
56	Low-gradient riffle	--	--	Yes	--	--	Small side-channel split on left bank through part of unit. Reconnects with main channel after 65 feet.
57	Run	--	--	--	--	--	--
58	Step run	--	--	Yes	--	--	--
59	Scour pool	--	--	Yes	--	--	Four-foot side channel low-gradient riffle splits off at the upstream end of this unit.

Unit No.[a]	Habitat Type	Cover	LWM	Split Channel	Passage Barrier	Tributary Inflow (cfs)	Notes
60	High-gradient riffle	--	--	--	--	--	--
61	Run	Wood	--	Yes	--	--	Middle segment of braided channel.
62	Scour pool	--	--	Yes	--	--	Two lateral scour pools; short run-like section in between included in unit.
63	Low-gradient riffle	--	--	Yes	--	--	--
64	High-gradient riffle	--	--	Yes	--	--	Short run section at downstream end of unit, then high gradient constricted section.
65	Scour pool	--	--	--	--	--	--
66	Run	--	--	--	--	--	Some backwater rearing habitat.
67	Scour pool	--	--	--	--	--	--
68	Low-gradient riffle	--	--	--	--	--	Small lateral scour pool included in unit.
69	Run	--	--	--	--	--	--
70	Scour pool	--	--	--	--	--	Two scour pools included in unit.
71	Low-gradient riffle	--	--	--	--	--	--
72	Step run	--	--	Yes	--	--	Split channel for 3 feet. Some small slower velocity sections are pool-like.
73	Low-gradient riffle	--	--	--	--	--	--
74	High-gradient riffle	--	--		--	--	Small run at downstream end included in unit.
75	Low-gradient riffle	--	--	Yes	--	--	Channel splits at upstream end of unit.
76	Low-gradient riffle	Vegetation	--	--	--	--	Complex, braided, flooded meadow habitat attached to segment, high quality rearing habitat, many young-of-the year trout observed.
77	Step run	--	--	--	--	--	--

Unit No.[a]	Habitat Type	Cover	LWM	Split Channel	Passage Barrier	Tributary Inflow (cfs)	Notes
78	High-gradient riffle	--	--	--	--	--	Nearly even cobble to boulder ratio.
79	High-gradient riffle	--	--	--	--	--	Long high-gradient riffle through canyon, small step run sections, small patches of gravel on margins, but none big enough for redd formation.
80	Low-gradient riffle	--	--	--	--	--	--
81	High-gradient riffle	--	--	--	--	--	--
82	Cascade	--	--		Small falls	--	Short cascade. Likely migration barrier at low flows.
83	Low-gradient riffle	--	--	--	--	--	--
84	Step run	--	--	--	--	--	--
85	Low-gradient riffle	--	--	--	--	--	--
86	Run	--	--		--	< 1	--
87	Low-gradient riffle	--	--	--	--	--	--
88	Run	--	--	--	--	--	--
89	Step run	--	--	Yes	--	--	Could be a low-gradient riffle at lower flows.
90	Low-gradient riffle	--	--	--	--	--	--
91	Step run	Vegetation	--	Yes	--	--	Small serpentine step run. At lower flows deep runs may be lateral scour pools.
Lee Vining Creek between Saddlebag Dam and the Confluence of Slate Creek							
92	High-gradient riffle	--	--	--	--	--	Long high-gradient-riffle section, some sections nearly cascade-like; grades likely higher than 10%. Slate creek confluence is at very downstream end of segment. The top of segment has high confinement. In narrow

Unit No.[a]	Habitat Type	Cover	LWM	Split Channel	Passage Barrier	Tributary Inflow (cfs)	Notes
							canyon and very high gradient.
93	Cascade	--	--	--	Falls	--	Much of the channel was inaccessible. Six-foot falls prohibited access. The top section was viewed from above, but much of canyon was not assessed. Notes are from the downstream 400 feet of accessible segment. Steep cascade sections in narrow canyon with short high-gradient-riffle sections between. Multiple falls within section are a barrier to dispersal.
94	High-gradient riffle	--	--	--	Flow gauge	--	Short steep high-gradient riffle immediately after SCE gauge station before reach enters cascade in steep canyon.
95	Step run	--	--	--	--	--	Short step run between flow station and culvert leaving from dam.
Glacier Creek between Tioga Lake and the Confluence of Lee Vining Creek							
1	Run	--	--	--	--	--	Extensive backwater habitat present off-channel, fry in backwater, trout in channel.
2	Low-gradient riffle	--	--	--	--	--	--
3	Run	--	--	--	--	--	--
4	Low-gradient riffle	--	--	--	--	--	Long riffle.
5	Run	--	--	--	--	--	--
6	Low-gradient riffle	--	--	Yes	--	--	Small side-channel and off-channel flooded meadow habitat present.
7	Scour pool	--	--	--	--	--	Small pool mid-channel
8	Low-gradient riffle	Vegetation	--	Yes	--	9.3	Single channel at downstream end, braided around gravel bar at upstream end. Small tributary joins at

Unit No.[a]	Habitat Type	Cover	LWM	Split Channel	Passage Barrier	Tributary Inflow (cfs)	Notes
							downstream end just below split around gravel bar.
9	Scour pool	Vegetation	--	--	--	--	--
10	Run	--	--	--	--	--	Temperature: 13 °C
11	High-gradient riffle	--	--	--	--	--	Long high-gradient riffle until cabins.
12	Scour pool	--	--	--	--	--	--
13	High-gradient riffle	--	--	--	--	--	Small cascade at downstream end included in high-gradient riffle.
14	Low-gradient riffle	--	--	--	--	--	Segment within Tioga Pass Resort. Small spawning gravel patches less than 6 square feet
15	High-gradient riffle	--	--	--	--	--	--
16	Cascade	--	--	Yes	--	--	Small split in channel.
17	High-gradient riffle	--	--	--	--	--	--
18	Low-gradient riffle	--	--	--	Culvert	--	Section goes up to culvert at State Route 120.
19	Run	Vegetation	--	--	--	0.5	Large, wide run just upstream of culvert. Lots of quality spawning gravel, flooded vegetation on river left. Lots of young-of-year trout observed in segment.
20	Low-gradient riffle	--	--	--	--	0.2	--
21	Scour pool	--	--	Yes	--	--	Split channel. Long scour pool with spawning gravel.
22	Low-gradient riffle	--	--	Yes	--	--	--
23	High-gradient riffle	--	--	Yes	--	0.9	Long unit, good areas of pocket water along margins. Braided channel along upstream end, smaller side channel also high-gradient riffle.
24	Cascade	--	--	--	--	1	--
25	Fall	--	--	--	--	--	--

Unit No.[a]	Habitat Type	Cover	LWM	Split Channel	Passage Barrier	Tributary Inflow (cfs)	Notes
26	Cascade	--	--	--	Falls	1.2	Falls is a fish passage barrier. Temperature: 12°C.
27	Run	--	--	--	--	1.2	--
28	Step run	--	--	--	--	1.1	Excellent habitat.
29	Scour pool	Vegetation	--	--	--	2.2	Silt/sand substrate transitions to cobble at upstream end some boulder cover mid-unit.
30	Low-gradient riffle	--	--	--	--	--	Gravel/cobble at downstream end transitions to boulder.
31	Run	--	--	--	--	2.5	Upstream end at large pool. Run-like habitat is extension of large pool/pond upstream.
32	Scour pool	--	--	--	--	2.5	Massive lake-like pool; excellent rearing habitat. Submerged aquatic vegetation on substrate. Fry observed throughout. Vegetation along margins. Right bank on downstream end has large backwater. Upstream end flooded with grass and vegetation. Abrupt shallow section at upstream end called top of unit.
33	Run	Vegetation	--	--	--	1.7	Margins are flooded vegetation. Total width 60 feet, but clear channel through center. Upstream end widens and shallows. Trout plentiful throughout.
34	Low-gradient riffle	--	--	--	--	--	--
35	Step run	--	--	--	--	1.1	--
36	Scour pool	--	--	--	Flow Gauge	--	Pool formed by SCE flow gauge station.
37	Step run	--	--	--	--	1.2	Road crossing at upstream end creates wider channel. Substrate sand/gravel. Almost spawning gravel

Unit No.[a]	Habitat Type	Cover	LWM	Split Channel	Passage Barrier	Tributary Inflow (cfs)	Notes
							but too sandy. Temperature: 13°C
38	Low-gradient riffle	--	--	--	--	0.6	Channel splits at discharge and spillway channel. Small run at discharge location included in low-gradient riffle.
39	High-gradient riffle	--	--	--	Spillway	--	High-gradient riffle and small cascade up to spillway. Fish passage barrier upstream at spillway.

-- = no data; °C = degrees Celsius; cfs = cubic feet per second; LWM = large woody material

Note:

[a] Habitat unit numbers start at the downstream end of the survey reach and extend upstream

APPENDIX D
SPAWNING GRAVEL ATTRIBUTE DATA

Table D-1. Spawning Gravel Attribute Data, Lee Vining and Glacier Creeks, 2023

Unit Number	Reach Mile	Activity Class [a]	Particle Size (mm)			Gravel Depth (mm)	Width (feet)	Length (feet)	Quality (1-4)
			D16	D84	D50				
Lee Vining Creek between the Los Angeles Department of Water and Power Diversion Dam and Poole Powerhouse									
6	6.38	Active	16	40	25	10	5	15	1
9	6.24	Semiactive	12	41	21	10	7	30	2
10	6.19	Nonactive	19	55	27	15	5	20	2
11	6.18	Semiactive	12	35	20	20	5	25	2
21	5.79	Nonactive	20	65	45	10	8	12	2
30	5.54	Semiactive	10	65	45	25	10	30	2
32	5.52	Nonactive	5	50	20	10	10	8	1
47	5.21	Nonactive	20	65	40	15	10	10	1
50	5.11	Semiactive	5	35	20	5	8	6	1
51	5.03	Semiactive	8	35	18	50	3	10	2
53	4.96	Semiactive	10	65	35	25	20	35	2
60	4.58	Semiactive	8	35	18	20	10	10	2
64	4.45	Semiactive	5	55	15	15	12	10	2
77	2.45	Semiactive	12	50	25	15	12	25	3
82	3.94	Semiactive	8	35	15	10	10	15	2
86	3.80	Semiactive	10	40	20	10	10	10	2
90	3.73	Active	8	25	15	10	10	15	2
96	3.63	Semiactive	15	50	28	10	8	15	2
120	3.04	Active	8	45	15	25	5	16	2
121	2.42	Active	8	34	20	25	10	20	2
123	2.37	Semiactive	15	55	28	15	8	30	2
126	2.35	Active	7	40	22	20	10	25	2
126	2.35	Semiactive	6	25	16	25	25	50	3
154	1.47	Semiactive	12	40	25	15	8	20	3
158	1.38	Semiactive	11	25	40	20	8	20	3
169	1.07	Nonactive	5	25	15	15	12	45	1
169	1.07	Semiactive	15	60	25	10	10	45	2
174	0.94	Nonactive	5	40	20	8	5	20	1

Unit Number	Reach Mile	Activity Class [a]	Particle Size (mm)			Gravel Depth (mm)	Width (feet)	Length (feet)	Quality (1-4)
			D16	D84	D50				
177	0.88	Semiactive	8	35	20	5	12	35	1
179	0.81	Semiactive	5	25	15	8	4	20	1
194	0.45	Semiactive	10	55	25	3	8	12	2
195	0.42	Nonactive	5	35	20	5	2	12	1
198	0.30	Semiactive	15	45	30	15	5	10	1
200	0.26	Semiactive	10	30	20	5	6	30	2
206	0.21	Semiactive	10	45	30	17	5	25	2
Lee Vining Creek between the Confluence with Slate Creek and Ellery Lake									
3	3.04	Semiactive	10	30	18	20	10	20	3
4	3.02	Active	15	100	30	--	30	50	2
6	3.00	Active	20	65	40	75	20	20	2
8	2.96	Semiactive	25	60	40	10	8	25	3
14	2.79	Semiactive	15	60	30	50	15	20	1
16	2.78	Active	15	55	30	50	15	15	2
16	2.78	Active	10	40	25	30	5	20	3
17	2.74	Semiactive	15	50	35	30	5	25	2
20	2.61	Active	10	25	15	5	4	15	4
21	2.60	Active	10	30	20	20	10	25	2
22	2.59	Semiactive	10	30	25	15	6	30	2
22	2.59	Semiactive	10	50	30	10	8	30	2
22	2.59	Active	15	60	30	10	10	25	2
23	2.51	Active	10	50	25	10	15	15	3
24	2.49	Semiactive	15	50	30	10	8	20	3
29	2.30	Semiactive	15	60	32	10	5	20	3
30	2.30	Active	15	50	25	15	2	10	2
30	2.30	Active	12	53	25	25	6	25	2
32	2.24	Semiactive	10	37	21	15	4	30	2
32	2.24	Semiactive	19	65	31	10	6	60	3
33	2.21	Semiactive	10	50	27	10	3	15	1
33	2.21	Semiactive	13	80	30	10	8	45	2
33	2.21	Semiactive	8	35	20	15	4	12	3

Unit Number	Reach Mile	Activity Class [a]	Particle Size (mm)			Gravel Depth (mm)	Width (feet)	Length (feet)	Quality (1-4)
			D16	D84	D50				
34	2.16	Semiactive	19	65	32	15	12	60	3
35	2.15	Semiactive	14	70	35	20	10	40	2
36	2.13	Semiactive	10	70	25	10	15	50	2
37	2.09	Semiactive	9	65	30	10	6	45	2
38	2.05	Semiactive	11	40	25	15	2.5	15	2
40	1.93	Semiactive	10	60	30	20	6	45	3
43	1.83	Semiactive	15	50	27	25	6	30	3
43	1.83	Semiactive	15	65	25	25	7	40	4
44	1.78	Semiactive	10	45	25	15	5	20	3
46	1.73	Semiactive	8	40	19	15	5	15	2
46	1.73	Semiactive	10	70	25	20	7	40	2
46	1.73	Semiactive	10	70	35	20	6	150	3
46	1.73	Semiactive	8	55	25	20	20	80	4
46	1.73	Semiactive	12	50	25	30	12	150	4
49	1.58	Semiactive	10	70	30	20	10	150	4
51	1.54	Semiactive	11	60	27	20	8	120	4
55	1.49	Semiactive	10	60	25	20	7	70	3
62	1.25	Semiactive	18	65	35	10	7	35	3
63	1.23	Semiactive	15	55	25	15	5	60	2
64	1.21	Semiactive	16	66	31	7	5	20	1
67	1.16	Semiactive	8	40	22	15	4	25	2
69	1.11	Semiactive	24	75	35	15	10	110	1
76	0.94	Semiactive	17	73	30	35	5	25	3
87	0.26	Semiactive	15	40	32	15	4	20	2
87	0.26	Semiactive	12	52	30	15	12	30	3
Glacier Creek between Tioga Dam and the Confluence of Lee Vining Creek									
1	0.84	Semiactive	--	--	--	10	1	2	4
3	0.82	Semiactive	--	--	--	15	4	10	4
14	0.67	--	--	--	--	15	2	8	2
18	0.56	Active	15	55	30	30	15	75	4
20	0.55	--	18	61	38	15	3	15	2

Unit Number	Reach Mile	Activity Class [a]	Particle Size (mm)			Gravel Depth (mm)	Width (feet)	Length (feet)	Quality (1-4)
			D16	D84	D50				
21	0.51	--	20	54	35	15	3	10	2
27	0.51	Active	20	55	28	12.5	6	20	3
34	0.12	Active	25	70	38	10	4	20	3
34	0.12	Active	15	42	26	25	12	45	4

-- = no data; mm = millimeter

Notes:

[a] Geomorphic activity class (e.g., active, semiactive, nonactive).

SOUTHERN CALIFORNIA EDISON
Lee Vining Hydroelectric Project
(FERC Project No. 1388)

AQUATIC INVASIVE PLANTS (AQ-4) FINAL TECHNICAL REPORT

SEPTEMBER 2024

SOUTHERN CALIFORNIA EDISON

Lee Vining Hydroelectric Project
(FERC Project No. 1388)

AQUATIC INVASIVE PLANTS (AQ-4) FINAL TECHNICAL REPORT

Southern California Edison
2244 Walnut Grove Avenue
Rosemead, CA 91770

September 2024

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LIST OF ACRONYMS AND ABBREVIATIONS

FERC	Federal Energy Regulatory Commission
LADWP	Los Angeles Department of Water and Power
Project	Lee Vining Hydroelectric Project (FERC Project No. 1388)
SCE	Southern California Edison
TWG	Technical Working Group

1.0 INTRODUCTION

The Lee Vining Hydroelectric Project (Project) includes three stream reaches downstream of Project reservoirs that have the potential to support invasive aquatic algae or plant species, including Didymo (*Didymosphenia geminata*): upper Lee Vining Creek between Saddlebag Dam and Ellery Lake, lower Lee Vining Creek between Poole Powerhouse and the Los Angeles Department of Water and Power (LADWP) Diversion Dam, and Glacier Creek between Tioga Dam and its confluence with Lee Vining Creek. Project operations affect environmental conditions (e.g., instream flows, sediment availability, water temperature) within these reaches, which could influence the distribution and extent of invasive aquatic plants and algae.

The *Aquatic Invasive Plants Study* (AQ-4) quantifies the extent of invasive aquatic plants and algae in Project reaches following methods described in the AQ-4 Final Technical Study Plan filed with the Federal Energy Regulatory Commission (FERC) in April 2022 (SCE, 2022). This report includes the results of monitoring completed during 2023.

1.1. EXISTING INFORMATION

Didymo was first documented in Lee Vining Creek near the confluence of Slate Creek in 2005 and reportedly remained present in this portion of Lee Vining Creek through summer 2006 (Rost and Fritsen, 2014). No additional published material was available to determine the spatial distribution of Didymo or invasive aquatic plant species in Project reaches.

2.0 STUDY GOALS AND OBJECTIVES

Study goals and objectives were determined during the February 22 and March 29, 2021, Aquatic Resources Technical Working Group (TWG) meetings. Stakeholders expressed a need for information regarding the distribution of Didymo and other invasive aquatic plants and algae in Lee Vining and Glacier Creeks. The objective of this study is to assess the extent and distribution of invasive aquatic plants and algae, with a particular focus on Didymo, in stream reaches downstream of Project reservoirs.

2.1. STUDY AREA

The Study Area included the following potentially affected reaches of Lee Vining and Glacier Creeks (Figure 2.1-1):

- Lee Vining Creek
  - Between Saddlebag Dam and the confluence of Slate Creek
  - Between the confluence of Slate Creek and the confluence of Glacier Creek
  - Between the confluence of Glacier Creek and Ellery Lake
  - Between Poole Powerhouse and the LADWP Diversion Dam
- Glacier Creek between Tioga Dam and the confluence of Lee Vining Creek

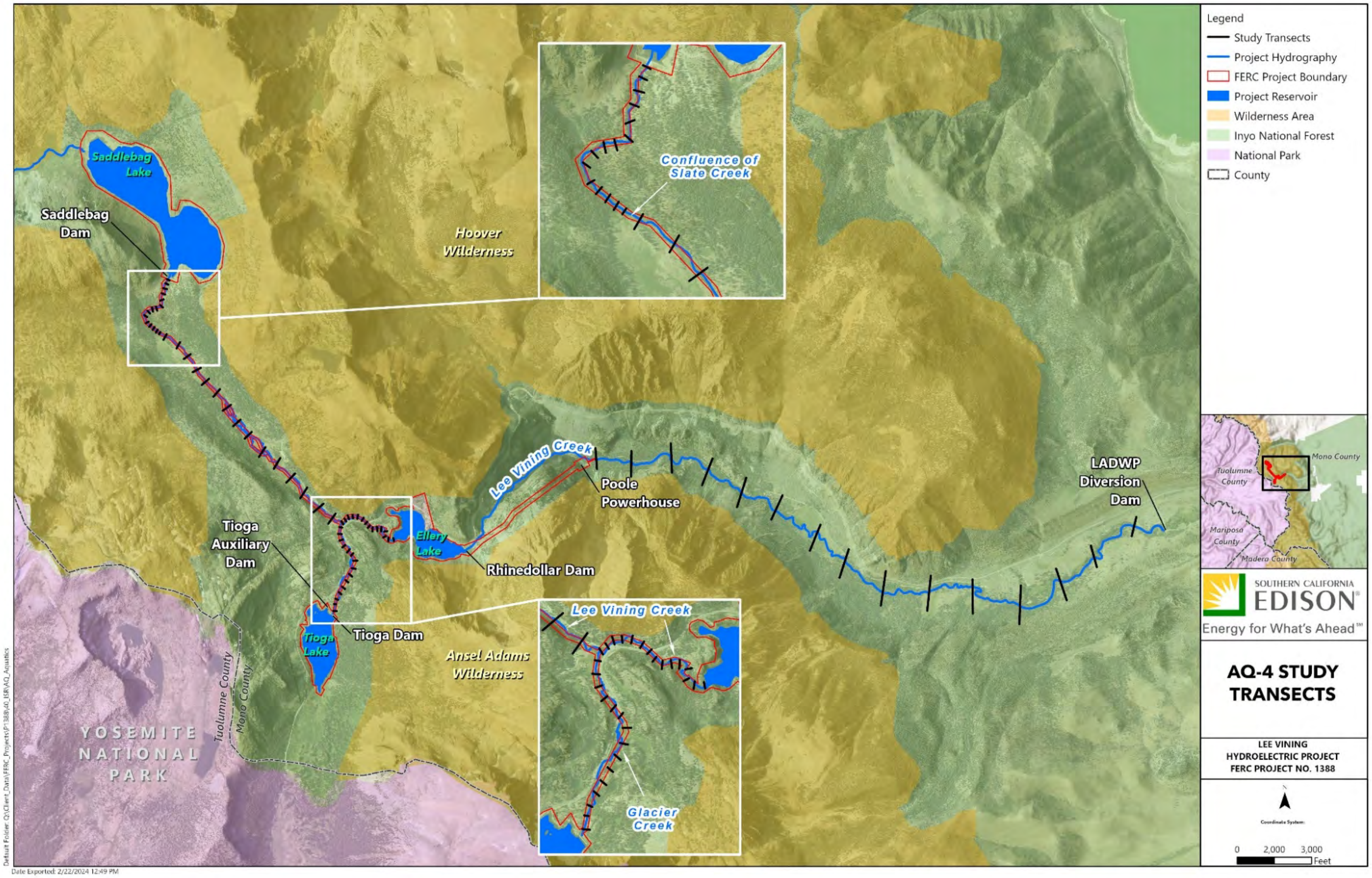

Figure 2.1-1. Aquatic Invasive Plant and Algae Monitoring Locations.

3.0 METHODS

Surveys were conducted using methods described in the AQ-4 Final Technical Study Plan (SCE, 2022). Study reaches were surveyed September 5 to 7, 2023, to provide quantitative estimates of the spatial extent and percent cover of Didymo and other invasive aquatic plant and algae species. Surveys were conducted at the end of summer and before fall storms to capture conditions during the bloom period for most aquatic invasive plants and when low flows allowed increased visibility of stream substrates. Methods included the placement of 15 transects at regular intervals along each reach (Figure 2.1-1). At each transect, surveyors placed a 1-square-meter (approximately 10.8-square-foot) quadrat at the right bank, left bank, or center channel and took representative photographs of stream conditions (see Figures A-6 and A-7 in Appendix A). Within each quadrat, surveyors identified invasive aquatic algae or plant species, if present, and recorded a visual estimate of percent areal coverage of each species. Surveyors also noted any incidental observations of aquatic invasive plant or algae species in the study reaches between transects.

3.1. ANALYSIS

Data collected during the invasive aquatic plant and algae survey were entered into a Microsoft Excel spreadsheet for data tabulation and summary. No further analyses (e.g., mapping longitudinal extents) were performed because no invasive aquatic species were documented during the survey (see Section 4.0, Study Results).

3.2. MODIFICATIONS TO METHODS

The following modifications were made to the Study Plan methods (SCE, 2022):

- A 1-square-meter quadrat was used instead of a 30-centimeter-diameter hoop to provide a larger, more standardized area in which to assess species cover.

- Quadrat placement alternated between right bank, left bank, and center channel rather than being randomized to ensure representative sampling of the channel margins and thalweg.

4.0 STUDY RESULTS

No invasive aquatic algae or plant species were observed during the September 2023 surveys (Table 4-1) or incidentally during other relicensing surveys in 2022 or 2023, including in the reach of Lee Vining Creek where Didymo was historically documented in 2005 and 2006 by Rost and Fritsen (2014). One native species of algae—brittlewort (*Nitella* sp.)—was observed in one quadrat in Glacier Creek downstream of Tioga Dam; two native species of aquatic moss—fountain moss (*Fontinalis* sp.) and splashzone moss (*Scouleria* sp.)—were observed in three and four quadrats, respectively, in Lee Vining Creek between Poole Powerhouse and the LADWP Diversion Dam. Representative photographs of conditions in each survey reach are included in Appendix A.

Table 4-1. Aquatic Plant and Algae Observations, September 2023

Reach	Scientific Name	Common Name	Invasive?	Average Percent Cover
Lee Vining Creek between Saddlebag Dam and the confluence of Slate Creek	–	–	–	–
Lee Vining Creek between the confluence of Slate Creek and the confluence of Glacier Creek	–	–	–	–
Lee Vining Creek between the confluence of Glacier Creek and Ellery Lake	–	–	–	–
Lee Vining Creek between Poole Powerhouse and the LADWP Diversion Dam	*Fontinalis* sp.	fountain moss	No	3.3%
	Scouleria sp.	splashzone moss	No	4.3%
Glacier Creek between Tioga Dam and the confluence of Lee Vining Creek	*Nitella* sp.	brittlewort	No	2.0%

– = no observations; LADWP = Los Angeles Department of Water and Power

5.0 CONSULTATION SUMMARY

In preparation to file the Pre-Application Document and Notice of Intent filed in August 2021, Southern California Edison (SCE) hosted Aquatic Resources TWG meetings on January 25, February 22, March 29, and May 24, 2021. These TWG meetings resulted in study requests from Stakeholders to address questions regarding aquatic habitat and sediment characteristics. Notes and materials from these meetings are available on SCE’s Project website (www.sce.com/leevining).

SCE filed the draft Study Plan with the Pre-Application Document and Notice of Intent on August 12, 2021, to address issues discussed with the TWGs. The Stakeholder comment period ended on January 18, 2022. SCE reviewed all comments received; drafted Revised Technical Study Plans were distributed to the TWGs on February 18, 2022, for another 30-day review period. Stakeholder comments received on the Revised Technical Study Plans were reviewed and incorporated as appropriate in the Final Technical Study Plans, which were filed with FERC on April 25, 2022 (SCE, 2022). Initial study results were provided to relicensing Stakeholders on February 1, 2023. Preliminary data collected in this study was analyzed and a Draft Technical Report was produced and distributed to Stakeholders for review for a 60-day review in September 2023.

Draft Technical Reports were distributed to TWGs on April 16, 2024, for a 60-day comment period. On May 14, 2024, SCE held a public meeting at the Lee Vining Community Center to discuss the draft reports and study findings to date. On June 12, 2024, at the end of the comment period, comments were received from U.S. Forest Service, U.S. Fish and Wildlife Service, California Department of Fish and Wildlife, State Water Resources Control Board, and Mono Lake Committee. Responses to Stakeholder comments on the 2023 Draft Technical Report are included in Table 1-1 in Volume III of the Draft License Application.

6.0 REFERENCES

Rost, A.L. and C.H. 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

SCE (Southern California Edison). 2022. *Final Technical Study Plans*. Lee Vining Hydroelectric Project, FERC Project No. 1388. April 25.

APPENDIX A

REPRESENTATIVE PHOTOGRAPHS OF MONITORED REACHES AND QUADRATS

Photo looking upstream (September 5, 2023)

Figure A-1. Lee Vining Creek between Saddlebag Dam and the Confluence of Slate Creek.

Photo looking upstream (September 5, 2023)

Figure A-2. Lee Vining Creek between the Confluence of Slate Creek and the Confluence of Glacier Creek.

Photo looking downstream (September 6, 2023)

Figure A-3. Lee Vining Creek between the confluence of Glacier Creek and Ellery Lake.

Photo looking downstream (September 7, 2023)

Figure A-4. Lee Vining Creek between Poole Powerhouse and the LADWP Diversion Dam.

Photo looking downstream (September 6, 2023)

Figure A-5. Glacier Creek between Tioga Dam and the Confluence of Lee Vining Creek.

Photo of brittlewort (*Nitella* sp.) in center channel (September 6, 2023)

Figure A-6. Glacier Creek between Tioga Dam and the confluence of Lee Vining Creek.

Photo of splashzone moss (*Scouleria* sp.) in center channel (September 7, 2023)

Figure A-7. Lee Vining Creek between Poole Powerhouse and the LADWP Diversion Dam.

SOUTHERN CALIFORNIA EDISON
Lee Vining Hydroelectric Project
(FERC Project No. 1388)

OPERATIONS MODEL (AQ-5)
FINAL TECHNICAL REPORT

SEPTEMBER 2024

SOUTHERN CALIFORNIA EDISON

Lee Vining Hydroelectric Project
(FERC Project No. 1388)

OPERATIONS MODEL (AQ-5) FINAL TECHNICAL REPORT

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LIST OF ACRONYMS AND ABBREVIATIONS

AF	acre-feet
ANOVA	Analysis of Variance
CDFW	California Department of Fish and Wildlife
cfs	cubic feet per second
DEM	digital elevation model
FERC	Federal Energy Regulatory Commission
ft/s	feet per second
HEC-RAS	Hydrologic Engineering Center River Analysis System
LADWP	Los Angeles Department of Water and Power
LiDAR	Light Detection and Ranging imagery
NAVD88	North American Vertical Datum of 1988
PAD	Pre-Application Document
Project	Lee Vining Hydroelectric Project (FERC Project No. 1388)
SCE	Southern California Edison
TWG	Technical Working Group
USFS	U.S. Forest Service

1.0 INTRODUCTION

During the initial Technical Working Group (TWG) meetings held January 25, February 22, March 29, and May 24, 2021, Southern California Edison (SCE) and Stakeholders identified the need to develop an operations model and intraday hydraulic model to help identify key hydraulic and hydrologic connections among the components of the Lee Vining Hydroelectric Project, Federal Energy Regulatory Commission (FERC) Project No. 1388 (Project).

The final *AQ-5 Operations Model Technical Study Plan* was filed with FERC on April 25, 2022 (SCE, 2022b). This technical report summarizes the development and application of the two models created to simulate Project operations relative to water allocation in support studies for AQ-5 conducted on the aquatic and riparian environment and effects of hydraulics in locations of recreational interest.

2.0 STUDY GOALS AND OBJECTIVES

- Develop a robust operations model to assist SCE and Stakeholders in understanding how Project operations interact with Lee Vining hydrology. This model will be used to make informed decisions regarding the implementation of and results from other relicensing studies. To meet this goal, the Study Plan included the following objectives:
  - Accurately model the systems inflows, outflows, and generation nodes.
  - Align model with needs of other relicensing studies and information needs.
  - Develop procedures to configure model for alternative operational scenarios and document results.
- Determine effective operating limits the Poole Powerhouse to accurately represent installed and dependable capacity for licensing documents.
- Determine the frequency, magnitude, duration, and seasonality of intraday releases from the Poole Powerhouse in response to hydro-resource optimization needs.
- Describe the stage/discharge relationship at discreet locations between the Poole Powerhouse and the Los Angeles Department of Water and Power (LADWP) diversion.

2.1. STUDY AREA

The study includes all Project influenced waters including bypass reaches and reservoirs beginning in the Project Area and continuing downstream to the LADWP Diversion Dam.

3.0 METHODS

The development of two models was identified in initial study scoping and consisted of a comprehensive system hydrologic model and a focused hydraulic model on select reaches of Lee Vining Creek. The larger operations model uses daily data input and time steps and is useful to evaluate hydrologic resource availability and allocation. The more focused intraday model uses 15-minute data to focus attention on flow events downstream of the powerhouse. System constraints, operational criteria, and operational practices were provided by SCE for both model efforts and reflect baseline conditions.

4.0 OPERATIONS MODEL DESCRIPTION

The operations model was developed as an Excel-based platform to facilitate user accessibility. Using information supplied by SCE, available flow data downloaded from U.S. Geological Survey (USGS), and snow course measurement data from National Resource Conservation Service, logic was developed to allocate hydrologic resources on a daily temporal resolution.

The Excel-based file containing the operations model is divided into tabs for user input and results, hydrologic contributions and hydraulic attributes, and logic for flow allocation. Metrics for comparing changes to the baseline of operations have yet to be developed and may constitute the basis of additional results tabs or graphs. Separate tabs for snowpack measurements, streamflow hydrologic datasets and comparisons, and reservoir stage-storage tables are used as datasets for inflow, determination of water year type, and operating logic thresholds. Daily flow allocations and resulting reservoir storage values and flows in each reach of the system are all calculated on the model tab. Columns within the model tab are titled to represent physical elements of the Project, or nodes where logic governs daily flow at that location within the system. The summary tab has inputs for flow targets at set locations of interest along a schematic representation of the Project (see Figure 4-1) and allows changes to seasonal flow targets.

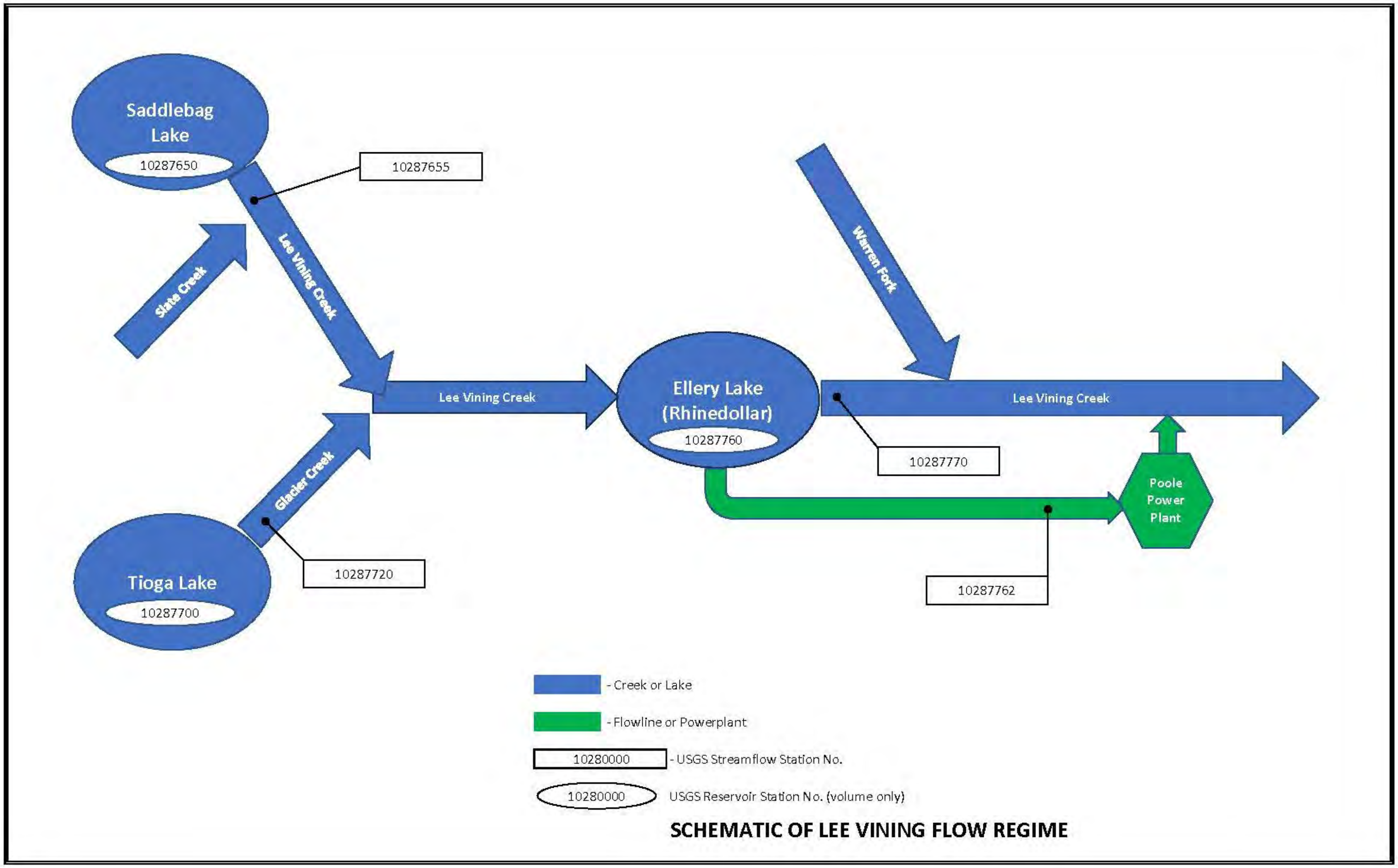


Figure 4-1. Lee Vining Creek Flow Routing.

4.1. FLOW AND STORAGE INPUTS

Storage records for the three Project reservoirs extend back to October 1989, as do total Project releases through combined records of the Poole Powerhouse intake and Lee Vining Creek below Rhinedollar Dam. However, data availability for flow releases below Saddlebag and Tioga Lakes begin in October of 1997 and are necessary for calculating inflows to these storage reservoirs. Therefore, 1997 was selected as the start of the model period of record to allow these critical inflow calculations while maximizing daily calculations to a 25-year period of record. A summary of available flow and storage data within the Project Vicinity is provided in Table 4.1-1.

Table 4.1-1. Hydrologic Data Sources within Project Area

USGS No.	Description	Data Type	Period of Record
10287655	Lee Vining Creek below Saddlebag Lake near Lee Vining, California	flow cfs	10/01/1997 to current
10287650	Saddlebag Lake near Lee Vining, California	storage AF	10/01/1989 to current
10287700	Tioga Lake near Lee Vining, California	storage AF	10/01/1989 to 09/30/2020
10287720	Glacier Creek below Tioga Lake near Lee Vining, California	flow cfs	10/01/1997 to current
10287760	Ellery Lake near Lee Vining, California	storage AF	10/01/1989 to current
10287770	Lee Vining Creek below Rhinedollar Dam near Lee Vining, California	flow cfs	10/01/1987 to current
10287762	Poole Powerhouse Conduit Intake near Lee Vining, California	flow cfs	10/01/1989 to current
10287780	Lee Vining Creek below Poole Powerhouse near Lee Vining, California	flow cfs	04/29/1999 to 09/30/2001
10287900	Lee Vining Creek near Lee Vining, California	flow cfs	10/01/1934 to 12/31/1979
NA	LADWP Diversion Dam	flow cfs	05/01/2013 to 09/30/2022

AF = acre-feet; cfs = cubic feet per second; NA = not applicable; USGS = U.S. Geological Survey

Stage-storage datasets for all three reservoirs were provided by SCE and were used in calculating daily storage based on inputs for release and the inflow datasets.

Model inflows were calculated for Saddlebag and Tioga Lakes using a mass balance method. Daily change in storage was calculated (whether positive or negative) and added to the daily average release below the respective reservoir, resulting in net daily inflows. These inflow datasets are used in the model logic in lieu of historic data, as inflow to the system is independent of how water is allocated. This permits the modeled allocation of hydrologic resource based on current release requirements and operational practices, as well as alternative proposed timing and magnitude of those allocations for comparison to the historic baseline.

Significant errors in the Saddlebag Lake calculated inflow dataset were observed, and corrective measures taken to eliminate model logic errors. While very minor negative inflows could theoretically occur due to evaporation or gage influence from wind, the size of the reservoir would limit these effects. Because the negative inflows typically followed and/or preceded significantly higher offsetting inflow calculations, corrective measures did not require supplemental contributions; rather, daily storage values were adjusted to smooth the calculated inflows. While a floor function was still needed in model logic for smaller occurrences, this corrective effort limited the errant effect on hydrology. A threshold of negative 10 cfs average daily inflow was selected for correction.

Seasonal gaps in the Tioga Lake flow release and storage datasets during winter months prevent a continuous inflow dataset based on mass balance for most years. During these gaps, inflow was calculated based on the Saddlebag Lake inflow dataset, prorated to the Tioga drainage area.

Historic inflows to Ellery Lake were calculated as the daily mass balance of storage change plus the total releases (the sum of Poole Intake flows plus bypass flows below Rhinedollar Dam). Unimpaired inflows to Ellery Lake were calculated using the historic inflow dataset minus storage changes in Saddlebag and Tioga Lakes, which negated the effect of capturing inflow or supplementing releases from those reservoirs.

For unregulated flows downstream of Rhinedollar Dam (including Warren Fork contributions), a correlation was developed between the calculated unimpaired inflows to Ellery Lake and calculated inflows to the unregulated downstream reach between Rhinedollar Dam and the LADWP Diversion Dam. Deducting historical Rhinedollar Dam total releases from daily LADWP Diversion Dam flows provided a 9-year dataset of unregulated flows in that reach. This dataset was correlated to the unimpaired Rhinedollar Dam inflow dataset on a monthly total acre-feet (AF) basis to minimize the effect of errors associated with both travel time between the upper and lower reaches as well as daily reservoir storage anomalies. The relationship between the unregulated contributions and unimpaired Rhinedollar Dam inflows is shown with the equation and r-squared value on Figure 4.1-1. This correlation was then applied to the unimpaired inflow dataset for the remaining period of record, extending the inflow dataset between Rhinedollar Dam and the LADWP Diversion Dam to match the model 25-year period of record. Daily flow contributions for the bypass reach between Rhinedollar Dam and Poole Powerhouse were calculated based upon the proportional drainage area of the Rhinedollar/LADWP inflow dataset and added to the Poole Powerhouse flows in the model for total Lee Vining flows exiting the Project at the Poole Powerhouse tailrace (see Table 4.1-2).

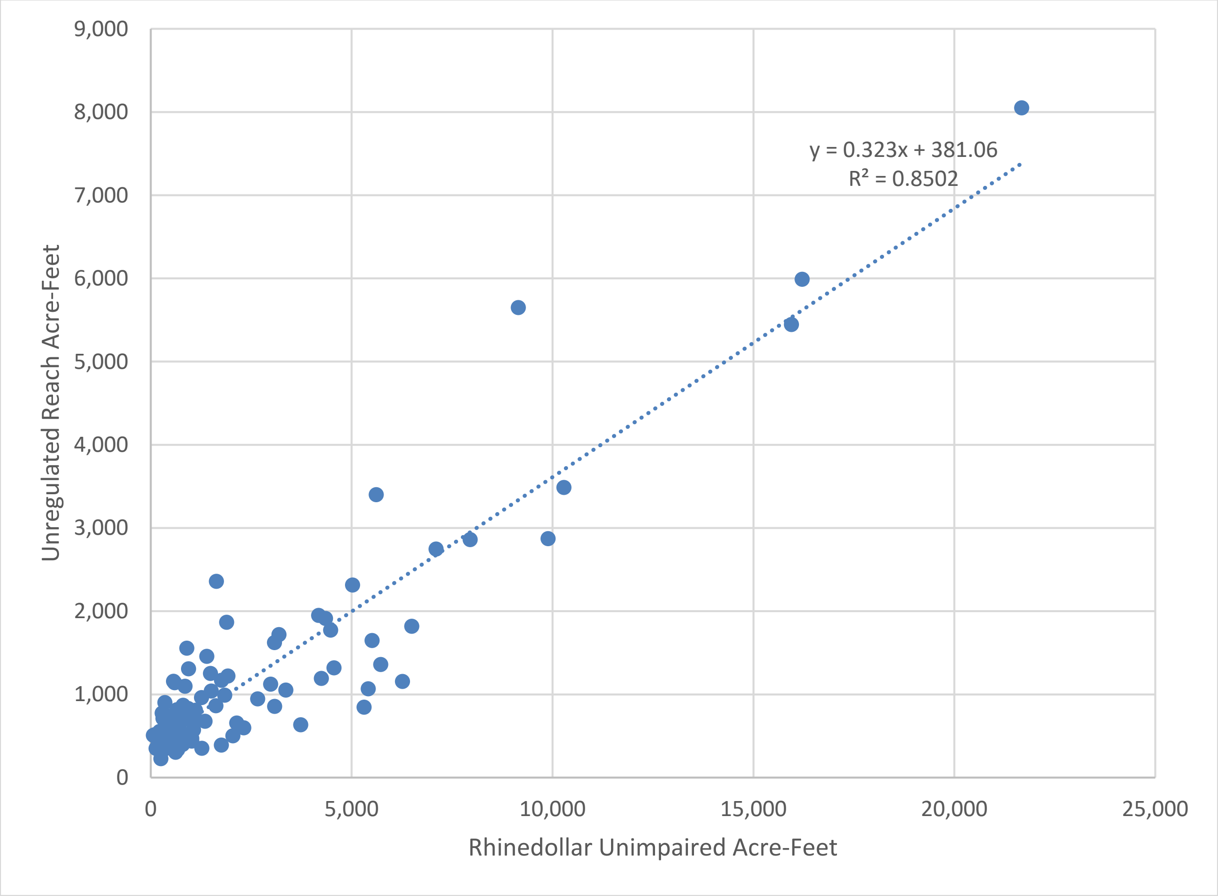


Figure 4.1-1. Correlation of Unregulated Reach to Rhinedollar Unimpaired Inflows (monthly acre-feet).

Table 4.1-2. Acre-Feet of Unregulated Flow in Lee Vining Drainage at Poole Powerhouse

Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1997–1998	690	647	399	601	1,260	1,140	771	2,196	13,003	16,451	4,684	1,978	43,819
1998–1999	719	436	414	843	710	553	1,105	8,491	12,106	5,645	1,864	936	33,822
1999–2000	394	538	364	555	576	401	1,762	8,291	9,983	3,047	1,836	619	28,366
2000–2001	459	294	285	414	489	803	2,105	10,172	3,222	2,001	1,052	492	21,787
2001–2002	235	586	770	487	447	661	2,824	7,216	8,990	3,443	1,036	610	27,306
2002–2003	160	766	906	672	660	830	1,283	8,218	12,523	4,556	1,361	633	32,567
2003–2004	615	560	1,032	709	832	1,688	3,534	6,801	7,466	3,302	1,348	493	28,380
2004–2005	791	908	999	1,457	860	1,084	1,396	9,950	13,906	12,859	3,252	832	48,293
2005–2006	662	1,470	1,200	1,178	799	1,123	1,327	10,499	21,195	12,399	3,086	1,145	56,082
2006–2007	886	1,214	1,236	847	163	925	1,866	6,683	4,458	1,903	973	568	21,721
2007–2008	469	385	709	852	652	661	1,522	7,060	9,263	3,703	943	482	26,703
2008–2009	461	774	698	611	636	1,015	2,550	10,845	8,104	4,884	1,568	523	32,671
2009–2010	1,054	679	789	847	789	850	1,356	3,353	16,148	8,594	1,776	584	36,818
2010–2011	1,807	1,779	3,419	1,610	986	1,104	1,904	4,479	15,740	16,137	6,108	2,364	57,436
2011–2012	1,368	557	375	453	335	652	2,618	6,651	3,635	1,899	1,277	549	20,369
2012–2013	458	624	979	495	445	868	3,189	6,199	5,224	2,256	720	457	21,914
2013–2014	404	349	514	404	630	680	2,419	5,862	4,750	1,944	993	395	19,345
2014–2015	322	453	509	388	514	815	1,425	4,003	3,807	2,258	693	448	15,634
2015–2016	816	819	1,089	909	794	1,343	3,061	7,261	11,094	3,912	1,278	549	32,925
2016–2017	1,638	1,383	1,175	2,008	1,490	1,550	2,622	11,512	25,040	18,716	7,037	2,673	76,843
2017–2018	1,076	1,053	733	611	593	1,192	5,154	9,148	8,252	4,998	2,013	882	35,704
2018–2019	702	573	535	710	981	687	2,435	5,992	18,224	11,744	3,760	1,315	47,656
2019–2020	629	632	910	633	508	695	2,259	6,752	3,457	1,671	1,090	607	19,842
2020–2021	283	441	499	525	283	579	1,925	5,668	3,444	1,454	639	350	16,090
2021–2022	963	1,221	1,209	756	523	1,009	2,570	6,296	5,114	1,986	1,310	748	23,705
Average	722	766	870	783	678	916	2,199	7,184	9,926	6,070	2,068	849	33,032

Figure 4.1-2 and Figure 4.1-3 represent the reservoir observed average monthly storage for dry, normal, and wet water years. The stage-storage curves used to determine minimum and maximum storage and spill thresholds were included in the operations model.

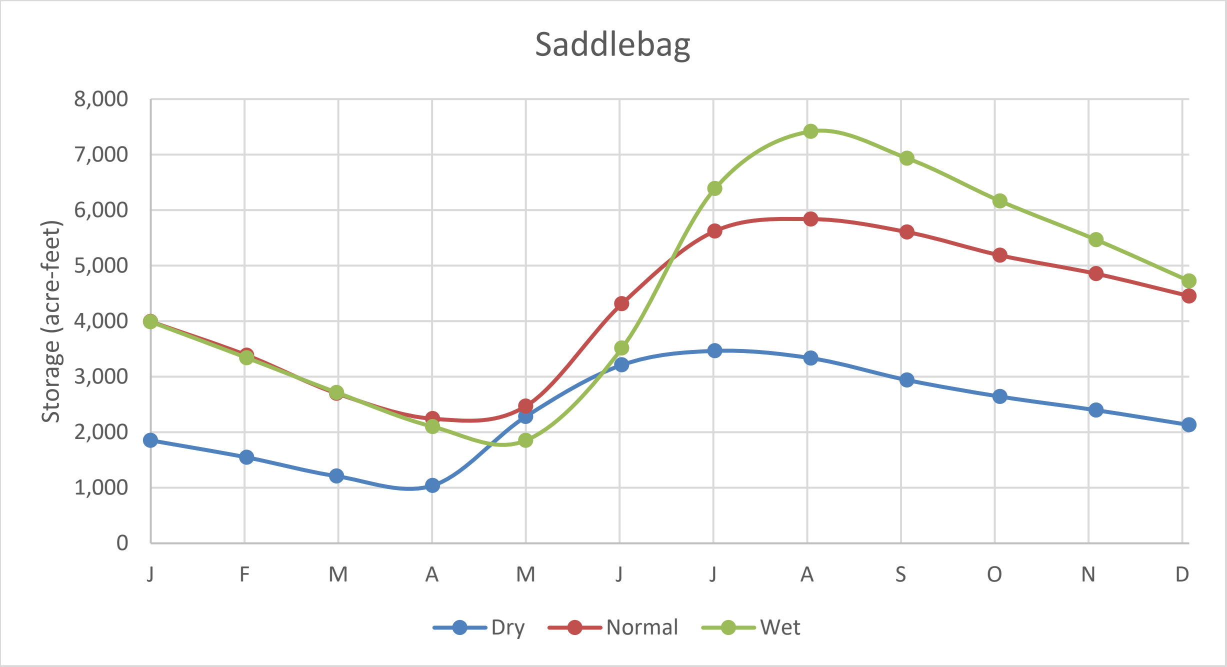


Figure 4.1-2. Saddlebag Lake Historic Monthly Averages for Year Types.

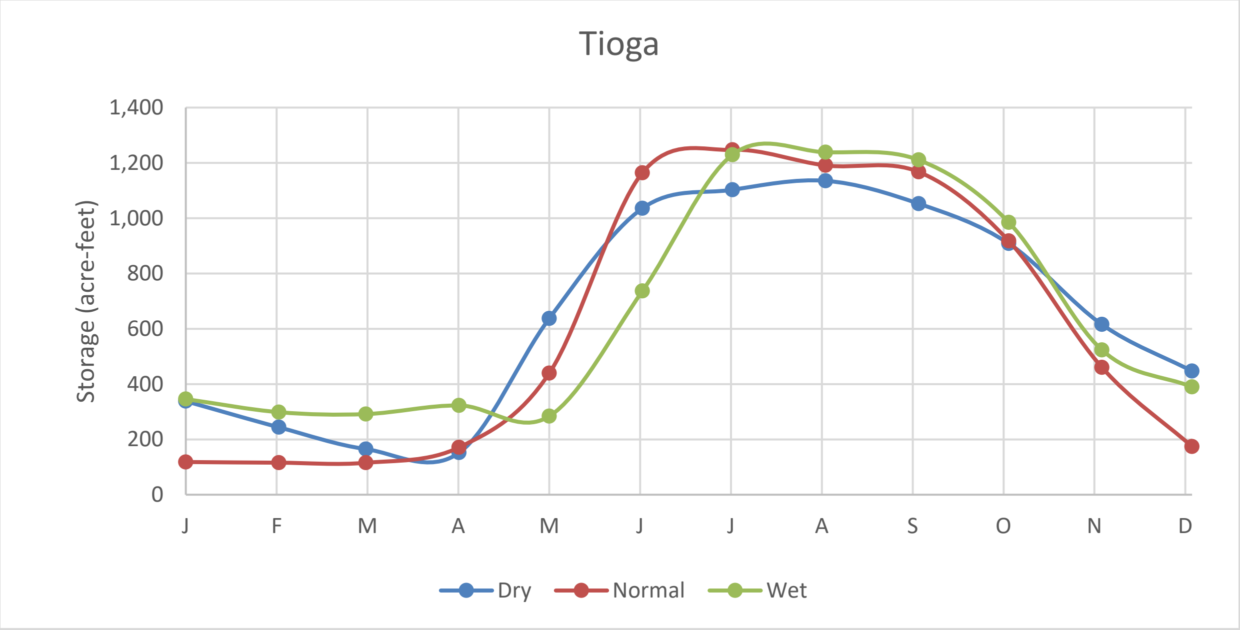


Figure 4.1-3. Tioga Lake Historic Monthly Averages for Year Types.

4.2. MODEL CALCULATION LOGIC

Physical constraints that confine the Lee Vining system are represented within the model as the basic structure for hydraulic thresholds. The hydraulic capacity of the Poole Powerhouse and the storage capacities and spill thresholds of the three reservoirs determine upper limits for flow through the turbine and thresholds for triggering spill from reservoirs. Likewise, lower limits within storage capacities for upper reservoirs are fixed to trigger (or inflow) releases. These bounding values constrain primary model calculations.

Within the physical logic constraints, daily minimum flow allocations are prioritized to meet regulatory requirements, adjusted where appropriate for seasonality and water year type according to the current license. Operational practices follow as tertiary logic, such as increased releases from Tioga Lake in the fall to achieve seasonal reservoir drawdown. Flows released from Ellery Lake are prioritized through Poole Powerhouse up to the hydraulic capacity, above which they are spilled. Water year types are determined based upon spring snow measurements at the Dana Meadows course and used to categorize each year as wet, normal, or dry. Wet and dry years are calculated as having snow course measurements 30 percent higher or lower than the annual average.

4.3. CALIBRATION

Hydrologic calibration was performed using a mass balance comparison of total daily Project outflow calculated by the model versus the sum of outflows measured by the USGS gages at the Poole Powerhouse intake and below Rhinedollar Dam (Figure 4.3-1). Annual totals and monthly averages were examined and based on the results of annual average total AF; no additional adjustments were made to inflows. The model-calculated total annual average run-off was 27,620 AF versus a total historic measured average of 27,615 AF.

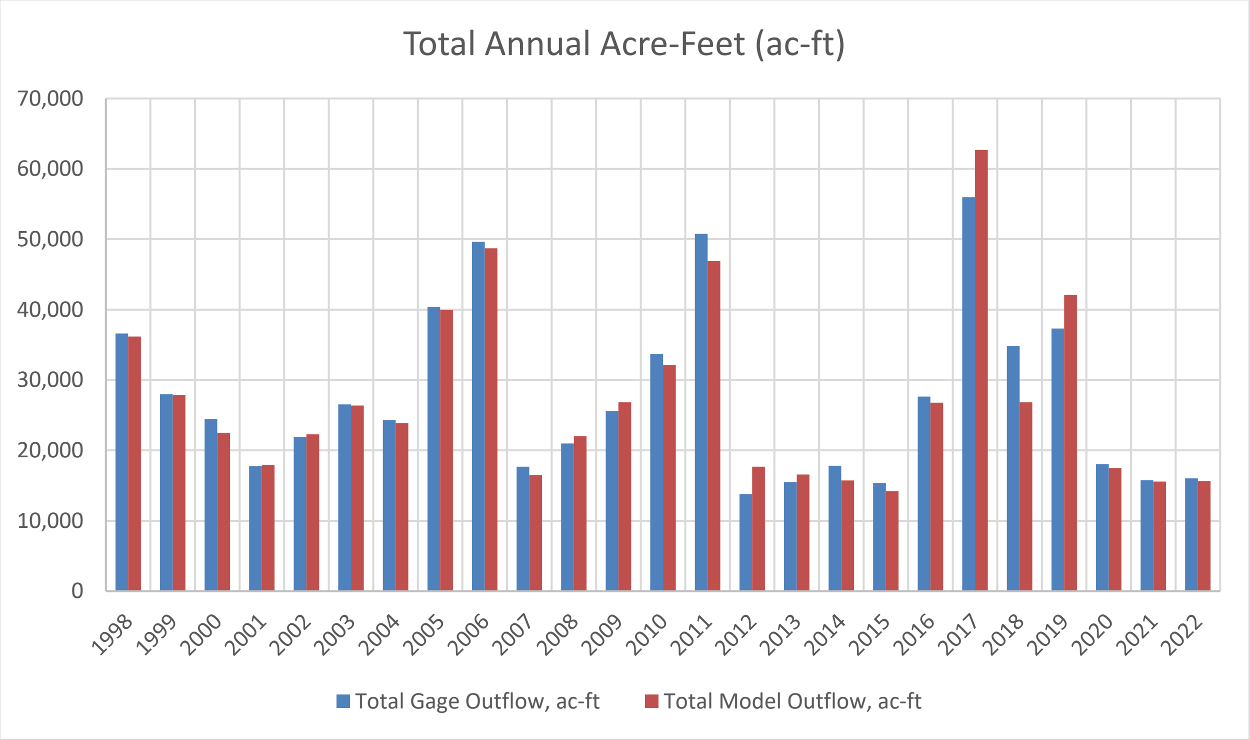


Figure 4.3-1. Annual Outflow.

4.4. APPLICATION AND RESULTS

The intent of the operations model is to measure the ability of the Lee Vining system to meet flow targets that may be beneficial as determined by studies conducted in support of the licensing process. Flow allocations that enhance various reaches can be entered into the model as alternative scenarios to the current baseline conditions. Flow targets may be set independently for seasonality (up to four settings per year) as well as for dry, normal, and wet years. The model as developed distributes flows in accordance with regulatory requirements within physical constraints and closely matches historically measured hydrologic availability. Metrics for comparison of alternative scenarios with the baseline are pending consultation for Stakeholder interest but are anticipated to include percentage of missed target flows for each location of specified interest.

5.0 INTRADAY AND HYDRAULIC MODEL DESCRIPTION

In accordance with the revised Technical Study Plan (SCE, 2022a), an intraday model was developed to quantify the frequency, magnitude, duration, and seasonality of intraday releases from Poole Powerhouse in response to hydro-resource optimization needs. This model was developed using Python code in a Jupyter Notebook. Additionally, a hydraulic model was developed using the Hydrologic Engineering Center River Analysis System (HEC-RAS) version 6.3.1 to describe the stage-discharge relationship at Poole Powerhouse and in the downstream channel.

5.1. FLOW AND PRICING DATA

Several datasets were obtained for use in the intraday model and hydraulic model. These data sets are summarized below in Table 5.1-1.

Table 5.1-1. Data Sources for Intraday and Hydraulic Model

Data Description	Date Range	Source
Powerhouse and Spillway Flow	October 2009 to August 2023	SCE
LADWP Flow	May 2013 to August 2023	SCE
Generation Data	January 2015 to October 2023	SCE
Cross section survey in downstream reach	N/A	Stillwater Sciences
LiDAR imagery DEM	N/A	HDR, provided by SCE

DEM = digital elevation model; LADWP = Los Angeles Department of Water and Power; LiDAR = Light Detection and Ranging; N/A = data not available

5.2. MODEL LOGIC

The hydro-resource optimization events are clearly distinguishable by human eye in the flow data but are challenging to systematically identify using an algorithm, as shown on Figure 5.2-1. Key components of a hydro-resource optimization event were identified as follows:

- Events are characterized by a steep rise and fall in flow compared to flows at neighboring time steps.

- Each event has a specific peak timestep (flow is not held at the peak for an extended period).

- The magnitude of the event is much smaller than that of seasonal changes in flow or flood events.

- Events are relatively short in duration (occur over the course of 1 day [i.e., “intraday”]).

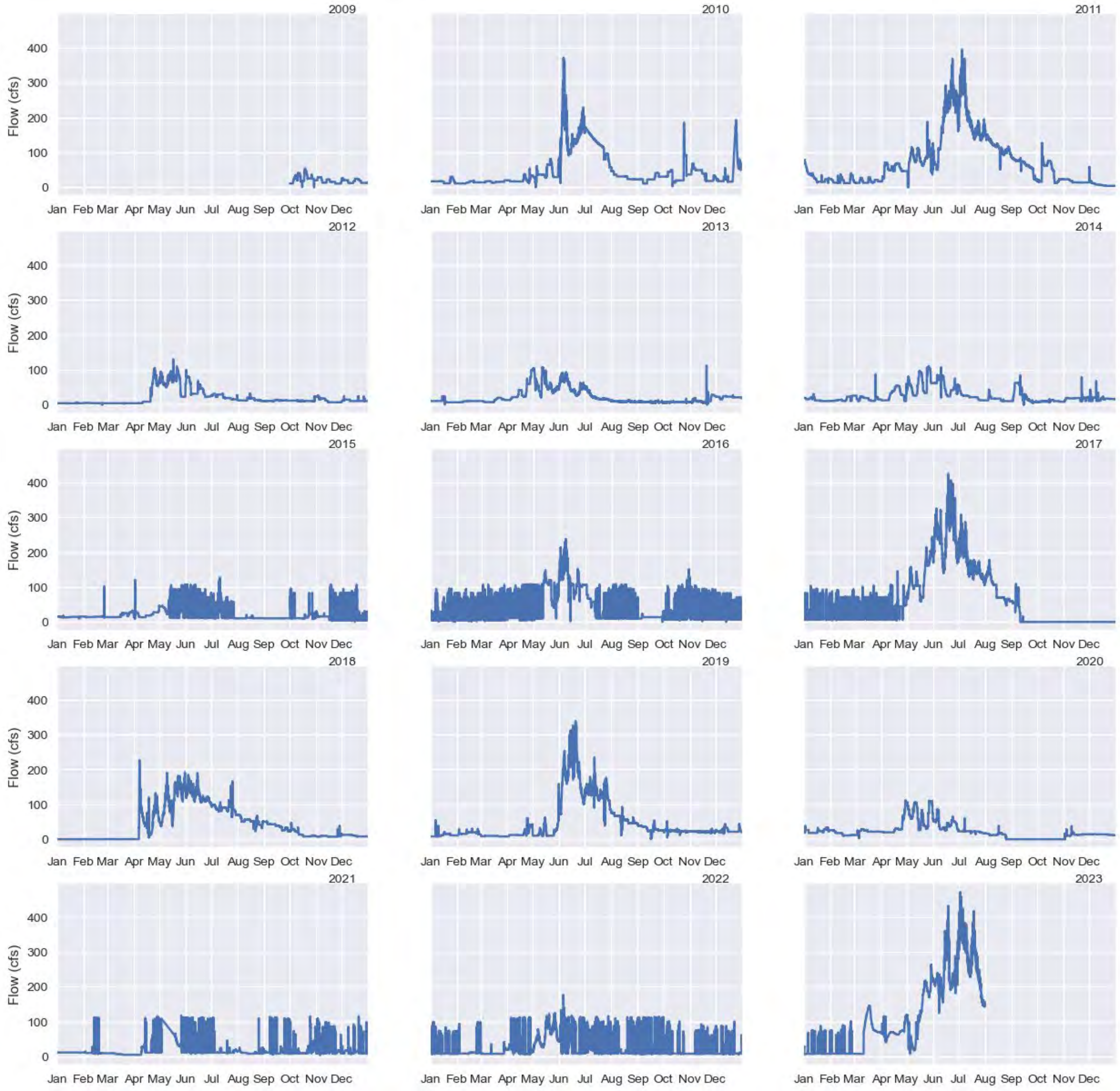


Figure 5.2-1. Flow in Lee Vining Creek Downstream of Poole Powerhouse.

To sufficiently capture the hydro-resource optimization events in Lee Vining Creek, the intraday model uses a Python algorithm to capture sudden changes in flow. The model uses total flows (including spill) to better represent effects in the downstream reach compared to using solely powerhouse flow. Hydro-resource optimization events are captured using a moving average algorithm to compare flows at each timestep to the average of recently preceding flows. The moving average algorithm allows suppression of seasonal or flood-related changes in flow as the larger events have gradual changes in flow. A simple value-threshold method would not correctly represent the seasonality and ranges of possible flows in the system.

5.3. MODEL CALIBRATION

The intraday model was calibrated using the moving average variables, including the length of the rolling window, standard deviations above the rolling mean, a minimum threshold for magnitude, and a maximum threshold for event duration. Both flow and generation data were analyzed using the same algorithm, but with different calibration parameters.

As the assumed hydro-resource optimization events are more visually identifiable in the generation data, the events identified by the algorithm were compared to visual plots of known events. The calibration parameters were adjusted to best match the known events to the model identified events using best engineering judgment. The events identified by the intraday model algorithm were used to calibrate the calibration parameters for the flow. Specifically, the flow calibration parameters were optimized to maximize both the percent of flow peaks occurring during generation peaks and the total number of flow peaks identified in the model. This allowed the calibration to be robust enough to identify true hydro-resource optimization events of different magnitudes, shapes, and durations while avoiding extraneous events. The result of the calibration showed that during the periods where both flow and generation data are available, the model identified 931 hydro-resource optimization events, 82 percent of which directly corresponded with a generation peak event. For example, Figure 5.3-1 shows flow for the month of November 2015. The blue line represents total flow in Lee Vining Creek and the green line represents assumed hydro-resource optimization events identified by the intraday model algorithm. Figure 5.3-2 shows the same results for February 2016 as another example.

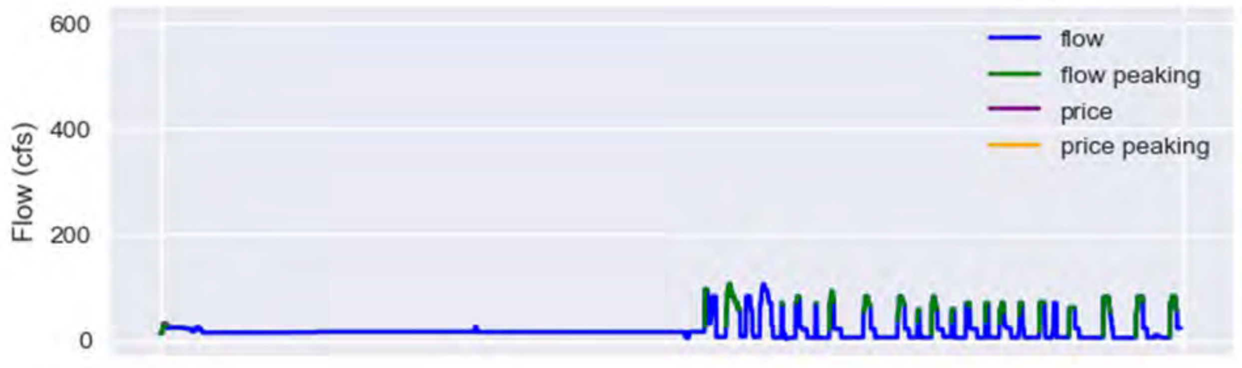


Figure 5.3-1. November 2015 Model Results.

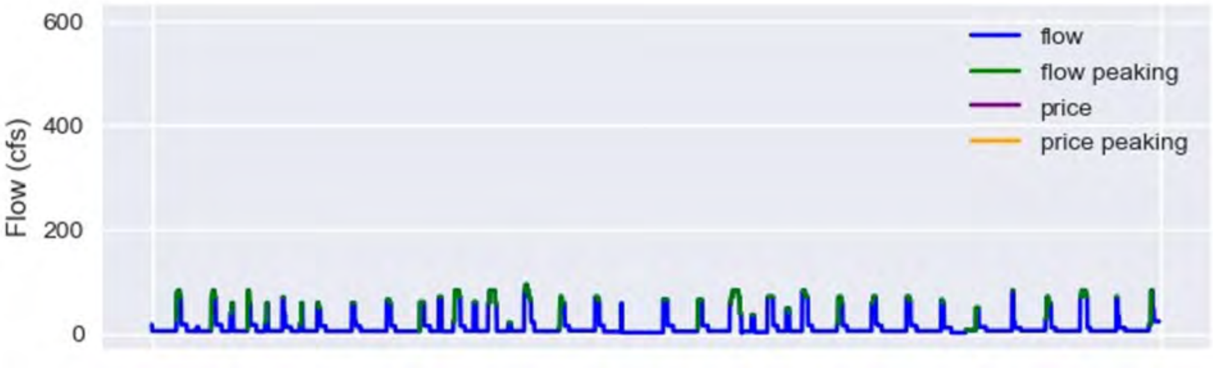


Figure 5.3-2. February 2016 Model Results.

The calibration parameters were applied to the period of record for the flow, allowing the identification and characterization of hydro-resource optimization events that occurred between October 2009 and August 2023.

However, the relationship between generation increases and hydro-resource optimization is not straightforward. Figure 5.3-3 shows the probability of flow peaking occurring due to changes in price. The likelihood of a hydro-resource optimization event increases steadily as the price increases up to about $20 (approximately 16 percent of the price), after which the likelihood of flow peaking decreases gradually. Note that this plot excludes outliers where the increase in price is greater than $100 (approximately 4 percent of the price). These outliers do not predict a noticeable trend in flow peaking probability.

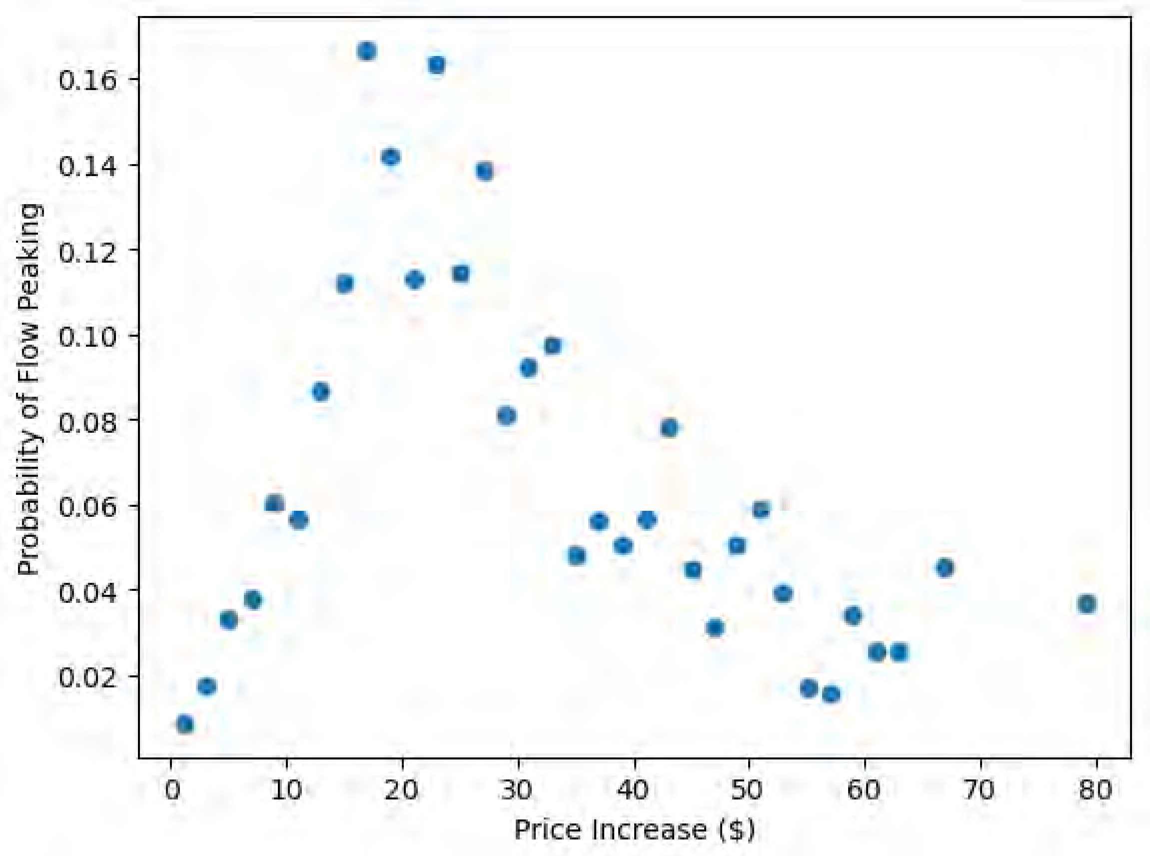


Figure 5.3-3. Probability of Flow Peaking based on Increase in Price.

5.4. APPLICATION AND RESULTS

The intraday model yielded tabular results, providing information on the duration and magnitude of hydro-resource optimization events that occurred over the period of record. Using the tabular data, summary statistics on the frequency, duration, magnitude, and seasonality of these events can be calculated. Overall, the duration of flow peaking events pre and post operations did not change (T-test p-value = 0.53), but the magnitude of the events changed significantly (T-test p-value = 3.1e-13). However, these statistics are inherently skewed for frequency as there are very few flow events prior to 2015 that show characteristics in line with the hydro-resource optimization events. Based on the lack of events prior to the operation shift, a T-test was not conducted for the frequency of events.

5.4.1. RESULTS BY SEASON

A one-way Analysis of Variance (ANOVA) test indicated that the change in magnitude of assumed hydro-resource optimization events was significant before and after the operations shift, even though different seasons (p-value = 0.8e-3). However, the duration and frequency of the identified hydro-resource optimization events showed no difference before and after the operations shift regardless of seasons using one-way ANOVA tests (p-values of 0.55 and 0.08, respectively).

Summary tables are provided by season and by water year type below in Table 5.4-1 through Table 5.4-3. These tables summarize the magnitude, duration, and frequency of hydro-resource optimization events due to the operations shift.

Table 5.4-1. Duration (hours) of Hydro-Resource Optimization Events by Season

Season	2010–2014	2015–2023
Fall	5.13	3.71
Winter	3.29	2.99
Spring	2.53	4.03
Summer	3.38	5.49

Table 5.4-2. Magnitude (cubic feet per second) of Hydro-Resource Optimization Events by Season

Season	2010–2014	2015–2023
Fall	41.57	67.42
Winter	19.71	60.80
Spring	26.78	65.49
Summer	11.74	66.82

cfs = cubic feet per second

Table 5.4-3. Frequency (Average Number of Hydro-Resource Optimization Events per Season) by Season

Season	2010–2014	2015–2023
Fall	1	28.13
Winter	1.4	37.78
Spring	1.6	21.89
Summer	0.4	18.78

5.4.2. RESULTS BY WATER YEAR TYPE

One-way ANOVA tests indicated that the change in magnitude and frequency of hydro-resource optimization events was significant before and after the operations shift across various water year types. However, the duration of the identified hydro-resource optimization events showed no difference before and after the operations shift regardless of seasons using one-way ANOVA tests.

Table 5.4-4 summarizes the distribution of water year type that is documented by SCE from 2009 to 2021. Table 5.4-5 through Table 5.4-7 show the duration, magnitude, and frequency of hydro-resource optimization events organized by water year.

Table 5.4-4. Distribution of Water Year Type

Dry Years	Normal Years	Wet Years
2012	2009	2011
2013	2010	2017
2014	2016	2019
2015	2018	
2020		
2021		

Table 5.4-5. Duration (hours) of Hydro-Resource Optimization Events by Water Year Type

Season	2010–2014	2015–2021
Dry	4.50	4.32
Normal	4.05	3.91
Wet	1.94	4.06

Table 5.4-6. Magnitude (cubic feet per second) of Hydro-Resource Optimization Events by Water Year Type

Season	2010–2014	2015–2021
Dry	29.63	61.43
Normal	19.81	65.20
Wet	28.71	56.81

Table 5.4-7. Frequency (Average Number of Hydro-Resource Optimization Events per Water Year) by Water Year Type

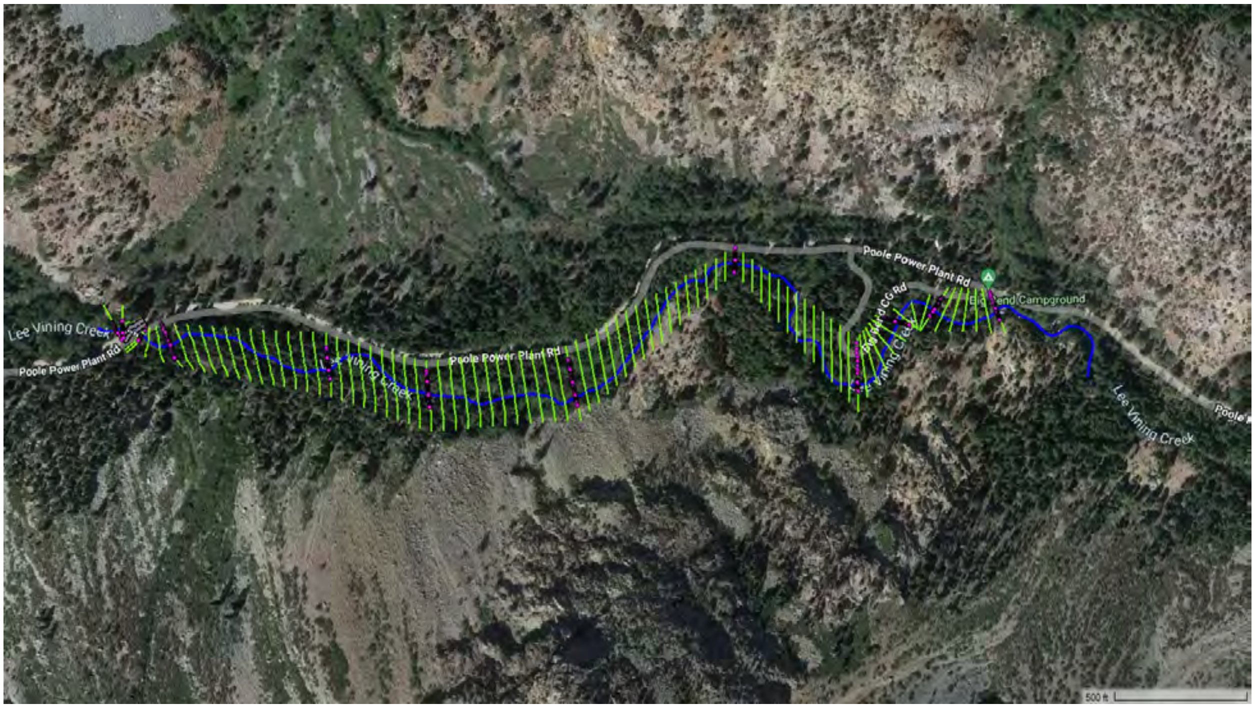
Season	2010–2014	2015–2021
Dry	3.33	79.33
Normal	2.5	153.5
Wet	8	67

5.5. HYDRAULIC MODEL

5.5.1. HYDRAULIC MODEL DEVELOPMENT

To help interpret the results from the intraday statistical model, a one-dimensional hydraulic model was developed to quantify effects on depths and velocities in the Lee Vining Creek downstream of Poole Powerhouse. The hydraulic model was built in HEC-RAS version 6.3.1 and used a combination of surveyed cross sections collected by Stillwater Sciences in 2022, and a Light Detection and Ranging imagery (LiDAR) digital elevation model (DEM) from a previous flood study by HDR. Upon investigation of the LiDAR DEM and the surveyed cross sections, it was determined that the LiDAR DEM needed to be adjusted by 2.5 feet to correctly match the North American Vertical Datum of 1988 (NAVD88 datum). This was an approximation based on best engineering judgment, as the surveyed cross sections and the DEM were clearly disjointed from each other. However, as the use of this model is primarily for changes in depths and velocities, this approximation is not expected to create issues in results.

Figure 5.5-1 below shows the layout of the hydraulic model. The model extends from just upstream of the intersection with Poole Power Plant Road to the Big Bend Campground. Note that the cross sections data was supplemented by LiDAR DEM information. Cross sections were interpolated in between survey information to provide the best estimate of channel geometry along the entire reach.



The collected cross section points are included in pink, while the cross sections included in the hydraulic model are shown as green lines.

Figure 5.5-1. Hydraulic Model Geometry.

Manning's roughness coefficients for the model were selected using methodology from Chow's 1959 guidance on Manning's n values (Chow, 1959) and Jarrett's equation for predicting Manning's n for higher gradient channels. Based on photos of the channel and Jarrett's equation calculations, Manning's n roughness coefficients for the channel varied between 0.06 and 0.14. The floodplain roughness coefficient was 0.1, which is appropriate for heavy timber with some down trees and little undergrowth.

5.5.2. HYDRAULIC MODEL SAMPLE RESULTS

A historical event was run in the hydraulic model to provide an example of the possible results available. Figure 5.5-2 shows flows in Lee Vining Creek during a cycle of hydro-resource optimization events in March 2017. The flow changes rapidly from about 7 cfs to 58 cfs, and up to 81 cfs in three cycles of hydro-resource optimization events.

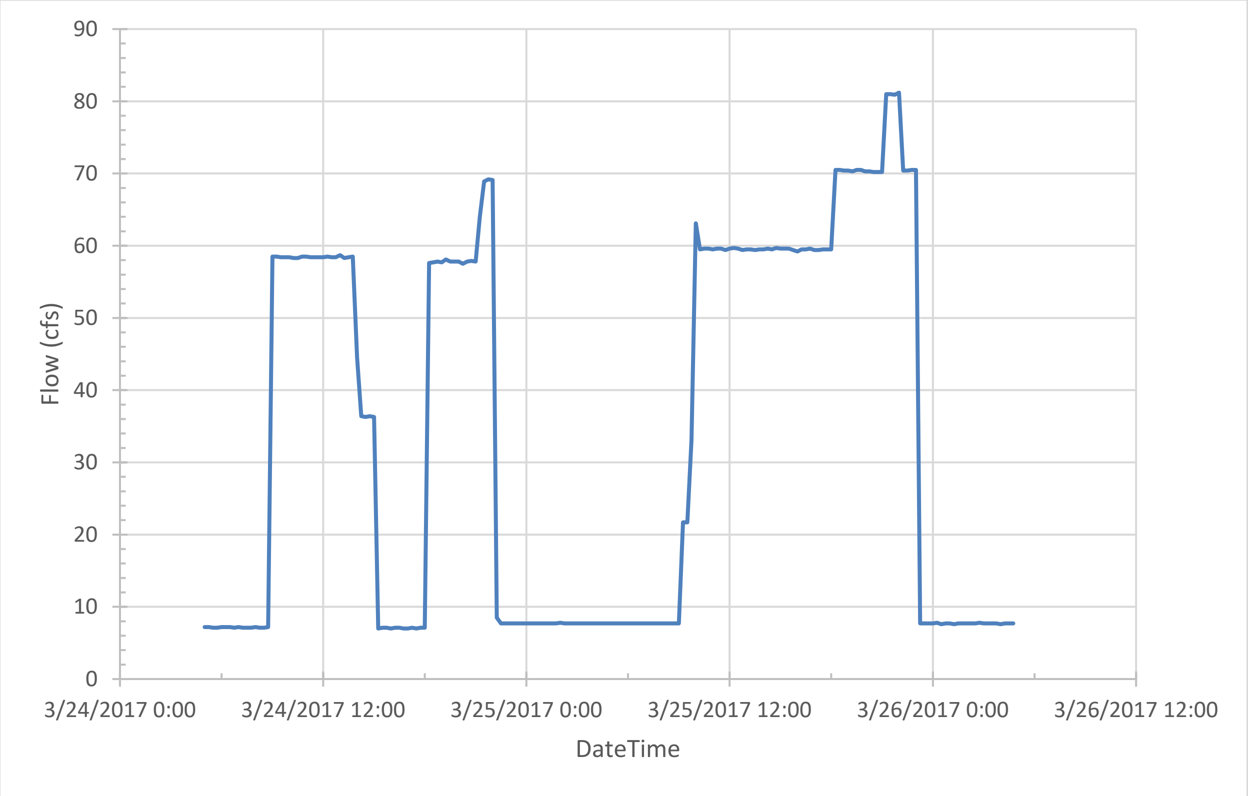


Figure 5.5-2. March 2017 Flow Hydrograph.

After running this hydrograph through the hydraulic model, water surface elevation, depth, and velocity results were captured at select cross sections in the model. These cross sections are summarized in Table 5.5-1. Cross section River Station 834 is located at Big Bend Campground.

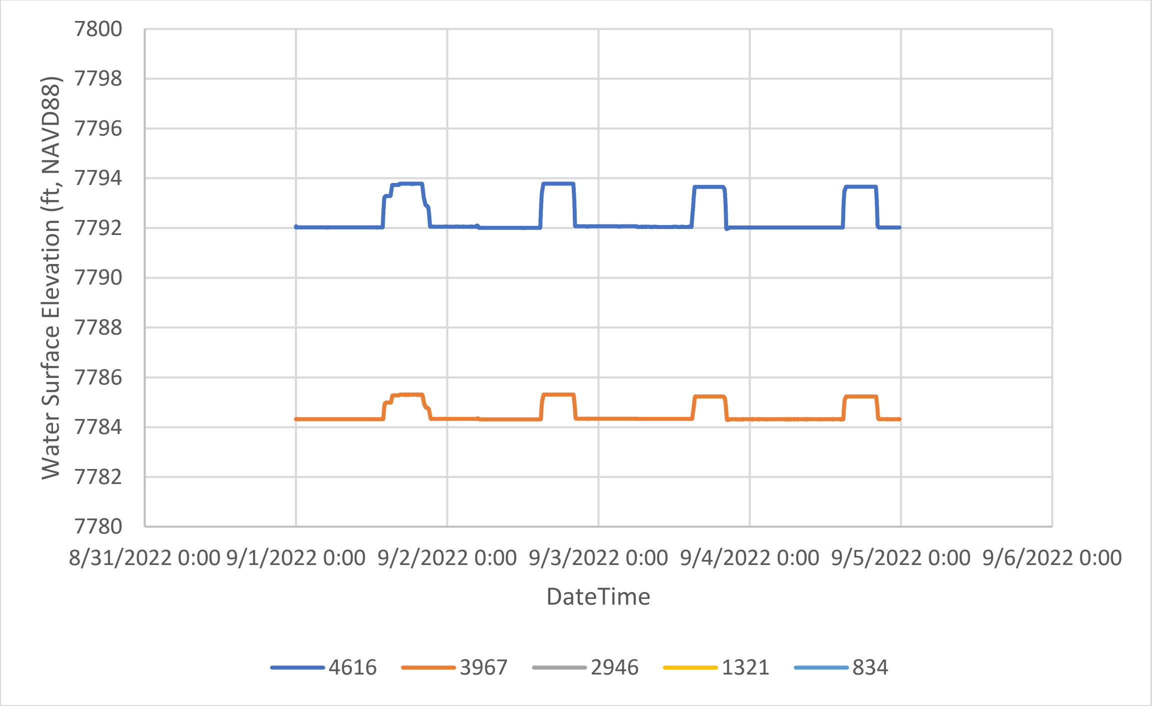
Table 5.5-1. Summary of Reported Cross Sections

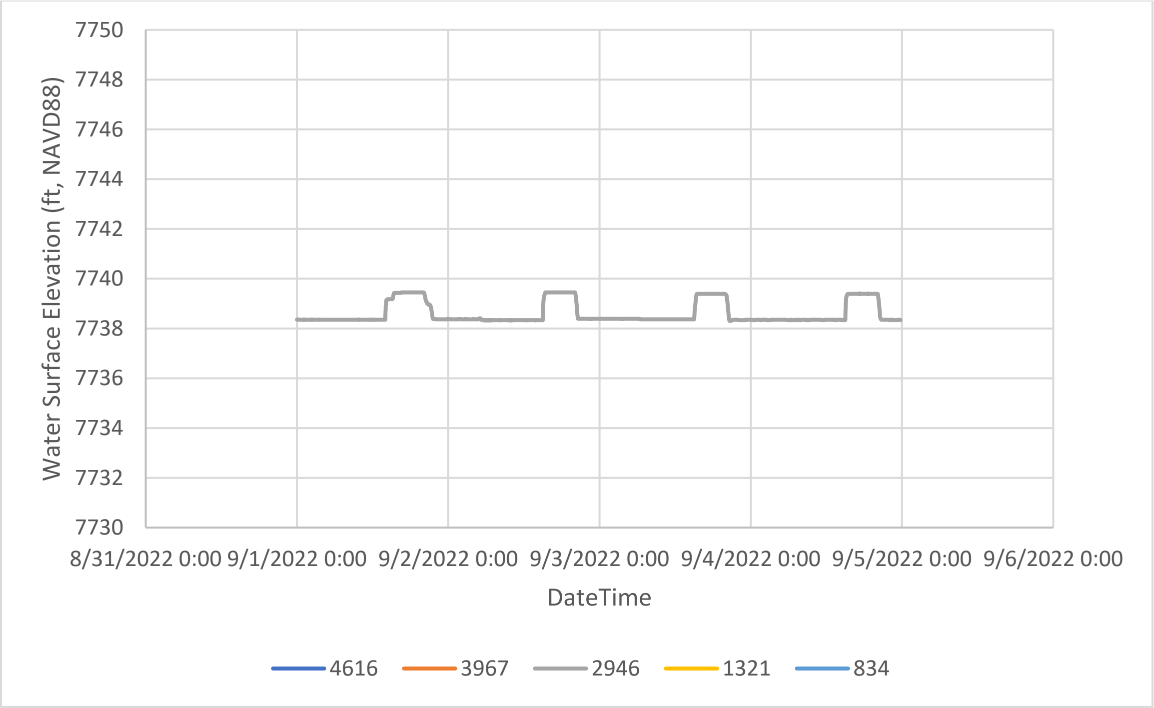
HEC-RAS River Station	Distance Downstream of Culvert on Power Plant Road (feet)
4616	128
3967	777
2946	1,798
1321	3,423
834	3,910

HEC-RAS = Hydrologic Engineering Center River Analysis System

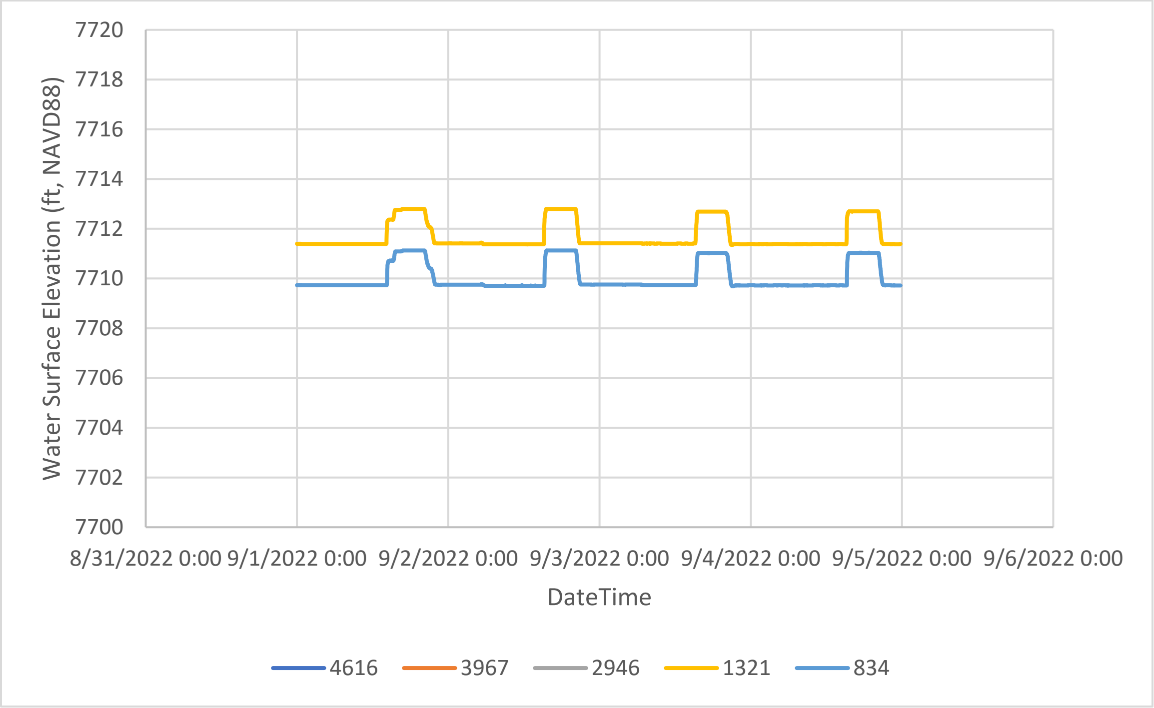
Figure 5.5-3 (separated into a, b, and c) through Figure 5.5-5 summarize the water surface elevation, depth, and velocity at each of these cross sections through the hydro-resource optimization event cycle shown on Figure 5.5-1.

(a)





(b)



(c)

Figure 5.5-3. March 2017 Water Surface Elevations from Hydraulic Model.

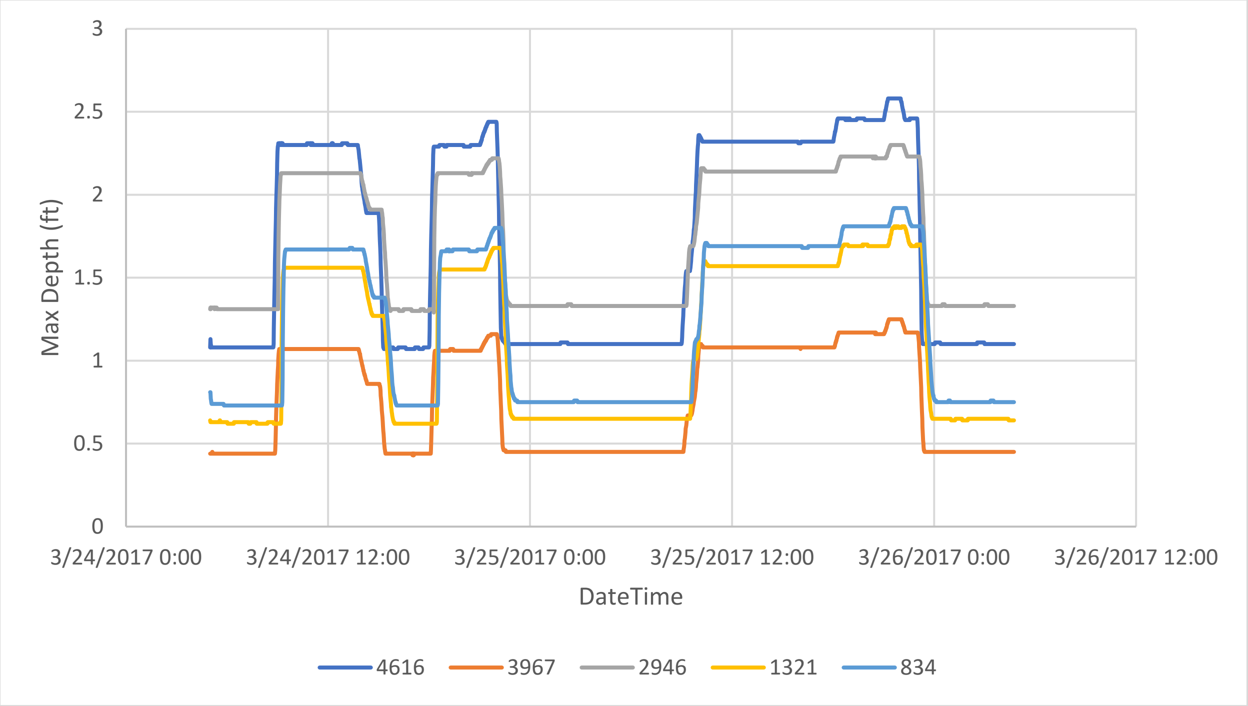


Figure 5.5-4. March 2017 Maximum Depths from Hydraulic Model.

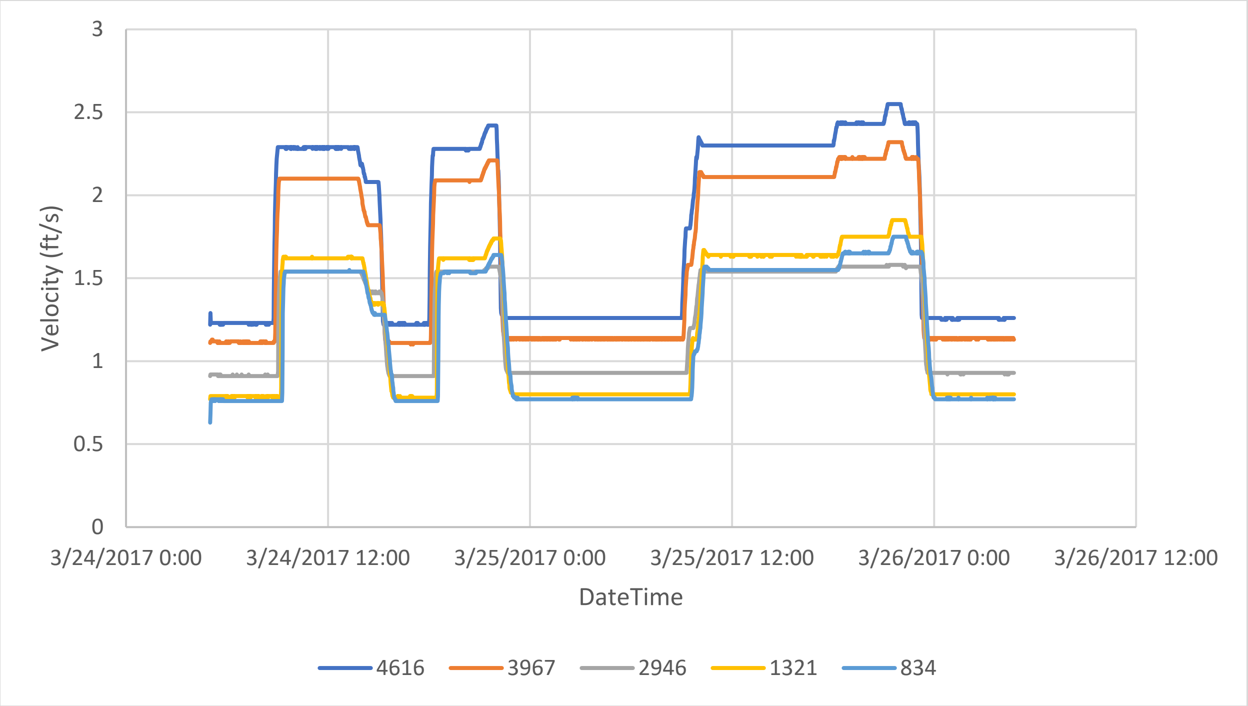


Figure 5.5-5. March 2017 Velocities from Hydraulic Model.

5.5.3. HYDRAULIC MODEL APPLICATION

These example results help quantify the effects of hydro-resource optimization downstream of the Project and provide a tool to describe potential localized effects of the events; however, this is a simplified representation of a complex system. Additional scenarios may be necessary to help understand specific effects of proposed operations.

6.0 CONSULTATION SUMMARY

In preparation to file the Pre-Application Document and Notice of Intent, SCE hosted Aquatic Resources TWG meetings on January 25, February 22, March 29, and May 24, 2021, which resulted in study requests from Stakeholders to address questions regarding stream and reservoir water quality. These TWG meetings resulted in study requests from Stakeholders to address questions regarding aquatic habitat and sediment characteristics. Notes and materials from these meetings are available on SCE's Project website (www.sce.com/leevining).

SCE filed draft Study Plans with the Pre-Application Document and Notice of Intent on August 12, 2021, to address issues discussed with the TWG. The Stakeholder comment period ended on January 18, 2022. SCE reviewed all comments received and drafted Revised Technical Study Plans, which were distributed to the TWGs on February 18, 2022, for another 30-day review period. Stakeholder comments received on the Revised Technical Study Plans were reviewed and incorporated as appropriate in the Final Technical Study Plans. Final Technical Study Plans were filed with FERC on April 25, 2022.

Initial study results were provided to relicensing Stakeholders on February 1, 2023. SCE held a focused Operations Model TWG meeting on May 18, 2023, to further develop the Operations Model. Preliminary data collected in this study was analyzed and a Draft Technical Report was produced and distributed to Stakeholders for review for a 60-day review in September 2023. All comments received related to the AQ-5 Study Plan are included in Table 6-1.

Draft Technical Reports were distributed to TWGs on April 16, 2024, for a 60-day comment period. On May 14, 2024, SCE held a public meeting at the Lee Vining Community Center to discuss the draft reports and study findings to date. On June 12, 2024, at the end of the comment period, comments were received from U.S. Forest Service, U.S. Fish and Wildlife Service, California Department of Fish and Wildlife, State Water Resources Control Board, and Mono Lake Committee.

SCE held focused Operations Model TWG meetings on June 5, 2024, and June 27, 2024, to share and further develop the Operations Model. Responses to Stakeholder comments on the 2023 Draft Technical Report are included in Table 1-1 in Volume III of the DLA.

Table 6-1. Consultation Summary—Response to Comments

Comment Number	Entity	Date/Forum	Comment	SCE Response
1	CDFW	5/18/2023 TWG Meeting	How does SCE plan to use the model? How do other stakeholders in the relicensing process intend to use the model?	The intent of this model is to connect the operations of the Project with a correlation to stage, and to understand the potential effects of this mode of operations on downstream resources. The intent is to communicate that to Stakeholders and integrate with objectives and operations moving forward. We have analyzed multiple resource areas and have had many conversations with Stakeholders.
2	CDFW	5/18/2023 TWG Meeting	Are you able to correlate peaking and operations? How are you planning to use the output from operations modeling? Will it be used to look at new scenarios in the operations model?	It is a two-step process: 1) understand relationship and correlation; 2) understand effects and how to manage them in the future. This helps agencies who may want to add operational structure in relation to how the model interacts with the grid. SCE wants a license that will guide operations in the future, and guide conversations about what we have learned from optimization. It is a simpler process, we came into this recognizing that optimization operation came into effect after the issuance of a previous license. Any change in operations is presumed an optimization, a presumed change in hydrology. This modeling effort is to clarify any changes in operations and correlate it with hydrology. Project effects is a requirement of licensing process, and the model helps optimize operations on ecological effects, benefits, or restoration activities.
3	CDFW	5/18/2023 TWG Meeting	I’m speaking for the needs of my resource agency; looking at peaking and resource optimization is great, but we want to ensure that it will be tied back to us and making considerations regarding how we/you	This model looks at the varying flows. SCE is interested in understanding the relationship between species, other ecological decisions, and this model. SCE wants to know agencies’

Comment Number	Entity	Date/Forum	Comment	SCE Response
			operate the project. We need a clear picture of how the models are being built. In order for us to analyze, we are interested in functional flows, peaking, and adding seasonal flows back into the creeks. There is a strong pressure to add seasonal flow back into river environments. We want to be able to use these tools. We want to understand peaking and how it returns to the river.	needs and what needs to be added to the system. Currently, we are using existing targets and constraints. Downstream effects are easier to quantify now that the hydraulic model is finished and operating. These models are specifically looking at downstream data.
4	CDFW	5/18/2023 TWG Meeting	We want to build in the option to see seasonal variability, with our experience from the Bishop project. We would like to look at SCE's power generation to do a trade-off analysis, recognizing that there is sensitivity there.	The power generation piece is still a larger issue. SCE understands the desire for it, but there needs to be some clear sideboards. We have included seasonal inputs. For the reaches below Saddlebag and Tioga, we can look at shoulder seasons.
5	CSPA	5/18/2023 TWG Meeting	For the intra-day issue, there is immediate focus on the reach downstream of Poole Powerhouse. There should also be focus on reservoirs and daily streamflow fluctuations especially between Saddlebag and Ellery Lakes, and focus on the confluence with Tioga. Hydropower operations are going to pull from upstream. Depending on hydraulics and seasonality, is there some way to limit the degree of fluctuation by reducing the peak or bringing up the base, that would impact the drafting of the reservoirs? Warren Fork may help by bringing up the bases when you go into high flows at the powerhouse.	To clarify, there is no drafting of Saddlebag or Tioga Lake as it relates to hydro-resource optimization. There is an instream flow requirement and Tioga that has to remain within a specified range of the spillway elevation for part of the year. Everything is managed from Ellery Lake, where there is an approximately 2-foot elevation change that SCE can manage. SCE uses that to optimize intraday. There is no control at Saddlebag or Tioga under the current license.
6	MLC	5/18/2023 TWG Meeting	I support what Beth was saying about functional flows, the California Environmental Flows Framework (CEFF) has this laid out well, they indicate the importance of flows and how to evaluate them. When I send the Snow Survey information, I will send that too. Saddlebag Lake stuff might help inform other resources but might miss something. With the functional flows, you assume that natural flows will	We are looking at the baseline Project. We hear that there is a desire to go back to a natural hydrograph, but we need to understand the environmental effects of the baseline Project operations. The tradeoff is that SCE is not here to return the stream to the natural hydrograph. We need a balance between restoration and Project effects. This will come into consideration

Comment Number	Entity	Date/Forum	Comment	SCE Response
			support the ecosystem. The operational change in the recent years and the variance that USFS has given turns the natural hydrograph upside down, natural flows are higher in the summer than winter.	during PME measures. This is our tool to help understand the baseline and develop that balance. We just do not want to be misleading that we will for sure be implementing functional flows.
7	CDFW	5/18/2023 TWG Meeting	I would echo Greg's point; we are interested in looking at functional flows in all reaches. You should bring functional flow metrics into the operations Model. There are different pulses based on season. A mass-balance approach is worth discussing. I can post the link to CEFF flow methodology. The point is not to replace studies but to work with existing methodologies to see where there are missing pieces.	Bret has looked into these recommended components and considered what pieces fit into the operations model. Things considered: seasons, water year types, reservoir elevations, target elevations, potential variables and prioritization of them, consider limitations of multiple constraints. We also compared with management goals and objectives. Regarding the intraday analysis, we connected calibration with a HEC-RAS model, which provided a tool to look at multiple downstream scenarios and tie in with other studies.
8	CDFW	5/18/2023 TWG Meeting	We are trying to balance operations (power generation) with maintaining as much of the natural hydrograph as possible. The collision is the whole reason why we make a model, so we don't break things in real life. We want to figure out what components you need so we can figure out how much we can push the system and how much we can put back into the creek.	See response to comment #7 above.

CDFW = California Department of Fish and Wildlife; CEFF = California Environmental Flows Framework; CSPA = California Sportfishing Protection Alliance; FERC = Federal Energy Regulatory Commission; LADWP = Los Angeles Department of Water and Power; MLC = Mono Lake Committee; PAD = Pre-Application Document; PME = protection, mitigation, and enhancement; SCE = Southern California Edison; SWRCB = State Water Resources Control Board; TWG = Technical Working Group; USFS = U.S. Forest Service

7.0 REFERENCES

Chow, V.T. 1959. Open-channel hydraulics. New York, McGraw-Hill.

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SCE (Southern California Edison). 2022b. Final Technical Study Plans. Lee Vining Hydroelectric Project, FERC Project No. 1388. April 25, 2022.

SOUTHERN CALIFORNIA EDISON
Lee Vining Hydroelectric Project
(FERC Project No. 1388)

LOWER LEE VINING CREEK CHANNEL MORPHOLOGY (AQ-6)
FINAL TECHNICAL REPORT

SEPTEMBER 2024

SOUTHERN CALIFORNIA EDISON

Lee Vining Hydroelectric Project
(FERC Project No. 1388)

LOWER LEE VINING CREEK CHANNEL MORPHOLOGY (AQ-6)
FINAL TECHNICAL REPORT

Southern California Edison
2244 Walnut Grove Avenue
Rosemead, CA 91770

September 2024

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LIST OF ACRONYMS AND ABBREVIATIONS

cfs	cubic feet per second
D_{50}	Particle Size Distribution D50
FERC	Federal Energy Regulatory Commission
ft^2	square feet
GIS	geographic information system
GNSS	Global Navigation Satellite System
HEC	Hydrologic Engineering Center
LADWP	Los Angeles Department of Water and Power
LWD	large woody debris
mm	millimeter
NA	not applicable
PAD	Pre-Application Document
PIT	passive integrated transponder
Project	Lee Vining Hydroelectric Project (FERC Project No. 1388)
RAS	River Analysis System
RTK	real-time kinematic
RTS	robotic total station
SCE	Southern California Edison
SSP	Statistical Software Package
TWG	Technical Working Group
USACE	U.S. Army Corps of Engineers
USFS	U.S. Forest Service

1.0 INTRODUCTION

The Lee Vining Hydroelectric Project, Federal Energy Regulatory Commission (FERC) Project No. 1388 (Project), Study AQ-6 Lower Lee Vining Creek Channel Morphology evaluates the channel morphology in Lee Vining Creek downstream of Poole Powerhouse.

Project operations have the potential to affect fluvial processes and channel morphology in lower Lee Vining Creek, which is defined as Lee Vining Creek downstream of Rhinedollar Dam to the Los Angeles Department of Water and Power (LADWP) Lee Vining Creek Diversion Dam / flowline).

1.1. EXISTING INFORMATION

Existing pertinent information on geology, soils, and channel morphology within the Project Vicinity is presented in Sections 5.1, *Geology and Soils*, of the Pre-Application Document (PAD; SCE, 2021).

2.0 STUDY GOALS AND OBJECTIVES

This study has three primary goals: (1) assess the potential geomorphic effects of reducing sediment supply (coarse and fine) and altering sediment transport in lower Lee Vining Creek, (2) provide information required to assess potential ecological effects of any geomorphic changes in lower Lee Vining Creek resulting from Project operation, and (3) provide information for developing Protection, Mitigation, and Enhancement measures aimed at mitigating any potential sediment imbalance.

The specific objectives of the study are to:

- Classify transport and response reaches in lower Lee Vining Creek using existing geographic information system (GIS) data, maps, and other remote sensing imagery; and
- Characterize channel morphology, fluvial processes, and coarse sediment (greater than 2 millimeters [mm]) transport rates at responsive study sites in lower Lee Vining Creek between Poole Powerhouse and LADWP Diversion Dam.

2.1. STUDY AREA

The entire study area occurs outside of the FERC Project Boundary, downstream of the Poole Powerhouse. The study area includes portion of lower Lee Vining Creek stream reach from Poole Powerhouse to LADWP Diversion Dam. Three study sites were determined based on a field reconnaissance visit in June 2022. Sites were selected based on the potential responsiveness of the channel to geomorphic change. Study site locations are depicted in Figure 2.1-1.

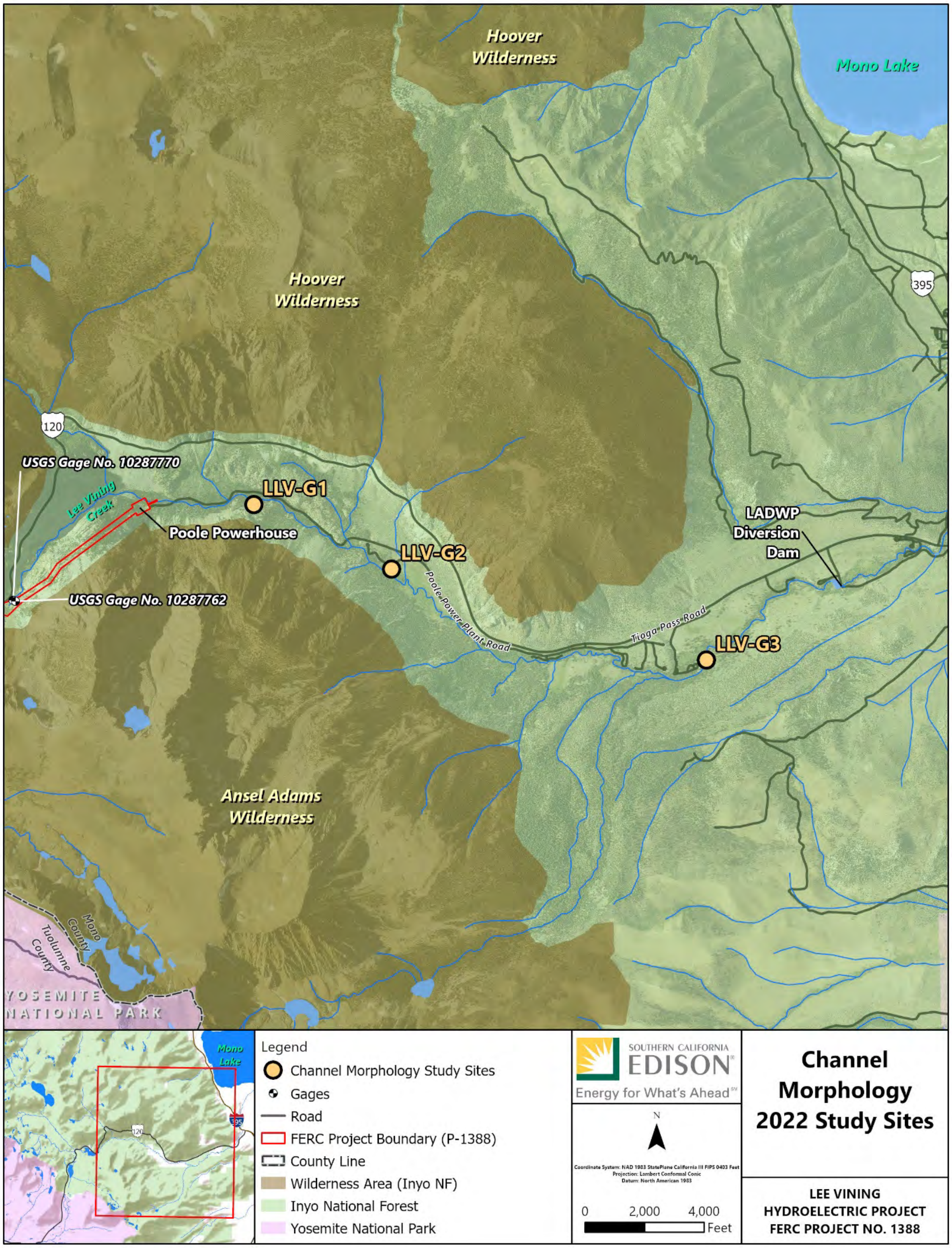

Figure 2.1-1. Channel Morphology Study Sites.

3.0 METHODS

Study implementation followed the methods described in the Final Technical Study Plan for Study AQ-6 (SCE, 2022); no modifications to the methods occurred during study implementation.

3.1. COARSE-LEVEL CHANNEL STRATIFICATION AND STUDY SITE SELECTION

In June 2022, lower Lee Vining Creek was classified into functionally similar reaches (i.e., reaches with similar sediment transport and storage processes that dictate responsiveness to changes in flow and sediment supply). Reach classifications were based on a reconnaissance-level longitudinal profile of lower Lee Vining Creek from Poole Powerhouse to LADWP Diversion Dam (Table 3.1-1) and field observations of channel gradient, relative confinement, morphology, alluvial sediment storage, and bed surface texture. Five distinct reaches were identified:

- **Reach 1**—Poole Powerhouse to the downstream end of Big Bend Campground.[1] Reach 1 has a channel gradient of approximately 2.1 percent and has predominately plane bed and pool-riffle sequence bedforms with occasional bedrock and step pool morphology in the steeper segments of the reach. Reach 1 has minor floodplain development with moderate channel confinement between steep valley walls mantled with large rockfall and debris-flow deposits, and frequent large woody debris (LWD) jams.

- **Reach 2**—Big Bend Campground to the upstream end of the large meadow complex near Aspen Campground.[1] Reach 2 has a channel gradient of approximately 4 percent with predominantly cascade and step pool morphology. The channel in this reach is highly confined by valley walls with little floodplain development and connectivity.

- **Reach 3**—Aspen Campground to the downstream extent of the large meadow complex. Reach 3 has a channel gradient of approximately 0.2 percent and is predominately pool-riffle channel type, unconfined by valley walls and well connected to the floodplain.

- **Reach 4**—Large meadow complex in Reach 3 to Lower Lee Vining Creek Campground.[1] Reach 4 has a channel gradient of approximately 1.4 percent and is predominantly plane bed and moderately confined by valley walls with moderate floodplain connectivity. A prominent recessional moraine cuts across the valley floor and forms the reach break between Reaches 4 and 5.

- **Reach 5**—Lower Lee Vining Creek Campground to LADWP Diversion Dam. Reach 5 has a channel gradient of approximately 1.4 percent and is predominantly plane bed and pool-riffle channel types with frequent LWD jams and increased floodplain connectivity relative to Reach 4.

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[1] The campground is a U.S. Department of Agriculture, U.S. Forest Service (USFS) facility.

Table 3.1-1. Lower Lee Vining Creek Channel Reaches

	Reach 1	**Reach 2**	**Reach 3**	**Reach 4**	**Reach 5**
	Poole Powerhouse to Big Bend Campground	**Big Bend Campground to Aspen Meadow**	**Meadow Reach**	**Meadow to Lower Lee Vining Campground**	**Lower Lee Vining Campground to LADWP Diversion Dam**
Length	4,020 feet	6,230 feet	3,840 feet	8,568 feet	9,447 feet
Elevation Change	85 feet	228 feet	9 feet	121 feet	131 feet
Gradient (%)	2.1%	3.7%	0.2%	1.4%	1.4%

Three responsive study sites (Sites LLV-G1, LLV-G2, and LLV-G3) were identified in Reaches 1, 3, and 5, respectively (Figure 2.1-1). Responsive reaches are channel reaches where morphology and sediment storage are most likely to show potential Project effects from altered sediment supply and transport. Responsive reaches in lower Lee Vining Creek generally have the following attributes: (1) slope less than 2 percent, (2) relatively unconfined, (3) plane bed or pool-riffle morphology, and (4) significant alluvial sediment storage (i.e., cobble facies or finer). A reconnaissance-level longitudinal profile with reach breaks and prominent landmarks in lower Lee Vining Creek is shown on Figure 3.1-1.

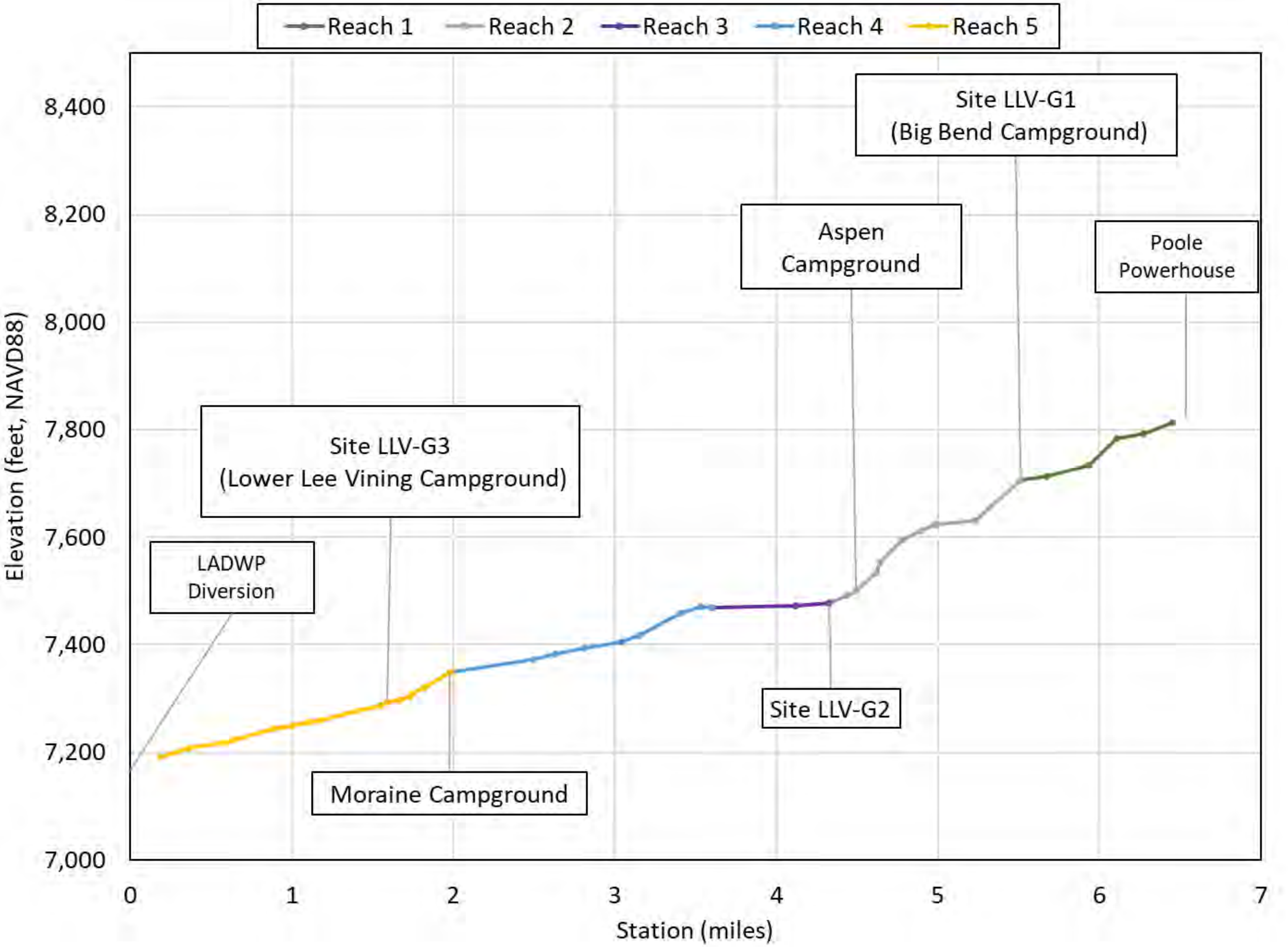


Figure 3.1-1. Longitudinal Profile of Lower Lee Vining Creek (June 2022).

3.2. RESPONSIVE STUDY SITE FIELD MEASUREMENTS

Field measurements at Sites LLV-G1, LLV-G2, and LLV-G3 were conducted from October 3 to 6, 2022, and included cross-section surveys, longitudinal profile surveys of the channel thalweg and water surface, surface and subsurface measurements of bed particle size distribution, sediment facies mapping, passive integrated transponder (PIT)-tagged tracker rock deployment, and photo documentation. PIT-tagged tracer rock recovery surveys were conducted September 1 to 5, 2023.

3.2.1. LONGITUDINAL PROFILES AND CROSS SECTIONS

Field surveys utilized Trimble S7 robotic total station (RTS) and Trimble R10-2 real-time kinematic (RTK) Global Navigation Satellite System (GNSS) survey equipment. Temporary control points were installed near each study site, and coordinates were established by submitting static GNSS observations to the National Geodetic Survey Online Positioning User Service.

Cross-section surveys were conducted in sufficient detail to capture significant changes in grade and characterize channel geometry, generally following standard survey procedures as described by the U.S. Department of Agriculture, U.S. Forest Service (USFS) (Harrelson et al., 1994). Cross-section surveys extended above bankfull on both banks and included measurements of the edge of water and thalweg. Indicators of bankfull flow elevation, including water stain lines, vegetation transitions, and channel bank slope breaks were noted, and the approximate bankfull locations were recorded. Photos of each cross section were taken facing upstream, downstream, towards left bank, and towards the right bank to document site conditions during the time of survey (Appendix A).

A longitudinal profile of the channel thalweg was surveyed through the length of the site and extended upstream and downstream of the cross sections for a minimum total length of 20 times the bankfull width. Survey-point spacing averaged 5 feet, with denser spacing in topographically complex areas. The longitudinal profile survey followed procedures described by USFS (Harrelson et al.,1994), including surveying enough points to capture the topography of pools, riffles, and other habitat features, as well as other significant breaks in channel gradient.

3.2.2. SUBSTRATE CHARACTERIZATION

Wolman pebble counts (Wolman, 1954) were conducted to characterize channel surface bed particle size distribution at select cross sections and representative unique sediment facies patches. Pebble counts entailed measuring the intermediate axis (b-axis) of approximately 100 particles in the immediate vicinity of a cross-section transect or unique sediment facies patch. All silt- and sand-sized particles were classified as less than 2 mm.

Subsurface sediment bulk samples were collected to characterize vertical stratification of predominately gravel and small cobble sized streambed sediment deposits. An 18-inch modified McNeil sampler was manually driven 10 to 12 inches into the streambed. The sediment inside the McNeil sampler was excavated by hand into 5-gallon buckets and processed near each sample location. The samples were sieved in the field at half-phi class intervals (i.e., 16, 22, 32, 45, 64, 90, and 128 mm), down to 11 mm; the fraction smaller than 11 mm was sieved once fully dry (Bunte and Abt, 2001).

Texturally distinct coarse sediment facies (surface texture by dominant and sub-dominant grain size classes) patches were mapped onto high-resolution imagery basemaps using a field mapping tablet. The high-resolution imagery was provided by CASC Engineering and Consulting in 2022. The field mapper drew continuous, edge-matched polygons of texturally distinct sediment facies within the bankfull channel margins. Visual estimates of three common particle size distribution metrics were recorded for each facies patch and other geomorphic interpretations were noted to inform site characteristics. The particle size metrics included the median particle size (D_{50}), the particle size at which 16 percent of the particles were smaller (D_{16}), and the particle size at which 84 percent of the particles were smaller (D_{84}). These metrics provide a central measure as well as both ends of the cumulative particle size distribution (Olsen et al., 2005). Pebble counts and periodic spot measurements of particle b-axis diameter were used to calibrate visual particle size estimates. Particle size estimates for sand and finer, very large boulders, or bedrock dominant and sub-dominant grain sizes were not recorded.

3.2.3. TRACER ROCKS

PIT-tagged tracer rocks were deployed to inform sediment transport dynamics at the three sites. Tracer rocks bracketed the average range of D_{10} to D_{84} particle sizes (16 to 110 mm) based on pebble counts and visual estimates of particle size distribution at representative mobile sediment patches. Table 3.2-1 describes the particle size classes and total quantity of tracer rocks deployed in October 2022.

Table 3.2-1. Tracer Rock Size Classes and Quantities by Site

Size Class [a]	B-axis Range (mm)	Site	Quantity
A [b]	Less than 22.6	LLV-G1	30
		LLV-G2	7
		LLV-G3	12
B	22.6–32	LLV-G1	0
		LLV-G2	17
		LLV-G3	13
C	32–45	LLV-G1	17
		LLV-G2	18
		LLV-G3	18
D	45–64	LLV-G1	17
		LLV-G2	12
		LLV-G3	13

Size Class [a]	B-axis Range (mm)	Site	Quantity
E	64–90	LLV-G1	4
		LLV-G2	7
		LLV-G3	7
F	90–256	LLV-G1	8
		LLV-G2	7
		LLV-G3	7
	Total:	**LLV-G1**	**76**
		LLV-G2	**68**
		LLV-G3	**70**

mm = millimeter; PIT = passive integrated transponder

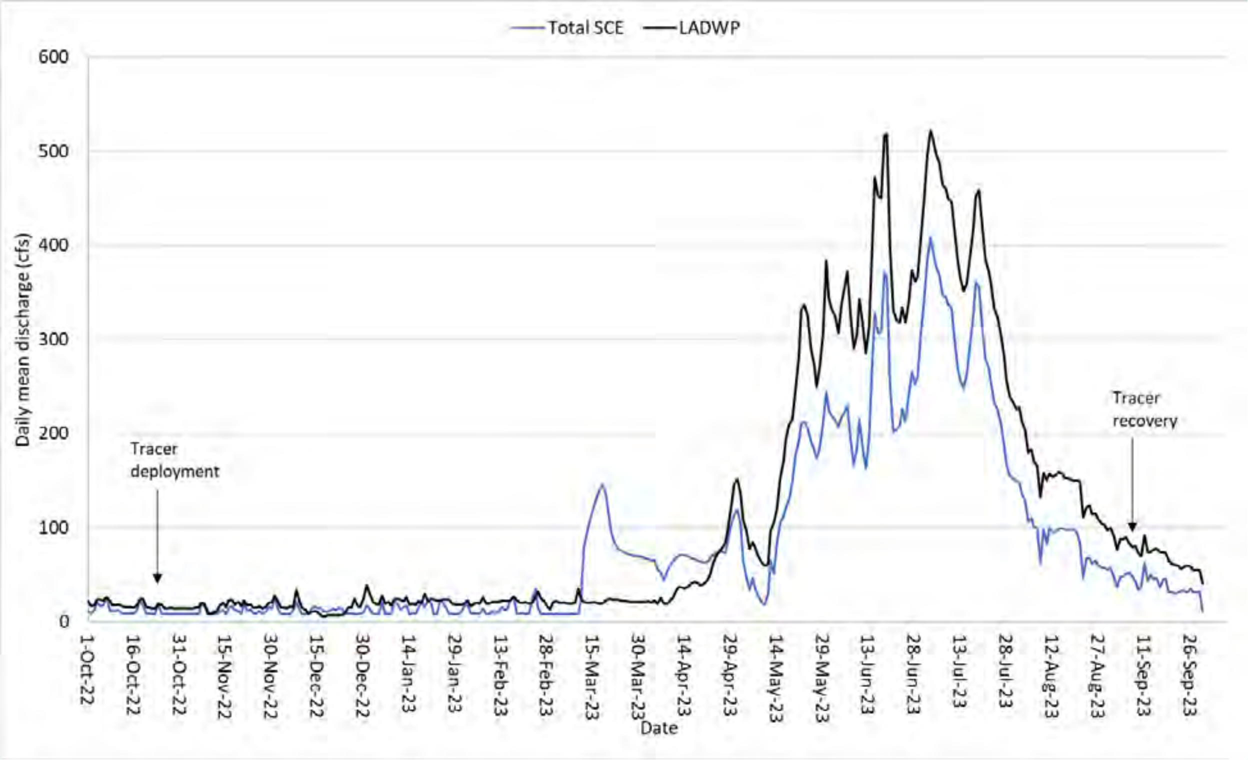
[a] Cell color shading indicates the tracer rock paint color for each size class. Blank indicates white paint color.

[b] PIT tags could not be reliably inserted into the Size Class A tracer rocks and were omitted for this size class.

Tracer rocks were collected and prepared on site. PIT tags were inserted into the tracer rocks by drilling a 3/16-inch hole into each particle and sealing the PIT tag in place with a quick cure, high-strength concrete and masonry anchoring adhesive. The adhesive was smoothed over to mimic natural particle surface texture. The tracer particles were painted a bright, high-contrast color with concrete marking paint once the adhesive was dry. The b-axis and mass were recorded for each tracer rock.

Tracer rocks were deployed along cross sections and at other representative mobile sediment patches at each study site. Tracer rock placement locations were selected based on suitability for monitoring and numerical sediment transport calculations to test rock particle mobility in a range of environments. Geomorphic units included riffles, pool tails, and flat-water sections (i.e., runs and glides). Prior to placement of individual tracer rocks, a rock of similar shape and size was removed from the streambed to create a void space and a similarly sized tracer rock was gently pressed down and worked into the void space to simulate natural streambed particle packing and embeddedness. The location of each tracer rock was surveyed with RTS or RTK GNSS equipment, and representative photographs were taken of the tracer locations.

Tracer rock recovery surveys were conducted September 1 to 4, 2023, following the historically high flows measured in 2023 (Figure 3.2-1).



The discrepancy between Total SCE and LADWP flows between March and April is due to unknown reasons.

Figure 3.2-1. Daily Mean Discharge in lower Lee Vining Creek during Tracer Rock Deployment and Recovery.

3.2.3.1. Analysis

Topographic and tracer rock survey data were processed with Trimble Business Center and ESRI ArcGIS software to construct longitudinal profile and cross-section plots, and export into spreadsheets for evaluation. The tracer rock recovery survey data were imported into ESRI ArcGIS to compute tracer transport distance. Tracer rocks were considered to have moved if the total displacement was greater than 1 foot (Haschenburger and Wilcock, 2003).

Particle size distributions were computed for the pebble counts and bulk samples using custom data models in Excel and used to compute the D_{16}, D_{50}, and D_{84}. Particle sizes were binned by size class using half-phi intervals and plotted using cumulative distribution functions (Bunte and Abt, 2001).

Digital facies mapping field data was processed in ESRI ArcGIS software to refine polygon topology and calculate the surface area for sediment facies patches. The Smooth Shared Edges (Cartography) tool using a Polynomial Approximation with Exponential Kernel smoothing algorithm with a smoothing tolerance of 0.25 foot was applied to the processed facies polygon data.

A flood frequency analysis was performed in accordance with Bulletin 17C (USGS, 2019) for USGS Gage ID 10287900 and the combined Southern California Edison (SCE) gage using the U.S. Army Corps of Engineers (USACE) Hydrologic Engineering Center's (HEC) Statistical Software Package (SSP) (USACE, 2019). Table 3.2-2 presents peak discharges up to the 100-year recurrence interval (1 percent annual exceedance probability).

Table 3.2-2. Flood Frequency Analysis Results for Lower Lee Vining Creek

Annual Exceedance Probability (%)	USGS Gage #10287900 (cfs) (1934–1979)	Combined SCE Gage (cfs) [a]
1	578	844
5	500	542
10	455	432
20	398	330
50	290	202

cfs = cubic feet per second; SCE = Southern California Edison; USGS = U.S. Geological Survey

[a] SCE gage 353 (USGS Gage #10287770) and SCE gage 363 (USGS Gage #10287762)

3.2.4. BED MOBILITY AND SEDIMENT TRANSPORT

The amount of bed material transport and the residence time of bed material in a channel reach strongly influences the potential effects of reducing sediment supply on channel form and aquatic habitat. Sediment mobility was assessed at each study site using the channel shear stresses estimated from the USACE HEC River Analysis System (RAS) hydraulic model, particle size data from the pebble counts and bulk samples, and the Shields relationship (equation 1) to compute the critical shear stresses acting on the channel bed during specific flows.

$$\tau^*_{crit} = \frac{\tau_b}{(\rho_s - \rho) g D_{50}} \qquad \text{(equation 1)}$$

Where:

τ^*_{crit} is the critical Shields number (unitless)

τ_b is basal shear stress (pascals)

ρ is the density of water (kilograms per cubic meter [kg/m^3])

ρ_s is the particle density, (assumed 2,650 [kg/m^3])

g is acceleration due to gravity (meters per second squared [m/s^2])

D_{50} is the median particle size (mm)

Equation 2 can then be rearranged to solve for critical D_{50} (i.e., the median particle size likely to be mobilized for a given shear stress) under a given flow at each cross section.

$$D_{50_{crit}} = \frac{\tau_b}{(\rho_s - \rho) g \tau^*_{crit}} \qquad \text{(equation 2)}$$

To estimate shear stresses (τ_b) acting on the channel bed at each study site, flow hydraulics were modeled by Stillwater Sciences using the HEC-RAS model, which has one- and two-dimensional hydraulic model capabilities and is widely used for estimating general flow characteristics. The HEC-RAS model developed for this purpose was a steady-state, one-dimensional hydraulic model, constructed for the purpose of estimating shear stress. This one-dimensional model assumes a uniform velocity across the channel but can partition flow into channel and overbank sections. Flow is modeled based on cross sections and topography between the cross sections is interpolated. Inputs to the HEC-RAS model included channel geometry from cross-section surveys and a peak instantaneous discharge value of 470 cfs. Peak discharge for the 2023 water year was calculated by combining flows measured at USGS Gage #10287770 (SCE gage 353) and USGS Gage #10287762 (SCE gage 363). Manning's "n" roughness values ranging between 0.05 and 0.055 were applied in the main channel and overbanks, respectively. The roughness values were estimated based on dominant substrate cover in the channel and vegetation density in overbank areas, using a combination of field observations and values provided in the *HEC-RAS River Analysis System Hydraulic Reference Manual* (USACE, 2023).

4.0 STUDY RESULTS

4.1. SITE LLV-G1

Site LLV-G1 is located approximately 1 mile downstream of Poole Powerhouse immediately adjacent to Big Bend Campground in Reach 1. The study site has predominately plane bed and pool-riffle morphology and is highly confined between steep, debris-flow mantled canyon walls. Numerous LWD jams are located within the study site. The LWD jams have numerous pieces greater than 30-inches diameter at breast height and appear to be relatively stable and persistent. The LWD jams trap large sediment wedges and provide significant influence on channel morphology and sediment dynamics within the study site.

The longitudinal profile surveyed in October 2022 was 1,460 feet long, extended approximately 40 feet upstream of Cross Section LLV-G1 XS1, and ended at Cross Section LLV-G1 XS6 (Figure 4.1-1 and Figure 4.1-2). The reach average slope, calculated as a best-fit line to the longitudinal profile, was 0.0073 (0.07 percent). Bankfull widths ranged from 25 to 30 feet. Site photographs and cross-section plots are presented in Appendix A.

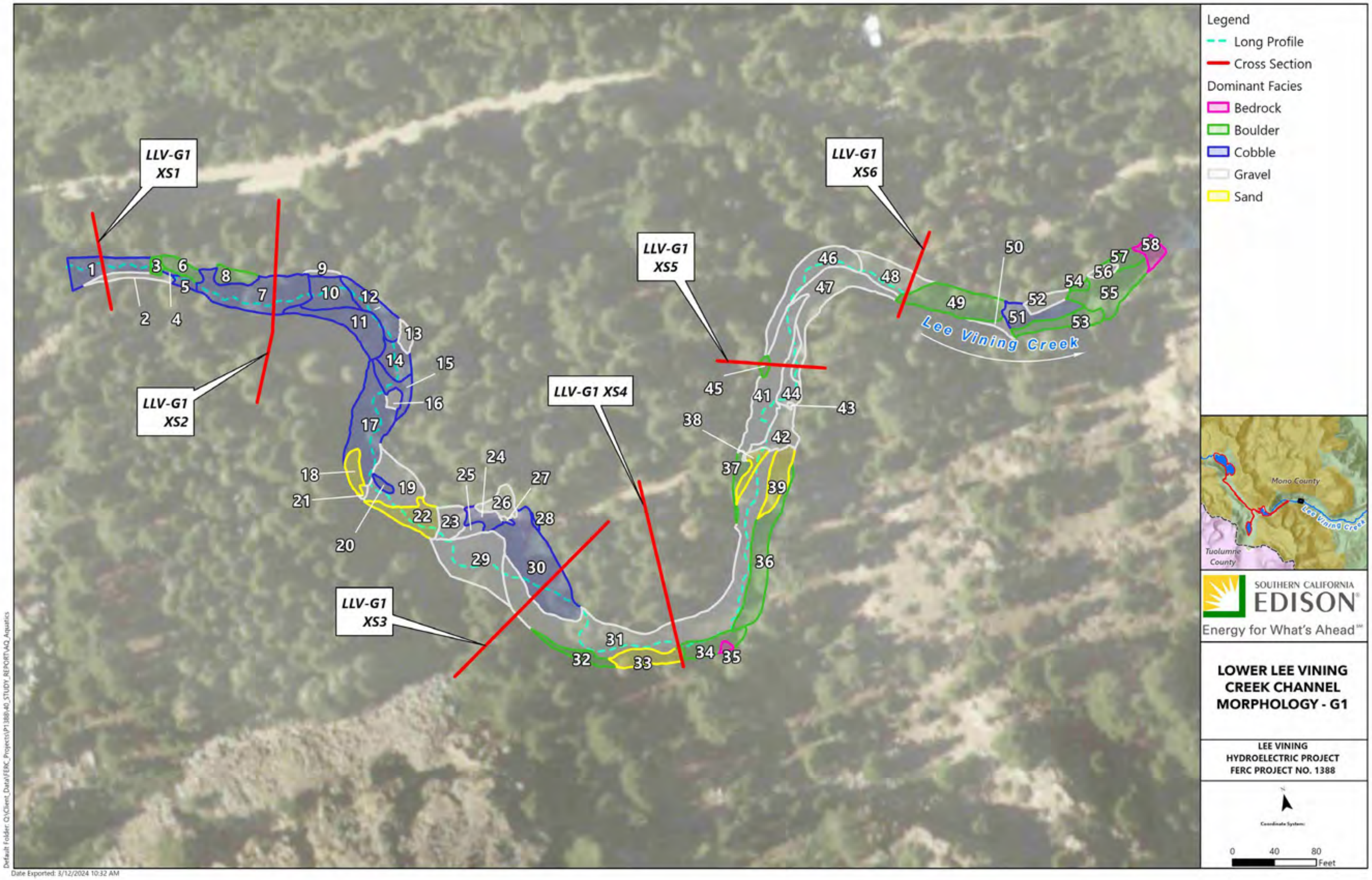


Figure 4.1-1. Site LLV-G1 Overview Showing Thalweg, Cross Sections, and Facies Mapping.

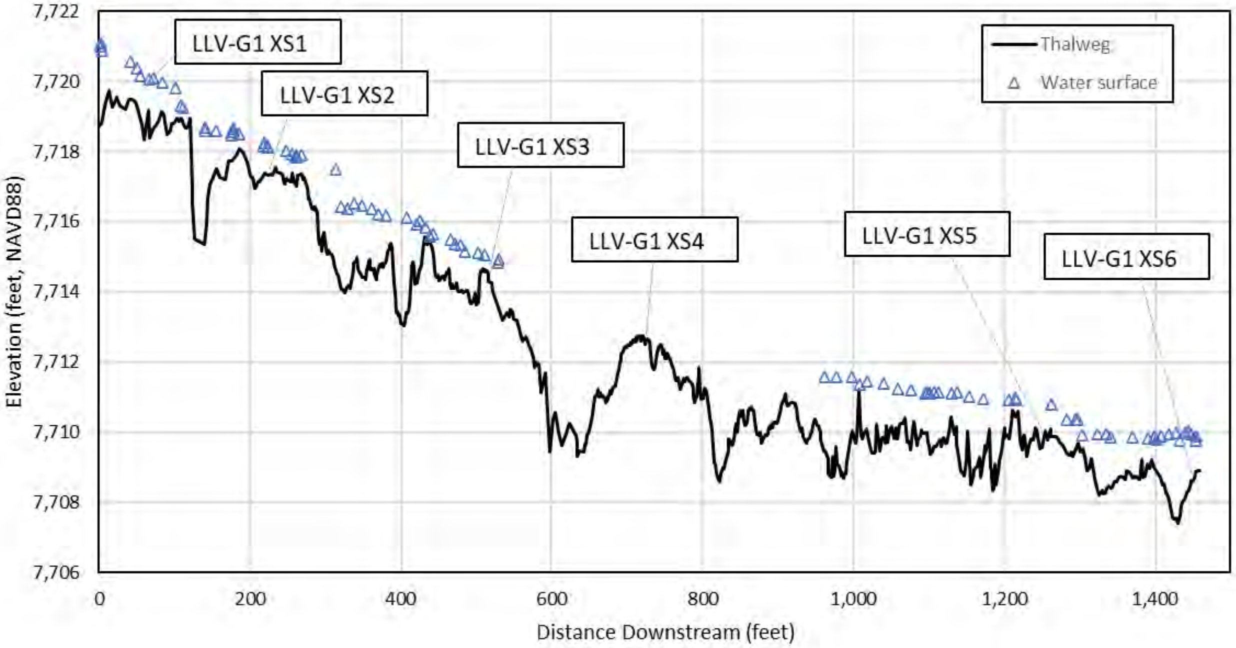


Figure 4.1-2. Longitudinal Profile for Site LLV-G1.

4.1.1. SUBSTRATE CHARACTERIZATION

The channel bed at Site LLV-G1 was dominated by gravel (45 percent of facies area) and cobble (30 percent of facies area) (Table 4.1-1). Gravel (20 percent of facies area) and boulder (18 percent of facies area) were the most abundant sub-dominant facies. Three bulk samples were excavated from representative mobile sediment patches near each cross-section location. Bulk sample BS-A1 was excavated from facies patch identification (ID) 11—a large cobble dominated patch with surface D_{50} of 90 mm (Figure 4.1-1). This is a large, coarse textured point bar formed at the most upstream bend where the channel makes a sharp turn south around Big Bend Campground. The pebble count was also conducted in facies patch ID 11, and the particle size distribution is shown on Figure 4.1-3. Facies patch ID 11 was one of the coarser representative mobile sediment patches at the study site and has a high degree of armoring as shown by the coarser particle size distribution of the surface pebble count as compared to bulk sample BS-A1, which sampled the subsurface.

Table 4.1-1. Summary of Dominant and Sub-Dominant Textural Facies at Site LLV-G1

Dominant Facies	**Area (ft^2)**	**% of Area**	**D_{50} (mm)**	**Sub-dominant Facies [a]**	**Area (ft^2)**	**% of Area**
Bedrock	594.5	1	NA	Bedrock	0	0
Boulder	10,822.7	18	322	Boulder	11,252.8	18
Cobble	18,704.3	30	96	Cobble	4,639.5	8
Gravel	27,453.6	45	33	Gravel	12,452.1	20
Sand	3,986.0	6	2	Sand	888.3	1
Not present	NA	NA	NA	Not present	32,328.5	53
Total	61,561.2	100	NA	Total	61,561.2	100

ft^2 = square feet; mm = millimeter; NA = not applicable

[a] Every patch has a dominant facies but may not have a sub-dominant facies.

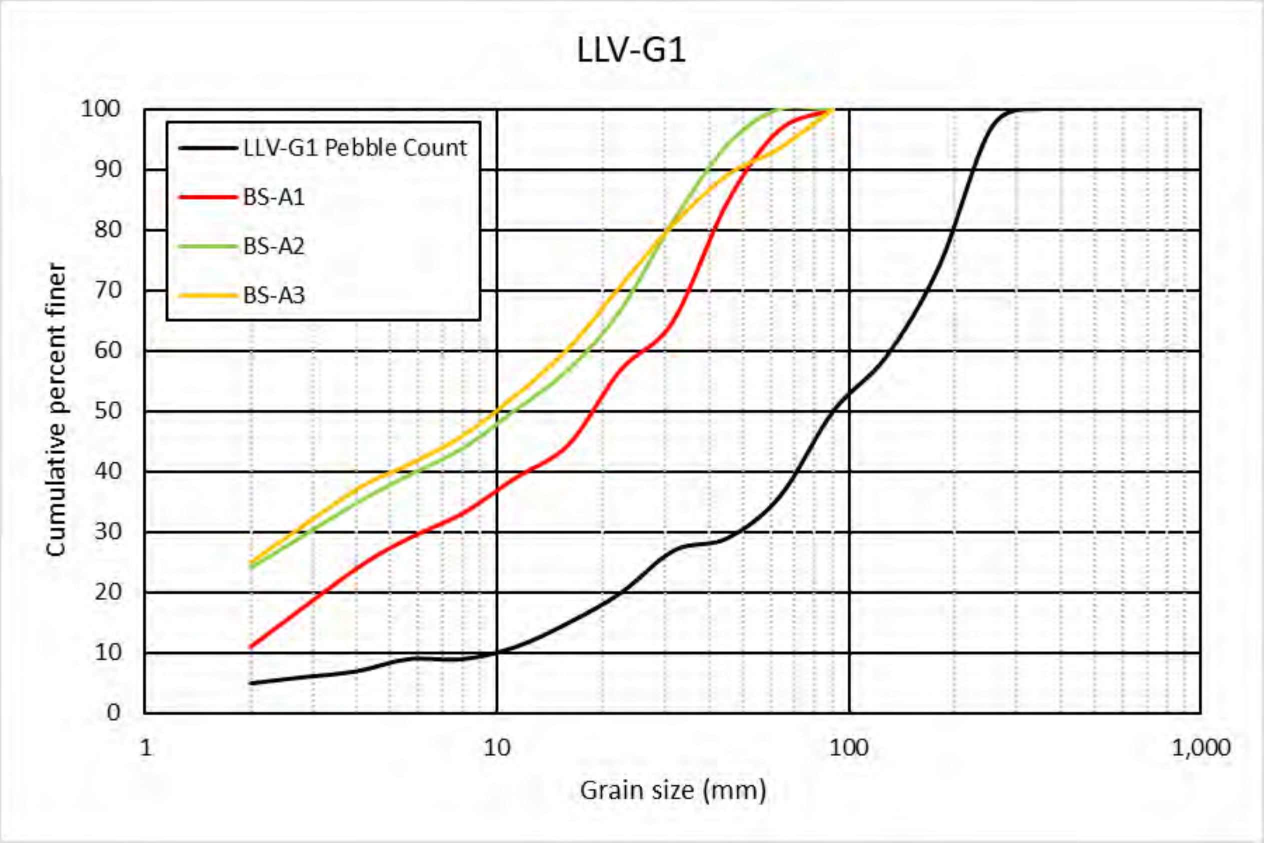


Figure 4.1-3. Particle Size Distribution for Bulk Samples and Pebble Count at Site LLV-G1.

4.1.2. PASSIVE INTEGRATED TRANSPONDER-TAGGED TRACER ROCKS AND CRITICAL D_{50}

Twenty-five of 76 deployed tracer rocks were recovered at Site LLV-G1, which represents a 33 percent recovery rate. One tracer rock in size class F was found in place. The remaining 24 recovered tracer rocks moved greater than 1 foot from original placement location to 70 feet. A single tracer rock in size class C that was placed along Cross Section LLV-G1 XS3 was recovered approximately 11 feet upstream of its original location and considered vandalized (i.e., moved by a curious visitor). Two size class E tracer rocks were recovered very far downstream from original placement location with cumulative travel distances of 481 and 566 feet along the centerline. Tracer displacement by particle size and the predicted critical D_{50} is shown on Figure 4.1-4.

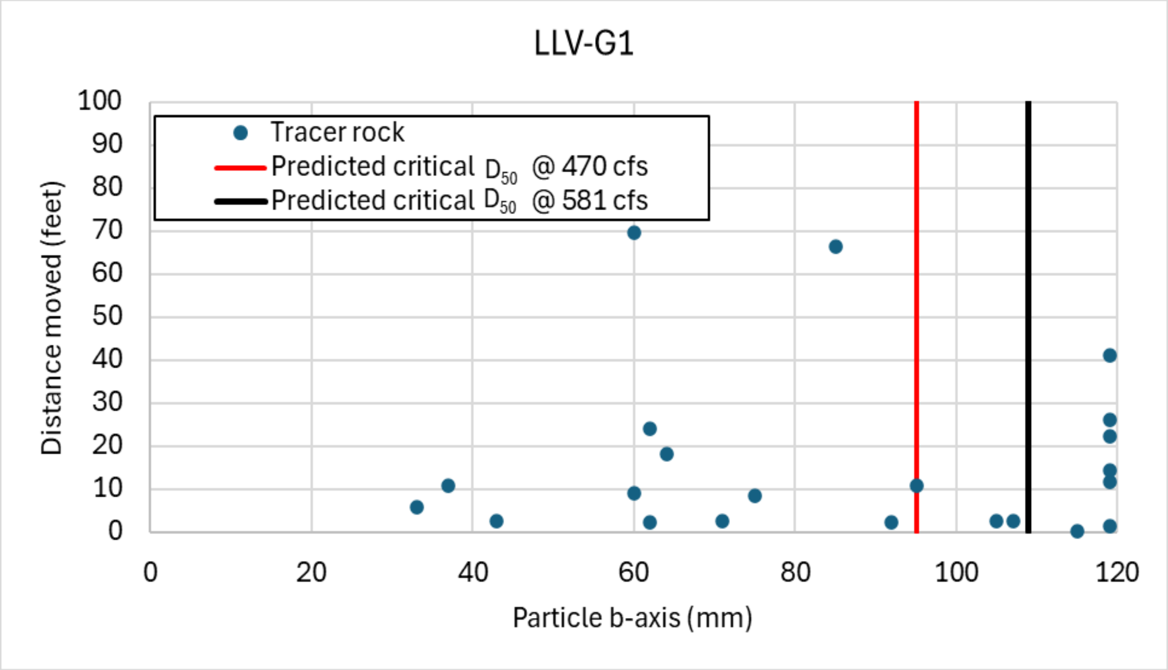


Figure 4.1-4. Transport Distance of Tracer Rocks by Particle Size at Site LLV-G1 and Predicted Critical D_{50} at 470 and 581 cfs.

4.2. SITE LLV-G2

Site LLV-G2 is located approximately 2.1 miles downstream of Poole Powerhouse immediately adjacent to the Aspen Campground. The site crosses the boundary from the higher gradient, highly confined Reach 2 to the lower gradient unconfined meadow area of Reach 3. Channel morphology transitions from predominately cascade in Reach 2 to pool-riffle and plane bed in Reach 3. Numerous LWD jams are located within the study site. The LWD jams have significant numbers of large pieces greater than 30-inch diameter at breast height and appear to be relatively stable and persistent. The LWD jams trap large sediment wedges and provide significant influence on channel morphologies and sediment dynamics within the study site.

The longitudinal profile surveyed in October 2022 was 1,352 feet long, extended 112 feet upstream of Cross Section LLV-G2 XS1, and ended at 188 feet downstream of Cross Section LLV-G2 XS4 (Figure 4.2-1 and 4.2-2). The reach average slope, calculated as a best-fit line to the entire longitudinal profile, was 0.013 (1.3 percent). Bankfull widths ranged from 25 to 45 feet. Site photographs and cross-section plots are presented in Appendix A.

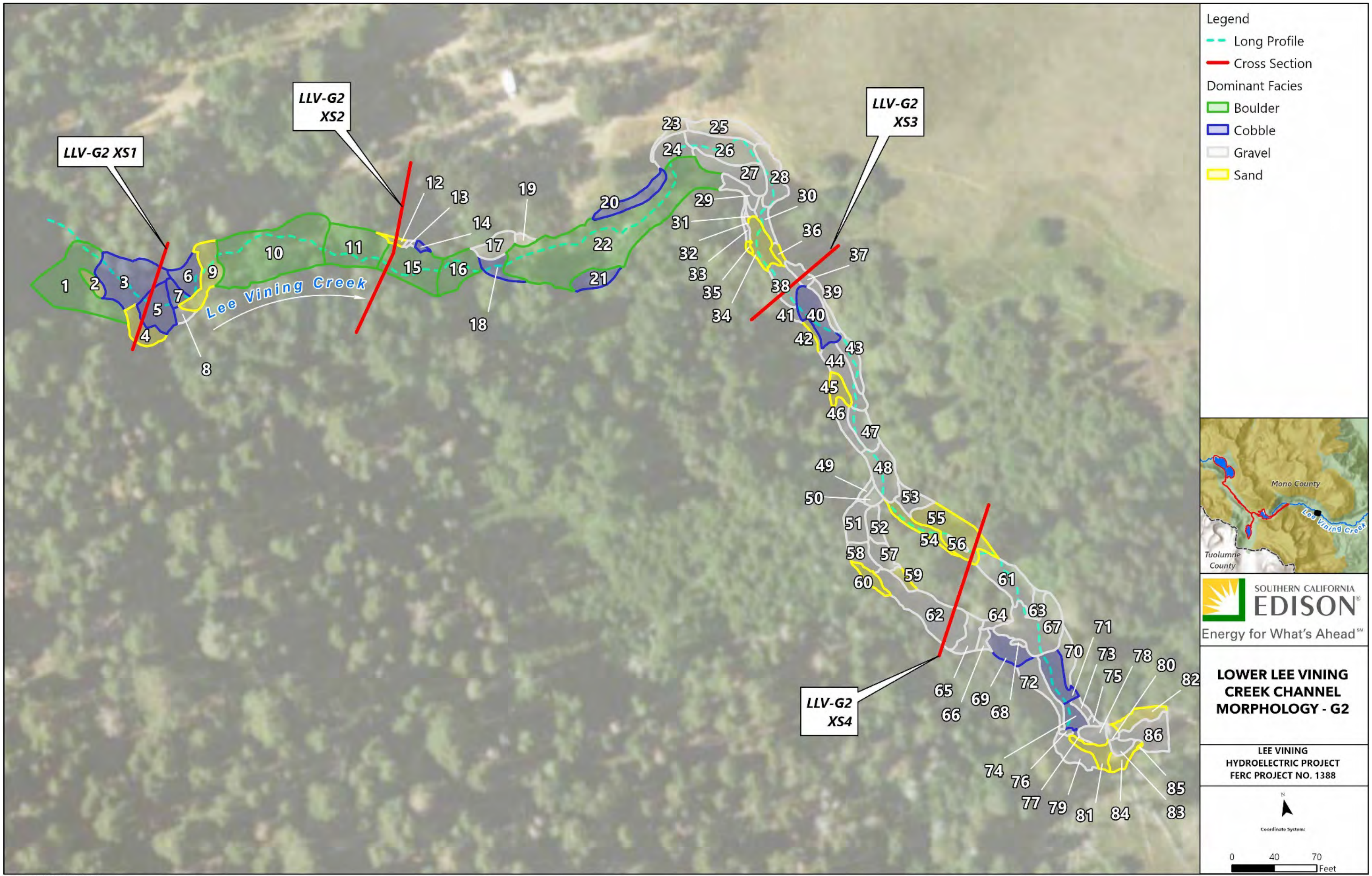


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Figure 4.2-1. Site LLV-G2 Overview Showing Thalweg, Cross Sections, and Facies Mapping.

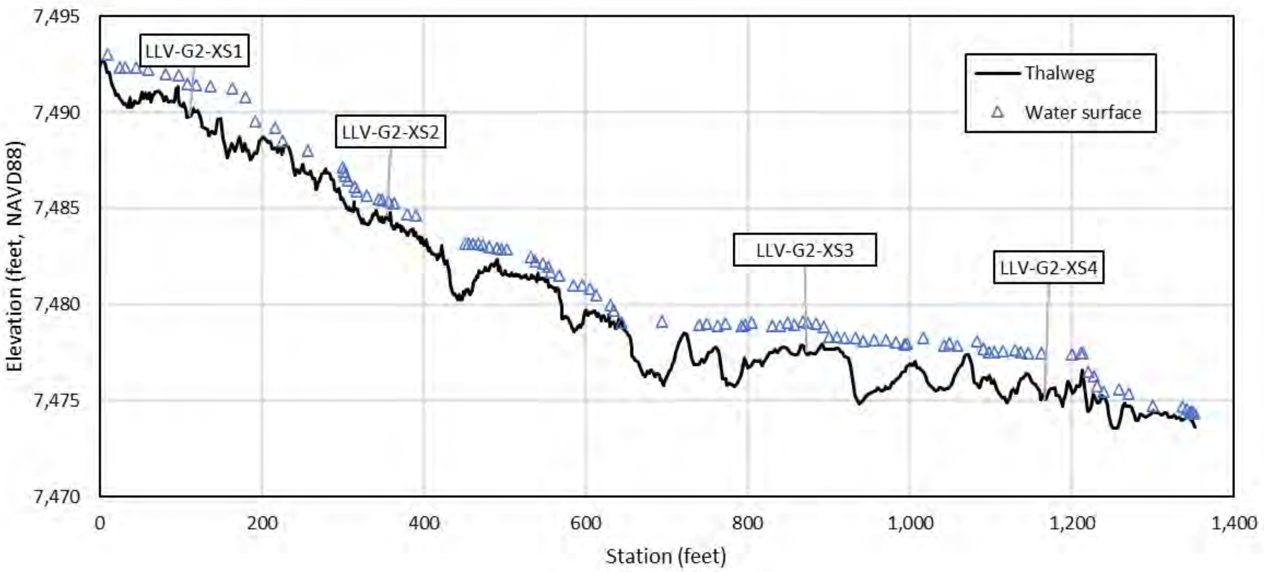

Figure 4.2-2. Longitudinal Profile for Site LLV-G2.

4.2.1. SUBSTRATE CHARACTERIZATION

The channel bed at Site LLV-G2 was dominated by gravel (41 percent of facies area) and boulder (31 percent of facies area) (Table 4.2-1). Cobble (47 percent of facies area) was the most abundant sub-dominant facies. Three bulk samples were excavated from representative mobile sediment patches near each cross-section location. Bulk sample BS-B1 was excavated from facies patch ID 3, a large cobble-boulder-gravel patch with surface D_{50} of 150 mm (Figure 4.2-3). This is a coarse textured deposit formed upstream of a complex LWD jam and adjacent to the distal margin of several large, coalescing, debris-flow runout zones from the steep canyon walls to the south of the study site. The pebble count was conducted in facies patch ID 3, and the particle size distribution is shown on Figure 4.2-1.

Table 4.2-1. Summary of Dominant and Sub-Dominant Textural Facies at Site LLV-G2

Dominant Facies	Area (ft^2)	% of Area	D_{50} (mm)	Sub-dominant Facies [a]	Area (ft^2)	% of Area
Bedrock	0.0	0	NA	Bedrock	0	0
Boulder	15,877.1	31	247	Boulder	3,142.6	6
Cobble	7,495.8	15	70	Cobble	23,611.9	47
Gravel	20,823.7	41	17	Gravel	4,724.2	9
Sand	6,303.5	12	6	Sand	376.4	1
Not present	NA	NA	NA	Not present	18,644.9	37
Total	50,500.0	100	--	Total	50,500.0	100

ft^2 = square feet; mm = millimeter; NA = not applicable

[a] Every patch has a dominant facies but may not have a sub-dominant facies.

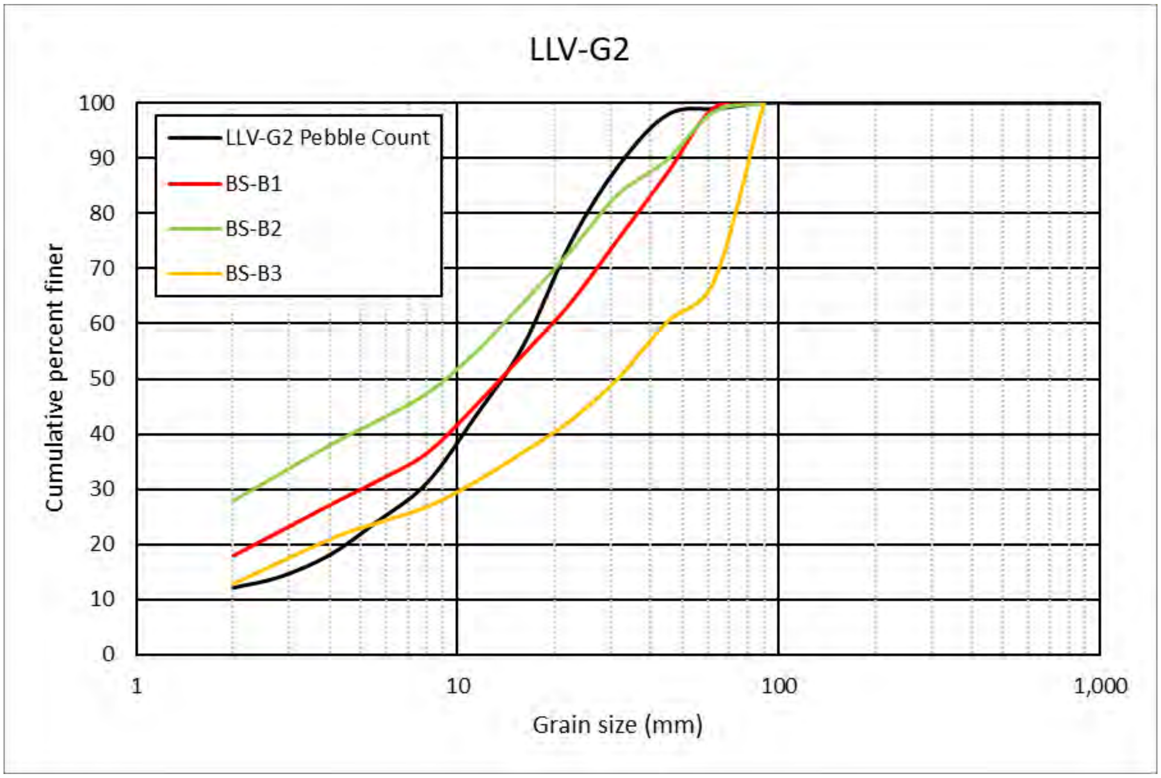

Figure 4.2-3. Particle Size Distribution for Bulk Samples and Pebble Count at Site LLV-G2.

4.2.2. PASSIVE INTEGRATED TRANSPONDER-TAGGED TRACER ROCKS AND CRITICAL D_{50}

Twenty-one of 68 deployed tracer rocks were recovered at Site LLV-G2 which represents a 31% recovery rate. Ten of the tracer rocks displaced greater than 1 foot downstream and 11 tracer rocks were recovered at the original deployment position. Of the ten displaced tracer rocks, four were in size class C, three in size class B, and one in each of size classes D, F, and E. Tracer rock displacement by particle size and the predicted critical D_{50} is shown on Figure 4.2-4.

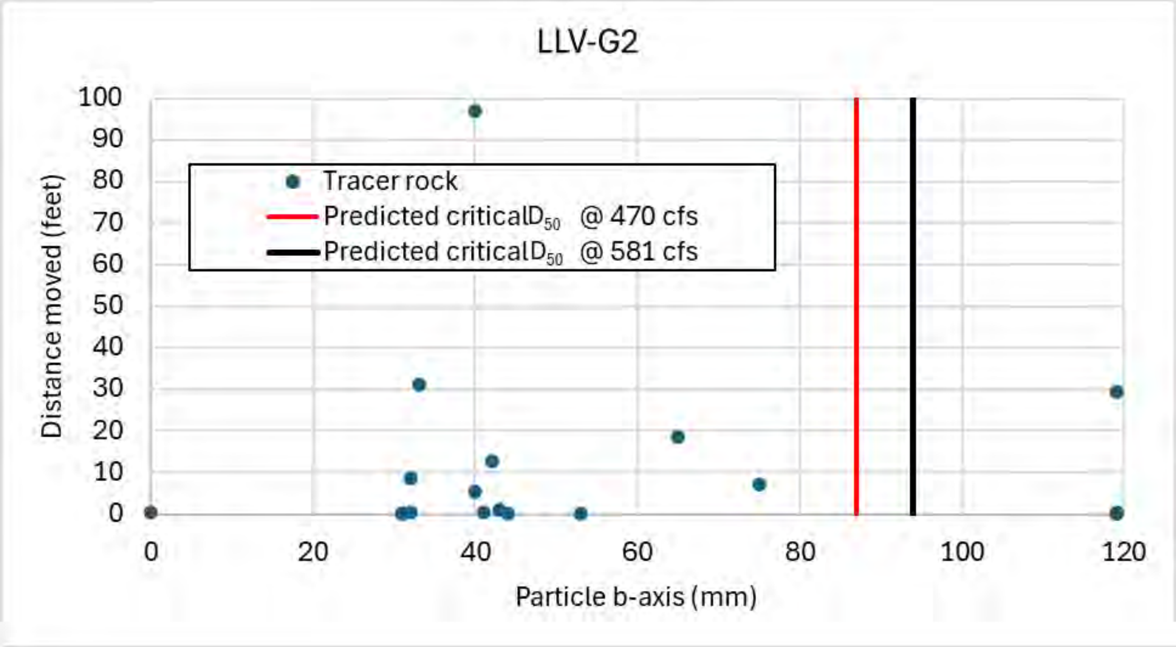

Figure 4.2-4. Transport Distance of Tracer Rocks by Particle Size at Site LLV-G2 and Predicted Critical D_{50} at 470 and 581 cfs.

4.3. SITE LLV-G3

Site LLV-G3 is located approximately 1.6 miles upstream of LADWP Diversion Dam facility near Lower Lee Vining Campground. The site is within Reach 5, a broad glacially sculpted valley bounded by high lateral moraines on either side of the valley. Numerous Tioga age recessional moraines (Kister, 1966) appear as a sequence of low ridges that cross the Lee Vining Creek Canyon.

The longitudinal profile surveyed in October 2022 was 1,216 feet long, extended 504 feet upstream of Cross Section LLV-G3 XS1, and ended 171 feet downstream of Cross Section LLV-G3 XS3 (Figures 4.3-1 and 4.3-2). Average slope for the reach, calculated as a best-fit line to the entire longitudinal profile, was 0.014 (1.4 percent). Bankfull widths ranged from 25 to 40 feet. Site photographs and cross-section plots are presented in Appendix A.

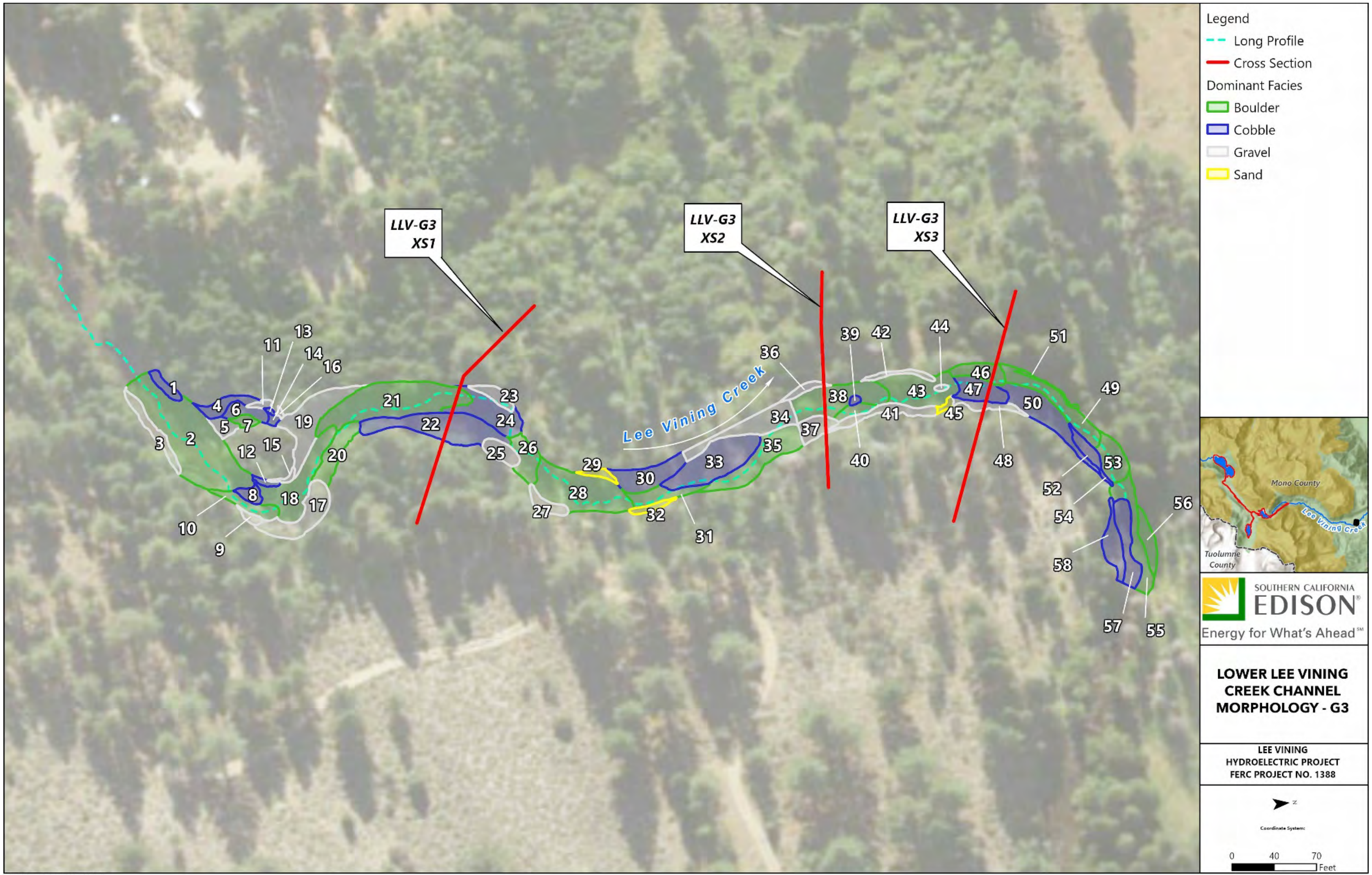

Figure 4.3-1. Site LLV-G3 Overview Showing Thalweg, Cross Sections, and Facies Mapping.

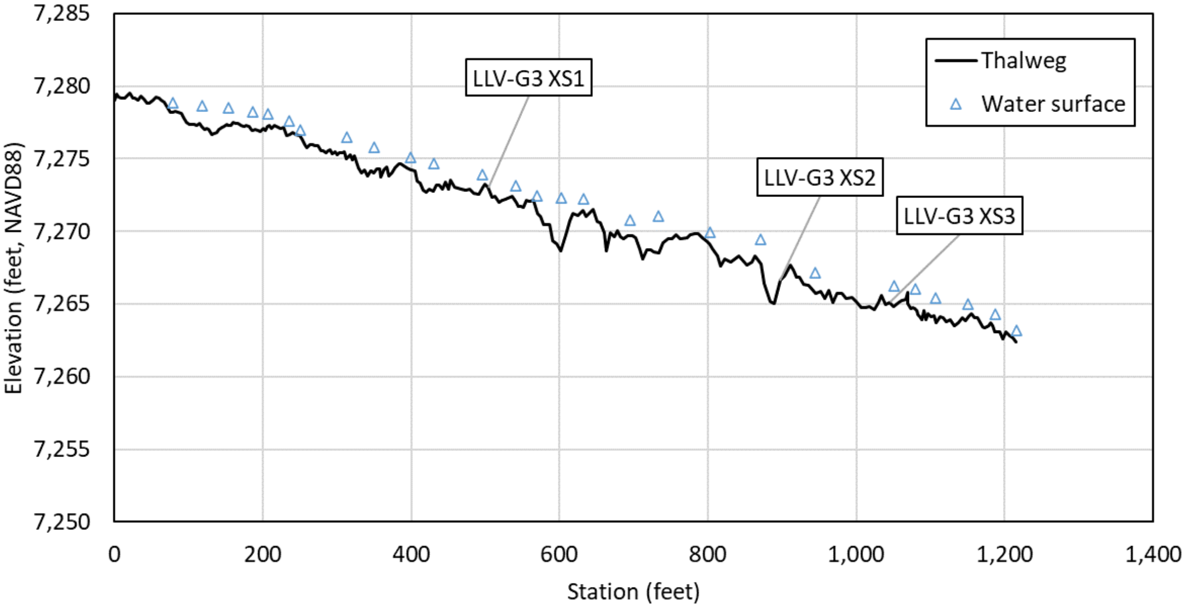

Figure 4.3-2. Longitudinal Profile for Site LLV-G3.

4.3.1. SUBSTRATE CHARACTERIZATION

The channel bed at Site LLV-G3 was dominated by boulder (54% of facies area) with significant area of cobble (27% of facies area) and gravel (19% of facies area) dominant texture patches (Table 4.3-1). Cobble (32% of facies area) was the most abundant sub-dominant facies with gravel (25% of facies area) and boulder (19% of facies area) also making up a significant portion of the sub-dominant texture. Three bulk samples were excavated from representative mobile sediment patches. Bulk sample BS-C1 was excavated from facies patch ID 30, a gravel cobble point bar deposit with surface D_{50} of 90 mm (Figure 4.3-1). Bulk sample BS-C2 was excavated from facies patch ID 19, a gravel lag deposit at the downstream end of a split-flow channel around a mid-channel island. Several LWD jams near this split-flow feature are influencing the sediment deposition pattern. Bulk sample BS-C3 was excavated from facies patch ID 48 just downstream of cross section 3. Pebble count was conducted in facies patch ID 30 and the particle size distribution is shown on Figure 4.3-3.

Table 4.3-1. Summary of Dominant and Sub-Dominant Textural Facies at Site LLV-G3

Dominant Facies	Area (ft^2)	% of Area	D_{50} (mm)	Sub-dominant Facies [a]	Area (ft^2)	% of Area
Bedrock	0.0	0	NA	Bedrock	234.1	0.6
Boulder	22,015.9	54	263	Boulder	7,681.6	19
Cobble	11,091.0	27	124	Cobble	13,164.1	32
Gravel	7,613.9	19	36	Gravel	10,424.7	25

Dominant Facies	Area (ft^2)	% of Area	D_{50} (mm)	Sub-dominant Facies [a]	Area (ft^2)	% of Area
Sand	401.2	1	1	Sand	461.7	1.1
Total	41,121.9	100	NA	Total	41,121.9	100

ft^2 = square feet; mm = millimeter; NA = not applicable

[a] Every patch has a dominant facies but may not have a sub-dominant facies.

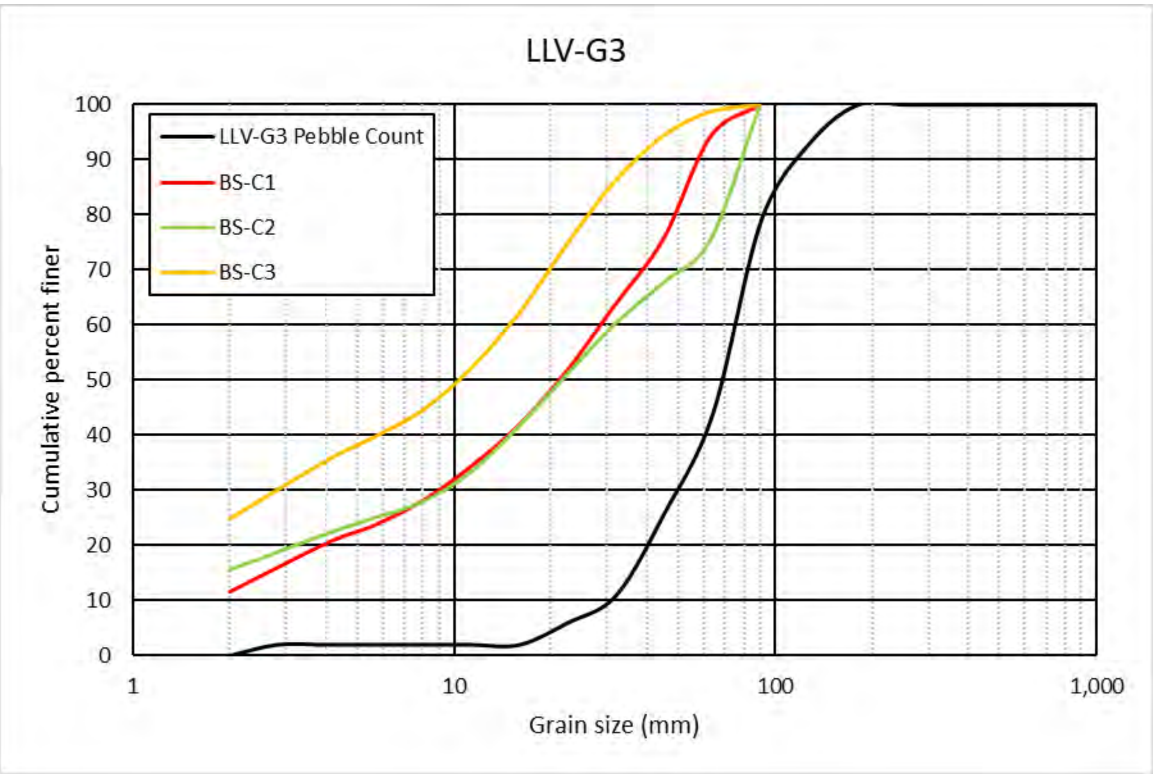

Figure 4.3-3. Particle Size Distribution for Bulk Samples and Pebble Count at Site LLV-G3.

4.3.2. PASSIVE INTEGRATED TRANSPONDER-TAGGED TRACER ROCKS AND CRITICAL D_{50}

Twelve of 70 deployed tracer rocks were recovered at Site LLV-G3, which represents a 17 percent recovery rate. Ten of the 12 displaced tracer rocks travelled greater than 1 foot, and 2 of the displaced rocks were recovered at the original deployment position. Tracer displacement by particle size and the predicted critical D_{50} is shown on Figure 4.3-4.

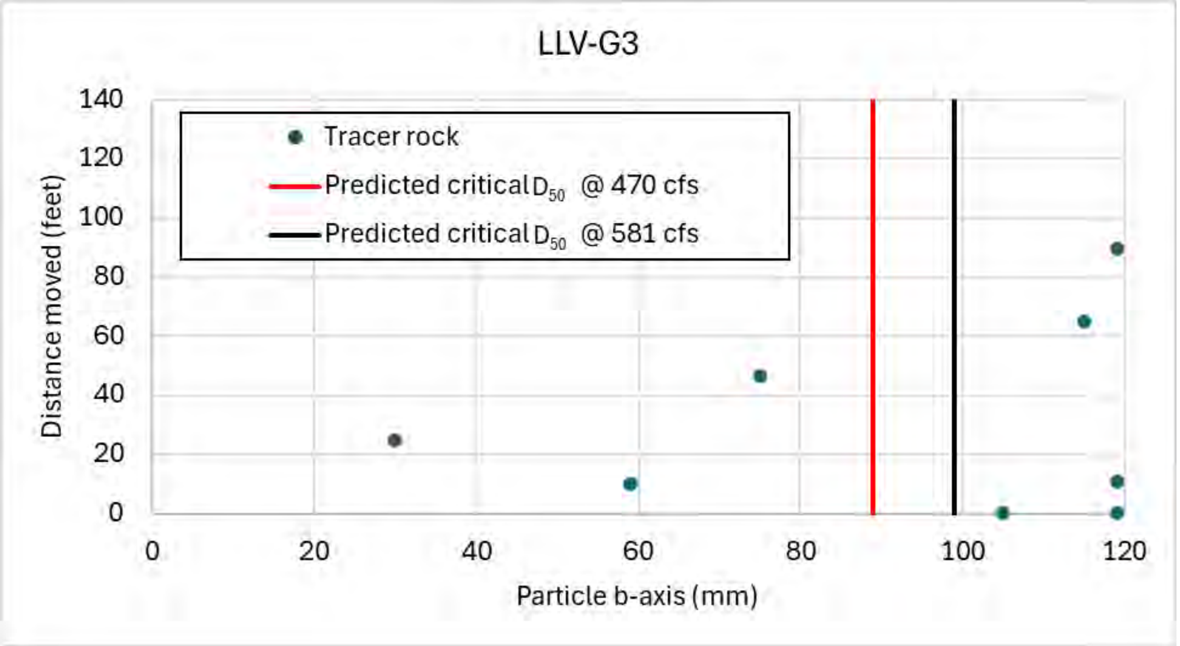

Figure 4.3-4. Transport Distance of Tracer Rocks by Particle Size at Site LLV-G3 and Predicted Critical D_{50} for Site at 470 and 581 cfs.

5.0 CONSULTATION SUMMARY

In preparation of the PAD and Notice of Intent filed in August 2021, SCE hosted Aquatic Resources Technical Working Group (TWG) meetings on January 25, February 22, March 29, and May 24, 2021. These TWG meetings resulted in study requests from Stakeholders to address questions regarding aquatic habitat and sediment characteristics. Notes and materials from these meetings are available are available on SCE's Project website (www.sce.com/leevining).

SCE filed draft Study Plans with the PAD and Notice of Intent on August 12, 2021, to address issues discussed with the TWG. The Stakeholder comment period ended on January 18, 2022. No comments were received related to this Study Plan, and the final Study Plan was submitted to FERC in April 2022. Initial study results were provided to relicensing Stakeholders on February 1, 2023. Preliminary data collected in this study was analyzed, and a Draft Technical Report was produced and distributed to Stakeholders for a 60-day review in September 2023. No comments were received from Stakeholders regarding this study.

Draft Technical Reports were distributed to TWGs on April 16, 2024, for a 60-day comment period. On May 14, 2024, SCE held a public meeting at the Lee Vining Community Center to discuss the draft reports and study findings to date. On June 12, 2024, at the end of the comment period, comments were received from USFS, U.S. Fish and Wildlife Service, California Department of Fish and Wildlife, State Water Resources Control Board, and MLC. Responses to Stakeholder comments on the 2023 Draft Technical Report are included in Table 1-1 in Volume III of the DLA.

6.0 REFERENCES

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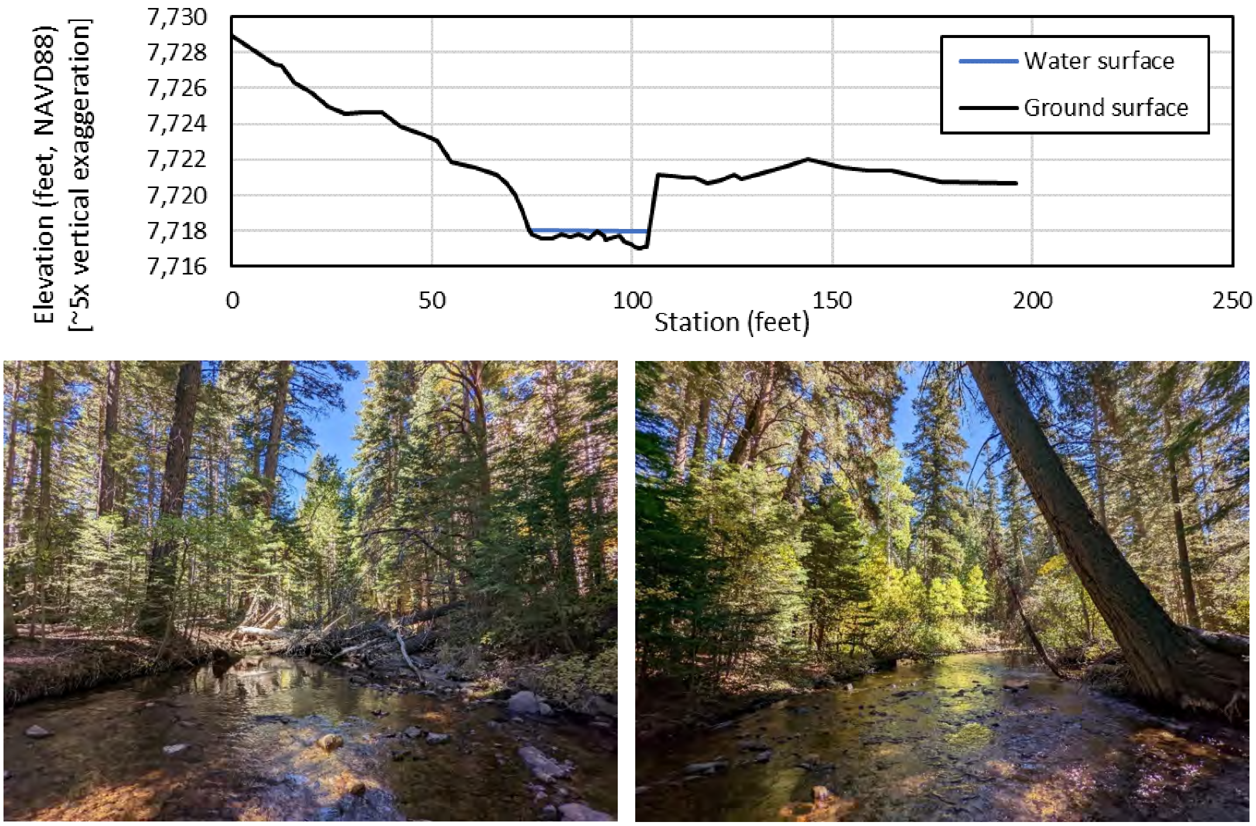
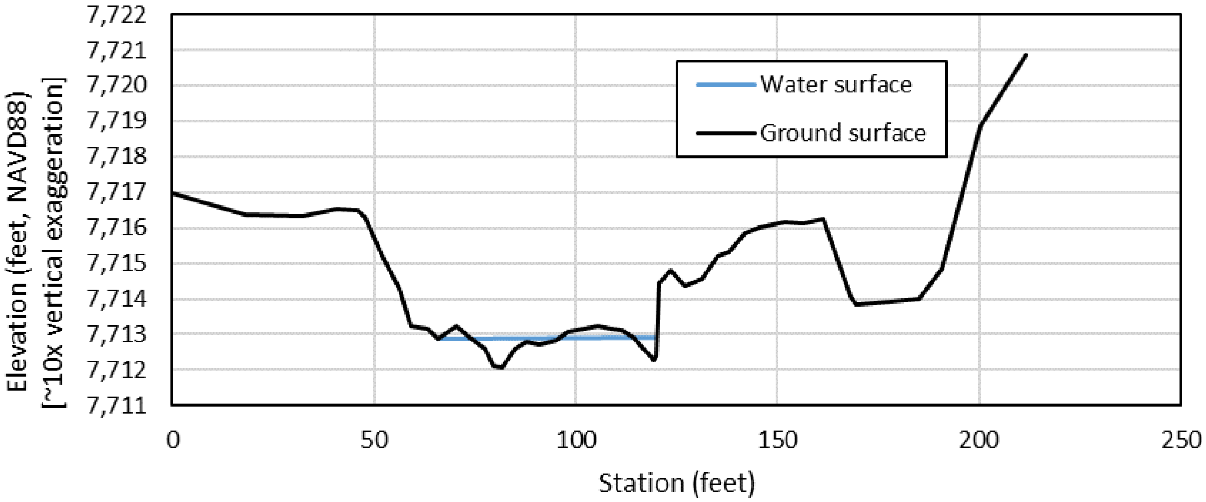
APPENDIX A

CROSS SECTIONS AND SITE PHOTOGRAPHS



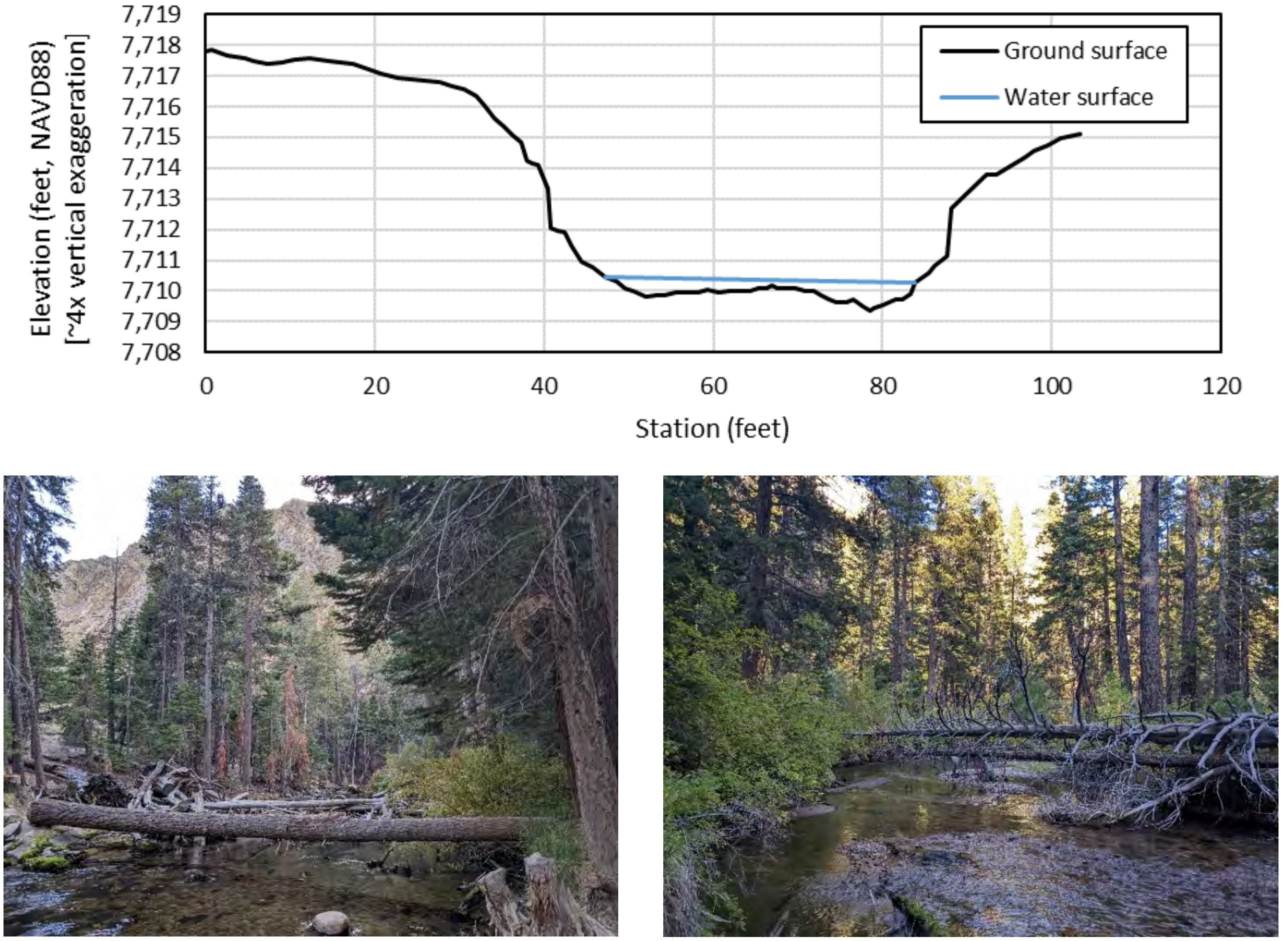
Stationing is from the left bank to the right bank, looking downstream.

Figure A-1. Cross Section LLV-G1 XS2 Plot (top) and Upstream (bottom left) and Downstream (bottom right) Site Photographs.



Stationing is from the left bank to the right bank, looking downstream.

Figure A-2. Cross Section LLV-G1 XS3 Plot (top) and Upstream (bottom left) and Downstream (bottom right) Site Photographs.



Stationing is from the left bank to the right bank, looking downstream.

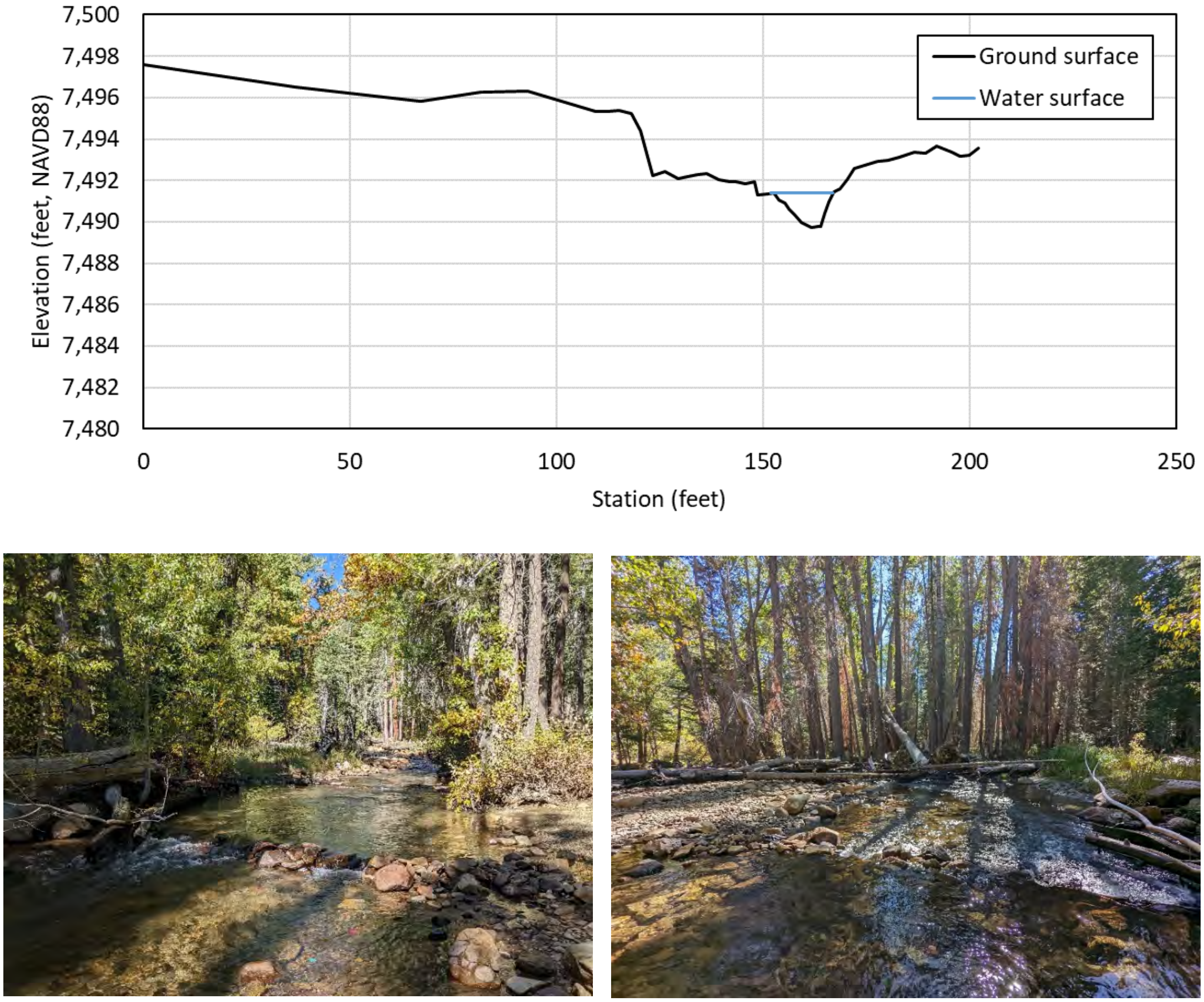
Figure A-3. Cross Section LLV-G1 XS5 Plot (top) and Upstream (bottom left) and Downstream (bottom right) Site Photographs.

Table A-1. Summary of Particle Size Distribution and Textural Facies at Site LLV-G1

Polygon Identification Number	D_{16} (mm)	D_{50} (mm)	D_{84} (mm)	Dominant facies	Sub-dominant facies	Area (ft^2)
1	25	120	200	Cobble	Boulder	1,457.3
2	20	30	60	Gravel	Not present	450.9
3	100	350	400	Boulder	Not present	181.1
4	60	80	250	Cobble	Boulder	57.5
5	0	150	270	Cobble	Boulder	214.1
6	60	270	300	Boulder	Not present	495.0
7	25	120	200	Cobble	Boulder	2,931.5
8	10	270	450	Boulder	Gravel	542.1
9	40	20	75	Gravel	Cobble	163.9
10	40	120	250	Cobble	Boulder	1,206.6
11	20	90	200	Cobble	Not present	1,696.2
12	50	150	250	Cobble	Boulder	1,083.3
13	10	40	80	Gravel	Not present	274.2
14	20	80	150	Cobble	Gravel	848.9
15	20	65	90	Cobble	Gravel	721.0
16	3	15	50	Gravel	Not present	240.5
17	20	65	120	Cobble	Gravel	2,768.1
18	2	2	2	Sand	Not present	483.2
19	10	45	80	Gravel	Not present	1,747.2
20	20	90	120	Cobble	Gravel	156.2
21	16	35	80	Gravel	Not present	71.9
22	2	2	80	Sand	Cobble	1,198.1
23	16	30	90	Gravel	Cobble	739.0
24	30	100	150	Cobble	Not present	502.2
25	16	25	60	Gravel	Not present	253.3
26	16	20	40	Gravel	Silt	656.1
27	10	45	80	Gravel	Cobble	58.2
28	20	80	350	Cobble	Boulder	50.1
29	10	40	75	Gravel	Not present	2,902.4
30	16	70	90	Cobble	Gravel	3,923.7
31	10	40	75	Gravel	Not present	8,626.0

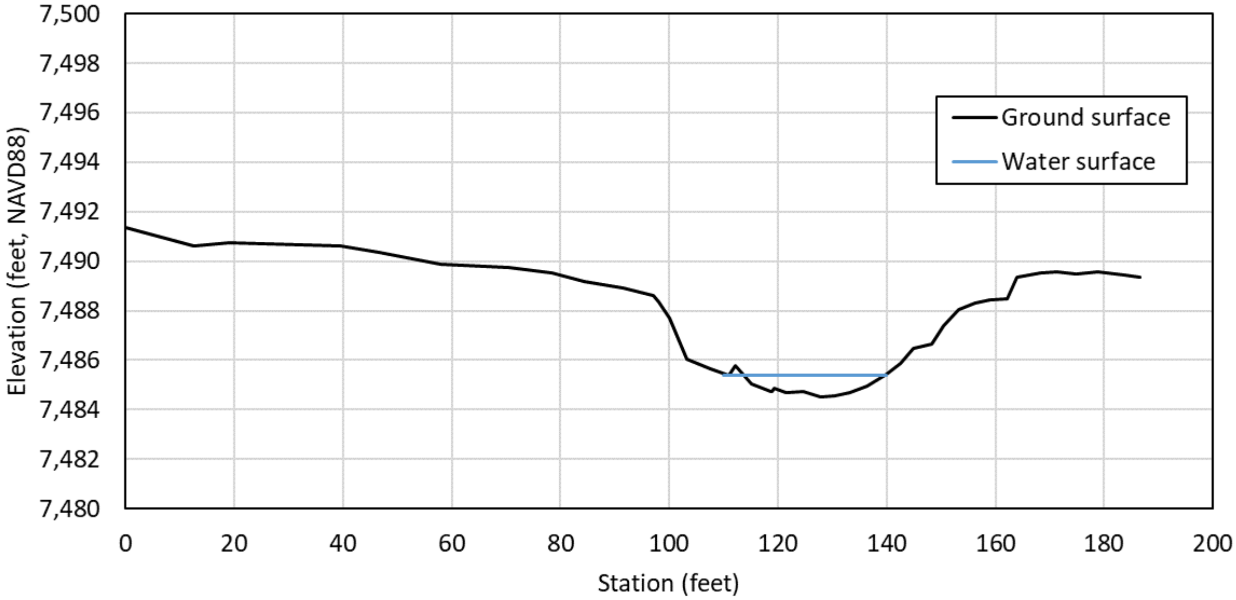
Polygon Identification Number	D_{16} (mm)	D_{50} (mm)	D_{84} (mm)	Dominant facies	Sub-dominant facies	Area (ft^2)
32	90	270	350	Boulder	Not present	520.4
33	2	2	300	Sand	Boulder	886.6
34	20	300	500	Boulder	Gravel	876.6
35	0	0	0	Bedrock	Not present	91.2
36	60	280	500	Boulder	Not present	2,145.7
37	250	270	350	Boulder	Not present	394.0
38	2	2	5	Sand	Not present	429.4
39	2	2	5	Sand	Not present	988.7
41	10	30	60	Gravel	Not present	2,729.7
42	10	30	60	Gravel	Not present	1,010.3
43	0	0	0	Bedrock	Not present	23.8
44	16	40	300	Gravel	Boulder	825.7
45	250	400	500	Boulder	Not present	145.9
46	15	50	80	Gravel	Cobble	1,999.3
47	10	35	50	Gravel	Not present	2,325.5
48	20	50	290	Gravel	Boulder	1,452.5
49	6	260	350	Boulder	Gravel	2,161.0
50	2	10	20	Gravel	Sand	232.2
51	45	65	270	Cobble	Boulder	1,087.5
52	10	40	100	Gravel	Cobble	481.0
53	50	350	500	Boulder	Not present	923.5
54	300	500	700	Boulder	Not present	111.4
55	50	400	900	Boulder	Not present	1,871.3
56	5	30	60	Gravel	Not present	213.9
57	20	270	300	Boulder	Gravel	454.6
58	0	0	0	Bedrock	Not present	479.5

ft^2 = square feet; mm = millimeter



Stationing is from the left bank to the right bank, looking downstream.

Figure A-4. Cross SectionLLV-G2 XS1 Plot (top) and Upstream (bottom left) and Downstream (bottom right) Site Photographs.



Stationing is from the left bank to the right bank, looking downstream.

Figure A-5. Site LLV-G2 XS2 Plot (top) and Upstream (bottom left) and Downstream (bottom right) Site Photographs.

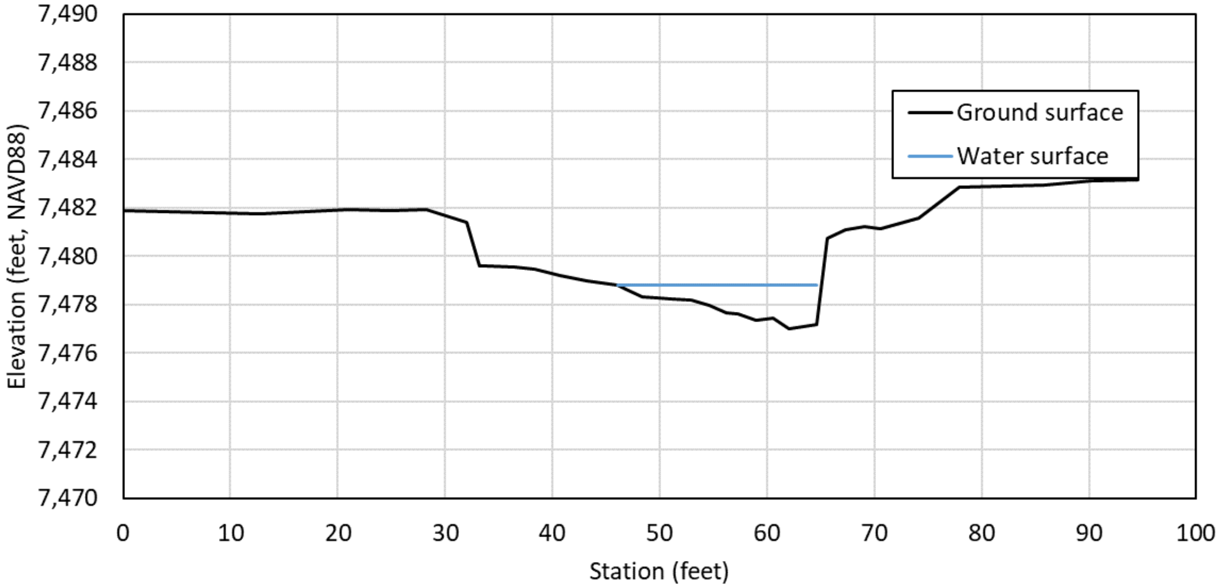


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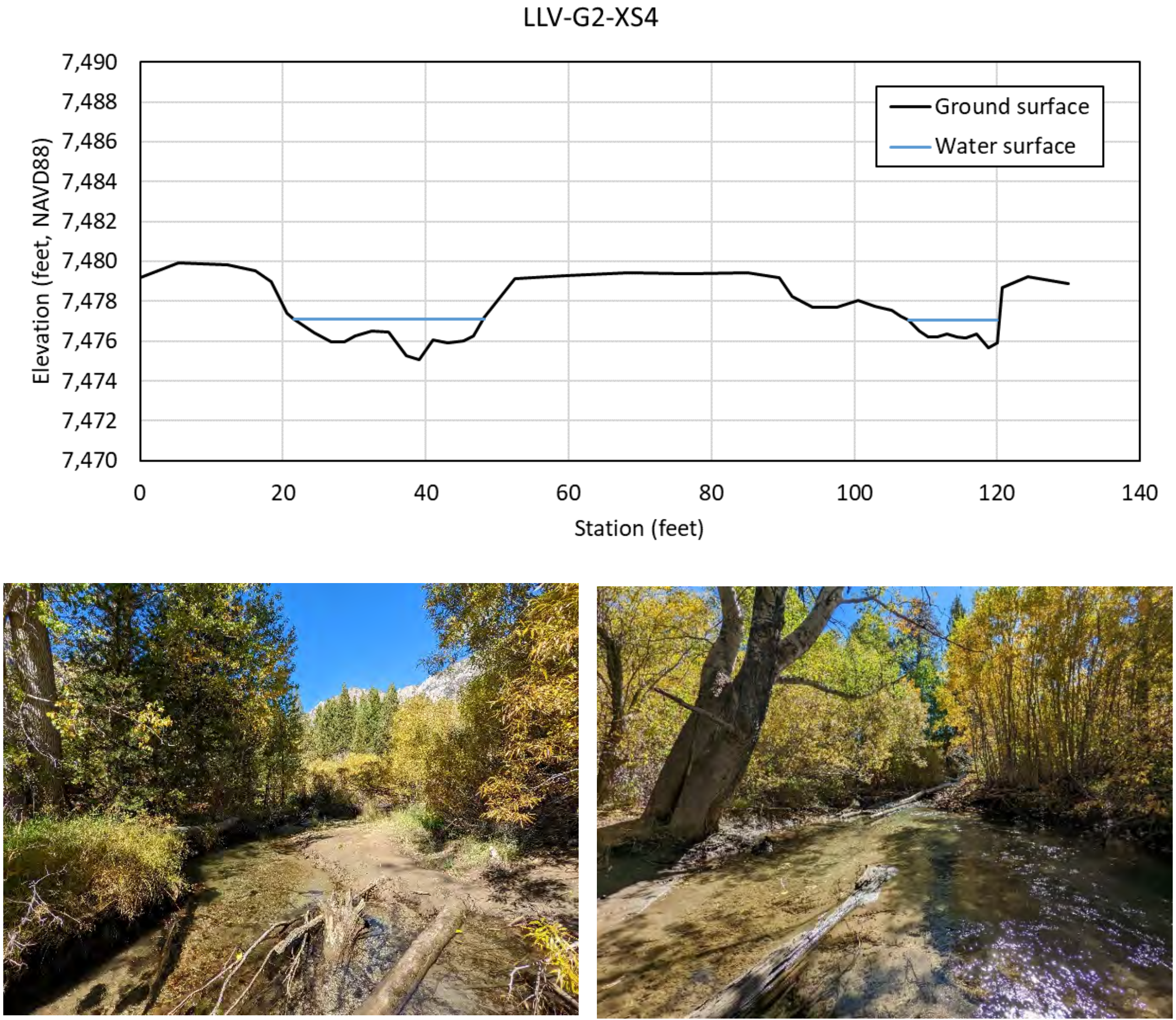
Figure A-6. Cross Section LLV-G2 XS3 Plot (top) and Upstream (bottom left) and Downstream (bottom right) Site Photographs.



Stationing is from the left bank to the right bank, looking downstream.

Figure A-7. Cross Section LLV-G2 XS4 Plot (top) and Upstream (bottom left) and Downstream (bottom right) Site Photographs.

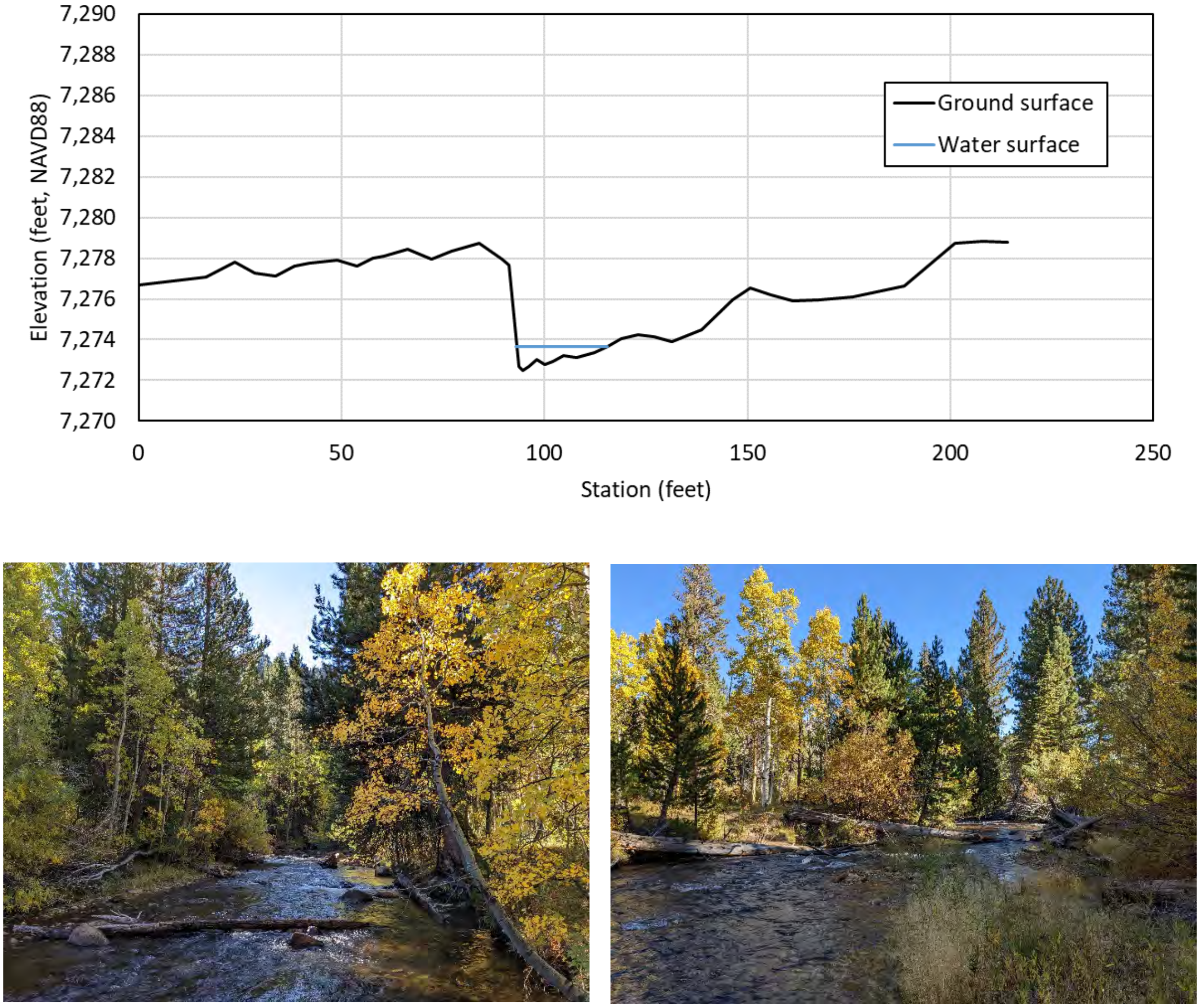
Table A-2. Summary of Particle Size Distribution and Textural Facies at Site LLV-G2

Polygon Identification Number	D_{16} (mm)	D_{50} (mm)	D_{84} (mm)	Dominant facies	Sub-dominant facies	Area (ft^2)
1	70	256	400	Boulder	Not present	2,380.7
2	2	2	90	Sand	Cobble	239.0
3	10	150	250	Cobble	Boulder	1,727.0
4	2	2	500	Sand	Boulder	557.9
5	5	90	250	Cobble	Gravel	857.0
6	20	60	100	Cobble	Gravel	578.4
7	30	100	150	Cobble	Not present	259.4
8	10	30	150	Gravel	Cobble	161.0
9	2	2	100	Sand	Cobble	875.0
10	50	270	300	Boulder	Cobble	3,730.6
11	50	250	300	Boulder	Cobble	1,534.3
12	5	16	60	Sand	Gravel	89.7
13	10	30	90	Gravel	Cobble	40.3
14	10	40	150	Cobble	Gravel	59.5
15	50	250	300	Boulder	Cobble	1,383.5
16	50	200	400	Boulder	Not present	859.6
17	1	10	200	Gravel	Cobble	488.1
18	30	100	200	Cobble	Gravel	367.1
19	1	10	200	Gravel	Cobble	130.5
20	20	120	200	Cobble	Boulder	589.0
21	10	40	100	Cobble	Not present	497.6
22	50	256	300	Boulder	Cobble	5,988.5
23	3	10	15	Gravel	Not present	199.5
24	5	15	50	Gravel	Not present	606.4
25	3	10	156	Gravel	Cobble	724.3
26	4	10	35	Gravel	Not present	1,062.6
27	3	5	10	Gravel	Not present	894.3
28	4	10	25	Gravel	Not present	730.7
29	2	16	25	Gravel	Not present	322.6
30	4	10	400	Gravel	Boulder	268.7
31	2	16	25	Gravel	Not present	64.6

Polygon Identification Number	**D_{16} (mm)**	**D_{50} (mm)**	**D_{84} (mm)**	**Dominant facies**	**Sub-dominant facies**	**Area (ft^2)**
32	1	2	3	Sand	Gravel	25.6
33	4	10	25	Gravel	Not present	96.6
34	2	20	300	Sand	Cobble	584.3
35	1	1	2	Sand	Not present	38.4
36	2	5	15	Sand	Gravel	116.1
37	4	16	35	Gravel	Not present	222.7
38	3	15	200	Gravel	Cobble	565.6
39	4	16	35	Gravel	Not present	217.1
40	4	35	250	Cobble	Gravel	837.3
41	2	10	206	Gravel	Cobble	67.8
42	2	4	6	Sand	Gravel	126.7
43	2	5	150	Gravel	Cobble	451.2
44	3	30	150	Gravel	Cobble	732.3
45	5	2	3	Sand	Not present	311.3
46	3	10	40	Gravel	Not present	395.9
47	4	10	200	Gravel	Cobble	540.5
48	5	30	130	Gravel	Cobble	843.1
49	2	10	30	Gravel	Not present	112.9
50	15	30	40	Gravel	Not present	156.2
51	10	40	70	Gravel	Cobble	570.6
52	5	30	90	Gravel	Cobble	342.5
53	5	30	75	Gravel	Cobble	399.5
54	3	6	110	Sand	Cobble	448.8
55	2	3	5	Sand	Not present	1,367.9
56	2	10	20	Gravel	Not present	78.7
57	5	12	35	Gravel	Not present	387.6
58	5	10	80	Gravel	Cobble	379.3
59	1	25	5	Sand	Not present	160.1
60	0	0	0	Sand	Not present	262.3
61	3	28	80	Gravel	Not present	1,068.6
62	5	16	35	Gravel	Not present	1,749.0
63	2	3	80	Gravel	Not present	238.4

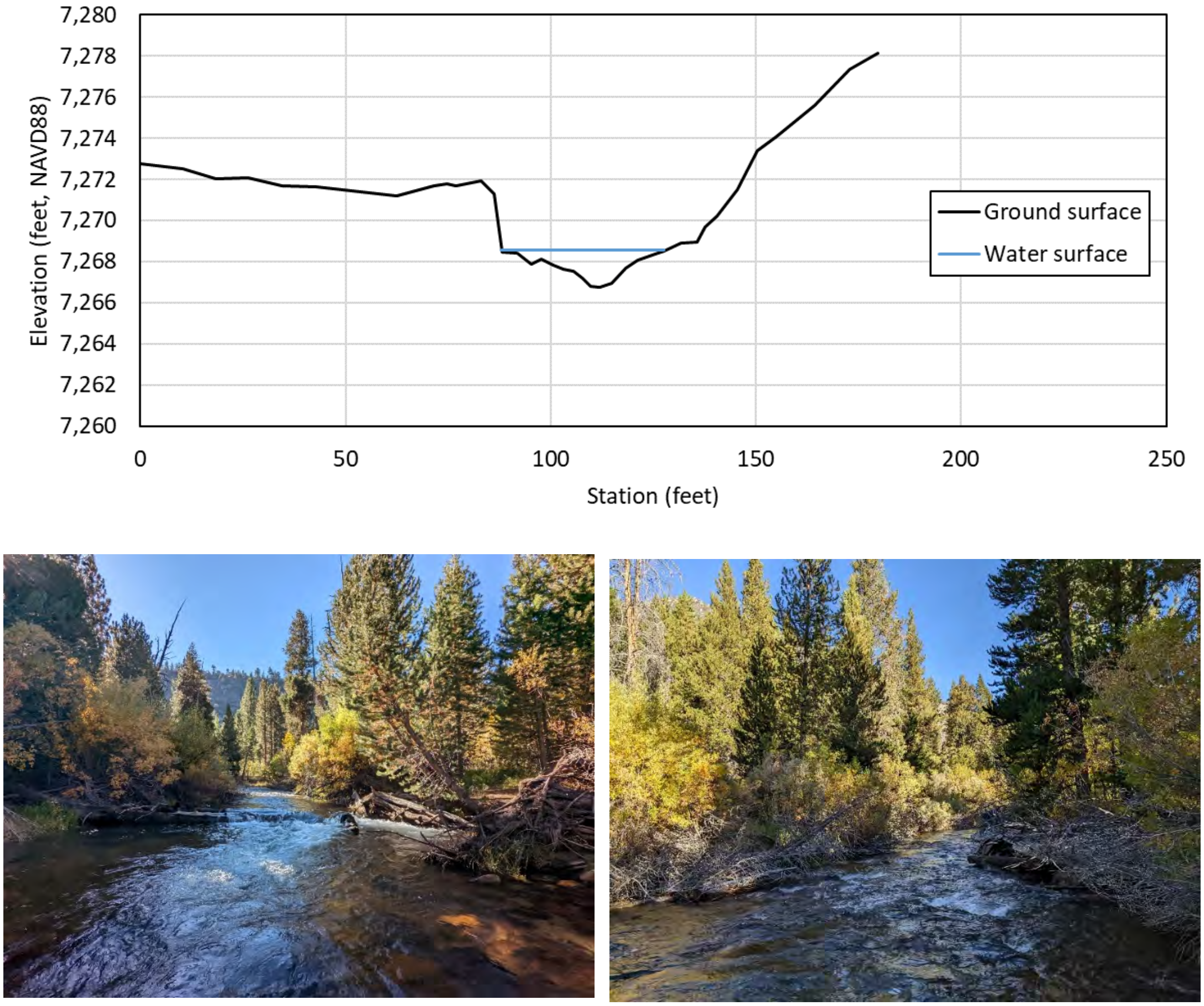
Polygon Identification Number	**D_{16} (mm)**	**D_{50} (mm)**	**D_{84} (mm)**	**Dominant facies**	**Sub-dominant facies**	**Area (ft^2)**
64	8	45	70	Gravel	Cobble	110.9
65	5	16	35	Gravel	Not present	436.6
66	3	10	40	Gravel	Not present	142.6
67	3	35	90	Gravel	Cobble	1,547.1
68	2	5	15	Gravel	Not present	49.8
69	10	45	130	Cobble	Gravel	598.8
70	4	16	28	Gravel	Not present	409.2
71	16	40	75	Cobble	Gravel	736.4
72	5	10	30	Gravel	Not present	610.8
73	8	16	40	Gravel	Not present	131.4
74	12	40	100	Cobble	Gravel	331.6
75	8	16	40	Gravel	Not present	57.6
76	2	3	8	Gravel	Sand	54.8
77	25	50	70	Cobble	Not present	56.7
78	2	3	7	Gravel	Sand	321.6
79	8	25	65	Gravel	Cobble	531.7
80	2	10	25	Gravel	Not present	108.2
81	0	1	2	Sand	Not present	383.0
82	1	1	5	Sand	Not present	434.2
83	10	35	70	Gravel	Cobble	201.7
84	25	5	3	Sand	Not present	273.5
85	25	5	3	Sand	Not present	9.7
86	4	16	30	Gravel	Not present	799.9

ft2 = square feet; mm = millimeter



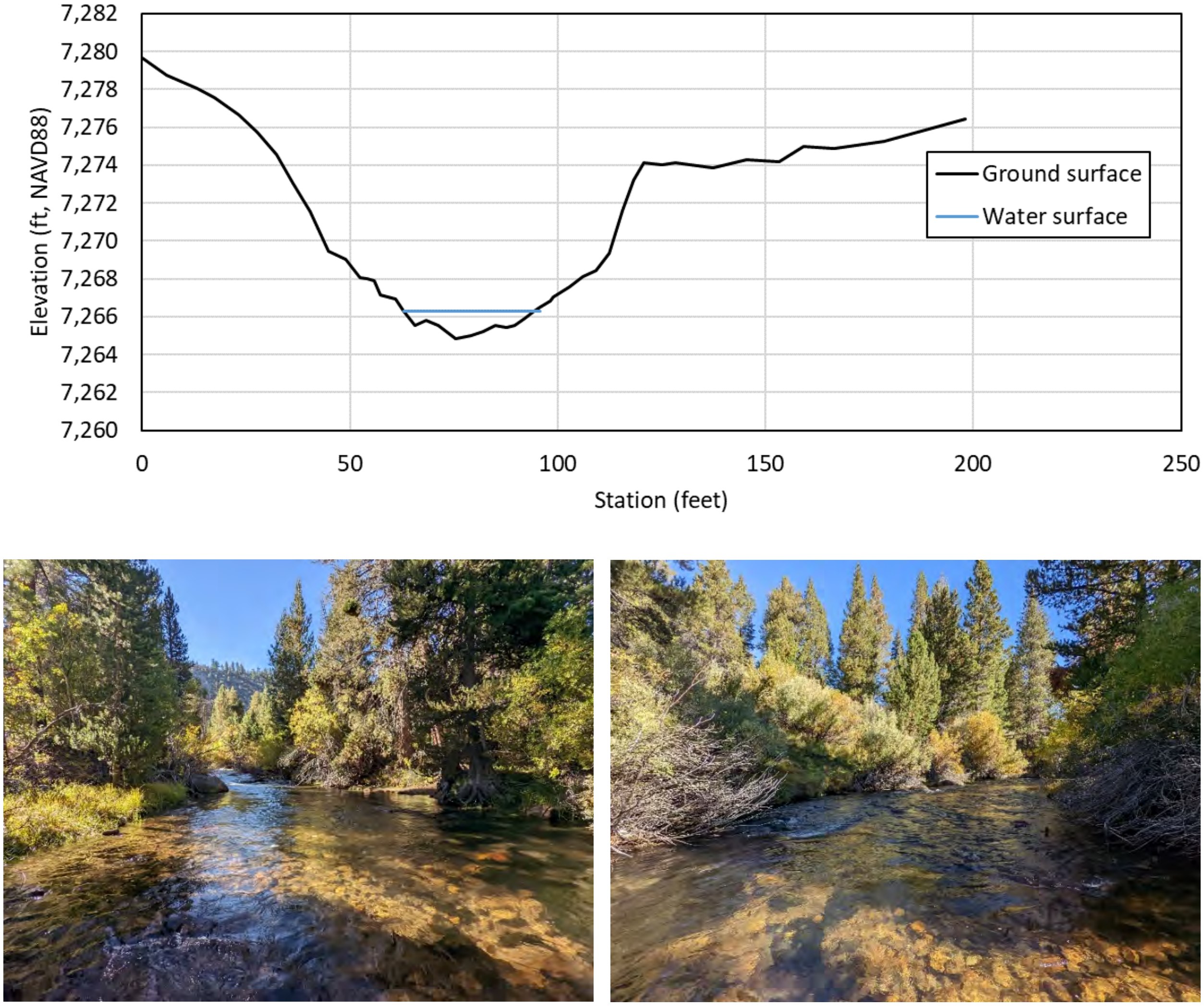
Stationing is from the left bank to the right bank, looking downstream.

Figure A-8. Cross SectionLLV-G3 XS1 Plot (top) and Upstream (bottom left) and Downstream (bottom right) Site Photographs.



Stationing is from the left bank to the right bank, looking downstream.

Figure A-9. Cross SectionLLV-G3 XS2 Plot (top) and Upstream (bottom left) and Downstream (bottom right) Site Photographs.



Stationing is from the left bank to the right bank, looking downstream.

Figure A-10. Cross SectionLLV-G3 XS3 Plot (top) and Upstream (bottom left) and Downstream (bottom right) Site Photographs.

Table A-3. Summary of Particle Size Distribution and Textural Facies at Site LLV-G3

Polygon Identification Number	D_{16} (mm)	D_{50} (mm)	D_{84} (mm)	Dominant facies	Sub-dominant facies	Area (ft^2)
1	20	100	200	Cobble	Gravel	240.6
2	100	280	450	Boulder	Cobble	4,081.4
3	20	50	150	Gravel	Cobble	512.6
4	20	90	270	Cobble	Boulder	407.4
5	5	40	100	Gravel	Cobble	266.8
6	15	80	200	Cobble	Gravel	370.4
7	100	200	400	Boulder	Cobble	162.9
8	50	150	256	Cobble	Boulder	215.3
9	10	30	50	Gravel	Not present	118.5
10	40	270	300	Boulder	Gravel	502.5
11	15	35	250	Gravel	Boulder	98.9
12	40	150	300	Cobble	Not present	98.8
13	20	100	150	Cobble	Not present	31.7
14	20	100	150	Cobble	Not present	77.6
15	15	50	120	Gravel	Not present	78.3
16	15	35	250	Gravel	Boulder	32.3
17	2	12	70	Gravel	Not present	1,124.6
18	80	380	450	Boulder	Not present	1,603.2
19	16	28	300	Gravel	Boulder	1,515.4
20	40	260	350	Boulder	Gravel	743.3
21	150	300	450	Boulder	Not present	2,885.5
22	40	100	250	Cobble	Gravel	1,909.7
23	40	60	85	Gravel	Not present	188.6
24	60	200	300	Cobble	Boulder	1,085.2
25	20	40	80	Gravel	Not present	411.5
26	30	256	350	Boulder	Gravel	635.0
27	15	30	90	Gravel	Not present	330.4
28	50	280	400	Boulder	Cobble	2,199.6
29	0	0	0	Sand	Bedrock	149.3
30	25	90	150	Cobble	Gravel	991.3
31	50	256	280	Boulder	Cobble	574.4

Polygon Identification Number	**D_{16} (mm)**	**D_{50} (mm)**	**D_{84} (mm)**	**Dominant facies**	**Sub-dominant facies**	**Area (ft^2)**
32	2	2	100	Sand	Cobble	167.1
33	50	125	250	Cobble	Boulder	1,820.0
34	40	50	90	Gravel	Cobble	1,133.8
35	15	270	300	Boulder	Gravel	1,464.3
36	10	40	70	Gravel	Not present	192.8
37	6	20	60	Gravel	Not present	469.2
38	50	270	320	Boulder	Gravel	1,590.7
39	30	150	270	Cobble	Boulder	56.3
40	60	270	300	Boulder	Cobble	263.3
41	20	50	80	Gravel	Cobble	577.6
42	10	30	90	Gravel	Not present	193.6
43	25	270	300	Boulder	Cobble	1,409.9
44	25	40	270	Gravel	Boulder	45.1
45	0	0	0	Sand	Bedrock	84.8
46	20	260	300	Boulder	Gravel	537.4
47	25	90	250	Cobble	Gravel	713.7
48	10	16	50	Gravel	Not present	323.8
49	40	260	300	Boulder	Cobble	1,096.6
50	40	150	270	Cobble	Boulder	1,300.6
51	20	260	300	Boulder	Gravel	102.4
52	50	100	250	Cobble	Boulder	310.3
53	50	270	350	Boulder	Cobble	718.2
54	50	90	150	Cobble	Not present	43.9
55	60	280	380	Boulder	Not present	983.7
56	2	100	300	Boulder	Sand	461.7
57	60	270	300	Cobble	Boulder	794.8
58	10	100	150	Cobble	Gravel	623.5

ft^2 = square feet; mm = millimeter

SOUTHERN CALIFORNIA EDISON
Lee Vining Hydroelectric Project
(FERC Project No. 1388)

GENERAL BOTANICAL RESOURCES SURVEY (TERR-1) FINAL TECHNICAL REPORT

SOUTHERN CALIFORNIA EDISON

Energy for What's Ahead®

SEPTEMBER 2024

SOUTHERN CALIFORNIA EDISON

Lee Vining Hydroelectric Project
(FERC Project No. 1388)

GENERAL BOTANICAL RESOURCES SURVEY (TERR-1) FINAL TECHNICAL REPORT

Southern California Edison
2244 Walnut Grove Avenue
Rosemead, CA 91770

September 2024

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LIST OF ACRONYMS AND ABBREVIATIONS

amsl	above mean sea level
AS	Above Saddlebag
BE	Below Ellery
BS	Below Saddlebag
Cal-IPC	California Invasive Plant Council
CALVEG	Classification and Assessment with Landsat of Visible Ecological Groupings
CDFW	California Department of Fish and Wildlife
CNDDB	California Natural Diversity Database
CRPR	California Rare Plant Rank
FERC	Federal Energy Regulatory Commission
GPS	Global Positioning System
LLV	Lower Lee Vining
MC	Mine Creek
MLV	Middle Lee Vining
NDVI	Normalized Difference Vegetation Index
NIR	near-infrared
NNIP	non-native invasive plant
Project	Lee Vining Hydroelectric Project (FERC Project No. 1388)
R	red light
SCE	Southern California Edison
TWG	Technical Working Group
ULV	Upper Lee Vining
USC	Upper Slate Creek
USFS	U.S. Forest Service
USGS	U.S. Geological Survey

1.0 INTRODUCTION

This technical report presents the results of Study TERR-1 conducted in 2022 and 2023 for the Lee Vining Hydroelectric Project (Project). The *TERR-1 General Botanical Resources Survey Technical Study Plan* details Southern California Edison's (SCE) proposal for study objectives, study area, methods, and schedule for the effort. The Final Technical Study Plan was filed with the Federal Energy Regulatory Commission (FERC) on April 25, 2022 (SCE, 2022).

During the Technical Working Group (TWG) meetings, SCE and Stakeholders identified the need to conduct botanical resources studies to determine the presence of sensitive natural communities, special-status plant species, invasive species, and riparian habitat at Project facilities and U.S. Forest Service (USFS) recreational areas.

Information on vegetation communities and plant species, including riparian conditions monitored as part of the current license, is provided by the previously conducted field surveys and license-required monitoring studies (Psomas, 2006, 2010, 2013; Read, 2012, 2017, 2022) and the Project Environmental Assessment (FERC, 1992). Since those studies were undertaken, new species have been added to the federal and state endangered species lists, and others have been deemed sensitive by various government agencies. Relicensing is an appropriate time to examine sensitive plant species presence in and around the Project to determine the effects of Project operations on those plants in the context of the most recent *Land Management Plan for the Inyo National Forest* (USFS, 2019), the federal and state Endangered Species Acts, the National Environmental Policy Act, and the California Environmental Quality Act.

As outlined in Study TERR-1, the studies were conducted in 2022 and 2023.

2.0 STUDY GOALS AND OBJECTIVES

The goal of this study is to supplement the existing information regarding sensitive botanical resources in the study area by:

- Ground-truthing the existing USFS vegetation map (USFS, 2020a), including identification of any sensitive natural communities;
- Documenting the presence of species listed by the federal and/or state Endangered Species Acts or proposed for listing, e.g., whitebark pine (*Pinus albicaulis*);
- Documenting the presence of other special-status plants including species with a California Rare Plant Rank (CRPR) of 1 or 2 and USFS Species of Conservation Concern;
- Documenting non-native, invasive plants identified in the Inyo National Forest Invasive Plant Inventory Database (NRM – TESP/IS, 2018) and on the California Invasive Plant Council (Cal-IPC) Inventory (Cal-IPC, 2020);

- Incorporating results of the riparian monitoring study undertaken as part of the existing license (Read, 2004, 2012, 2017, 2022); and
- Performing a focused study of selected riparian habitat areas using Normalized Difference Vegetation Index (NDVI) to (1) compare "test" reaches and "control" reaches and (2) to assess whether or not there have been changes resulting from hydro-resource optimization.

2.1. STUDY AREAS

Three study areas were used as part of the botanical resources survey. This includes a Botanical Resources Study Area, a Riparian Monitoring Study Area, and an NDVI Study Area.

2.1.1. BOTANICAL RESOURCES STUDY AREA

Surveys conducted within the Botanical Resources Study Area include ground-truthing the USFS-mapped vegetation communities and documenting the presence of special-status and invasive plant species. The Botanical Resources Study Area is shown on the associated mapbook in Appendix A and includes all aboveground Project facilities and USFS recreation areas, including an approximate 100-foot buffer around these areas:

- Saddlebag Dam and Campgrounds (SD): Saddlebag Dam, spillway, and valve house; Saddlebag Day Use Picnic/Fishing Site; Saddlebag Lake Campground; Saddlebag Lake Group Campground; Saddlebag Lake Loop trailhead; and the access road to Saddlebag Dam
- Rhinedollar Dam and Penstock Trail (RD): Rhinedollar Dam, tunnel intake, spillway, and valve house and Penstock Trail
- Tioga Dam (TD): Tioga Dam, Tioga Auxiliary Dam, and access road
- Poole Powerhouse (PP)
- Sawmill Campground (SM): Sawmill Walk-in Campground including parking area
- Junction Campground (JC)
- Ellery Lake Campground (EC)
- Ellery Lake Overlook (EO)
- Tioga Lake Campground (TC)

Select riparian areas were extended beyond the 100-foot buffer (i.e., the portion of Lee Vining Creek below Saddlebag Dam and the lakeshore around the Saddlebag Day Use Picnic/Fishing Site) at the recommendation of the USFS to include additional riparian areas for analysis. In 2022, the area surveyed was adjusted in the field based on accessibility and topography.

2.1.2. RIPARIAN MONITORING STUDY AREA

The Riparian Monitoring Study Area was developed as part of the vegetation monitoring conducted for the current FERC license, which began in 1999. The study area is located along Lee Vining Creek between Saddlebag Lake and the confluence with Slate Creek (Appendix A). The study area consists of three sites with Site 1 at the upstream end, Site 2 in the middle, and Site 3 at the downstream end. Vegetation data were collected at permanent transects established during baseline surveys in 1999. Data were collected at four transects at Site 1, three transects at Site 2, and three transects at Site 3. Each transect consists of a 3-meter-wide belt placed perpendicular to the stream channel. For the upstream and downstream transects, belts were oriented toward the interior of the site. For the intermediate transect(s), the belt extended downstream. Additional details are provided in Read (2004, 2012, 2017, and 2022).

2.1.3. NDVI STUDY AREA

The NDVI Study Area was used (1) to compare test reaches and control reaches and (2) to assess the potential effects of hydro-resource optimization on riparian resources. The NDVI Study Area extends from above Saddlebag Lake to below Aspen Campground (Table 2.1-1 and the associated mapbook in Appendix A). Test reaches were located along Lee Vining Creek, within or adjacent to the FERC Project Boundary, that are downstream of Project water releases, including minimum instream flows and hydro-optimization. Control areas include a reach along Lee Vining Creek that is upstream of any Project facility (i.e., upstream of Saddlebag Lake) and tributaries to Lee Vining Creek (i.e., Mine Creek and Slate Creek).

Table 2.1-1. NDVI Study Sites and Source for Delimiting Sampling Plots

Study Site	Control/Test-Influenced	Affected by Hydro-Resource Optimization	Willow Riparian Scrub Vegetation Determination	Wet Meadow Vegetation Determination
Above Saddlebag (AS)	Control	No	Based on Google Earth aerial imagery	Based on Google Earth aerial imagery
Upper Slate Creek (USC)	Control	No	Based on Google Earth aerial imagery	Based on Google Earth aerial imagery
Mine Creek (MC)	Control	No	Based on Google Earth aerial imagery	Based on Google Earth aerial imagery
Below Saddlebag (BS)	Test	No	Based on field survey; dominated by gray-leafed Sierra willow (*Salix orestera*)	Community not present

Study Site	Control/Test-Influenced	Affected by Hydro-Resource Optimization	Willow Riparian Scrub Vegetation Determination	Wet Meadow Vegetation Determination
Upper Lee Vining (ULV)	Test	No	Based on field survey; mix of Sierra willow (*Salix eastwoodiae*), tea-leafed willow (*Salix planifolia*), Jepson’s willow (*Salix jepsonii*), and gray-leafed Sierra willow	Based on field survey; dominated by a mix of grasses and forbs, including Pacific onion (*Allium validum*), alpine ragwort (*Packera pauciflora*), sedges (*Carex* spp.), and rushes (*Juncus* spp.)
Middle Lee Vining (MLV)	Test	No	Based on Google Earth aerial imagery	Based on Google Earth aerial imagery
Below Ellery (BE)	Test	No	Based on field survey; dominated by gray-leafed Sierra willow	Community not present
Lower Lee Vining (LLV)	Test	Yes	Based on field survey; dominated by narrow-leaved willow (*Salix exigua*)	Based on field survey; dominated by sedges (*Carex* spp.) and rushes (*Juncus* spp.)

Source: Google Earth, various dates

NDVI = Normalized Difference Vegetation Index

3.0 METHODS

Study implementation generally followed the methods described in the *TERR-1 General Botanical Resources Survey Technical Study Plan*, with the exceptions described below.

3.1. MODIFICATIONS TO METHODS

Study TERR-1 originally proposed two study sites to determine whether changes were detected in riparian “health” as a result of hydro-resource optimization, as measured by NDVI. The current study expanded the analysis to eight study sites: five test reaches of Lee Vining Creek downstream of Project facilities and three outside the Project to act as controls. These additional study sites allow for an increase in sampling replicates and a more robust analysis.

Select portions of the Botanical Resources Study Area were extended beyond 100 feet at the request of the USFS (i.e., the portion of Lee Vining Creek below Saddlebag Dam and the lakeshore around the Saddlebag Day Use Picnic/Fishing Site) for the purpose of gathering more extensive data along the creek.

In some locations, the Botanical Resources Study Area buffer was decreased within 100 feet due to limitations of accessibility and topography.

An upland area (i.e., access road) below Saddlebag Dam was included in the 2023 surveys at the request of the USFS.

Some areas previously surveyed in 2022 were inaccessible for early 2023 surveys due to higher water levels (e.g., the lakeshore around Saddlebag Lake, the left bank of Lee Vining Creek below Saddlebag Dam, and the active channel at Poole Powerhouse), persistent snowpack (e.g., the end of Penstock Trail and a portion of the Tioga Dam study area), or the presence of Yosemite toad (i.e., the eastern end of the Saddlebag Dam and Campgrounds study area). The end of the Penstock Trail was accessible and surveyed during the second round of 2023 surveys; however, other areas were still below water or snow. The eastern end of the Saddlebag Dam and Campgrounds study area was viewed from the edge of the meadow in order to avoid incidental effects on Yosemite toadlets and adults present at the time of the surveys.

In place of reference population checks, two rounds of surveys were performed in 2022 and 2023 to ensure coverage of the blooming periods for all species.

3.2. VEGETATION MAPPING

3.2.1. LITERATURE REVIEW

The original vegetation map was obtained from the USFS (USFS, 2020a). Keys and descriptions followed the CALVEG (Classification and Assessment with Landsat of Visible Ecological Groupings) classification system (USFS, 2009). This is the preferred key to the Inyo National Forest and is used for consistency with the Inyo National Forest Plan (USFS, 2019). The Botanical Resources Study Area occurs in the South Sierran mapping zone.

3.2.2. FIELD SURVEY

Surveys were conducted by Psomas Senior Botanist Allison Rudalevige and Consulting Senior Botanist Sandra Leatherman. Vegetation mapping surveys were performed in 2022 and occurred on July 18, 19, 20, 21, and 22 and August 15, 16, 17, 18, and 19, 2022. A field map with the Botanical Resources Study Area and the original USFS vegetation map was overlaid on aerial imagery (USGS, 2020) and was prepared at a scale of 1 inch equals 150 feet (1″=150′). Canopy cover and dominant plant species were assessed within the study area to determine if ground-truthed vegetation was consistent with the USFS vegetation classification. Given the relatively small size of the various portions of the study area, vegetation was mapped at a scale to enable habitat (i.e., vegetated areas) to be distinguished from non-habitat (i.e., unvegetated and developed areas) and small areas of sensitive vegetation communities or habitats for special-status plant species to be identified.

3.3. SPECIAL-STATUS PLANT SPECIES SURVEY

3.3.1. LITERATURE REVIEW

A literature review was conducted to identify special-status plant species reported to occur (or that historically occurred) in the vicinity of the Botanical Resources Study Area. This literature review also verified the protective status of any of the previously identified special-status plants and reviewed any new literature on the ecology and life history of these resources. The literature review was used to define potentially suitable habitat for special-status plant species and make a determination on which species have potential to occur in the Botanical Resources Study Area based on the presence of suitable habitat.

A list of special-status plant species was compiled from several sources by searching the following U.S. Geological Survey (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 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)

The literature review yielded a total of 135 special-status plant species reported from the vicinity of the Botanical Resources Study Area as shown in Table B-1 of Appendix B, Literature Review Results, to this technical report. Species listed in the table are categorized as known to occur, may occur, or unlikely to occur. The table 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 Botanical Resources Study Area.

A soil map was prepared to assist in determining whether soils suitable for special-status plant species occur in the Botanical Resources Study Area (Appendix A).

3.3.2. FIELD SURVEY

Special-status plant surveys were floristic in nature and consistent with the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (CDFW, 2018). Surveys were performed at appropriate times of year to maximize the probability of detecting special-status plant species, as determined by the literature review and in consultation with the relevant Stakeholders. Two rounds of surveys were conducted each year (2022 and 2023) to encompass the blooming/fruiting period for multiple special-status plant species. Two years of surveys were performed to maximize the chance of detecting special-status plant species.

Surveys were conducted by Psomas Senior Botanist Allison Rudalevige, and Consulting Senior Botanist Sandra Leatherman. In 2022, surveys were performed on July 18, 19, 20, 21, and 22 and August 15, 16, 17, 18, and 19, 2022. In 2023, surveys were performed on July 24, 25, 26, and 27 and August 18, 19, 20, and 22, 2023. The total number of person-hours spent surveying was approximately 110 hours in 2022 and 85 hours in 2023. A systematic, pedestrian survey was conducted throughout the Botanical Resources Study Area in all areas of suitable plant habitat. Inaccessible areas were viewed via binoculars. A field map with the Botanical Resources Study Area overlaid on aerial imagery (USGS, 2020) was prepared at a scale of 1 inch equals 150 feet (1″=150′).

Plant species were identified in the field or collected for future identification. At the time of this technical report, voucher specimens are in the process of being deposited in an approved herbarium that is a member of the Consortium of California Herbaria (i.e., at the University of California, Riverside, and the California Botanic Garden). Individuals were collected under the conditions of California Department of Fish and Wildlife (CDFW) and USFS permits.

Plants were identified to the taxonomic level necessary to determine whether they were a special-status species. Identification was made using taxonomic keys, descriptions, and illustrations in Jepson Flora Project (2022), Wilson et al. (2014), Hurd et al. (1998), Wiese (2013), and Breckling and Breckling (2020). Nomenclature of plant taxa conform to the *Special Vascular Plants, Bryophytes, and Lichens List* (CDFW, 2022) for special-status species and the Jepson eFlora (Jepson Flora Project, 2022) for all other taxa.

The location of any special-status plant species population observed in the Botanical Resources Study Area was recorded with either a handheld Garmin Global Positioning System (GPS) unit or on an iPad loaded with Avenza Maps software displaying the field map. Horizontal mapping accuracy ranged from approximately 10 to 30 feet. The number of individuals was collected for non-clonal species (estimated for large populations) and the area and percent cover was mapped for clonal species. Data were collected on the phenology of individuals and microsite characteristics (e.g., slope, aspect, soil texture, surrounding habitat, and associated species). At the request of the resource agencies, locations of black cottonwood (*Populus trichocarpa*) were also recorded. CNDDB Field Survey Forms will be submitted to the CDFW for species with a CRPR of 1 or 2 and are included in Appendix C.

3.4. INVASIVE PLANT SPECIES SURVEY

3.4.1. LITERATURE REVIEW

The list of invasive plant species with potential to occur in the Botanical Resources Study Area was developed from a query of the Cal-IPC (Cal-IPC, 2020) and a list provided by the USFS of non-native invasive plants (NNIPs) currently known in the Inyo National Forest (NRM – TESP/IS, 2018).

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

- Jepson region: The inventory uses geographic floristic provinces and subdivisions within California as described by the Jepson Flora Project (2022); Sierra Nevada East was used.
- Habitat types: Five vegetation communities were known to be in or near the Botanical Resources Study Area 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 effect in California (Cal-IPC, 2020):

- High: Severe ecological effects 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 effects 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 effects 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 invasive plant species that have the potential to occur in the Botanical Resources Study Area as shown in Table B-2 of Appendix B, Literature Review Results, to this technical report.

3.4.2. FIELD SURVEY

Invasive plant species surveys were performed concurrently with and followed the methods for special-status plant surveys, as described above.

Plant species were identified in the field or collected for future identification. Voucher specimens will be deposited in an approved herbarium that is a member of the Consortium of California Herbaria (i.e., at the University of California, Riverside, and the California Botanic Garden). Individuals were collected under the conditions of USFS Forest Product Free Use Permit OMB No. 0596-0085, held by Ms. Rudalevige.

The USFS identified select invasive species of concern to be mapped within the Botanical Resources Study Area. This includes all species on the Inyo National Forest Invasive Plant Inventory Database with a treatment strategy of (1) eradicate or (2) control and select species with a treatment strategy of (3) contain (see Table B-3 in Appendix B, Literature Review Results, of this technical report). Discrete individuals/populations were mapped as a point or a polygon. Widely distributed species dispersed throughout a study site were documented as present/absent in individual study sites. The number of individuals of each invasive species was estimated. Other non-native plant species observed were documented as present but not mapped.

3.5. RIPARIAN MONITORING STUDY

The following is a summary of riparian monitoring methods performed as part of the previous license agreement. A complete description of methods can be found in Read (2004, 2012, 2017, and 2022). Herbaceous data were collected in 1-meter square quadrats nested within each transect belt. Parameters measured within each quadrat consisted of cover (by species) and species richness.

Tree and shrub data were collected within the entire 3-meter-wide transect belts. Parameters collected for each tree or shrub species included location within the belt, canopy cover, height, and size class.

3.6. NDVI ANALYSIS

An NDVI analysis was performed for willow riparian scrub and wet meadow communities on select study sites of the riparian corridor. Study sites were selected visually based on the presence of a relatively uniform riparian plant community (i.e., willow riparian scrub with or without a wet meadow) that was not obscured by a conifer canopy, as identified by Google Earth aerial imagery and field surveys. Sites were selected that had a willow cover large enough to support 10 replicate sampling plots of 10 square meters each. The number and size of sampling plots per study site was constrained because some study sites had limited willow extent. For each study site, sampling plots were placed within areas of relatively homogeneous willow riparian scrub or wet meadow (where present). Plots were repositioned to minimize the amount of non-vegetative landcover (e.g., rock, trail) or shadow within the plot boundary as shown in the 2016 and 2021 imagery flown as part of the long-term riparian monitoring study.

An NDVI quantifies vegetation by measuring the difference between near-infrared (NIR), which vegetation strongly reflects, and red light (R), which vegetation absorbs. This reports the “greenness” of vegetation, which is used as a proxy for vegetation health (i.e., high NDVI values represent healthier vegetation) (GISGeography, 2022).

$$NDVI = (NIR - R)/(NIR + R)$$

The mean NIR and R values were obtained for each sampling plot using the false color infrared aerial imagery flown as part of the current license requirement for riparian monitoring. Aerial imagery was flown by Keystone Aerial Surveys on August 12, 2016, and August 2, 2021. The flight line extended from just upstream of Saddlebag Lake to the SCE powerhouse in Lee Vining. Pixel resolution of the imagery was approximately 12 centimeters for aerials flown in 2021 and 15 centimeters for aerials flown in 2016.

Values were obtained using the NDVI tool in ArcGIS software. The average and standard deviation of NDVI values were calculated for each of the eight study sites.

4.0 RESULTS

4.1. VEGETATION MAPPING

Thirteen vegetation communities and other areas were identified in 2022 in the Botanical Resources Study Area: alpine grasses and forbs, barren, developed, lakeshore, lodgepole pine, mixed conifer / fir, non-vegetated, quaking aspen, wet meadow, whitebark pine / alpine grasses and forbs, whitebark pine / lodgepole pine, water, and willow.

4.1.1. ALPINE GRASSES AND FORBS

The alpine grasses and forbs vegetation community occurs in the following portions of the Botanical Resources Study Area: Saddlebag Dam and Campgrounds, Junction Campground, Ellery Lake Overlook, Rhinedollar Dam and Penstock Trail, Tioga Lake Campground, and Tioga Dam. This vegetation community consists of a variety of native and non-native annual and perennial grasses and forbs, with few scattered shrubs or trees. The habitat is drier than the wet meadow vegetation type, described below. Species composition varies by site, but includes rough bent grass (*Agrostis scabra*), reflexed rockcress (*Boechera retrofracta*), abrupt-beaked sedge (*Carex abrupta*), sagebrush sedge (*Carex filifolia* var. *erostrata*), squirreltail wildrye (*Elymus elymoides* var. *elymoides*), reduced buckwheat (*Eriogonum nudum* var. *deductum*), pale fragrant monardella (*Monardella odoratissima* ssp. *pallida*), Sierra beardtongue (*Penstemon heterodoxus* var. *heterodoxus*), Newberry’s beardtongue (*Penstemon newberryi*), compact spear phacelia (*Phacelia hastata* var. *compacta*), Parry’s rush (*Juncus parryi*), and one-seeded pussypaws (*Calyptridium monospermum*).

This vegetation type does not correspond to a single vegetation community recognized by the CDFW (2023). Vegetation alliances or associations dominated by particular species may be considered a sensitive natural community (e.g., the *Carex filifolia* Association) while others are not (e.g., the *Elymus elymoides* Provisional Association).

4.1.2. BARREN

Barren areas occur in the following portions of the Botanical Resources Study Area: Rhinedollar Dam and Penstock Trail and Tioga Dam. This landcover consists of exposed bedrock, cliffs, and scree slopes with limited vegetation. Areas with soil development are mapped as non-vegetated.

Given the lack of vegetation, this area would not be considered a sensitive natural community.

4.1.3. DEVELOPED

Developed areas occur in the following portions of the Botanical Resources Study Area: Saddlebag Dam and Campgrounds, Sawmill Campground, Junction Campground, Ellery Lake Campground, Ellery Lake Overlook, Rhinedollar Dam and Penstock Trail, Poole Powerhouse, Tioga Lake Campground, and Tioga Dam. Developed areas are unvegetated and consist of buildings, paved roads, and parking lots.

Given the lack of vegetation, this area would not be considered a sensitive natural community.

4.1.4. LAKESHORE

Lakeshore occurs in the following portion of the Botanical Resources Study Area: Saddlebag Dam and Campgrounds. The area around the reservoir has a fluctuating shoreline that is dependent on climatic conditions (e.g., rainfall, snowpack) and water releases. During the 2022 survey, water levels were low and much of the lakeshore was exposed. This area contained scattered vegetation such as mountain bent grass (*Agrostis humilis*), rough bent grass, arctic pearlwort (*Sagina saginoides*), and abrupt-beaked sedge. During the 2023 survey, water levels were much higher and much of the lakeshore was submerged. The vegetation types shown in Appendix A represent 2022 conditions.

There is no vegetation alliance or association dominated by mountain bent grass, rough bent grass, or abrupt-beaked sedge recognized by the CDFW. However, since mountain bent grass is a special-status plant species (see Section 4.2.1 below), this area may be considered a sensitive natural community. However, the area is inundated when reservoir levels are normal.

4.1.5. LODGEPOLE PINE

The lodgepole pine vegetation community occurs in the following portions of the Botanical Resources Study Area: Sawmill Campground and Junction Campground. This vegetation type is dominated by a canopy of lodgepole pine (*Pinus contorta* ssp. *murrayana*). The understory varies but contains species such as sagebrush sedge, fireweed (*Chamerion angustifolium* ssp. *circumvagum*), western prickly gooseberry (*Ribes montigenum*), northern goldenrod (*Solidago multiradiata*), and Fendler's meadow-rue (*Thalictrum fendleri*).

The *Pinus contorta* ssp. *murrayana* Association is not considered a sensitive natural community by the CDFW (2023).

4.1.6. MIXED CONIFER – FIR

The mixed conifer – fir vegetation community occurs in the following portion of the Botanical Resources Study Area: Poole Powerhouse. This vegetation type is dominated by a canopy of Jeffrey pine (*Pinus jeffreyi*) and white fir (*Abies concolor*). The understory contains species such as mugwort (*Artemisia douglasiana*), silver wormwood (*Artemisia ludoviciana*), big sagebrush (*Artemisia tridentata*), bush chinquapin (*Chrysolepis sempervirens*), and roundleaf snowberry (*Symphoricarpos rotundifolius*).

The *Pinus jeffreyi – Abies concolor* Association is not considered a sensitive natural community by the CDFW (2023).

4.1.7. NON-VEGETATED

Non-vegetated areas occur in the following portion of the Botanical Resources Study Area: Saddlebag Dam and Campgrounds. This landcover lacks vegetation or has sparse vegetation. It consists of the exposed slope on the back of Saddlebag Dam as well as larger dirt roads and graded areas. Small dirt trails found in other areas were not mapped separately from the surrounding vegetation type.

Given the lack of vegetation, this area would not be considered a sensitive natural community.

4.1.8. QUAKING ASPEN

The quaking aspen vegetation community occurs in the following portion of the Botanical Resources Study Area: Poole Powerhouse. This vegetation type is dominated by a canopy of quaking aspen (*Populus tremuloides*) with lesser amount of gray-leafed Sierra willow (*Salix orestera*) and bitter cherry (*Prunus emarginata*).

The *Populus tremuloides* Association is considered a sensitive natural community by the CDFW (2023).

4.1.9. WET MEADOW

The wet meadow vegetation community occurs in the following portions of the Botanical Resources Study Area: Saddlebag Dam and Campgrounds, Sawmill Campground, and Tioga Dam. This vegetation type is dominated by a variety of sedges and rushes such as abrupt-beaked sedge, Baltic rush (*Juncus balticus* ssp. *ater*), Parry's rush, and Sierra woodrush (*Luzula orestera*). Other species include primrose monkeyflower (*Erythranthe* *primuloides*), Sierra gentian (*Gentianopsis holopetala*), ranger's button (*Angelica capitellata*), small alisma-leaved buttercup (*Ranunculus alismifolius* var. *alismellus*), alpine shooting star (*Primula tetrandra*), and Pacific onion (*Allium validum*). The habitat is wetter than the alpine grasses and forbs vegetation type, described above.

This vegetation type does not correspond to a single vegetation community recognized by the CDFW (2023). Vegetation alliances or associations dominated by particular species may be considered a sensitive natural community (e.g., the *Carex filifolia* Association) but most of the species found in the wet meadows are not named as a specific alliance or association.

4.1.10. WHITEBARK PINE – ALPINE GRASSES AND FORBS

The whitebark pine – alpine grasses and forbs vegetation community occurs in the following portions of the Botanical Resources Study Area: Saddlebag Dam and Campgrounds, Ellery Lake Campground, and Rhinedollar Dam and Penstock Trail. This vegetation type is characterized by the presence of whitebark pine. A relatively small amount of lodgepole pine is also present. The understory contains species typical of the alpine grasses and forbs, but in lower densities, and the lodgepole pine vegetation types.

Only certain associations of the *Pinus albicaulis* Alliance are considered sensitive natural communities by the CDFW (2023). However, given that the species has been federally listed as a Threatened species under the Endangered Species Act, this vegetation type could be considered sensitive.

4.1.11. WHITEBARK PINE – LODGEPOLE PINE

The whitebark pine – lodgepole pine vegetation community occurs in the following portions of the Botanical Resources Study Area: Sawmill Campground, Tioga Lake Campground, and Tioga Dam. This vegetation type contains a mix of whitebark pine and lodgepole pine. A relatively small amount of lodgepole pine is also present. The understory contains species typical of the alpine grasses and forbs and the lodgepole pine vegetation types.

There is no named association containing whitebark pine and lodgepole pine in the CDFW's list sensitive natural communities (CDFW, 2023). However, as discussed above, areas containing whitebark pine could be considered sensitive.

4.1.12. WATER

The water "vegetation community" was observed at one location within the Botanical Resources Study Area: a small pond located northeast of the Tioga Auxiliary Dam. This landcover is unvegetated.

Given the lack of vegetation, this area would not be considered a sensitive natural community.

4.1.13. WILLOW

The willow vegetation community occurs in the following portions of the Botanical Resources Study Area: Saddlebag Dam and Campgrounds, Junction Campground, Ellery Lake Campground, Rhinedollar Dam and Penstock Trail, Poole Powerhouse, and Tioga Dam. The willow vegetation type is dominated by various shrubby willow species, depending on location. The willow density is generally high with few understory species. Common species include Sierra willow (*Salix eastwoodiae*), Jepson's willow (*Salix jepsonii*), and gray-leafed willow (*Salix orestera*). Co-occurring species may include fireweed, American dogwood (*Cornus sericea*) (only at Poole Powerhouse), shrubby cinquefoil (*Dasiphora fruticosa*), Wood's rose (*Rosa woodsia*), Pacific onion, small alisma-leaved buttercup, and willowherb (*Epilobium* spp.).

Various willow associations are considered to be sensitive natural communities, including the *Salix eastwoodiae* Association and the *Salix jepsonii* Association (CDFW, 2023). Areas dominated by these two species would be considered sensitive natural communities while areas dominated by narrow-leaved willow and gray-leafed willow would not be considered sensitive.

4.2. SPECIAL-STATUS PLANT SPECIES

Two special-status plant species tracked by the CNDDB were observed in 2022 and 2023 in the Botanical Resources Study Area: mountain bent grass and whitebark pine. Appendix A shows the location of each population of special-status plant species. At the request of the resource agencies, information was also collected on black cottonwood. Detailed information on these species is provided below. In addition, three species with a CRPR of 4.3 were observed: beautiful pussy-toes (*Antennaria pulchella*; observed in 2022 and 2023), Congdon's sedge (*Carex congdonii*; observed in 2023), and water awlwort (*Subularia aquatica* ssp. *americana*; observed in 2022). Species with a CRPR are considered to be on a "watch list"; they are not considered "rare" from a statewide perspective but are uncommon enough that their status is monitored. A complete list of plant species observed is included in Appendix D, Plant Compendium.

4.2.1. MOUNTAIN BENT GRASS

Mountain bent grass has a CRPR of 2B.3 and is designated as a Species of Conservation Concern by the Inyo National Forest. This perennial herb blooms between July and September (CNPS, 2020). It occurs in moist to dry subalpine or alpine meadows, seeps, slopes, rock fields, and subalpine coniferous forest at elevations between approximately 3,200 and 10,500 feet above mean sea level (amsl) (Jepson Flora Project, 2020, 2022; CNPS, 2020). In California, it is known from the Klamath Ranges, the High North Coast Ranges, the High Cascade Range, and the central and southern High Sierra Nevada (Jepson Flora Project, 2020, 2022).

4.2.1.1. 2022 Results

Five populations of mountain bent grass totaling approximately 854 individuals were observed in the Botanical Resources Study Area (Appendix A; Table 4.2-1). The majority of individuals were flowering or fruiting. Populations were observed in the Saddlebag Dam and Campgrounds portion of the study area. The species was growing in relatively barren areas along the lakeshore and below Saddlebag Dam, sometimes among scattered boulders and cobbles. Associated species vary by population and include rough bent grass, abrupt-beaked sedge, umbel-bearing pussypaws (*Calyptridium umbellatum*), Newberry's beardtongue, northern goldenrod, and Anderson's alpine aster (*Oreostemma alpigenum* var. *andersonii*).

Table 4.2-1. Population Counts and Phenology of Mountain Bent Grass in 2022

Botanical Study Area	Population	Number of Individuals	Percent Vegetative	Percent Flowering/Fruiting
Saddlebag Dam and Campgrounds	1	106	10	90
	2	500	10	90
	3	48	10	90
	4	100	10	90
	5	100	10	90

4.2.1.2. 2023 Results

Most populations of mountain bent grass were observed only in 2022 when lake levels were low and snow was absent from the Botanical Resources Study Area; higher lake levels and patches of snow were observed in 2023, covering many of the 2022 populations. No new populations were observed in 2023.

4.2.2. WHITEBARK PINE

Whitebark pine is listed as Threatened under the federal Endangered Species Act and is designated as a Species of Conservation Concern by the Inyo National Forest. Federal listing was finalized on December 15, 2022, effective January 17, 2023 (USFWS, 2022). This evergreen tree occurs in upper red-fir forest to the timberline, especially in subalpine forests at elevations between approximately 6,500 and 12,100 feet amsl (Jepson Flora Project, 2020). In California, it is known from the Klamath Ranges; the High Cascade Range; the northern, central, and southern High Sierra Nevada; the Warner Mountains; the White and Inyo Mountains; and areas east of the Sierra Nevada.

4.2.2.1. 2022 Results

Twenty-four populations of whitebark pine totaling approximately 1,069 individuals were observed in the Botanical Resources Study Area (Appendix A; Table 4.2-2). Populations were observed in the Rhinedollar Dam and Penstock Trail, Saddlebag Dam and

Campgrounds, Ellery Lake Campground, Sawmill Campground, Tioga Dam and Auxiliary Dam, and Tioga Lake Campground portions of the study area. Populations 1 through 17 were documented in 2022. The species was observed in several vegetation types including whitebark pine forest, whitebark pine – alpine, willow scrub, and wet meadow. Associated species vary by site and include lodgepole pine, gray-leafed Sierra willow, Brewer's mountain heather (*Phyllodoce breweri*), western Labrador tea (*Rhododendron columbianum*), whitestem goldenbush (*Ericameria discoidea*), dwarf bilberry, fireweed, compact spear phacelia, Newberry's beardtongue, squirreltail, Sierra beardtongue, frosted wild buckwheat (*Eriogonum incanum*), and thread-leaved sedge (*Carex filifolia*).

4.2.2.2. 2023 Results

Populations 1 through 17, initially documented in 2022, were confirmed in 2023. Populations 18 through 24 were documented in 2023.

Table 4.2-2. Population Counts and Phenology of Whitebark Pine in 2022 and 2023

Botanical Study Area	Population	Number of Individuals	Percent Vegetative	Percent Flowering/Fruiting
Rhinedollar Dam and Penstock Trail	1	2	50	50
	2	1	100	0
	3	2	100	0
	4	300	75	25
	5	12	33	67
	6	300	75	25
Saddlebag Dam and Campgrounds	7	30	85	15
	8	200	75	25
Ellery Lake Campground	9	2	0	100
	10	3	33	67
Sawmill Campground	11	17	41	59
	12	23	78	22
Tioga Dam and Auxiliary Dam	13	10	60	40
	14	74	69	31
Tioga Lake Campground	15	6	17	83
	16	9	55	45
	17	13	85	15

Botanical Study Area	**Population**	**Number of Individuals**	**Percent Vegetative**	**Percent Flowering/Fruiting**
Saddlebag Dam and Campgrounds	18	16	80	20
	19	1	100	0
	20	30	80	20
	21	14	80	20
	22	1	100	0
	23	1	100	0
	24	2	100	0

4.2.3. BLACK COTTONWOOD

Black cottonwood is not considered a special-status plant species; however, as a riparian species, it is of interest to the Stakeholders. This deciduous tree generally grows up to 30 meters tall (Jepson Flora Project, 2020). It occurs in alluvial bottomland and stream sides and elevations between approximately 16 and 10,007 meters amsl. In California, it is known throughout the California Floristic Province and the Great Basin.

4.2.3.1. 2022 Results

Three populations of black cottonwood were observed in the Botanical Resources Study Area, all within the Poole Powerhouse area (Appendix A; Table 4.2-3). Population 1 consisted of two, mature individuals. Both individuals appeared healthy. Population 2 consisted of a cluster of eight saplings, all appearing healthy.

4.2.3.2. 2023 Results

Population 1 was observed again in 2023 and appeared healthy. Population 2 was not observed in 2023. SCE conducted a large-scale tree removal effort around Poole Powerhouse in fall of 2022, after the 2022 survey occurred. The majority of trees removed were conifers (red fir, white fir, Jeffrey pine, and lodgepole pine) for the purposes of reducing wildfire risk and winter falling risk of large trees around the powerhouse. The tree removal was conducted according to the Project's Wildfire Mitigation Plan and VM-3 Vegetation Management Program. USFS, CDFW, and the California Waterboards were consulted before the effort occurred to ensure compliance. Population 2 of black cottonwood was presumably unintentionally removed during the 2022 wildfire clearing effort.

An additional sapling was observed in 2023, comprising Population 3.

Table 4.2-3. Population Counts and Phenology of Black Cottonwood

Botanical Study Area	Population	Number of Individuals	Percent Vegetative	Percent Flowering	Percent Fruiting
Poole Powerhouse	1	2	100	0	0
	2	8	100	0	0
	3	1	100	0	0

4.3. INVASIVE PLANT SPECIES

One invasive plant species of concern designated for mapping was observed in 2022 and 2023 in the Botanical Resources Study Area: cheat grass (*Bromus tectorum*). It is an annual grass that occurs in open, disturbed areas at elevations below approximately 11,155 feet amsl (Jepson Flora Project, 2020). The species is native to northern Africa, Europe, and western Asia (Kelch, 2015). It was introduced to North America independently via ship ballast, contaminated crop seed, and packing material (Kelch, 2015). It is found throughout California except the driest deserts in the southeast of the state (Jepson Flora Project, 2020; Kelch, 2015). It has a USFS treatment strategy of 3 (Contain) and a Cal-IPC rating of “high.”

4.3.1. 2022 RESULTS

Three populations of cheat grass were observed in 2022 in the Botanical Resources Study Area (the associated mapbook in Appendix A). Two populations were documented near Poole Powerhouse (Population 1 has 30 individuals; Population 2 has 60 individuals) and one was documented at Ellery Lake Campground (Population 3 has 40 individuals).

No other invasive plant species of concern were observed in the study area. Other non-native plant species observed are reported in Appendix D, Plant Compendium.

4.3.2. 2023 RESULTS

Two additional populations of cheat grass were observed in 2023 (Appendix A). Both of these were documented near Poole Powerhouse (Population 4 has 5 individuals; Population 5 has 10 individuals).

4.4. RIPARIAN MONITORING STUDY

Baseline surveys were repeated over 3 years (1999, 2000, and 2001) and long-term monitoring was performed over the next 20 years in 2006, 2011, 2016, and 2021 under the current license.

Variability in species cover was observed among sites, vegetation types (i.e., riparian shrub, riparian herb, upland tree, upland shrub, and upland herb), and monitoring years. Some vegetation has remained relatively stable over the course of the monitoring (e.g., riparian shrub cover at Site 1). In other cases, there has been variability between years (e.g., upland conifer cover). The most pronounced change in vegetation cover was a decrease in upland herb cover at Site 3 from a high of 92 in 2000 and to a low of 28 in 2021. Both riparian and upland herbaceous species richness also decreased over the course of the monitoring period at all sites. Given that the observed variability has occurred in both riparian and upland species, it is likely to be more related to environmental factors outside of the Project's control.

The latest riparian monitoring report summarizes data between the baseline years and 2021 (Read, 2022).

4.5. NDVI ANALYSIS

Vegetation indices are used to measure biomass or vegetative vigor using combinations of several spectral values (Campbell and Wynne, 2011). The NDVI is one form of vegetation index that is constrained to vary within limits (i.e., between -1 and +1). A high NDVI value indicates "healthy" vegetation because it reflects more NIR and green light compared to other wavelengths and absorbs more red and blue light.

Table 4.5-1 and Figure 4.5-1 summarize the 2016 and 2021 NDVI data for willow riparian scrub at both control and test sites. While there is variability among sites and between years, there appears to be no obvious trends when comparing control to test sites or when comparing 2016 and 2021 data.

Table 4.5-2 and Figure 4.5-2 summarize the 2016 and 2021 NDVI data for wet meadow at both control and test sites. While there is variability among sites and between years, there appears to be no obvious trends when comparing control to test sites or when comparing 2016 and 2021 data. The most noticeable change is an increase in NDVI for the Lower Lee Vining site between 2016 and 2021.

Table 4.5-1. Summary of NDVI Data for Willow Riparian Scrub in 2016 and 2021

Site [a]	Mean (2016)	Mean (2021)	Standard Deviation (2016)	Standard Deviation (2021)	Minimum (2016)	Minimum (2021)	Maximum (2016)	Maximum (2021)
AS	*0.338*	*0.291*	*0.039*	*0.063*	*0.209*	*0.055*	*0.437*	*0.473*
USC	*0.415*	*0.369*	*0.036*	*0.054*	*0.307*	*0.180*	*0.489*	*0.500*
MC	*0.447*	*0.437*	*0.040*	*0.040*	*0.347*	*0.305*	*0.592*	*0.570*
BS	0.326	0.321	0.043	0.047	0.218	0.119	0.438	0.487
ULV	0.371	0.349	0.043	0.051	0.111	0.138	0.488	0.482
MLV	0.442	0.434	0.041	0.046	0.258	0.223	0.519	0.569
BE	0.321	0.468	0.060	0.040	0.102	0.331	0.437	0.582
LLV	0.333	0.405	0.044	0.061	0.198	0.220	0.454	0.590

AS = Above Saddlebag; USC = Upper Slate Creek; MC = Mine Creek; BS = Below Saddlebag; ULV = Upper Lee Vining; MLV = Middle Lee Vining; BE = Below Ellery; LLV = Lower Lee Vining

[a] Site names in italics are control sites; site names not in italics are test sites.

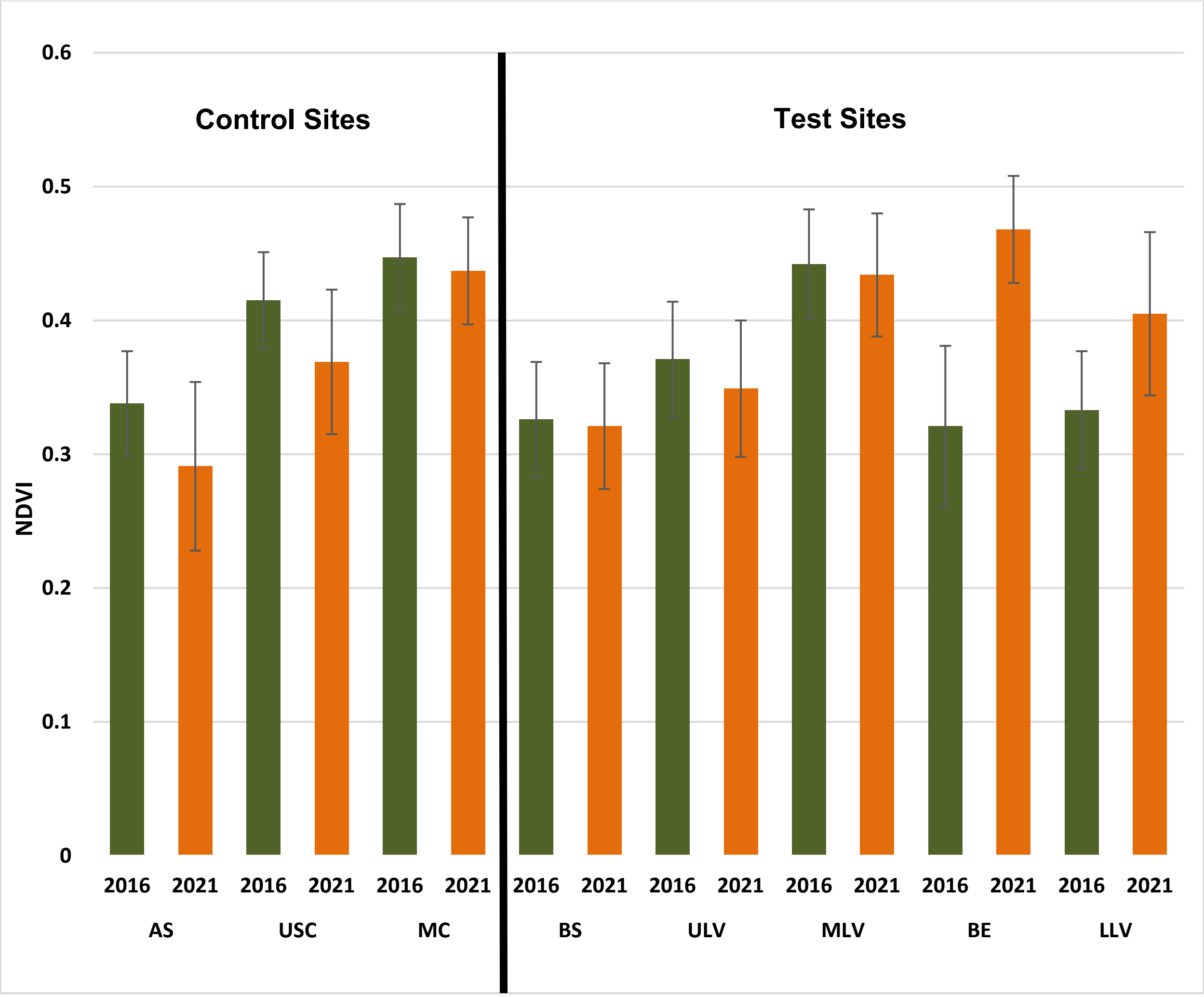

Figure 4.5-1. Mean NDVI (+/- Standard Deviation) for Control and Test Willow Riparian Scrub.

Table 4.5-2. Summary of NDVI Data for Wet Meadow in 2016 and 2021

Site [a]	Mean (2016)	Mean (2021)	Standard Deviation (2016)	Standard Deviation (2021)	Minimum (2016)	Minimum (2021)	Maximum (2016)	Maximum (2021)
AS	*0.148*	*0.126*	*0.037*	*0.036*	*0.059*	*0.026*	*0.251*	*0.223*
USC	*0.224*	*0.190*	*0.066*	*0.070*	*0.102*	*0.029*	*0.358*	*0.344*
MC	*0.186*	*0.216*	*0.054*	*0.048*	*0.075*	*0.092*	*0.354*	*0.354*
ULV	0.202	0.205	0.078	0.088	0.014	-0.029	0.344	0.388
MLV	0.253	0.277	0.080	0.052	0.099	0.145	0.402	0.447
LLV	0.186	0.392	0.058	0.059	0.062	0.191	0.333	0.523

AS = Above Saddlebag; USC = Upper Slate Creek; MC = Mine Creek; ULV = Upper Lee Vining; MLV = Middle Lee Vining; LLV = Lower Lee Vining; NDVI = Normalized Difference Vegetation Index

[a] Site names in italics are control sites; site names not in italics are test sites.

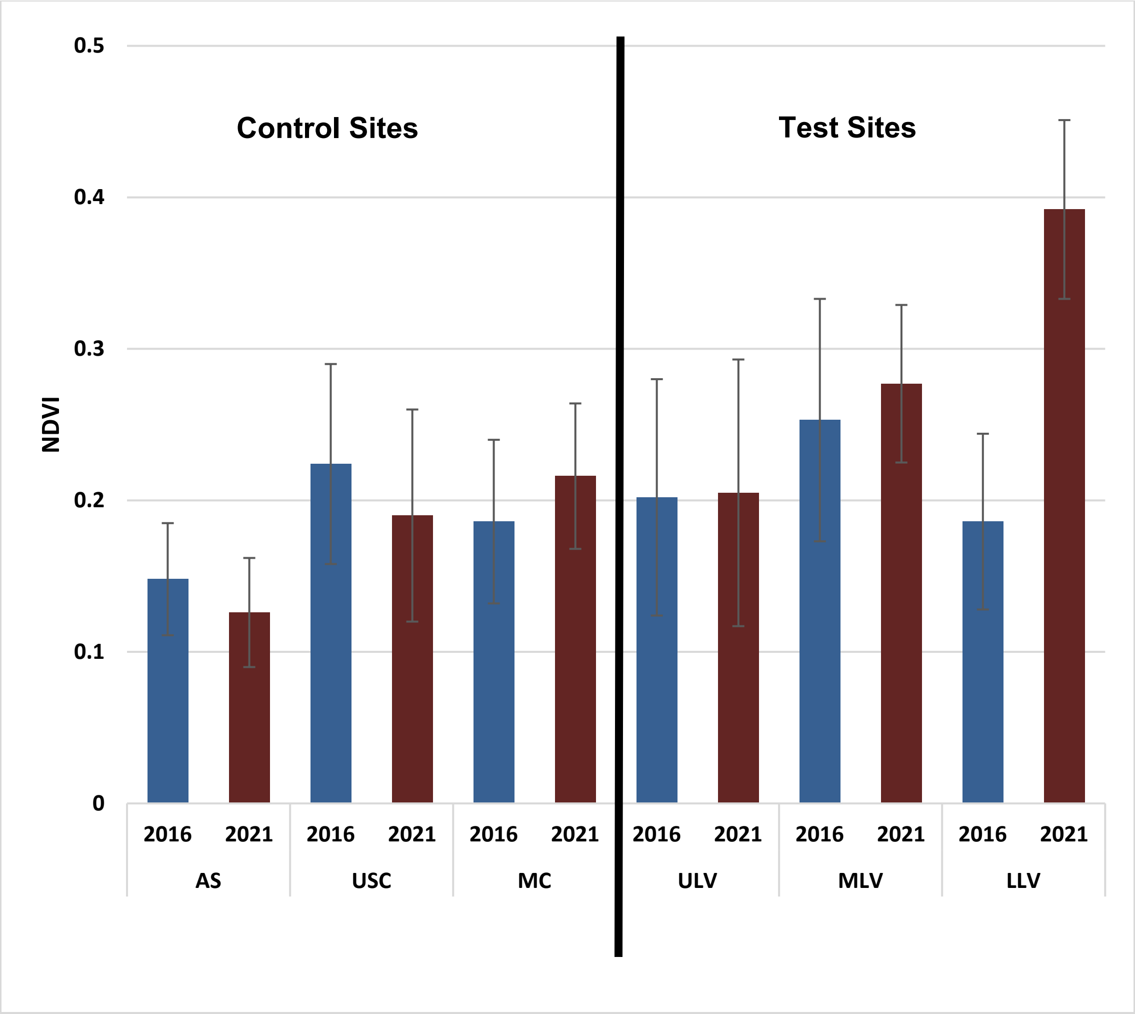

Figure 4.5-2. Mean NDVI for Control and Test Wet Meadow Habitat.

5.0 CONSULTATION SUMMARY

In preparation to file the Pre-Application Document and Notice of Intent filed in August 2021, SCE hosted Terrestrial and Botanical TWG meetings on January 27, February 24, April 7, and May 26, 2021. These TWG meetings resulted in study requests from Stakeholders to address questions regarding botanical resources. Notes and materials from these meetings are available on SCE's Project website (www.sce.com/leevining).

SCE filed draft Study Plans with the Pre-Application Document and Notice of Intent on August 12, 2021, to address issues discussed with the TWGs. The Stakeholder comment period for these filings ended on January 18, 2022. SCE reviewed all comments received and drafted Revised Technical Study Plans, which were distributed to the TWGs on February 18, 2022, for another 30-day review period. Stakeholder comments received on the Revised Technical Study Plans were reviewed and incorporated as appropriate in the Final Technical Study Plans, which were filed with FERC on April 25, 2022 (SCE, 2022). Vegetation mapping and Year 1 of the special-status plant and invasive plant species surveys were conducted in 2022. Year 2 of the special-status plant and invasive plant species surveys were conducted in 2023. Data collected in 2022 was analyzed and a Draft Technical Report was produced and distributed to Stakeholders for review in September 2023. Comments on the report were received from Stakeholders after a 60-day review, and are included in Table 5-1 below.

Draft Technical Reports were distributed to TWGs on April 16, 2024, for a 60-day comment period. On May 14, 2024, SCE held a public meeting at the Lee Vining Community Center to discuss the draft reports and study findings to date. On June 12, 2024, at the end of the comment period, comments were received from USFS, U.S. Fish and Wildlife Service, CDFW, State Water Resources Control Board, and Mono Lake Committee. All comments received related to the TERR-1 2023 Draft Technical Report are included in Table 1-1 in Volume III of the Draft License Application.

Table 5-1. Consultation Summary—Response to Comments

Comment Number	Entity	Date/Forum	Comment [a]	SCE Response
1	USFS	12/27/2023 Comments on 2022 Draft Technical Report	This letter is to comment on the technical surveys performed for the 2022 and 2023 period as required for the relicensing of the Southern California Edison hydroelectric facilities in the Lee Vining Creek drainage. The survey studies are: general botanical resources, water quality, stream fish populations, reservoir fish populations and hydrology operation modeling. For the Owens River watershed, the 2022 water year received a very low snowpack with a seasonal average of 40% and a precipitation average of 40% as well. The 2023 water year saw the largest recorded snowpack in recorded history with a seasonal average of 266% and a seasonal precipitation average of 161%. For seasonal snowpack this a drastic change of approximately 565% between the two years and a 300% change for seasonal precipitation. The hydroelectric license is for a 30-year period and with only these two years of data collection guiding the relicensing process, anomalous weather events could skew what is already a limited dataset and provide a flawed basis for management decisions. A similar situation occurred with Colorado River water flows, when past allocation decisions were based on very high flow years. We are concerned that a similar situation could unfold given that these survey studies are based on two years of data collection, with one of those years being the extreme winter of 2022-2023. For this reason, we would like to see at least one more year of data collection for the relicensing process.	SCE believes we have collected adequate information to assess potential Project effects and do not believe an additional study year is warranted. 2023 may have had higher than average precipitation; however, global climate trends indicate increasingly erratic and unpredictable weather events, so an additional 2024 study year may not be a truly "normal" year either. Special-status species were identified in both a dry year and a wet year. Future O&M activities resulting in vegetation removal/ground disturbance over the new license term would be addressed in the Vegetation Management Plan, which may include additional survey(s). Given stochasticity in plant population sizes, a PME addressing potential future threats may be more appropriate than a third consecutive year of plant surveys.

Comment Number	Entity	Date/Forum	Comment [a]	SCE Response
2	CDFW	11/22/2023 Comments on 2022 Draft Technical Report	Comment: The CNPS identifies that mountain bent grass (*Agrostis humilis*) (California Rare Plant Rank 2B.3-rare, threatened or endangered in California) is threatened by foot traffic and vehicles and possibly threatened by grazing and trampling. SCE should identify the potential for these threats and any other threats (e.g., maintenance activities) at each population location to determine the vulnerability, condition of occurrences, and if PME measures are needed (e.g., signage, fencing) to protect the plant.	SCE will discuss potential threats to mountain bent grass populations in the DLA. PME measures will be included in the DLA for mountain bent grass, if appropriate.
3	CDFW	11/22/2023 Comments on 2022 Draft Technical Report	Comment: On January 14th, 2022, CDFW proposed a Riparian Monitoring and Community Health Study. SCE responded that 'sufficient data exists from ongoing Riparian Monitoring Evaluations conducted as part of the license'. SCE has shared with CDFW via email various Riparian Reports associated with the existing FERC License requirements; however, these reports should be made available for review on the Projects relicensing website. Additionally, SCE responded in the Revised Technical Study Plans that raw data would be provided to the TWG. This data should also be made available on the Projects relicensing website. All existing available data that SCE produced as part of the license (e.g., riparian monitoring and evaluations) should be made available for review. Providing this data later with the DLA will not provide stakeholders sufficient time to review the data in a meaningful way.	SCE provided historic riparian reports and other relevant existing data to interested Stakeholders when requested. If additional Stakeholders would like this information, SCE can provide it. However, SCE does not intend to provide these reports and data on the website.

Comment Number	Entity	Date/Forum	Comment [a]	SCE Response
4	CDFW	11/22/2023 Comments on 2022 Draft Technical Report	Comment: Much of the Botanical Resource study area is outside of the FERC Project area and is focused only around Project facilities or recreational areas. Question: Does sufficient data exist to provide a baseline of the distribution of special status plant species within the FERC Project area?	The Botanical Resources Study Area was determined in consultation with Stakeholders during several TWG meetings prior to the field studies. The study area was developed to address potential future O&M activities, which would occur around Project facilities. The studies were designed to document baseline conditions (i.e., Lee Vining Creek with flow conditions similar to that under the current license).
5	CDFW	11/22/2023 Comments on 2022 Draft Technical Report	CDFW requests the following spatial data be provided as shapefiles or geodatabase: Botanical Study Area boundary	Data will be provided with distribution of draft reports.
6	CDFW	11/22/2023 Comments on 2022 Draft Technical Report	CDFW requests the following spatial data be provided as shapefiles or geodatabase: NDVI: Sampling plots (wet meadow), Sampling plots (willow riparian scrub), Study Sites (Test), Study Sites (Control)	Data will be provided with distribution of draft reports.
7	CDFW	11/22/2023 Comments on 2022 Draft Technical Report	CDFW requests the following spatial data be provided as shapefiles or geodatabase: Special-status plant species populations	Data will be provided with distribution of draft reports.

CDFW = California Department of Fish and Wildlife; DLA = Draft License Application; FERC = Federal Energy Regulatory Commission; FS = Forest Service; ft = feet; GIS = geographic information system; INF = Inyo National Forest; NDVI = Normalized Difference Vegetation Index; O&M = operation and maintenance; PME = Protection, Mitigation, and Enhancement; RTSP = Revised Technical Study Plan; SCE = Southern California Edison; TWG = Technical Working Group; USFS = U.S. Forest Service; USGS = U.S. Geological Survey

[a] Acronyms are used in comments that do not align with those used in this technical report: FS = Forest Service; ft = feet; INF = Inyo National Forest; RTSP = Revised Technical Study Plan

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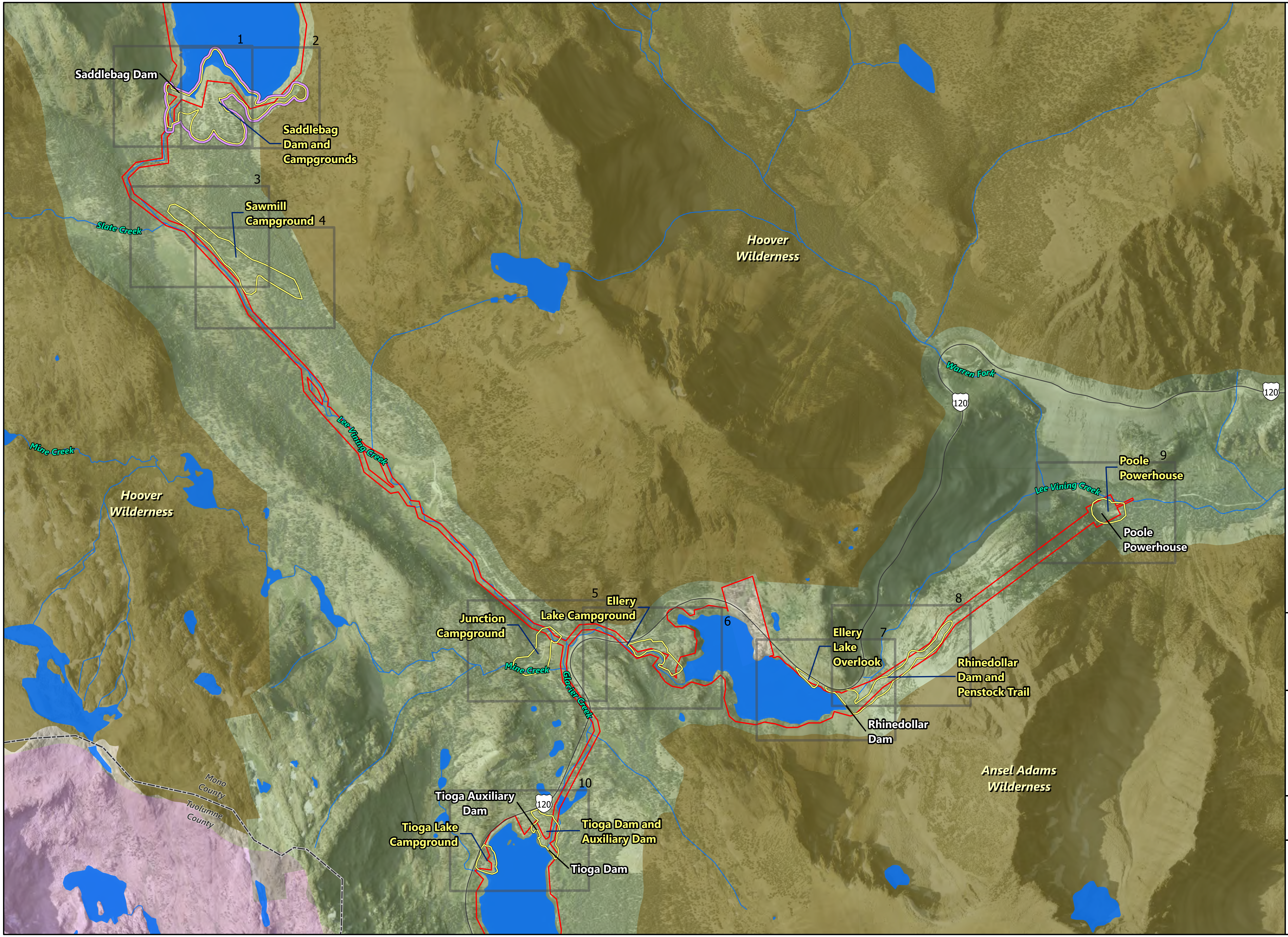
APPENDIX A
MAPBOOKS



▭ 2023 Study Area Modification
▭ 2022 Study Area
▭ Map Extents
▭ County Line
▭ FERC Project Boundary (P-1388)
▨ Wilderness Area (Inyo NF)
▨ Yosemite National Park
▨ Inyo National Forest

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Botanical Resources Study Area

LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

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Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
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Waterbody
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Base Imagery: NAIP 2020

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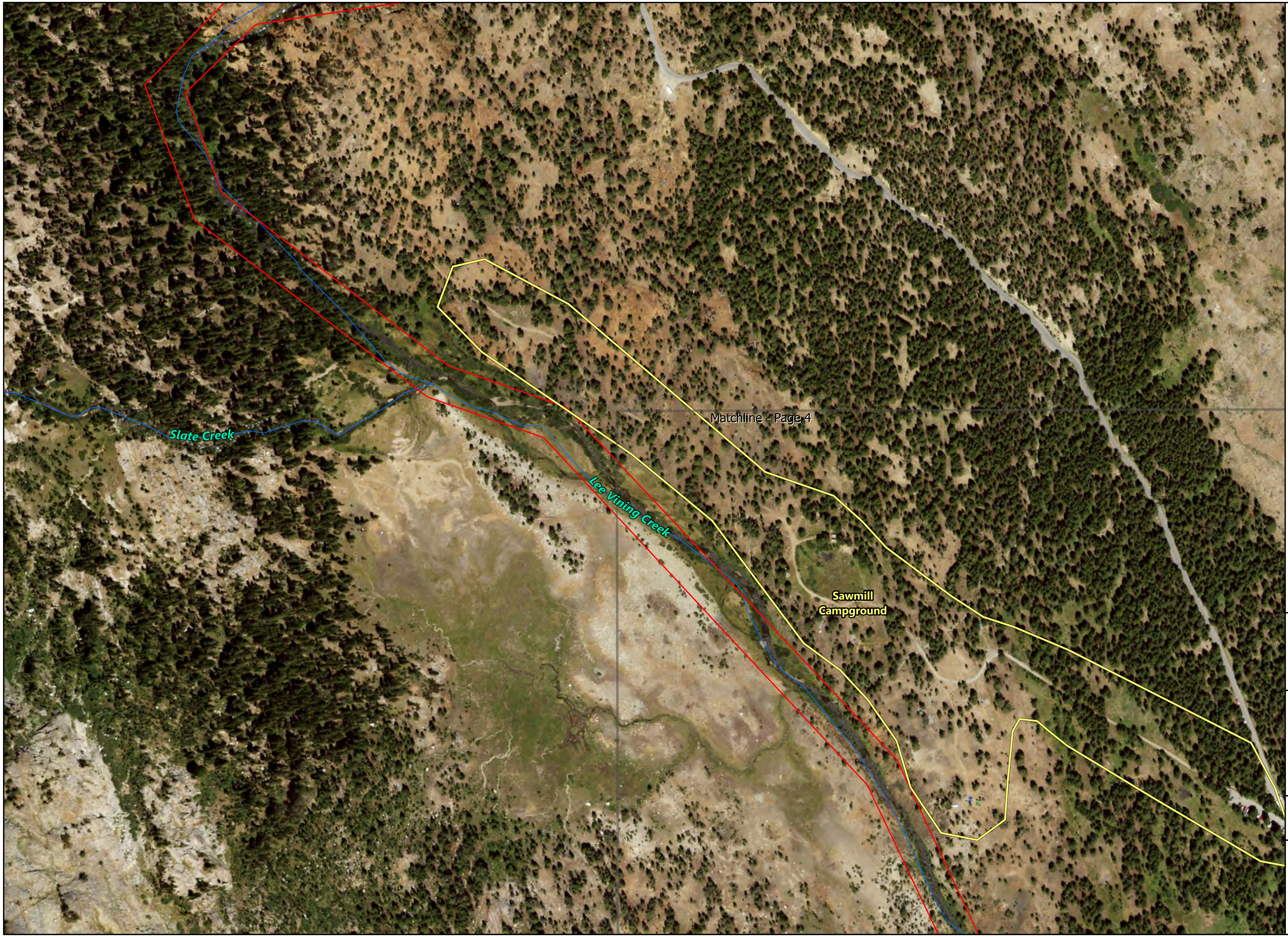

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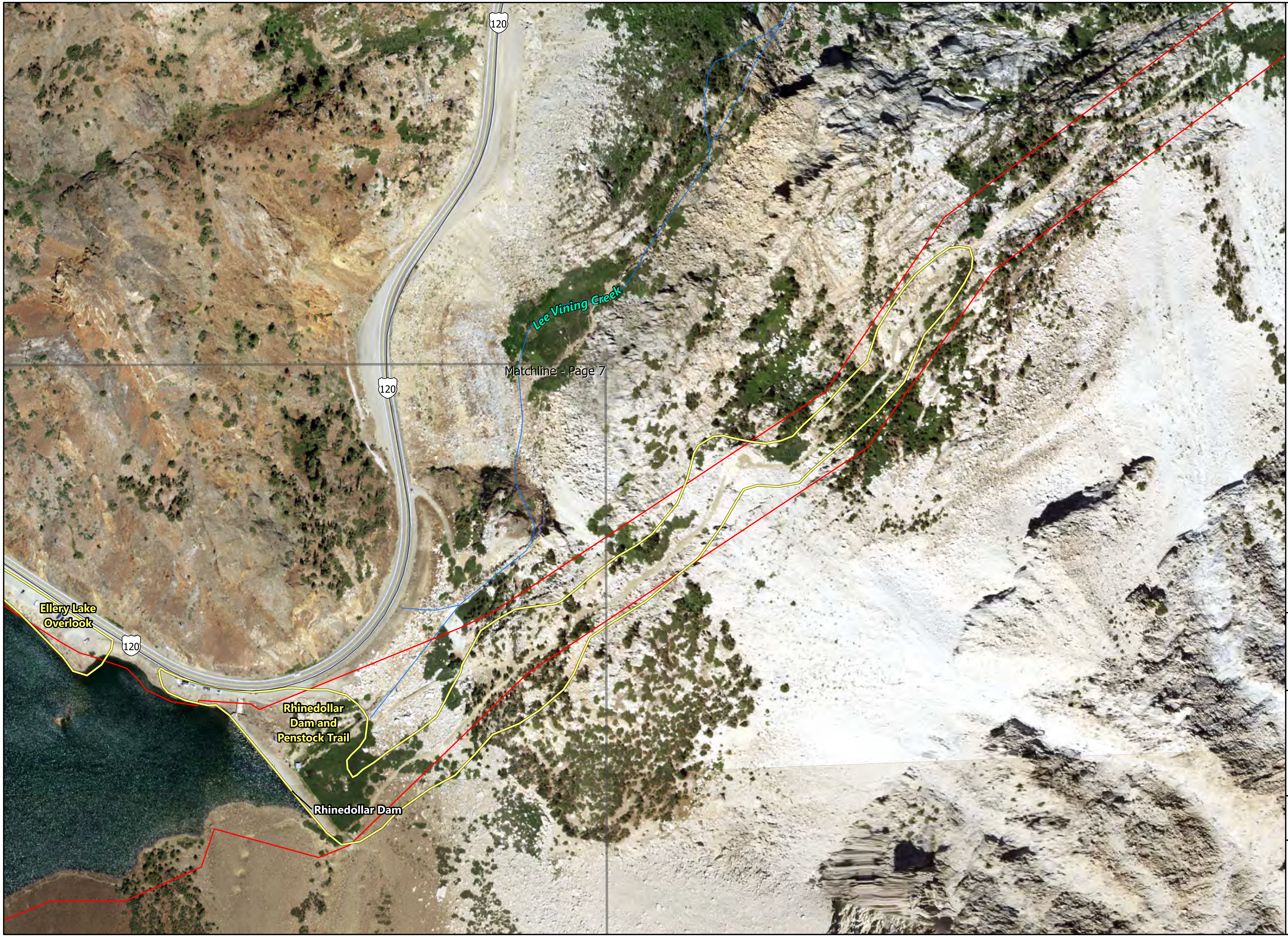

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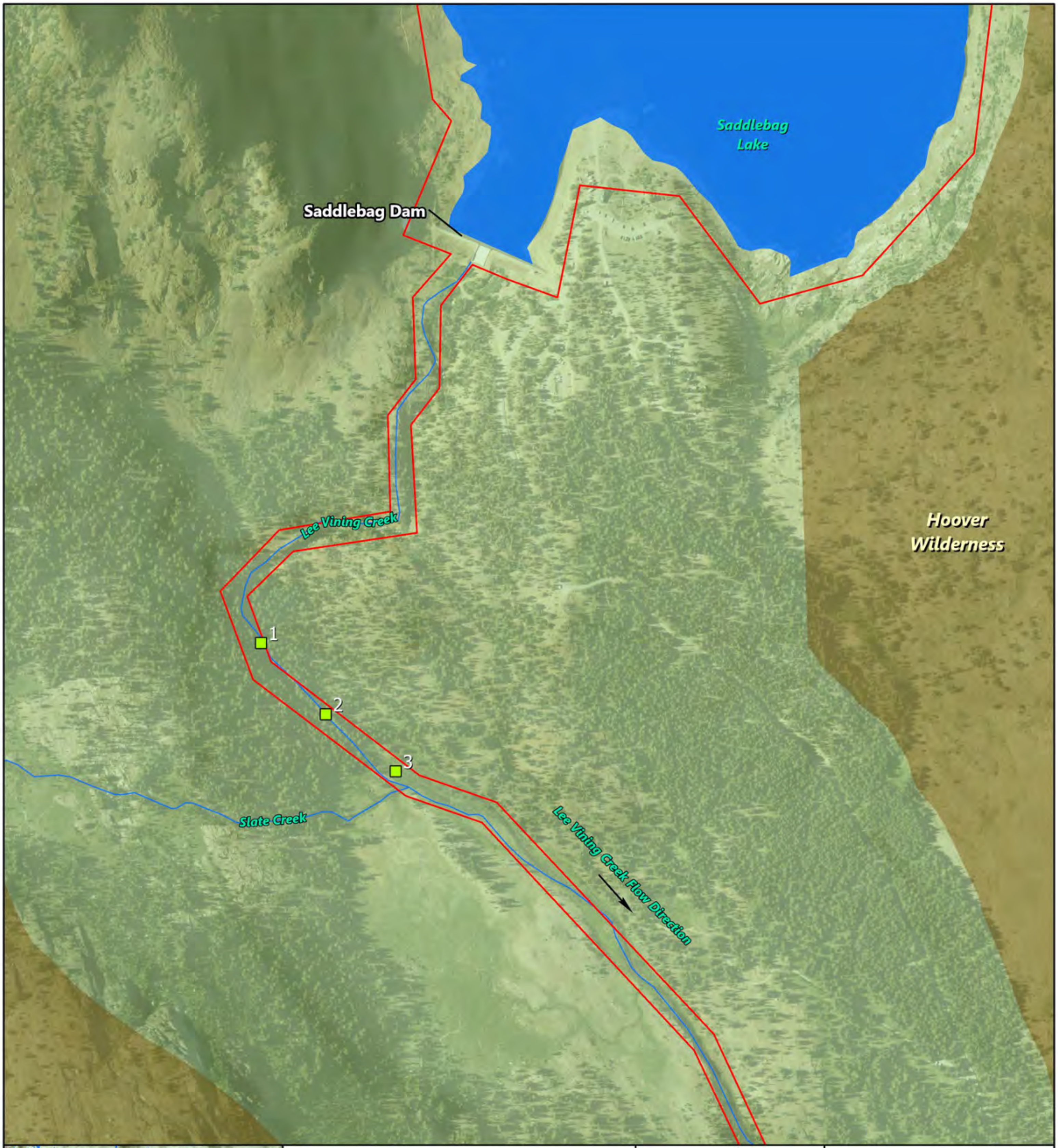

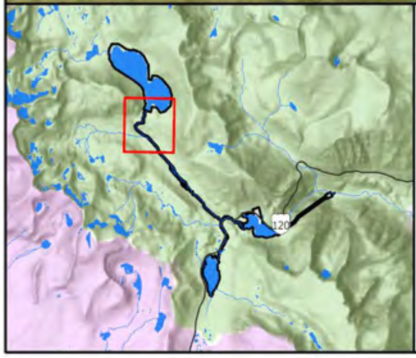

- 🟩 Riparian Monitoring Study Sites
- ☐ FERC Project Boundary (P-1388)
- ⬚ County Line
- 🟫 Wilderness Area (Inyo NF)
- 🟩 Inyo National Forest
- 🟪 Yosemite National Park

The riparian monitoring study area consists of three study sites.

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Riparian Monitoring Study Sites

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▭ Map Extents
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— Stream Flowline
🟩 Inyo National Forest
🟪 Yosemite National Park

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NDVI Study Area

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NDVI Plots

- 🟦 Sampling Plot - Wet Meadow
- 🟩 Sampling Plot - Willow Riparian Scrub

NDVI Study Sites

- 🟧 NDVI Study Site - Test
- 🟨 NDVI Study Site - Contol
- — Stream Flowline
- — Road
- 🟥 FERC Project Boundary (P-1388)

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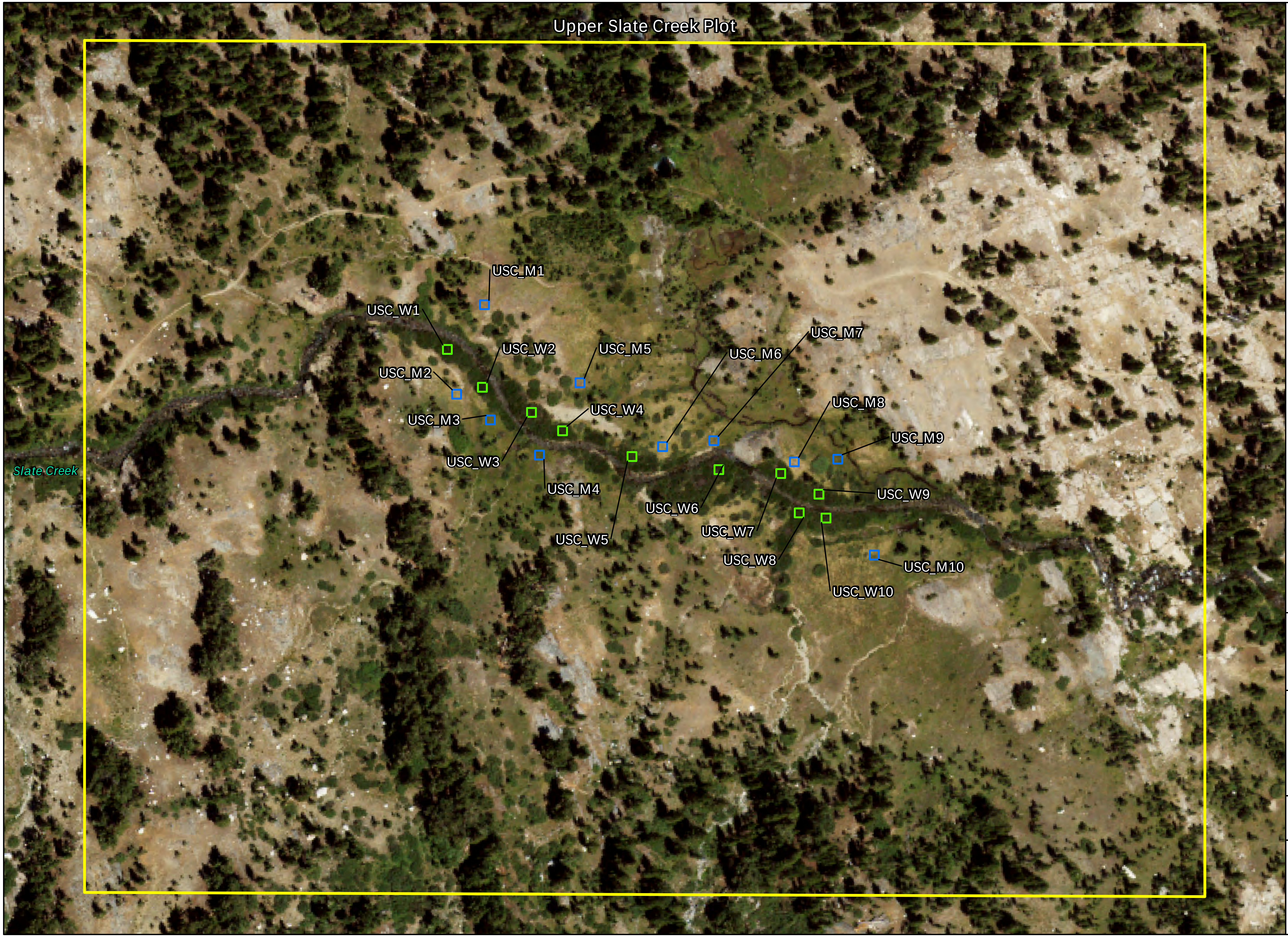

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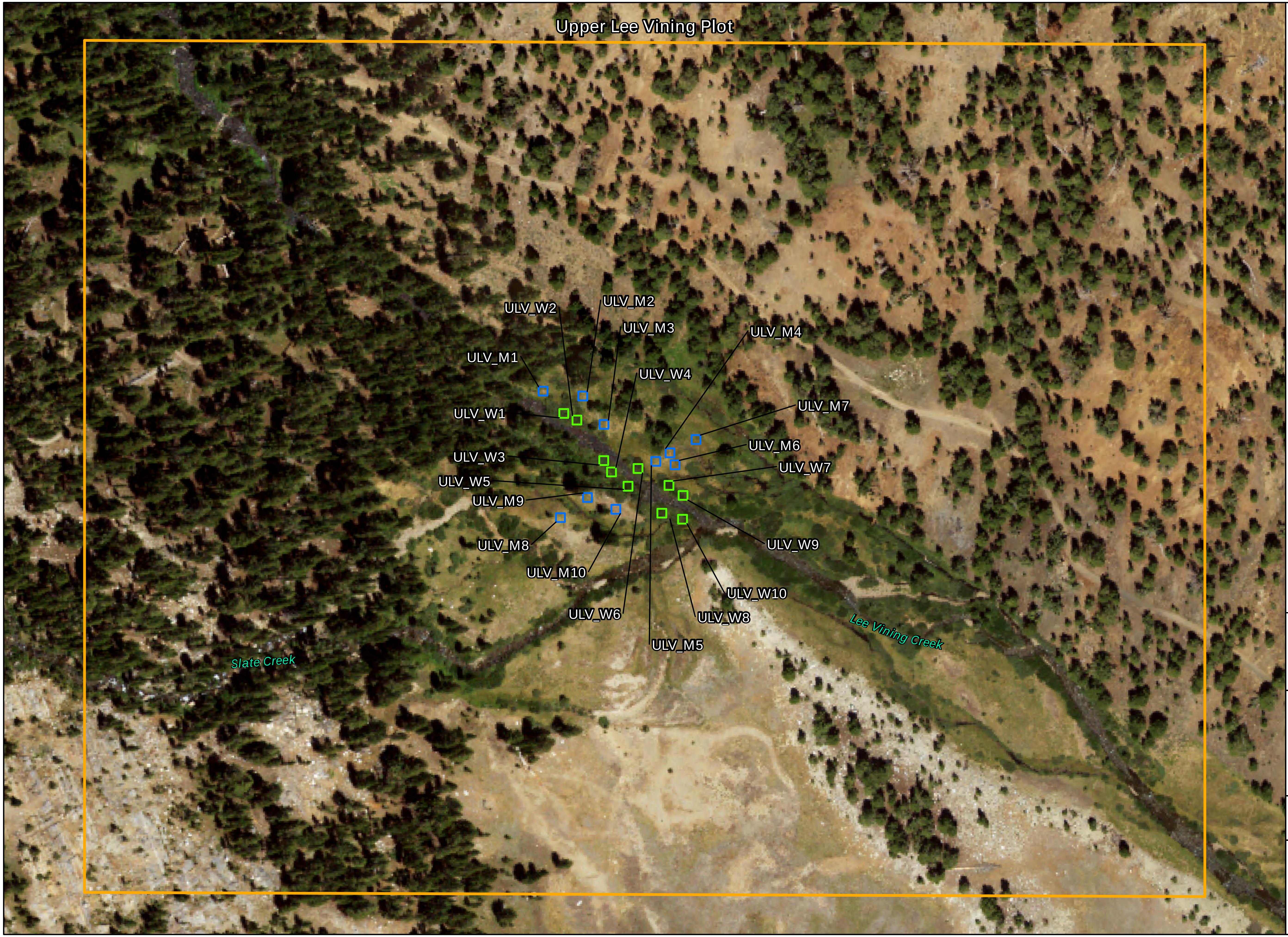

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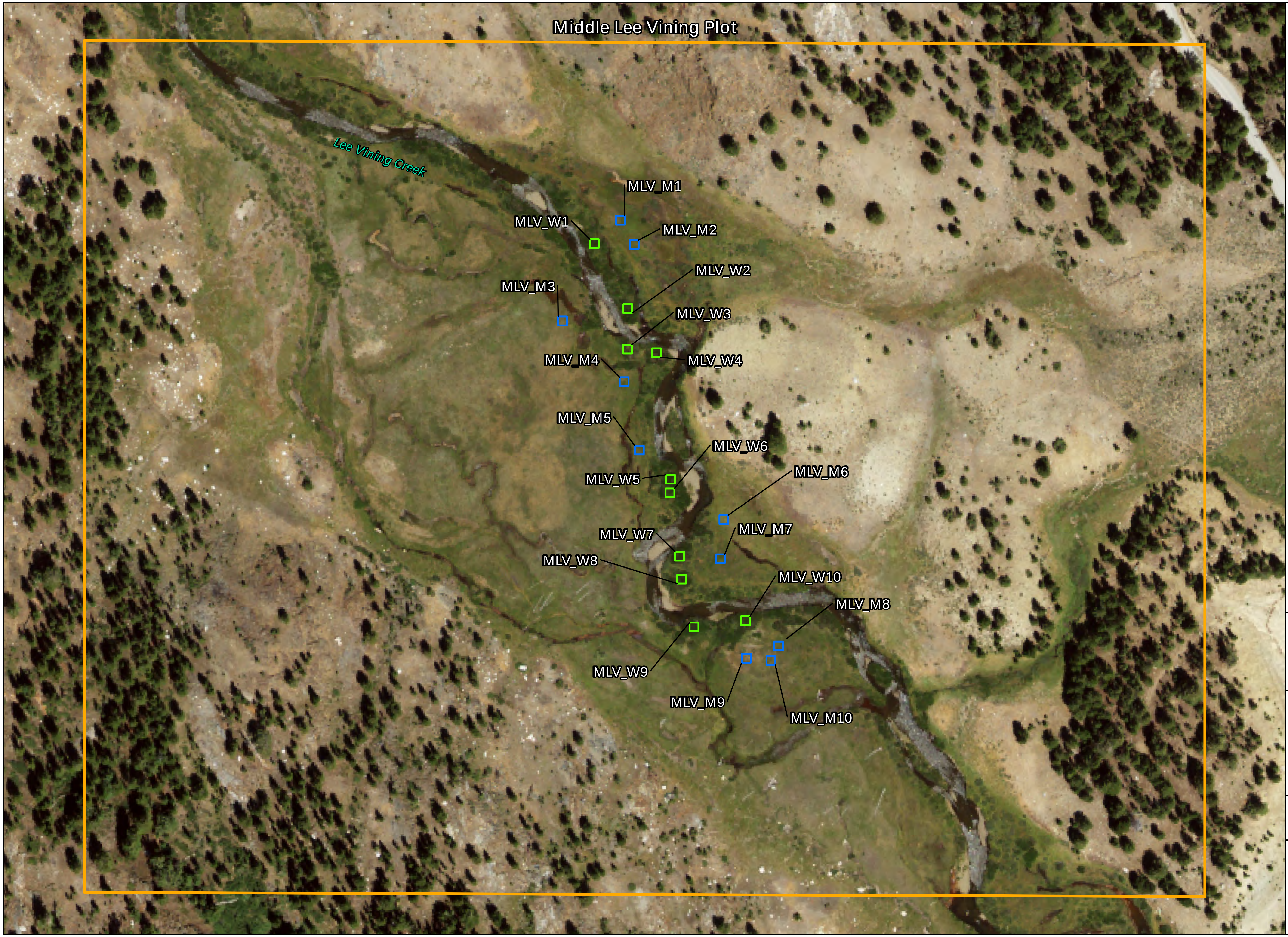

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Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
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NDVI Plots

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NDVI Study Sites

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— Stream Flowline

— Road

□ FERC Project Boundary (P-1388)

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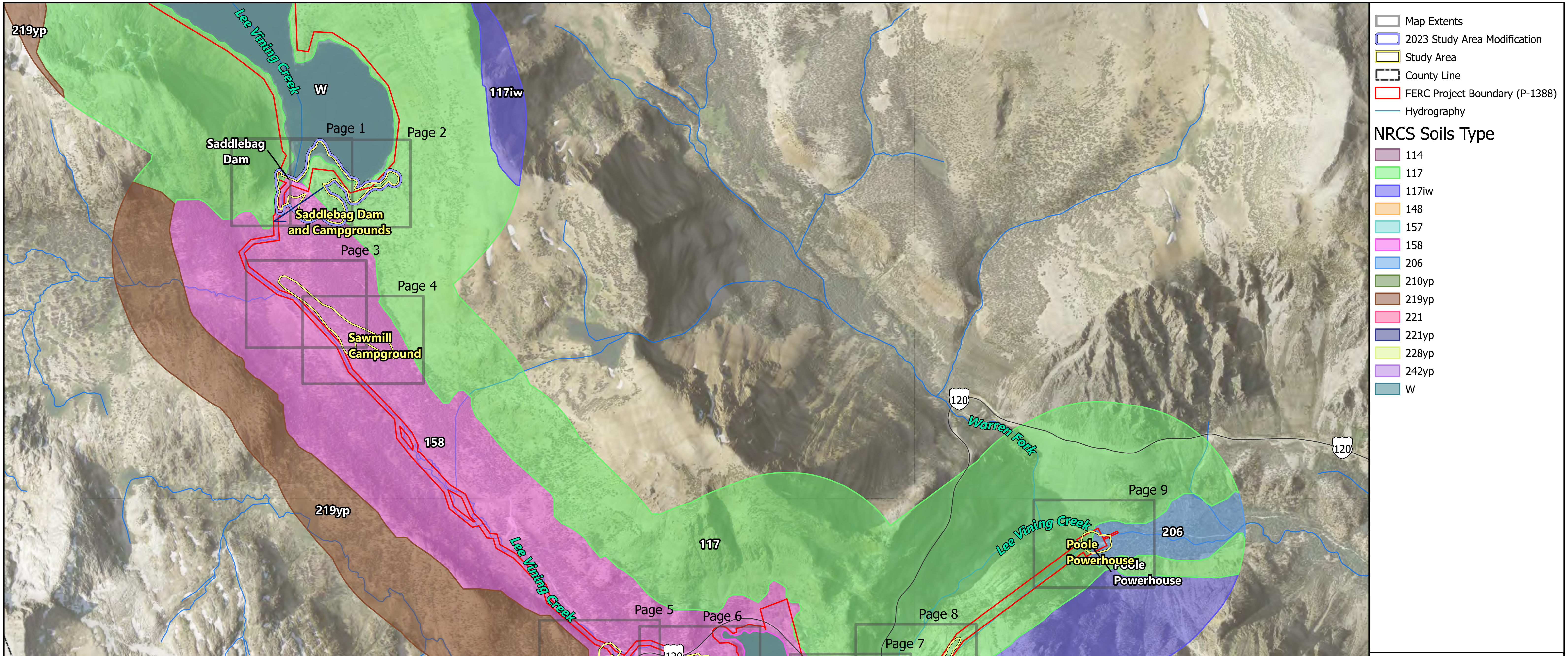
Datum: North American 1983

0 75 150 Feet

NRCS Soil Type Key

Map Unit Symbol	Map Unit Name
114	Typic Cryorthents-Rock outcrop complex, 0 to 45 percent slopes
117	Rock outcrop-Rubble land complex (published 1998)
117iw	Rock outcrop-Rubble land complex (published 1996)
148	Rock outcrop-Typic Cryorthents complex, 40 to 85 percent slopes
157	Stecum-Guiser families-Rock outcrop complex, 15 to 60 percent slopes.
158	Stecum-Charcol familes-Rock outcrop complex, 30 to 70 percent slopes.
206	Stecum-Chacol families-Rock outcrop association, 2 to 50 percent slopes.
210yp	Rubble land-Typic Cryorthents-Rock outcrop-Xeric Dystrocryepts complex, 30 to 80 percent slopes, mountainflanks, metamorphic, mafic, cryic
219yp	Rock outcrop-Rubble land-Canisrocks association, 0 to 80 percent slopes, cirqued mountainflanks, cryic
221	Typic Cryorthents-Xeric Dystrocryepts-Oxyaquic Dystrocryepts complex, 15 to 45 percent slopes, metamorphic, mountain slopes, lateral moraines, cryic (published 2006)
221yp	Typic Cryorthents-Xeric Dystrocryepts-Oxyaquic Dystrocryepts complex, 15 to 45 percent slopes, metamorphic, mountain slopes, lateral moraines, cryic (published 1998)
228yp	Xeric Dystrocryepts-Vitrandic Eutrocryepts complex, 0 to 15 percent slopes, wet/dry meadows, cryic
242yp	Rock outcrop-Canisrocks-Xeric Dystrocryepts complex, 0 to 35 percent slopes, mountain slopes, cryic
W	Water



SOUTHERN CALIFORNIA EDISON®
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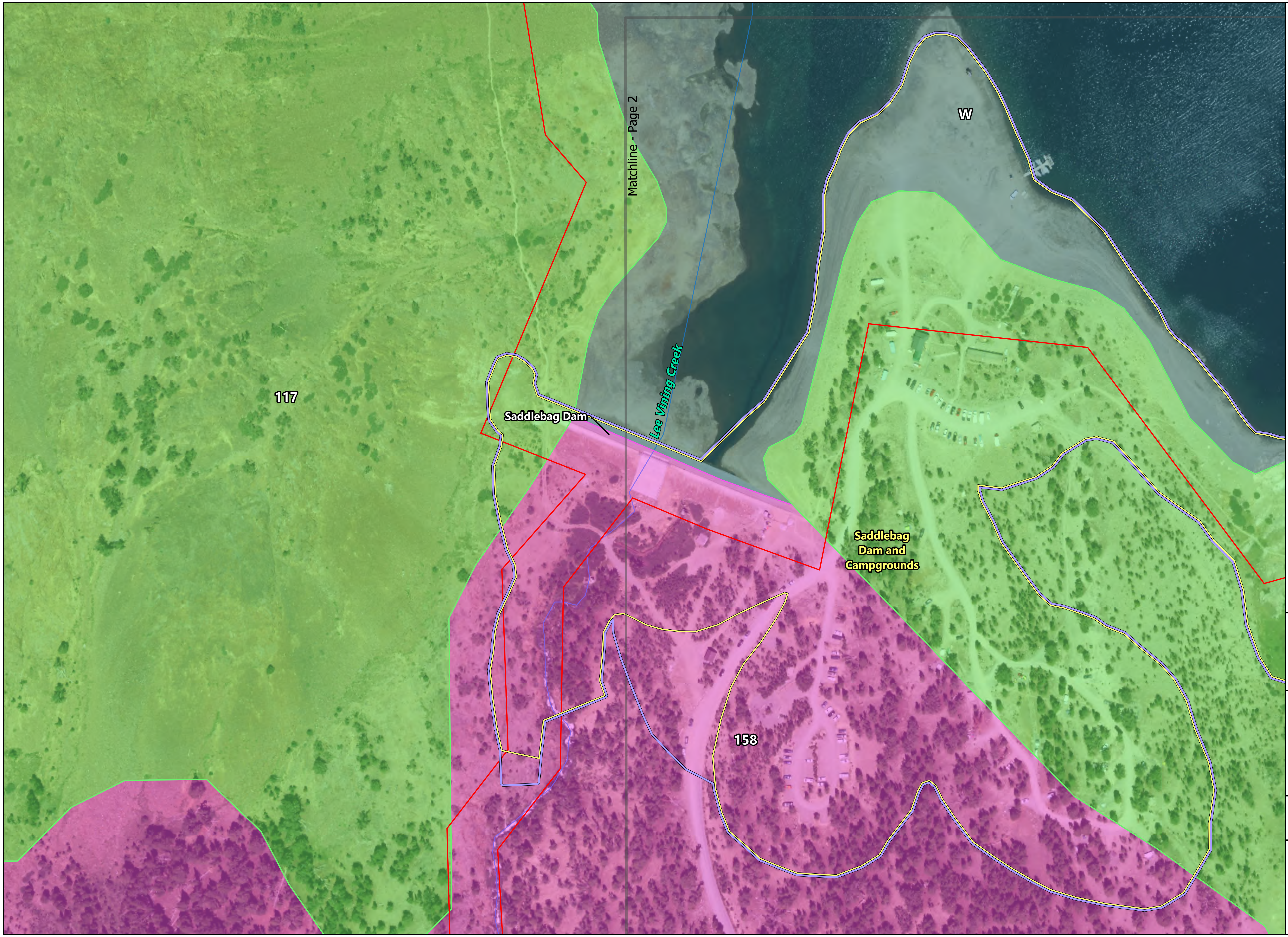
Soil Types

**LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388**

N

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

0 1,250 2,500 Feet



- ▭ Map Extents
- ▭ 2023 Study Area Modification
- ▭ Study Area
- ⬚ County Line
- 🟥 FERC Project Boundary (P-1388)
- — Hydrography

NRCS Soils Type

- ▨ 114
- 🟩 117
- 🟦 117iw
- 🟧 148
- ▨ 157
- 🟪 158
- 🟦 206
- 🟩 210yp
- 🟫 219yp
- 🟥 221
- 🟦 221yp
- 🟨 228yp
- 🟪 242yp
- ▨ W

Base Imagery: NAIP 2020

SOUTHERN CALIFORNIA EDISON®
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Soil Types

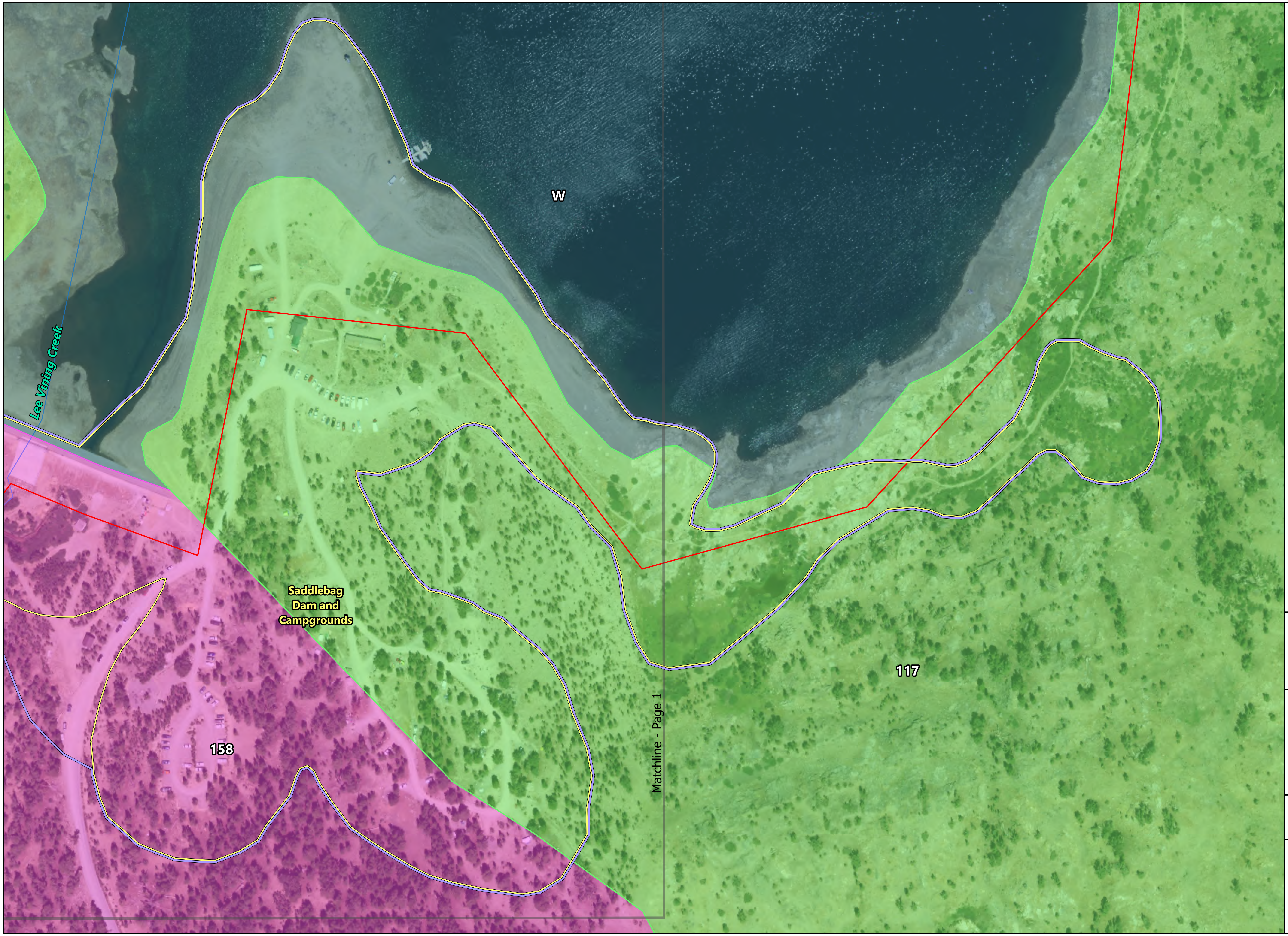
Page 1 of 10

LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

N

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

0 125 250 Feet



Base Imagery: NAIP 2020

SOUTHERN CALIFORNIA EDISON®
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Soil Types

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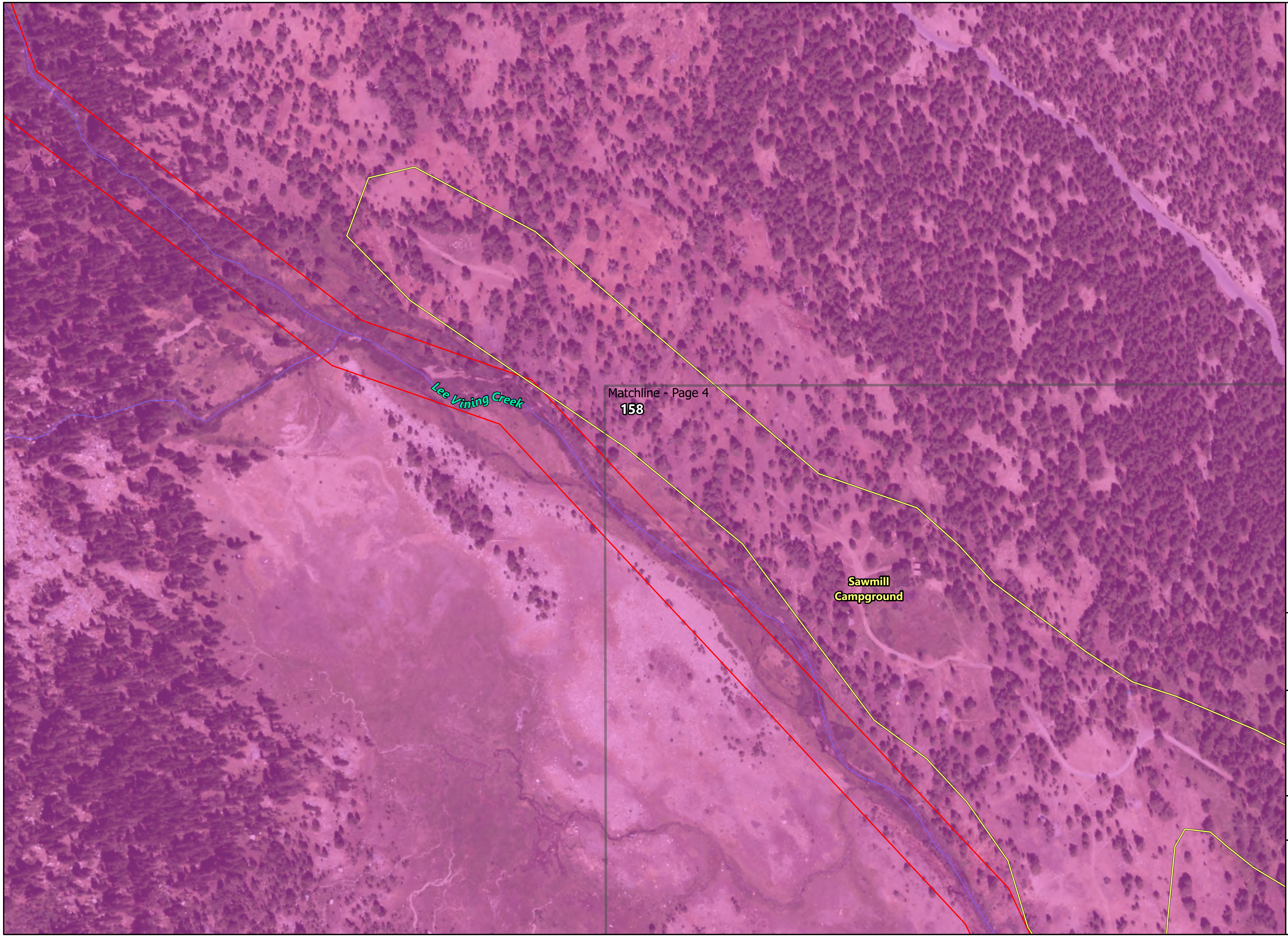
**LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388**

N

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

0 125 250
Feet



- ▭ Map Extents
- ▭ 2023 Study Area Modification
- ▭ Study Area
- ⬚ County Line
- ▭ FERC Project Boundary (P-1388)
- — Hydrography

NRCS Soils Type

- ■ 114
- ■ 117
- ■ 117iw
- ■ 148
- ■ 157
- ■ 158
- ■ 206
- ■ 210yp
- ■ 219yp
- ■ 221
- ■ 221yp
- ■ 228yp
- ■ 242yp
- ■ W

Base Imagery: NAIP 2020

SOUTHERN CALIFORNIA
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Soil Types

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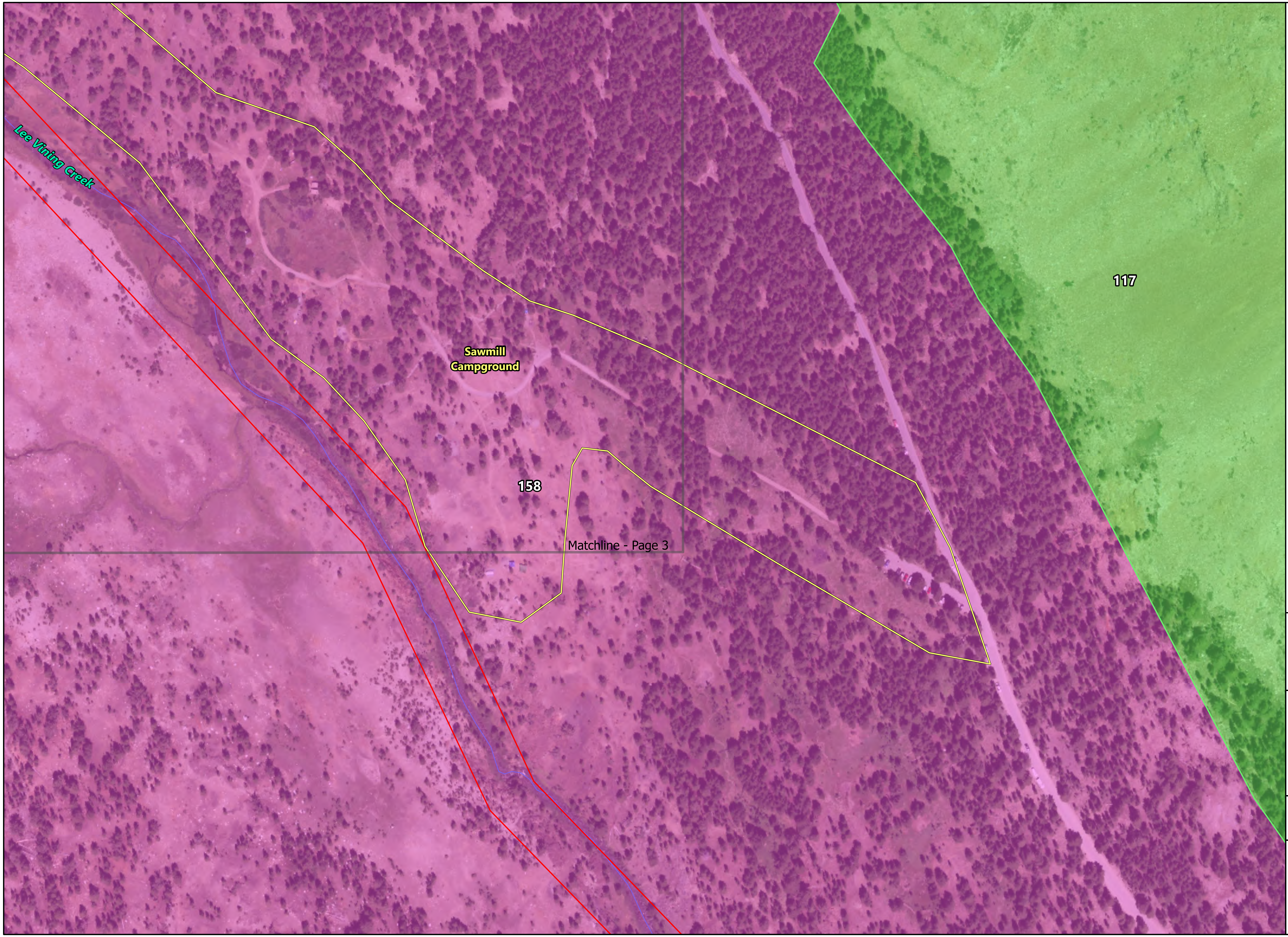
LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

N

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

0 125 250 Feet



Base Imagery: NAIP 2020

SOUTHERN CALIFORNIA EDISON®
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Soil Types

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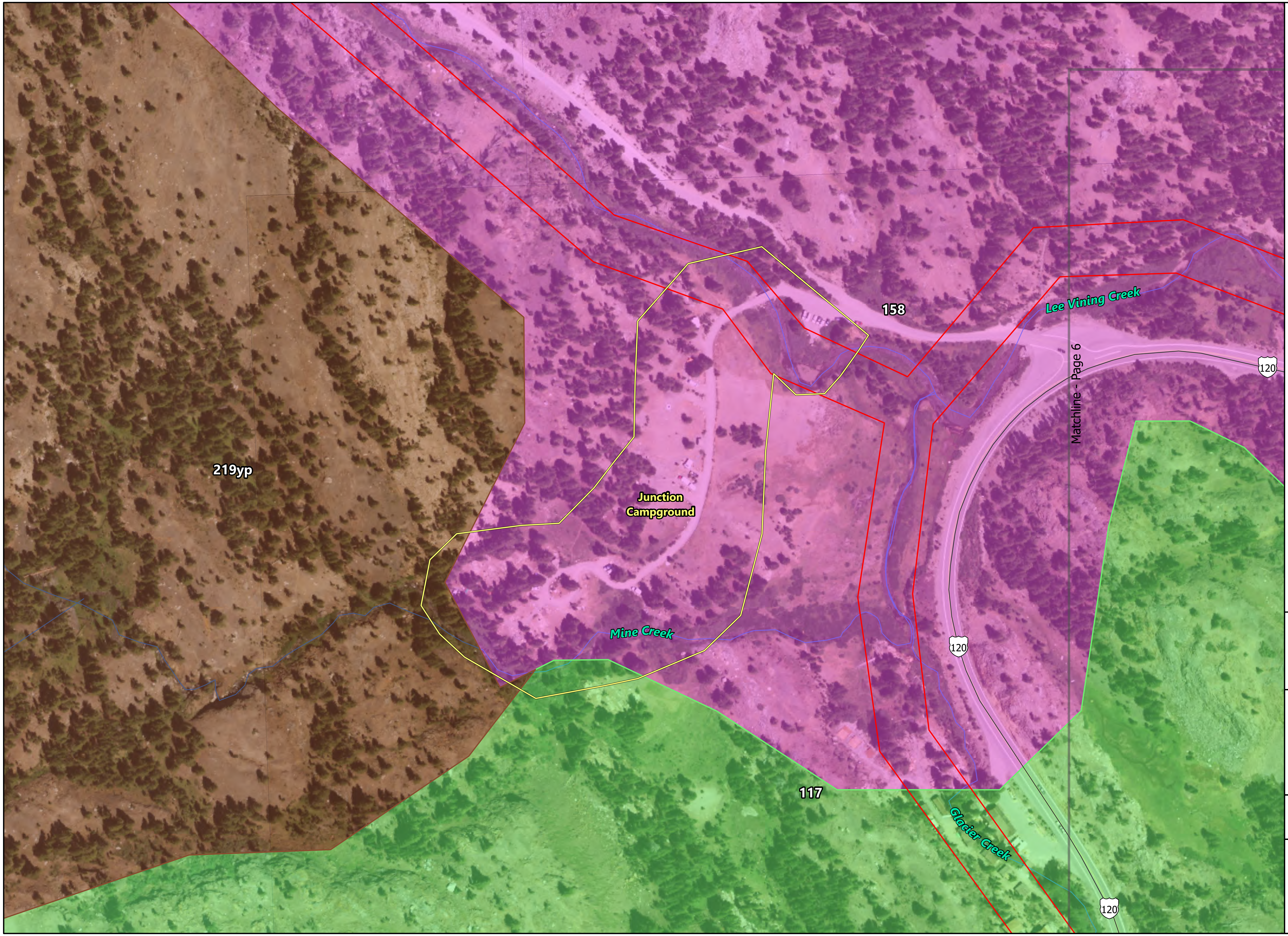
LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983



Base Imagery: NAIP 2020

SOUTHERN CALIFORNIA EDISON®
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Soil Types

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LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

N

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
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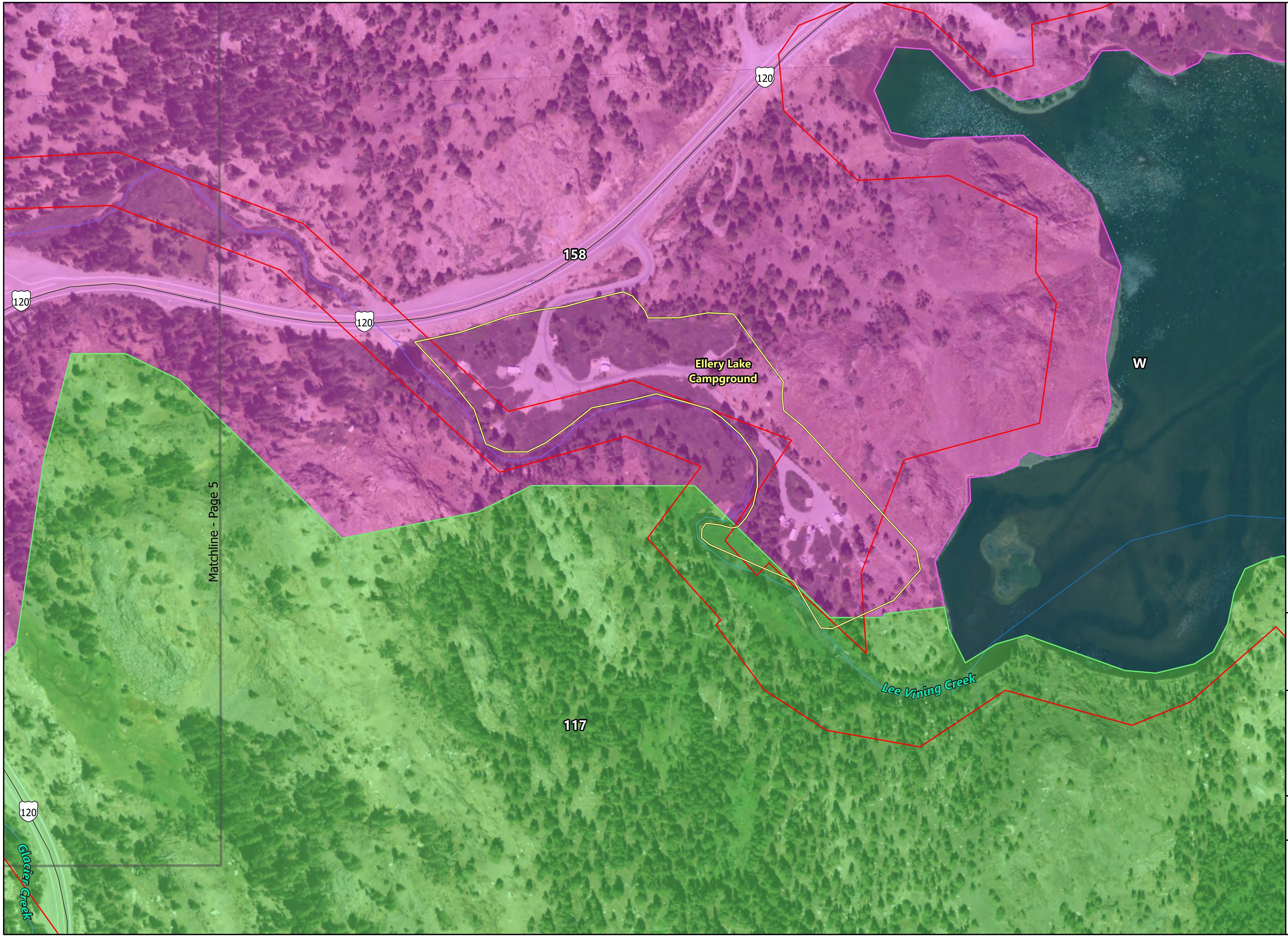
0 125 250
Feet



Base Imagery: NAIP 2020

Soil Types

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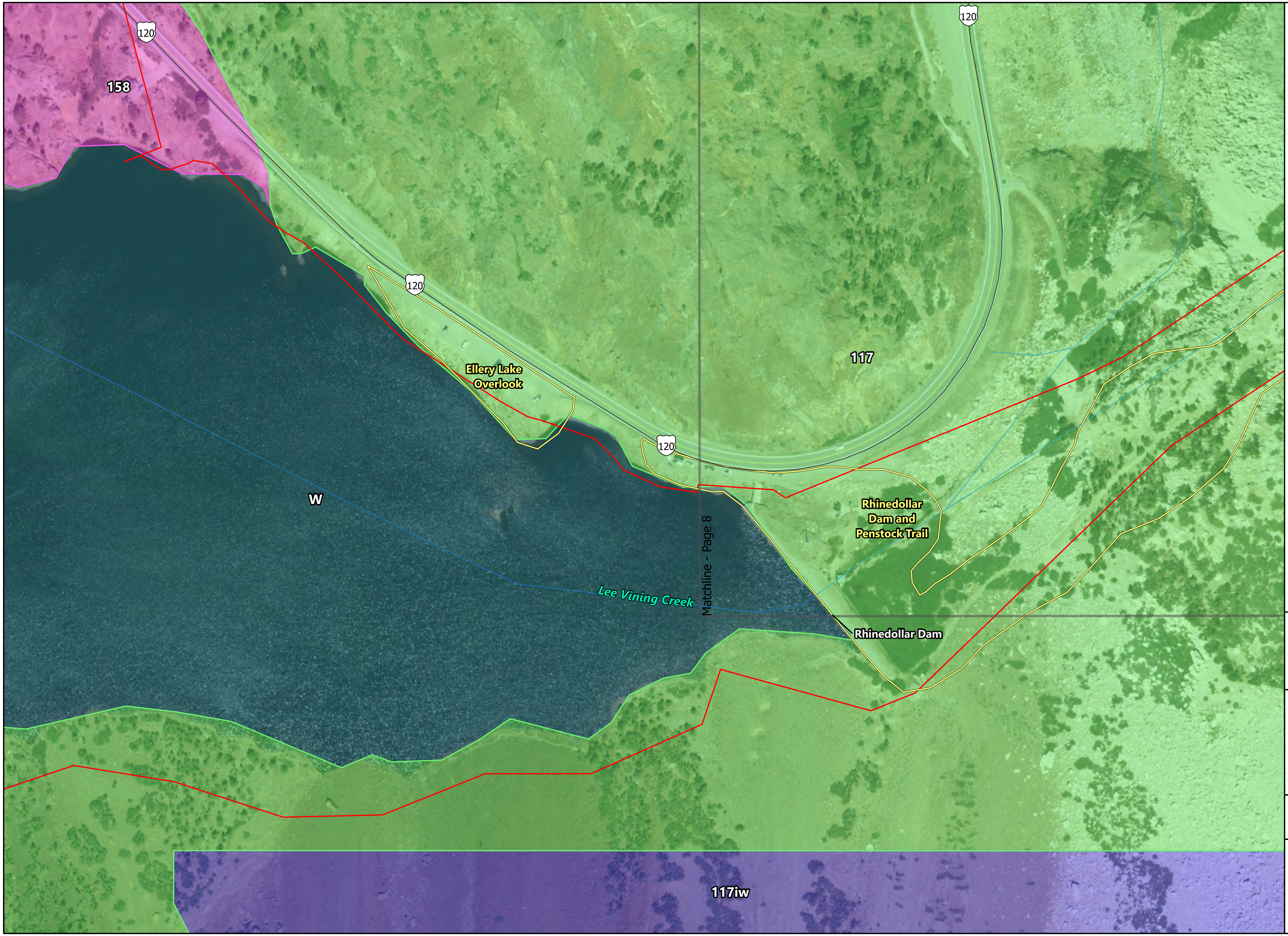
LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983



▭ Map Extents
▭ 2023 Study Area Modification
▭ Study Area
▭ County Line
▭ FERC Project Boundary (P-1388)
— Hydrography

NRCS Soils Type
- ■ 114
- 🟩 117
- 🟦 117iw
- 🟧 148
- ■ 157
- 🟪 158
- 🟦 206
- ■ 210yp
- 🟫 219yp
- ■ 221
- ■ 221yp
- 🟨 228yp
- 🟪 242yp
- ■ W

Base Imagery: NAIP 2020

SOUTHERN CALIFORNIA EDISON®
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Soil Types

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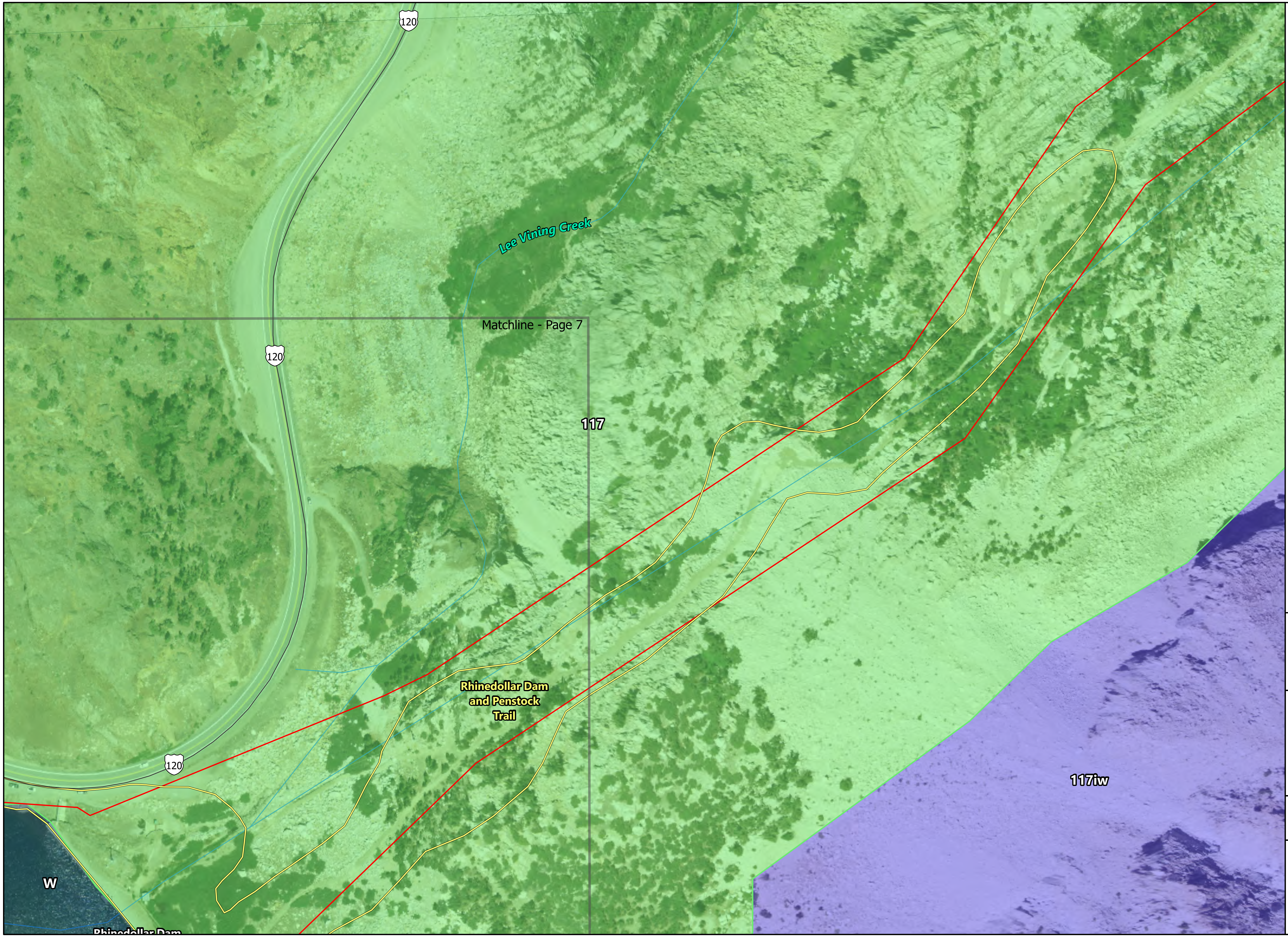
LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

N

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

0 125 250 Feet



SOUTHERN CALIFORNIA EDISON
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Soil Types

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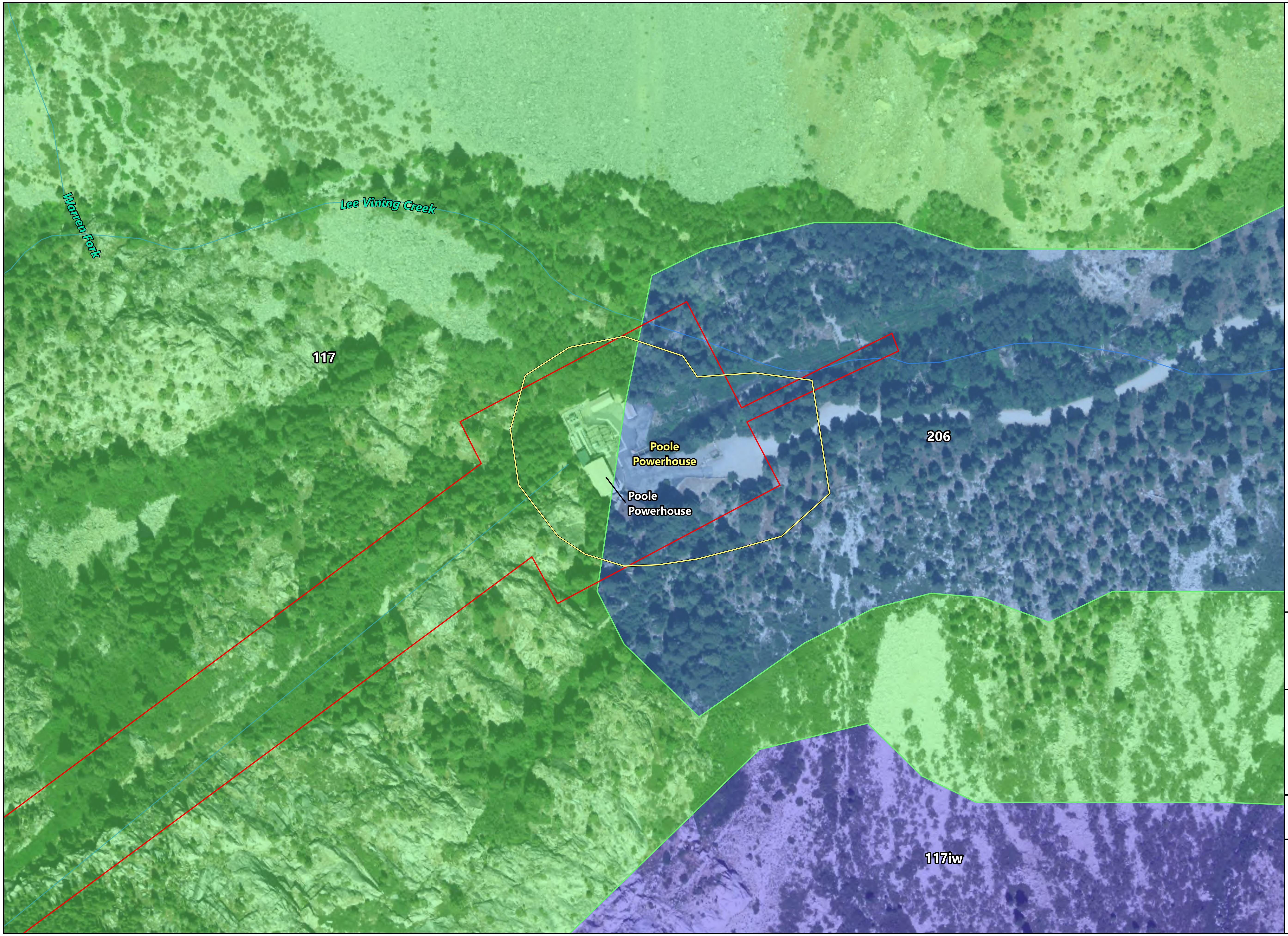
LEE VINING HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983



- ▭ Map Extents
- ▭ 2023 Study Area Modification
- ▭ Study Area
- ⬚ County Line
- 🟥 FERC Project Boundary (P-1388)
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NRCS Soils Type

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- 🟪 242yp
- ■ W

Base Imagery: NAIP 2020

SOUTHERN CALIFORNIA
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Soil Types

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LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

N

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

0 125 250
Feet

- ▭ Map Extents
- ▭ 2023 Study Area Modification
- ▭ Study Area
- ▭ County Line
- ▭ FERC Project Boundary (P-1388)
- ― Hydrography

NRCS Soils Type

- ■ 114
- ■ 117
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- ■ W

Base Imagery: NAIP 2020

SOUTHERN CALIFORNIA EDISON®
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Soil Types

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LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

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Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
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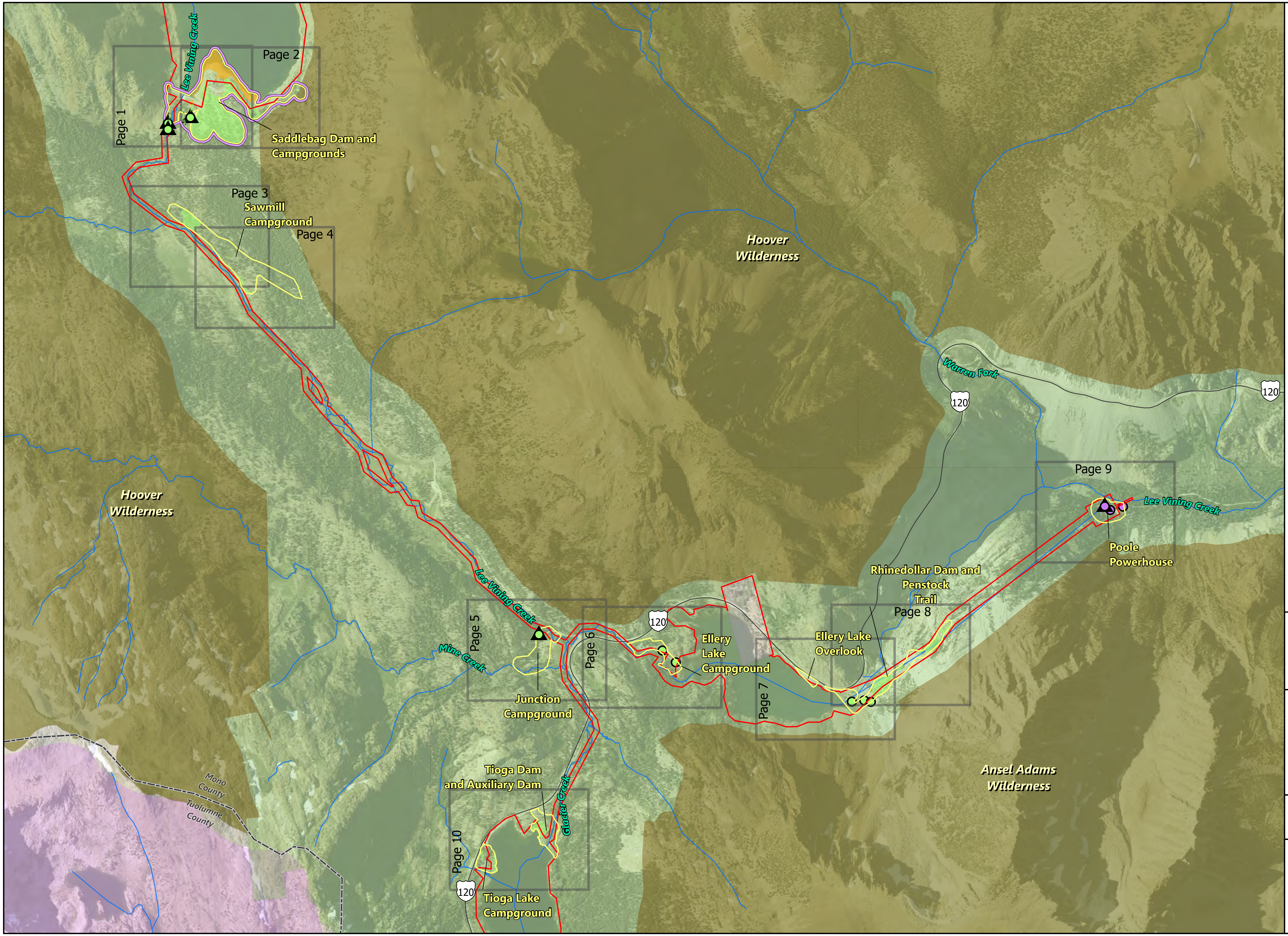
0 125 250 Feet



SOUTHERN CALIFORNIA EDISON
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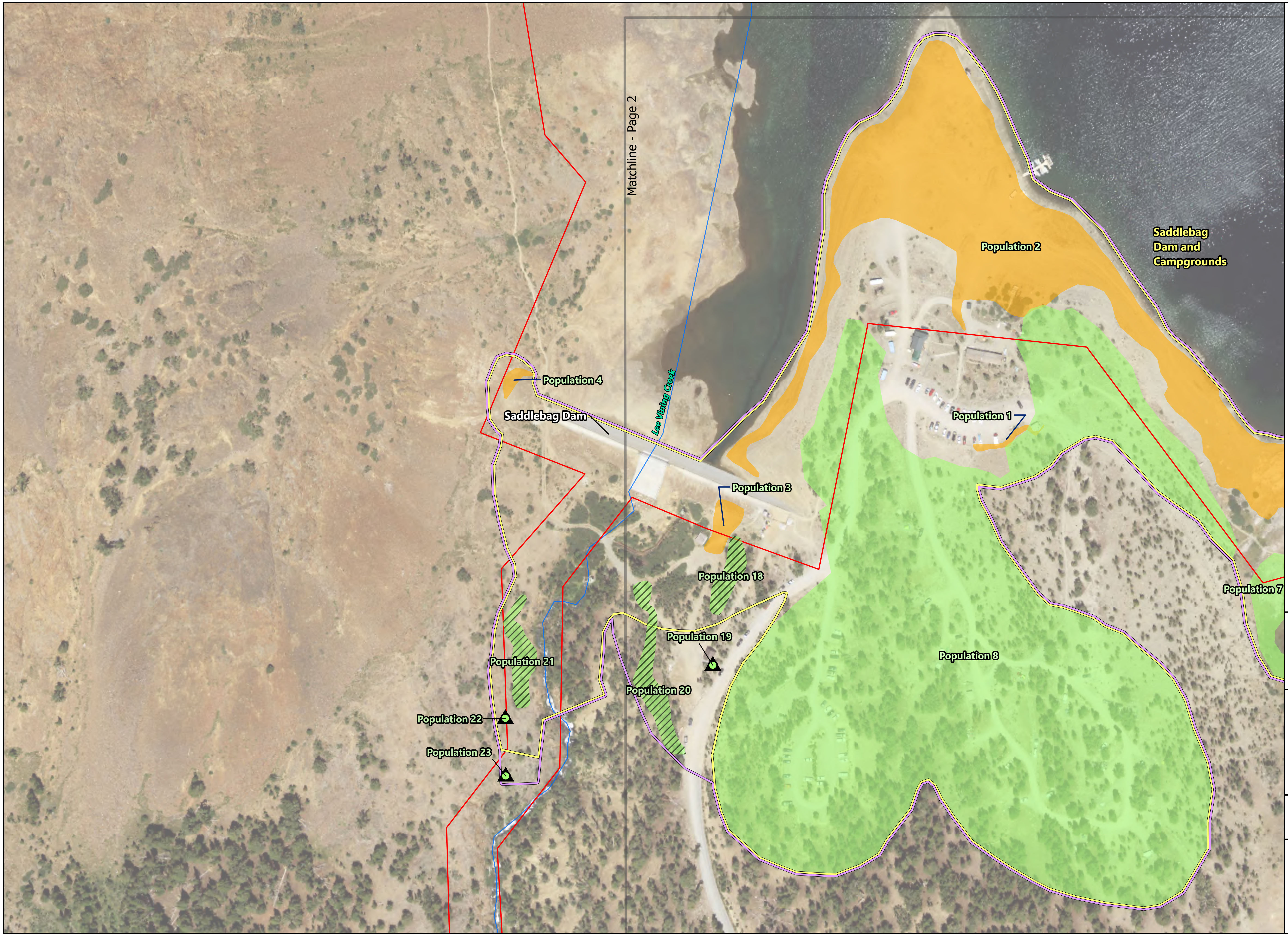
Botanical Resources Study Area – Special-status Plant Species

LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983



▭ 2023 Study Area
▭ 2022 Study Area
▭ Map Extents
▭ FERC Project Boundary (P-1388)
▭ County Line

Special-status Plant Species Populations 2022
🟧 *Agrostis humilis*
🟩 *Pinus albicaulis*

Special-status Plant Species Populations 2023
▨ *Pinus albicaulis*
▲ *Pinus albicaulis*

SOUTHERN CALIFORNIA EDISON®
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Botanical Resources Study Area – Special-status Plant Species

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LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

N

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

0 125 250 Feet

- ▭ 2023 Study Area
- ▭ 2022 Study Area
- ▭ Map Extents
- ▭ FERC Project Boundary (P-1388)
- ⬚ County Line

Special-status Plant Species Populations 2022

- 🟧 *Agrostis humilis*
- 🟩 *Pinus albicaulis*

Special-status Plant Species Populations 2023

- ▨ *Pinus albicaulis*
- ▲ *Pinus albicaulis*

SOUTHERN CALIFORNIA EDISON®
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Botanical Resources Study Area – Special-status Plant Species

Page 2 of 10

LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

N

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
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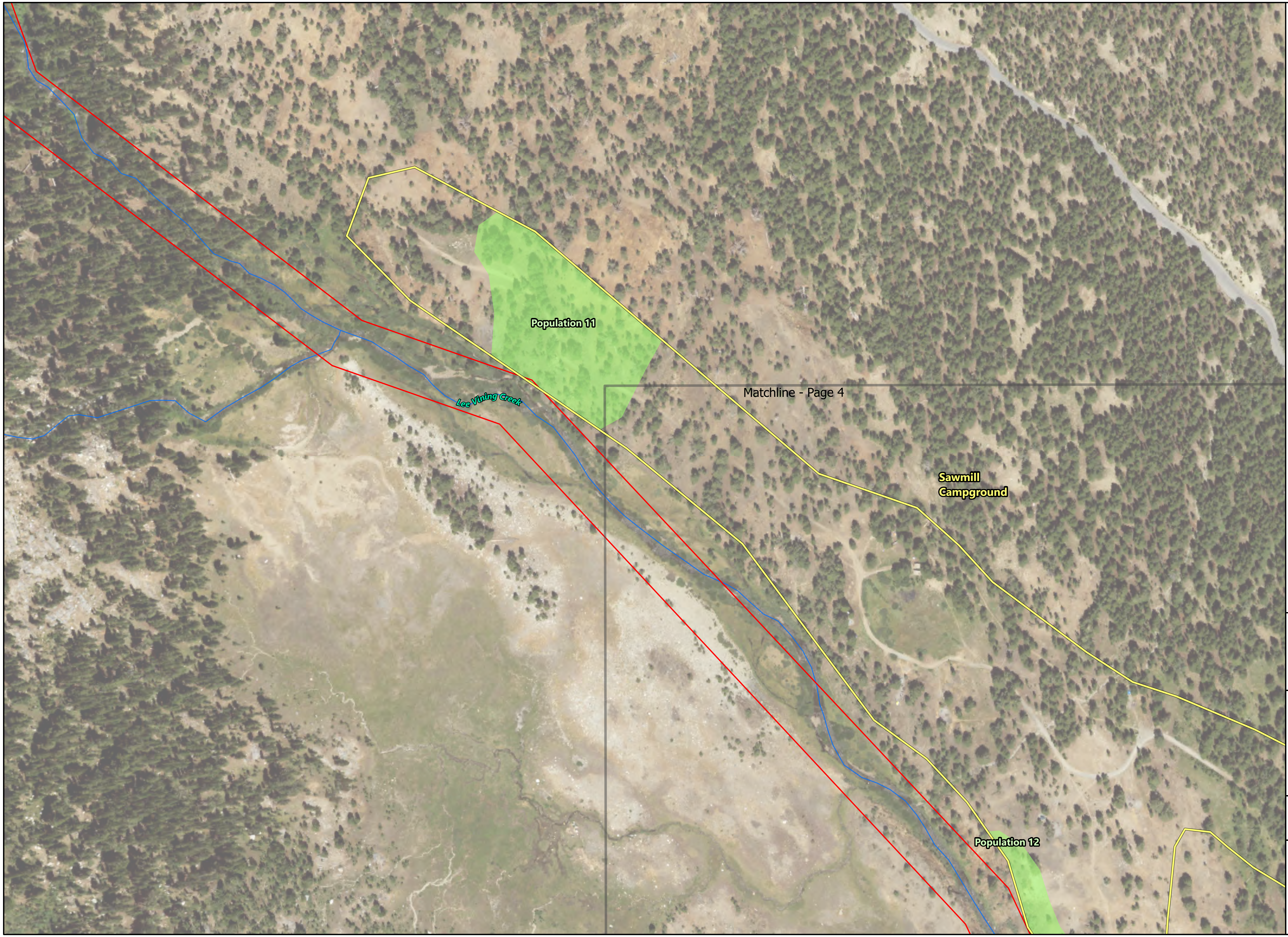
0 125 250 Feet



SOUTHERN CALIFORNIA EDISON
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Botanical Resources Study Area – Special-status Plant Species

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LEE VINING HYDROELECTRIC PROJECT FERC PROJECT NO. 1388

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
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▭ 2023 Study Area
▭ 2022 Study Area
▭ Map Extents
▭ FERC Project Boundary (P-1388)
▭ County Line

Special-status Plant Species Populations 2022

🟩 *Pinus albicaulis*

SOUTHERN CALIFORNIA EDISON
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Botanical Resources Study Area – Special-status Plant Species

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LEE VINING HYDROELECTRIC PROJECT FERC PROJECT NO. 1388

N

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
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0 125 250 Feet

▭ 2023 Study Area
▭ 2022 Study Area
▭ Map Extents
▭ FERC Project Boundary (P-1388)
▭ County Line

Special-status Plant Species Populations 2023

▲ *Pinus albicaulis*

SOUTHERN CALIFORNIA EDISON®
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Botanical Resources Study Area – Special-status Plant Species

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LEE VINING HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

N

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

0 125 250 Feet

▭ 2023 Study Area
▭ 2022 Study Area
▭ Map Extents
▭ FERC Project Boundary (P-1388)
⬚ County Line

Special-status Plant Species Population 2022

● *Pinus albicaulis*

SOUTHERN CALIFORNIA EDISON
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Botanical Resources Study Area – Special-status Plant Species

LEE VINING HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

N

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

0 125 250 Feet

SOUTHERN CALIFORNIA EDISON

Energy for What's Ahead℠

Botanical Resources Study Area – Special-status Plant Species

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LEE VINING HYDROELECTRIC PROJECT FERC PROJECT NO. 1388

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

▭ 2023 Study Area
▭ 2022 Study Area
▭ Map Extents
▭ FERC Project Boundary (P-1388)
⬚ County Line

Special-status Plant Species Populations 2022
🟩 *Pinus albicaulis*

Special-status Plant Species Population 2022
● *Pinus albicaulis*

SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead℠

Botanical Resources Study Area – Special-status Plant Species

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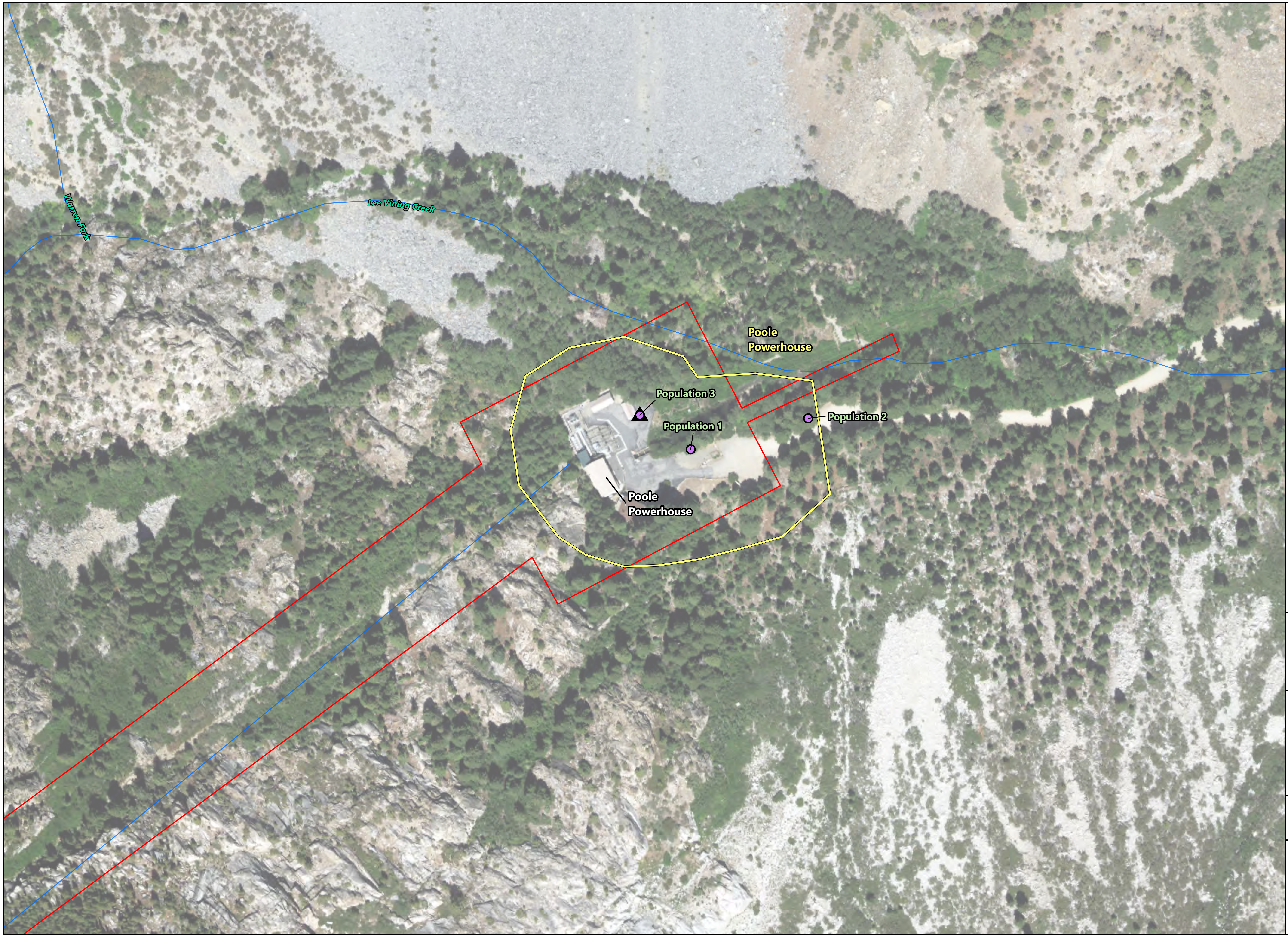
LEE VINING HYDROELECTRIC PROJECT FERC PROJECT NO. 1388

N

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

0 125 250 Feet



▭ 2023 Study Area
▭ 2022 Study Area
▭ Map Extents
▭ FERC Project Boundary (P-1388)
⬚ County Line

Special-status Plant Species Population 2022
● *Populus trichocarpa*

Special-status Plant Species Population 2023
▲ *Populus trichocarpa*

SOUTHERN CALIFORNIA EDISON
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Botanical Resources Study Area – Special-status Plant Species

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LEE VINING HYDROELECTRIC PROJECT FERC PROJECT NO. 1388

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
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SOUTHERN CALIFORNIA EDISON
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Botanical Resources Study Area – Special-status Plant Species

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LEE VINING HYDROELECTRIC PROJECT FERC PROJECT NO. 1388

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
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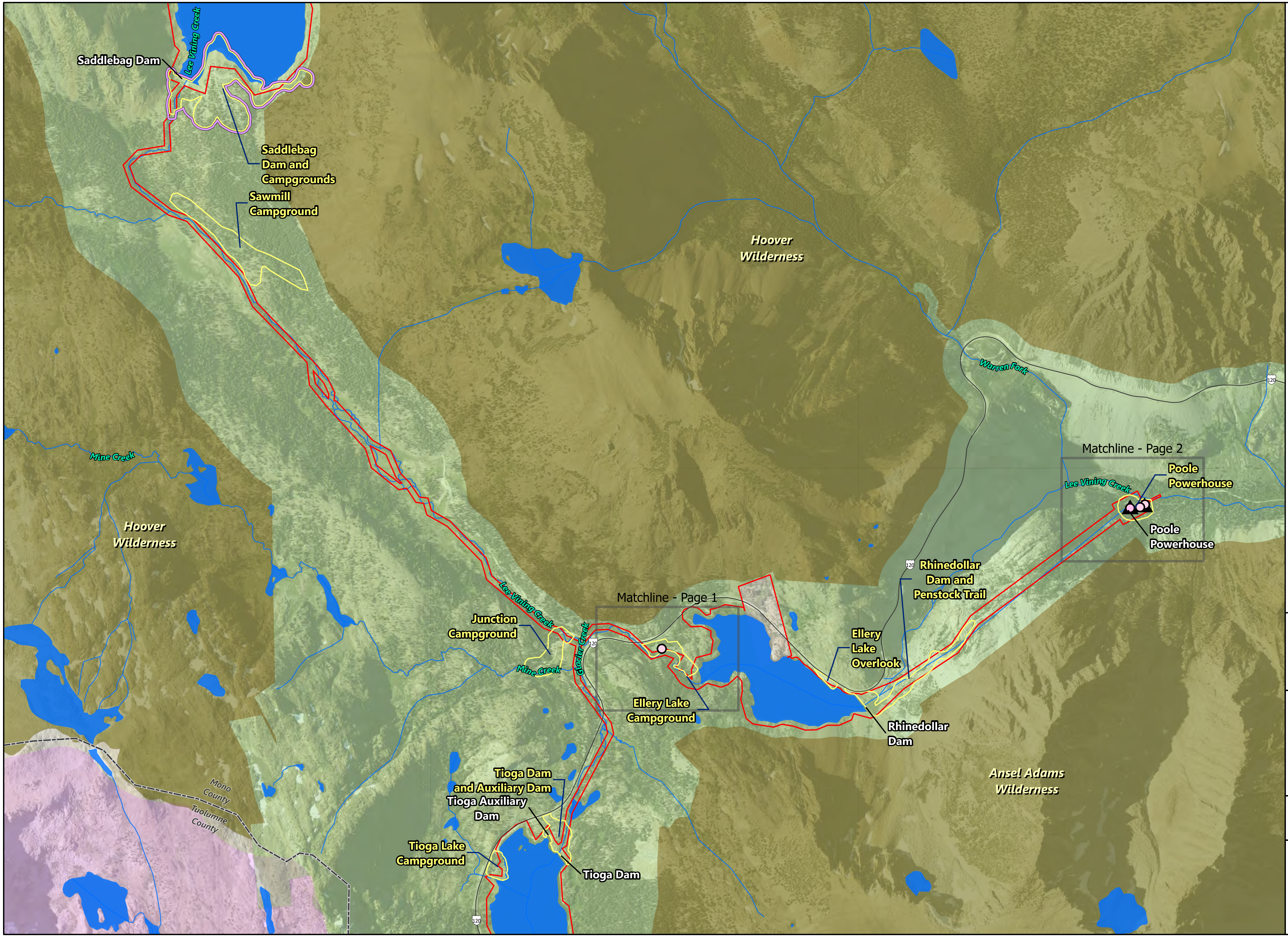

▭ 2023 Study Area Modification
▭ 2022 Study Area
▭ Map Extents
▭ County Line
▭ FERC Project Boundary (P-1388)
🟫 Wilderness Area (Inyo NF)
🟩 Inyo National Forest
🟪 Yosemite National Park

Invasive Plant Populations 2022
○ *Bromus tectorum*

Invasive Plant Populations 2023
▲ *Bromus tectorum*

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Botanical Resources Study Area – Invasive Species

LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

N

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

0 1,000 2,000 Feet

▭ 2023 Study Area Modification
▭ 2022 Botanical Study Area
▭ Map Extents
▭ County Line
▭ FERC Project Boundary (P-1388)
— Stream Flowline

Invasive Plant Populations 2022
○ *Bromus tectorum*

Invasive Plant Populations 2023
▲ *Bromus tectorum*

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Botanical Resources Study Area – Invasive Species

Page 1 of 2

LEE VINING HYDROELECTRIC PROJECT FERC PROJECT NO. 1388

N

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

0 180 360 Feet

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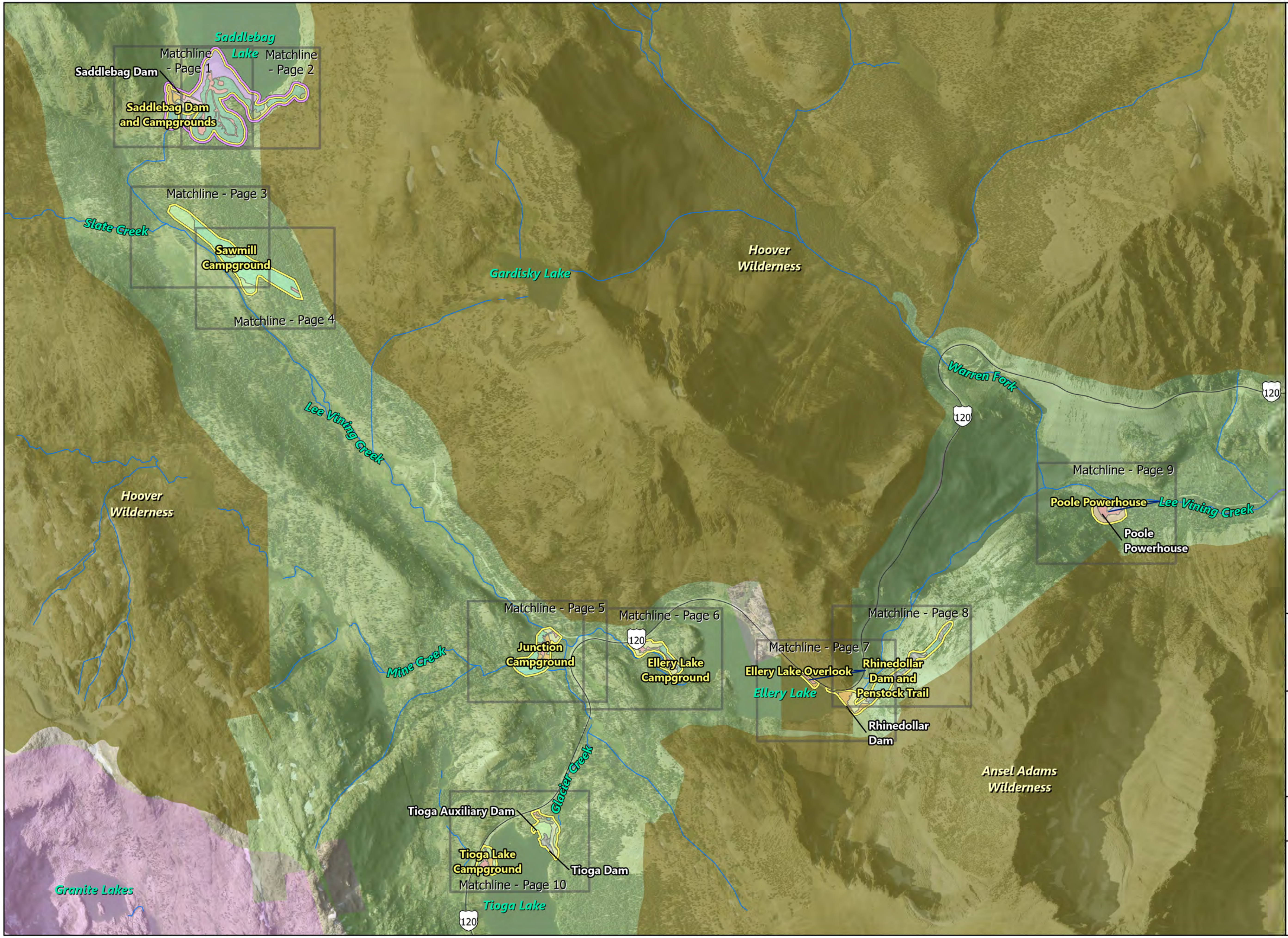
Botanical Resources Study Area – Invasive Species

Page 2 of 2

**LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388**

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983



- ▭ 2023 Study Area Modification
- ▭ Map Extents
- ▭ Study Area
- — Stream Flowline
- 🟫 Wilderness Area (Inyo NF)
- 🟩 Inyo National Forest
- 🟪 Yosemite National Park

Vegetation Type

- 🟨 Alpine Grasses and Forbs
- ▨ Barren
- 🟥 Developed
- 🟪 Lakeshore
- 🟩 Lodgepole Pine
- 🟧 Mixed Conifer - Fir
- 🟥 Non-Vegetated
- 🟦 Quaking Aspen
- 🟦 Water
- 🟩 Wet Meadow
- 🟩 Whitebark Pine - Alpine Grasses and Forbs
- 🟩 Whitebark Pine - Lodgepole Pine
- 🟨 Willow

SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead℠

Vegetation Type Overview

LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

N

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

0 1,000 2,000 Feet

- ▭ 2023 Study Area Modification
- ▭ Study Area
- — Stream Flowline

Vegetation Type

- 🟧 Alpine Grasses and Forbs
- 🟥 Developed
- 🟪 Lakeshore
- ▨ Non-Vegetated
- 🟩 Wet Meadow
- 🟩 Whitebark Pine - Alpine Grasses and Forbs
- 🟨 Willow

Base Imagery: NAIP 2020

SOUTHERN CALIFORNIA EDISON®
Energy for What's Ahead℠

Vegetation Type

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**LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388**

N

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

0 120 240 Feet

Base Imagery: NAIP 2020

SOUTHERN CALIFORNIA EDISON®
Energy for What's Ahead℠

Vegetation Type

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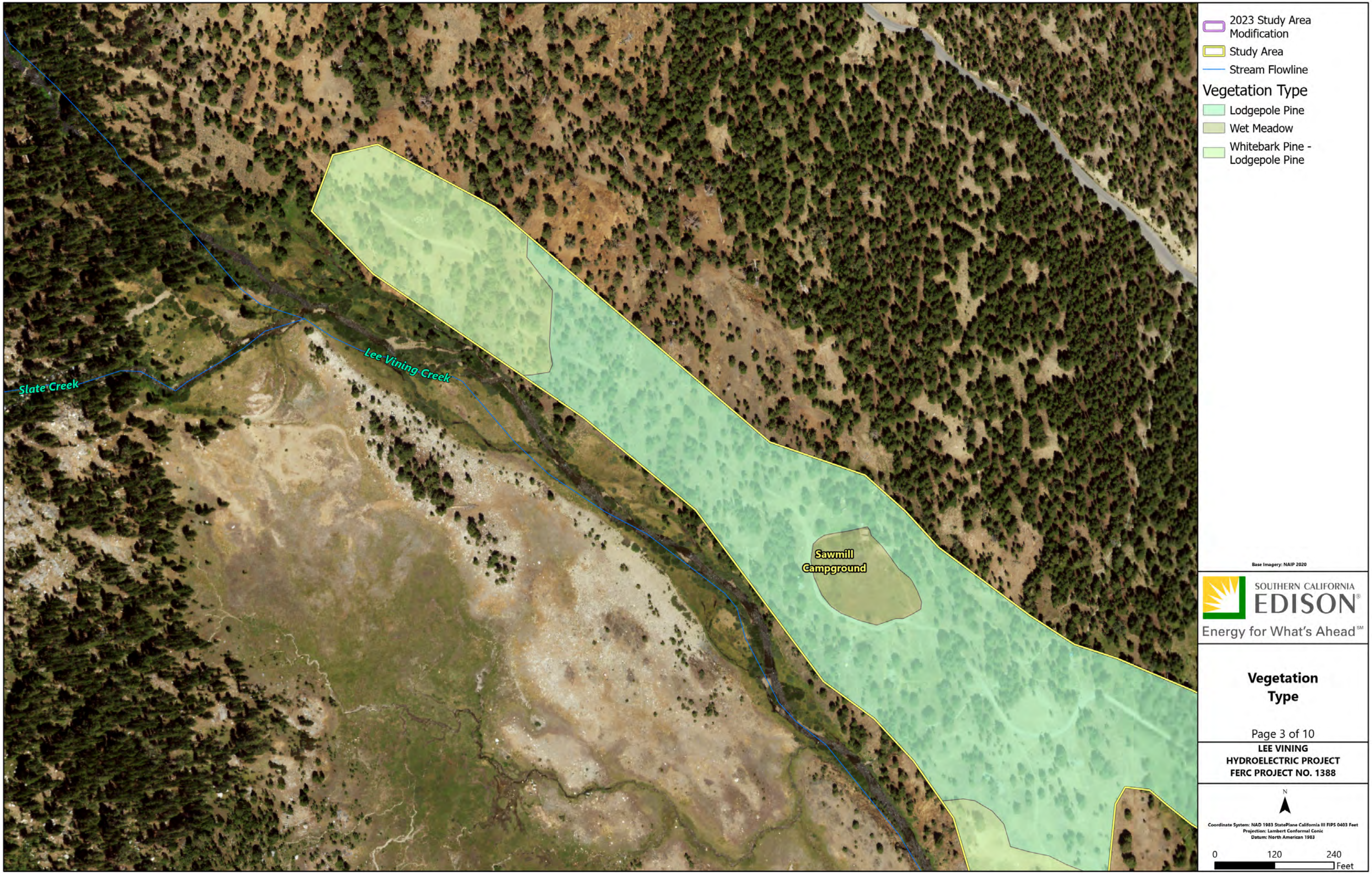
LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983



Base Imagery: NAIP 2020

SOUTHERN CALIFORNIA EDISON®

Energy for What's Ahead℠

Vegetation Type

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LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

2023 Study Area Modification
Study Area
Stream Flowline

Vegetation Type

🟥 Developed
🟩 Lodgepole Pine
🟫 Wet Meadow
🟩 Whitebark Pine - Lodgepole Pine

Base Imagery: NAIP 2020

SOUTHERN CALIFORNIA EDISON®
Energy for What's Ahead℠

Vegetation Type

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LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

N

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

0 120 240 Feet

▭ 2023 Study Area Modification
▭ Study Area
— Stream Flowline

Vegetation Type

🟧 Alpine Grasses and Forbs
🟥 Developed
🟩 Lodgepole Pine
🟨 Willow

Base Imagery: NAIP 2020

SOUTHERN CALIFORNIA EDISON®
Energy for What's Ahead℠

Vegetation Type

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LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

N

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

0 120 240 Feet

▭ 2023 Study Area Modification
▭ Study Area
— Stream Flowline

Vegetation Type

🟥 Developed
🟩 Whitebark Pine - Alpine Grasses and Forbs
🟨 Willow

Base Imagery: NAIP 2020

SOUTHERN CALIFORNIA EDISON®
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Vegetation Type

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LEE VINING HYDROELECTRIC PROJECT FERC PROJECT NO. 1388

N

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

0 120 240 Feet

▭ 2023 Study Area Modification
▭ Study Area
— Stream Flowline

Vegetation Type

🟧 Alpine Grasses and Forbs
▨ Barren
🟥 Developed
🟩 Whitebark Pine - Alpine Grasses and Forbs
🟨 Willow

Base Imagery: NAIP 2020

SOUTHERN CALIFORNIA EDISON®
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Vegetation Type

LEE VINING
HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

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Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
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0 120 240 Feet

▭ 2023 Study Area Modification
▭ Study Area
— Stream Flowline

Vegetation Type

🟧 Alpine Grasses and Forbs
▨ Barren
🟥 Developed
🟩 Whitebark Pine - Alpine Grasses and Forbs
🟨 Willow

Base Imagery: NAIP 2020

SOUTHERN CALIFORNIA EDISON®
Energy for What's Ahead℠

Vegetation Type

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LEE VINING HYDROELECTRIC PROJECT
FERC PROJECT NO. 1388

N

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

0 120 240 Feet

▭ 2023 Study Area Modification

▭ Study Area

— Stream Flowline

Vegetation Type

🟥 Developed

🟧 Mixed Conifer - Fir

🟪 Quaking Aspen

🟨 Willow

Base Imagery: NAIP 2020

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Feet

APPENDIX B
LITERATURE REVIEW RESULTS

Table B-1. Potential for Special-status Plant Species to Occur

Scientific/Common Name [a]	Federal Status [b]	State Status and CRPR Rank [c]	Blooming Period [d]	Habitat	Likelihood for Occurrence Within Study Area [e,f] and Occurrence Notes
Known to Occur					
Agrostis humilis mountain bent grass	SCC	2B.3	Jul–Sep	Perennial herb found in alpine boulder and rock field, meadows and seeps, and subalpine coniferous forest, sometimes in carbonate soil; 3,200–10,500 feet	Known to occur. This species has numerous records in the local watershed and two 1999 records within the study area: (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 study area 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 study 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 study area in 2006 in a meadow across State Route 120 and upstream by 0.1 mile (CHSC99395).
Eriogonum alexanderae Alexander's buckwheat [g]	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 study area in 2002 at the south end of Saddlebag Lake (SEINET 523071).

Scientific/Common Name [a]	Federal Status [b]	State Status and CRPR Rank [c]	Blooming Period [d]	Habitat	Likelihood for Occurrence Within Study Area [e,f] and Occurrence Notes
Pinus albicaulis whitebark pine	Threatened; SCC		NA	Tree found in subalpine forest; 10,000–12,100 feet	Known to occur. This species has been recorded in the study area 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 study area 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 study area. 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 study area 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 study area but outside the local watershed. Suitable habitat is present.
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 study area 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 study area but outside the local watershed. Suitable habitat is present.

Scientific/Common Name [a]	Federal Status [b]	State Status and CRPR Rank [c]	Blooming Period [d]	Habitat	Likelihood for Occurrence Within Study Area [e,f] and Occurrence Notes
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 study area 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 study area 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 study area 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 study area but outside the local watershed. Suitable habitat is present.
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 study area 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 study area. 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 study area. Suitable habitat is present.

Scientific/Common Name [a]	Federal Status [b]	State Status and CRPR Rank [c]	Blooming Period [d]	Habitat	Likelihood for Occurrence Within Study Area [e,f] and Occurrence Notes
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 study area 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 study area 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 study area. Suitable habitat is present.
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 study area 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 study area. 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 study area. 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 study area outside the local watershed. Suitable habitat is present.

Scientific/Common Name [a]	**Federal Status** [b]	**State Status and CRPR Rank** [c]	**Blooming Period** [d]	**Habitat**	**Likelihood for Occurrence Within Study Area** [e,f] **and Occurrence Notes**
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 study area in 1949. Suitable habitat is present.
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 study area 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 study area 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 study area 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 study area 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 study area but outside the local watershed. Suitable habitat is present.

Scientific/Common Name [a]	**Federal Status [b]**	**State Status and CRPR Rank [c]**	**Blooming Period [d]**	**Habitat**	**Likelihood for Occurrence Within Study Area [e,f] and Occurrence Notes**
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 study area in 1934. Suitable habitat is present.
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 study area 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 study area. 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 study area 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 study area. 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 study area 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 study area but outside the local watershed. Suitable habitat is present.

Scientific/Common Name [a]	Federal Status [b]	State Status and CRPR Rank [c]	Blooming Period [d]	Habitat	Likelihood for Occurrence Within Study Area [e,f] 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 study area 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 study area 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 study area 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, limestone sites with carbontate/calcareous substrates; 4,987–6,759 feet	Unlikely to occur. The study area 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 study area 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 study area 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 study area lies outside this species' known geographic range.

Scientific/Common Name [a]	**Federal Status** [b]	**State Status and CRPR Rank** [c]	**Blooming Period** [d]	**Habitat**	**Likelihood for Occurrence Within Study Area** [e,f] **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 study area 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 study area 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; 3,355–11,005 feet	Unlikely to occur. The study area 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 study area 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 study area 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 study area 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 study area lies outside this species' known geographic range.

Scientific/Common Name [a]	Federal Status [b]	State Status and CRPR Rank [c]	Blooming Period [d]	Habitat	Likelihood for Occurrence Within Study Area [e,f] 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 study area 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 study area 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 study area 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 study area 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 study area 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 study area 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 study area 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 study area lies outside this species' known geographic range.

Scientific/Common Name [a]	**Federal Status [b]**	**State Status and CRPR Rank [c]**	**Blooming Period [d]**	**Habitat**	**Likelihood for Occurrence Within Study Area [e,f] 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 study area 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 study area 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 study area lies outside this species' elevation range and known geographic range.
Cinna bolanderi Bolander's woodreed		1B.2	Jul–Sep	Perennial herb found in mesic stream sides of meadows, seeps, and upper montane coniferous forests; 5,479–8,005 feet	Unlikely to occur. The study area 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 study area 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 study area 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 study area lies outside this species' known geographic range.

Scientific/Common Name [a]	**Federal Status [b]**	**State Status and CRPR Rank [c]**	**Blooming Period [d]**	**Habitat**	**Likelihood for Occurrence Within Study Area [e,f] 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 study area 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 study area 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 study area 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 study area 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 study area 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 study area 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 study area 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 study area 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 [d]	Habitat	Likelihood for Occurrence Within Study Area [e,f] 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 study area 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 study area 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 study area 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 study area 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 study area 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 boulder and rock fields; 10,696–11,598 feet	Unlikely to occur. The study area 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 study area lies outside this species' known geographic range.

Scientific/Common Name [a]	**Federal Status** [b]	**State Status and CRPR Rank** [c]	**Blooming Period** [d]	**Habitat**	**Likelihood for Occurrence Within Study Area** [e,f] **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 study area 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 study area 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 study area 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 study area 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 study area 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 study area 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 study area lies outside this species' known geographic range.
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 study area lies outside this species' known geographic range.

Scientific/Common Name [a]	Federal Status [b]	State Status and CRPR Rank [c]	Blooming Period [d]	Habitat	Likelihood for Occurrence Within Study Area [e,f] and Occurrence Notes
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 study area 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 study area 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 study area 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 study area 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 study area 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 study area 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 study area lies outside this species' known geographic range.

Scientific/Common Name [a]	**Federal Status** [b]	**State Status and CRPR Rank** [c]	**Blooming Period** [d]	**Habitat**	**Likelihood for Occurrence Within Study Area** [e,f] **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 study area 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 study area 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 study area 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 study area 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 study area 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 study area lies outside this species' known geographic range.

Scientific/Common Name [a]	**Federal Status** [b]	**State Status and CRPR Rank** [c]	**Blooming Period** [d]	**Habitat**	**Likelihood for Occurrence Within Study Area** [e,f] **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 study area 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 study area 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 study area 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 study area 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 study area 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 study area 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 study area lies outside this species' known geographic range.

Scientific/Common Name [a]	**Federal Status [b]**	**State Status and CRPR Rank [c]**	**Blooming Period [d]**	**Habitat**	**Likelihood for Occurrence Within Study Area [e,f] 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 study area 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 study area 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 study area 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 study area lies outside this species' known geographic range.
Populus angustifolia narrow-leaved cottonwood	SCC	2B.2	Mar–Apr	Perennial deciduous tree that occurs on stream sides; 3,937–5,906 feet	Unlikely to occur. The study area 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 study area 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 study area lies outside this species' known geographic range.

Scientific/Common Name [a]	**Federal Status** [b]	**State Status and CRPR Rank** [c]	**Blooming Period** [d]	**Habitat**	**Likelihood for Occurrence Within Study Area** [e,f] **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 study area 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 study area 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; approximately 9,500 feet	Unlikely to occur. The study area 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 study area 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 study area 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 study area 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 study area lies outside this species' known geographic range.

Scientific/Common Name [a]	**Federal Status** [b]	**State Status and CRPR Rank** [c]	**Blooming Period** [d]	**Habitat**	**Likelihood for Occurrence Within Study Area** [e,f] **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 study area 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 study area 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 study area 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 study area 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 study area 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 study area 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 study area 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 study area contains no suitable habitat for this species.

Scientific/Common Name [a]	**Federal Status** [b]	**State Status and CRPR Rank** [c]	**Blooming Period** [d]	**Habitat**	**Likelihood for Occurrence Within Study Area** [e,f] **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 study area lies outside this species' known geographic range.

CRPR = California Rare Plant Rank; NA = not applicable; study area = Botanical Resources Study Area

[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] Parentheses enclose blooming periods that are rare to uncommon.

[e] Occurrence information provided by the Consortium of California Herbaria (CCH, 2021); number in parentheses is the accession number.

[f] The Botanical Resources Study Area includes the FERC Project Boundary plus a 200-foot buffer extending from the reservoir behind Saddlebag Dam to the Poole Powerhouse tailrace.

[g] This species is not reported in the Jepson eflora except as a note under the treatment for ochre-flowered buckwheat (*Eriogonum ochrocephalum* var. *ochrocephalum*) indicating that it occurs in Nevada near the Mono County line and is unknown from California (Jepson Flora Project, 2022).

Federal Status
Threatened = Listed as Threatened under the Endangered Species Act
Inyo National Forest
SCC = Species of Conservation Concern
State Status
SR = State Rare
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)

Table B-2. Invasive Plants Potentially Occurring in the Botanical Resources Study 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

Table B-3. Invasive Species of Concern to be Mapped in the Botanical Resources Study Area

Scientific Name	Common Name	USFS Treatment Strategy	Cal-IPC Rank
Ailanthus altissima	tree of heaven	1: Eradicate	Moderate
Bassia hyssopifolia	five-hook bassia	3: Contain	Limited
Bromus rubens	red brome	3: Contain	High
Bromus tectorum	cheat grass	3: Contain	High
Centaurea diffusa	diffuse knapweed	1: Eradicate	Moderate
Centaurea solstitialis	yellow star-thistle	1: Eradicate	High
Centaurea stoebe ssp. *micranthos*	spotted knapweed	1: Eradicate	High
Cirsium arvense	Canada thistle	1: Eradicate	Moderate
Cirsium vulgare	bull thistle	3: Contain	Moderate
Convolvulus arvensis	bindweed	3: Contain	
Dipsacus fullonum	wild teasel	2: Control	Moderate
Elaeagnus angustifolia	Russian olive	2: Control	Moderate
Halogeton glomeratus	saltlover	2: Control	Moderate
Holcus lanatus	common velvet grass	3: Contain	Moderate
Lepidium appelianum	white-top	1: Eradicate	
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
Linaria dalmatica ssp. *dalmatica*	dalmatian toadflax	1: Eradicate	Moderate
Linaria vulgaris	butter-and-eggs	1: Eradicate	Moderate
Rhaponticum repens	Russian knapweed	1: Eradicate	Moderate
Robinia pseudoacacia	black locust	3: Contain	Limited
Rubus armeniacus	Himalayan blackberry	2: Control	High
Salsola tragus	Russian thistle	3: Contain	Limited
Saponaria officinalis	bouncingbet	2: Control	Limited
Spartium junceum	Spanish broom	1: Eradicate	High
Tamarix ramosissima	saltcedar	2: Control	High
Tribulus terrestris	puncturevine	2: Control	Limited
Ulmus pumila	Siberian elm	2: Control	

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

APPENDIX C
CALIFORNIA NATIVE SPECIES FIELD SURVEY FORMS

CNDDB Online Field Survey Form Report

California Natural Diversity Database
Department of Fish and Wildlife
1416 9th Street, Suite 1266
Sacramento, CA 95814
Fax: 916.324.0475
cnddb@wildlife.ca.gov
www.dfg.ca.gov/biogeodata/cnddb/

This data has been reported to the CNDDB, but may not have been evaluated by the CNDDB staff

Source code RUD22F0005
Quad code 3711983
Occ. no.
EO index no.
Map index no.

Scientific name: *Agrostis humilis*

Common name: mountain bent grass

Date of field work (mm-dd-yyyy): 08-19-2022

Comment about field work date(s): Surveys performed 7/18-7/22 and 8/15-8/19 in 2022

OBSERVER INFORMATION

Observer: Allison D. Rudalevige

Affiliation: Psomas

Address: 5 Hutton Centre Drive, Suite 300 , Santa Ana, CA 92707

Email: allison.rudalevige@psomas.com

Phone: (714) 325-0129

Other observers: Sandra Leatherman

DETERMINATION

Keyed in: Jepson eFlora (2022)

Compared w/ specimen at:

Compared w/ image in:

By another person:

Other:

Identification explanation:

Identification confidence: Confident

Species found: Yes **If not found, why not?**

Level of survey effort: Pedestrian surveys following Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities (CDFW, 2018). Large population sizes estimated.

Total number of individuals: 854

Collection? Yes **Collection number:** SJL 1347

Museum/Herbarium: University of California, Riverside Herbarium

PLANT INFORMATION

Phenology:

10 %	0 %	90 %
vegetative	**flowering**	**fruiting**

SITE INFORMATION

Habitat description: Growing in relatively barren areas along the lakeshore and below Saddlebag Dam, sometimes among scattered boulders and cobbles. Associated species include Agrostis scabra, Carex abrupta, Calyptridium umbellatum, Penstemon newberryi, Solidago multiradiata, and Oreostemma alpigenum var. andersonii.

Slope: gently sloping

Land owner/manager: Inyo National Forest

Aspect: varies

Site condition + population viability: Good

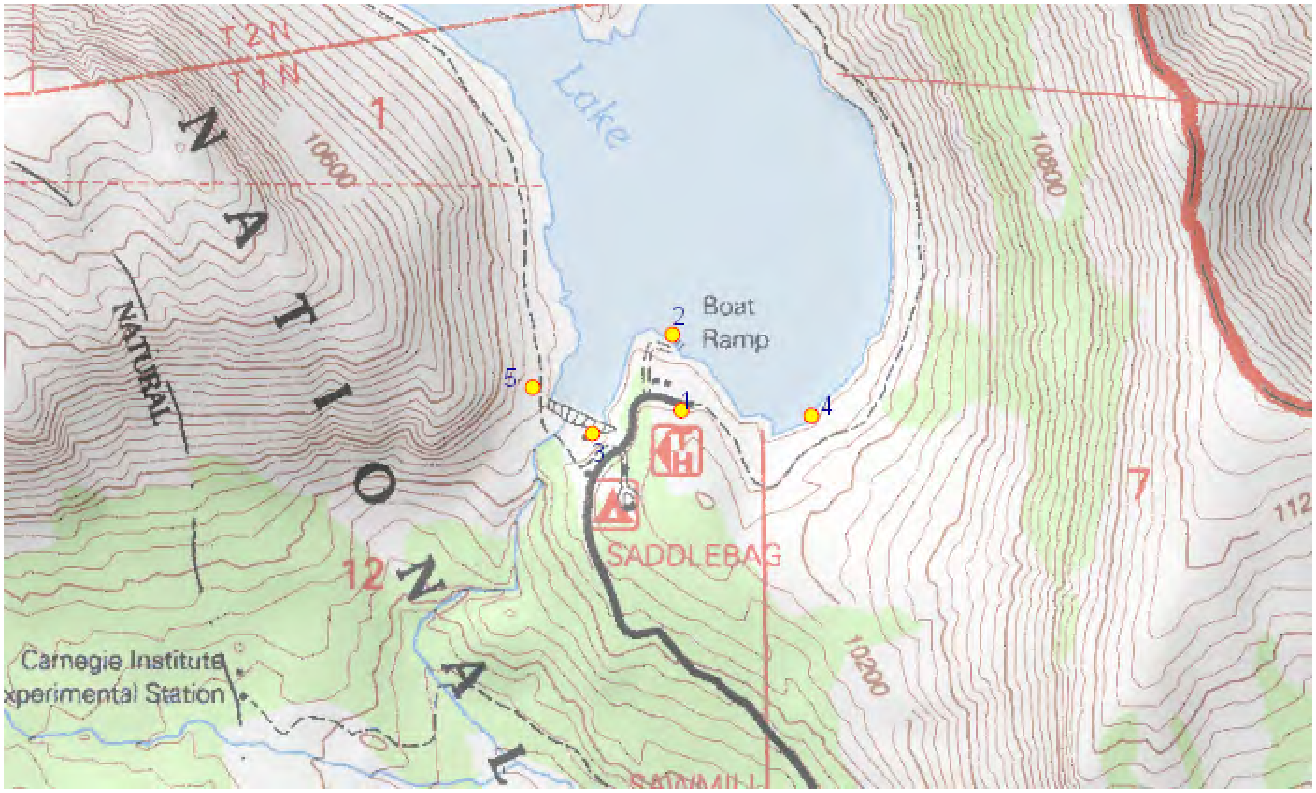
Immediate & surrounding land use: Undeveloped open space, Saddlebag Lake, Saddlebag Dam, campground and recreational uses

Visible disturbances: recreational activity

Threats: recreational activity

General comments: Reservoir levels fluctuate within and between years.

MAP INFORMATION



ID	County	24K Quadrangle	Elev. (ft)	Latitude NAD83	Longitude NAD83	UTM E NAD83	UTM N NAD83	UTM Zone
	Mono	Tioga Pass	10124	37.96562	-119.27079	300524	4204433	11
1	Public Land Survey	Feature Comment						
	M T01N R24E 12	Population 1; 106 individuals						

ID	County	24K Quadrangle	Elev. (ft)	Latitude NAD83	Longitude NAD83	UTM E NAD83	UTM N NAD83	UTM Zone
	Mono	Tioga Pass	10064	37.96699	-119.27100	300510	4204586	11
2	Public Land Survey	Feature Comment						
	M T01N R24E 12	Population 2; 500 individuals						

ID	County	24K Quadrangle	Elev. (ft)	Latitude NAD83	Longitude NAD83	UTM E NAD83	UTM N NAD83	UTM Zone
	Mono	Tioga Pass	10072	37.96520	-119.27283	300344	4204391	11
3	Public Land Survey	Feature Comment						
	M T01N R24E 12	Population 3; 48 individuals						

ID	County	24K Quadrangle	Elev. (ft)	Latitude NAD83	Longitude NAD83	UTM E NAD83	UTM N NAD83	UTM Zone
	Mono	Tioga Pass	10068	37.96552	-119.26781	300786	4204416	11
4	Public Land Survey	Feature Comment						
	M T01N R25E 7	Population 5; 100 individuals						

ID	County	24K Quadrangle	Elev. (ft)	Latitude NAD83	Longitude NAD83	UTM E NAD83	UTM N NAD83	UTM Zone
5	Mono	Tioga Pass	10104	37.96603	-119.27421	300225	4204487	11
	Public Land Survey	**Feature Comment**						
	M T01N R24E 12	Population 4; 100 individuals						

The mapped feature is accurate within: 20 m

Source of mapped feature: Garmin handheld GPS

Mapping notes: Data on individual populations included in attachments.

Location/directions comments:

Attachment(s): Agrostis humilis.kmz

APPENDIX D
PLANT COMPENDIUM

Species [a]	**Common Name**	**SD**	**RD**	**TD**	**PP**	**SM**	**JC**	**EC**	**EO**	**TC**
PTERIDOPHYTES – FERNS AND FERN ALLIES										
PTERIDACEAE – BRAKE FAMILY										
Cryptogramma acrostichoides	American parsley fern	x		x						
Pelleae breweri	Brewer's cliff-brake	x					x	x		
SELLAGINELLACEAE – SPIKE-MOSS FAMILY										
Selaginella watsonii	Watson's spike-moss	x	x	x		x	x	x	x	
WOODSIACEAE – CLIFF FERN FAMILY										
Cystopteris fragilis	brittle fragile fern	x								
GYMNOSPERMS – CONIFERS										
CUPRESSACEAE – CYPRESS FAMILY										
Juniperus communis	common juniper		x	x						
Juniperus occidentalis	western juniper		x	x						
PINACEAE – PINE FAMILY										
Abies concolor	white fir				x		x			x
***Pinus albicaulis* (federally Threatened)**	**whitebark pine**	**x**	**x**	**x**		**x**		**x**		**x**
Pinus contorta ssp. *murrayana*	lodgepole pine	x	x	x		x	x	x		x
Pinus jeffreyi	Jeffrey pine				x					
EUDICOTS – FLOWERING PLANTS										
APIACEAE – CARROT FAMILY										
Angelica capitellata	ranger's buttons	x	x	x	x [d]		x	x		
Cymopterus terebinthinus	turpentine cymopterus	x				x				
Ligusticum grayi	Gray's ligusticum	x								
Perideridia parishii	Parish's yampah	x				x		x		
APOCYNACEAE – DOGBANE FAMILY										
Apocynum androsaemifolium	bitter dogbane				x					
ASTERACEAE – SUNFLOWER FAMILY										
Achillea millefolium	common yarrow	x	x			x	x	x		
Agoseris monticola	Sierra Nevada agoseris	x								

Species [a]	**Common Name**	**SD**	**RD**	**TD**	**PP**	**SM**	**JC**	**EC**	**EO**	**TC**
Agoseris cf. parviflora	Steppe agoseris		x							
Ambrosia sp. [d]	ragweed				x					
Antennaria media	Rocky Mountain pussy-toes		x	x	x	x	x	x		x
***Antennaria pulchella* (CRPR 4.3)**	**beautiful pussy-toes**	**x**				**x**	**x**			**x**
Antennaria rosea ssp. *rosea*	rosy pussy-toes	x	x	x	x	x	x	x		x
Arnica lanceolata ssp. *prima*	clasping arnica	x						x		
Arnica latifolia	broadleaf arnica							x		
Arnica mollis	hairy arnica	x		x				x		
Artemisia ludoviciana	silver wormwood	x			x			x		
Artemisia spiciformis	snowfield sagebrush		x	x	x		x	x		x
Artemisia tridentata	big sagebrush	x			x	x	x		x	x
Cirsium andersonii	Anderson's thistle					x				
Cirsium scariosum	meadow thistle	x	x	x		x	x	x		x
Dieteria canescens	hoary-aster	x			x					
Ericameria discoidea	whitestem goldenbush	x	x							
Ericameria nauseosa	rubber rabbitbrush				x			x	x	
Erigeron algidus	Sierra fleabane	x	x		x					
Erigeron compositus	cut-leaf fleabane		x							
Erigeron coulteri	Coulter’s fleabane					x				
Hulsea algida	Pacific alpinegold		x						x	
Oreostemma alpigenum var. *andersonii*	Anderson’s mountaincrown	x		x		x	x			x
Packera pauciflora	alpine groundsel	x		x			x			
Packera subnuda var. *subnuda*	cleftleaf groundsel	x								x
Pyrrocoma apargioides	alpine flames	x	x							
Raillardella argentea	silky raillardella	x		x		x				

Species [a]	Common Name	SD	RD	TD	PP	SM	JC	EC	EO	TC
Raillardella scaposa	scaped raillardella	x								
Senecio integerrimus var. *exaltatus*	Columbia ragwort					x	x	x		
Senecio scorzonella	Sierra ragwort	x				x				
Senecio triangularis	arrowleaf ragwort	x					x			
Solidago multiradiata	northern goldenrod	x	x	x	x		x	x		
Sphaeromeria cana	gray chickensage		x							
Stephanomeria tenuifolia	narrow-leaved wire-lettuce				x					
Symphyotrichum spathulatum	western mountain aster	x								
Taraxacum officinale[b]	common dandelion		x	x	x	x	x	x		x
Tragopogon sp. [b]	salsify							x		
Wyethia mollis	soft mule's ears					x				
BORAGINACEAE – BORAGE FAMILY										
Cryptantha sp.	cryptantha				x					
Hackelia micrantha	meadow stickseed	x				x				
Oreocarya nubigena	Sierra oreocarya		x			x				
Phacelia hastata var. *compacta*	compact spear phacelia	x	x	x			x	x	x	x
BRASSICACEAE – MUSTARD FAMILY										
Barbarea orthoceras	straight-horned winter cress		x							
Boechera elkoensis	Elko rockcress		x							
Boechera depauperata	soldier rockcress		x							
Boechera howellii	Howell's rockcress	x			x					x
Boechera lyallii	Lyall's rockcress	x			x					
Boechera pauciflora	hairy stem rockcress		x		x					
Boechera platysperma	pioneer rockcress	x				x				
Boechera retrofracta	reflexed rockcress				x				x	

Species [a]	**Common Name**	**SD**	**RD**	**TD**	**PP**	**SM**	**JC**	**EC**	**EO**	**TC**
Boechera stricta	Drummond's rockcress	x								
Cardamine breweri	Brewer's bitter-cress				x					
Descurainia californica	California tansy mustard		x		x			x		
Draba albertina	Alberta draba	x		x		x	x			
Erysimum perenne	perennial wallflower	x		x	x	x	x	x		x
Lepidium virginicum	Virginia peppergrass	x	x		x			x	x	
Rorippa curvipes	curved-footed yellow cress	x								
Sisymbrium altissimum[b]	tumble mustard				x					
Streptanthus tortuosus	mountain jewelflower	x				x	x	x	x	
***Subularia aquatica* ssp. *americana* (CRPR 4.3)**	**water awlwort**		**x**							
CAPRIFOLIACEAE – HONEYSUCKLE FAMILY										
Symphoricarpos rotundifolius	round-leaved snowberry			x	x			x		
CARYOPHYLLACEAE – PINK FAMILY										
Eremogone kingii var. *glabrescens*	King's sandwort	x	x			x				
Sagina saginoides	Arctic pearlwort	x								
Silene sp.	campion	x	x	x	x					
Spergularia rubra	red sand-spurrey	x							x	
Stellaria longipes ssp. *longipes*	Goldie's starwort			x						
CHENOPODIACEAE – GOOSEFOOT FAMILY										
Chenopodium atrovirens	dark green pigweed		x		x					
Dysphania ambrosioides	Mexican tea				x					
CORNACEAE – DOGWOOD FAMILY										
Cornus sericea	American dogwood		x		x					
CRASSULACEAE – STONECROP FAMILY										
Rhodiola integrifolia ssp. *integrifolia*	western roseroot	x	x			x				

Species [a]	**Common Name**	**SD**	**RD**	**TD**	**PP**	**SM**	**JC**	**EC**	**EO**	**TC**
Sedum lanceolatum	spearleaf stonecrop	x	x			x	x			
Sedum spathulifolium	broadleaf stonecrop					x	x			
ERICACEAE – HEATH FAMILY										
Cassiope mertensiana	white heather	x	x							
Kalmia polifolia	swamp laurel	x		x						
Orthilia secunda	one-sided wintergreen			x						
Phyllodoce breweri	Brewer’s mountain heather	x	x	x		x	x	x		x
Pyrola asarifolia ssp. *asarifolia*	bog wintergreen	x		x		x				
Rhododendron columbianum	western Labrador tea		x							
Vaccinium cespitosum	dwarf bilberry	x		x		x	x			x
Vaccinium uliginosum ssp. *occidentale*	western blueberry	x		x						
EUPHORBIACEAE – SPURGE FAMILY										
Euphorbia serpillifolia ssp. *serpillifolia*	thyme-leaf sandmat				x					
FABACEAE – LEGUME FAMILY										
Lupinus argenteus	silvery lupine			x	x					
Lupinus lepidus var. *lobbii*	Lobb's dwarf lupine	x	x	x		x				x
Lupinus polyphyllus	meadow lupine						x			
Trifolium monanthum ssp. *monanthum*	carpet clover		x	x		x	x[d]			x
FAGACEAE – OAK FAMILY										
Chrysoepis sempervirens	bush chinquapin				x					
GENTIANACEAE – GENTIAN FAMILY										
Gentianopsis holopetala	Sierra gentian	x		x						
GROSSULARIACEAE – GOOSEBERRY FAMILY										
Ribes cereum	wax current		x	x	x			x		x
Ribes montigenum	western prickly gooseberry	x	x			x		x		
HYPERICACEAE – ST. JOHN'S WORT FAMILY										
Hypericum anagalloides	tinker's penny	x		x			x	x		x

Species [a]	**Common Name**	**SD**	**RD**	**TD**	**PP**	**SM**	**JC**	**EC**	**EO**	**TC**
LAMIACEAE – MINT FAMILY										
Monardella odoratissima ssp. *pallida*	pale coyote-mint	x	x	x		x	x	x	x	x
Stachys rigida var. *rigida*	rigid hedge-nettle				x					
MONTIACEAE – MINER'S LETTUCE FAMILY										
Calyptridium monospermum	oneseed pussypaws	x	x	x		x	x	x		x
Calyptridium umbellatum	umbel-bearing pussypaws	x				x				
Lewisia nevadensis	Nevada lewisia	x		x		x	x			x
Lewisia tripylla	thread-leaved lewisia					x				
Montia chamissoi	toad lily					x				
ONAGRACEAE – EVENING PRIMROSE FAMILY										
Chamerion angustifolium ssp. *circumvagum*	fireweed	x	x	x	x	x	x	x		x
Epilobium ciliatum ssp. *ciliatum*	fringed willowherb					x		x		x
Epilobium ciliatum ssp. *glandulosum*	glandular fringed willowherb	x	x	x			x			x
Epilobium hallianum	glandular willowherb	x				x				
Epilobium minutum	chaparral willowherb		x							
Epilobium obcordatum	rockfringe	x								
Gayophytum diffusum	spreading groundsmoke	x			x	x		x		
Gayophytum sp.	groundsmoke		x			x				x
OPHIOGLOSSACEAE – ADDER'S-TONGUE FAMILY										
Botrychium simplex	least moonwort	x								
OROBANCHACEAE – BROOM-RAPE FAMILY										
Castilleja appelgatei ssp. *pallida*	pale Applegate's paintbrush	x			x	x				x
Castilleja miniata ssp. *miniata*	giant red paintbrush				x					
Castilleja nana	alpine paintbrush	x				x				x
Pedicularis attollens	little elephant's head	x	x							

Species [a]	**Common Name**	**SD**	**RD**	**TD**	**PP**	**SM**	**JC**	**EC**	**EO**	**TC**
Pedicularis groenlandica	elephant's head	x		x						x
PAPAVERACEAE – POPPY FAMILY										
Dicentra uniflora	steer’s head	x								
PARNASSIACEAE – GRASS-OF-PARNASSUS FAMILY										
Parnassia palustris	marsh grass-of-Parnassus	x		x			x			
PHYRMACEAE – LOPSEED FAMILY										
Erythranthe breweri	Brewer’s monkeyflower				x					
Erythranthe floribunda	many-flowered monkeyflower	x								
Erythranthe lewisii	Lewis's monkeyflower				x					
Erythranthe primuloides	primrose monkeyflower	x		x		x	x			x
Erythranthe suksdorfii	Sukdort’s monkeyflower	x								
Erythranthe tilingii	Tiling's monkeyflower	x	x		x	x				x
PLANTAGINACEAE – PLANTAIN FAMILY										
Penstemon davidsonii var. *davidsonii*	Davidson’s beardtongue	x	x							
Penstemon heterodoxus var. *heterodoxus*	Sierra beardtongue	x	x	x		x	x	x		x
Penstemon newberryi	Newberry's beardtongue	x		x	x	x	x	x		x
Penstemon rostriflorus	beak-flower beardtongue				x			x		
Penstemon rydbergii var. *oreocharis*	Rydberg’s beautiful mountain beardtongue						x	x		x
Veronica serpyllifolia ssp. *humifusa*	sprawling thyme-leaved speedwell	x			x			x		
Veronica wormskjoldii	American alpine speedwell			x			x			x
POLEMONIACEAE – PHLOX FAMILY										
Ipomopsis aggregata ssp. *aggregata*	clustered scarlet gilia				x					
Linanthus pungens	granite gilia	x	x	x	x			x	x	x

Species [a]	**Common Name**	**SD**	**RD**	**TD**	**PP**	**SM**	**JC**	**EC**	**EO**	**TC**
POLYGONACEAE – BUCKWHEAT FAMILY										
Bistorta bistortoides	western bistort	x		x		x	x	x		x
Eriogonum esmeraldense var. *esmeraldense*	Esmeralda wild buckwheat		x							
Eriogonum incanum	frosted wild buckwheat	x	x	x	x	x	x	x		x
Eriogonum nudum var. *deductum*	reduced wild buckwheat	x			x	x	x	x	x	x
Eriogonum ovalifolium	cushion wild buckwheat	x	x	x						
Eriogonum umbellatum	sulphur flower				x					
Polygonum aviculare	knotweed		x		x					
Polygonum douglasii	Douglas' knotweed					x				
Polygonum polygaloides ssp. *kelloggii*	Kellogg’s knotweed	x								x
Rumex paucifolius	alpine sheep sorrel	x	x	x		x	x	x		x
Rumex salicifolius	willow dock		x		x			x		
Rumex triangulivalvus	triangular-valved dock		x					x	x	x
PRIMULACEAE – PRIMROSE FAMILY										
Primula cf. *tetrandra*	alpine shooting star			x		x	x			x
RANUNCULACEAE – BUTTERCUP FAMILY										
Aquilegia formosa	handsome columbine	x	x	x			x			
Aquilegia pubescens	downy columbine		x		x					
Ranunculus alismifolius var. alismellus	alisma-leaved buttercup	x		x		x	x			x
Thalictrum fendleri	Fendler's meadow-rue	x	x	x	x	x	x	x		
RHAMNACEAE – BUCKTHORN FAMILY										
Ceanothus cordulatus	mountain whitethorn				x					
ROSACEAE – ROSE FAMILY										
Cercocarpus ledifolius	curl-leaf mountain-mahogany				x					
Dasiphora fruticosa	shrubby cinquefoil	x	x							

Species [a]	**Common Name**	**SD**	**RD**	**TD**	**PP**	**SM**	**JC**	**EC**	**EO**	**TC**
Drymocallis glandulosa	glandular drymocallis							x		
Drymocallis hansenii	Yosemite woodbeauty			x		x				
Drymocallis lactea var. *lactea*	Sierran woodbeauty	x		x			x	x		x
Fragaria virginiana	mountain strawberry						x	x		
Geum macrophyllum	large-leaved avens	x				x	x	x		x
Holodiscus discolor	oceanspray			x	x	x		x		
Horkelia fusca	pinewoods horkelia	x		x		x	x			x
Potentilla breweri	Brewer's cinquefoil	x								x
Potentilla gracilis var. *fastigiata*	Nuttall’s cinquefoil	x	x							
Prunus emarginata	bitter cherry				x					
Purshia tridentata	bitterbrush		x		x	x				
Rosa woodsia	Wood’s rose		x		x					
Sibbaldia procumbens	creeping sibbaldia	x	x	x		x	x	x		x
Spiraea splendens	splendid spiraea	x				x	x			x
RUBIACEAE – COFFEE FAMILY										
Galium bifolium	Low Mountain bedstraw					x		x		
Kelloggia galioides	galium-like kelloggia				x					
SAPINDACEAE – SOAPBERRY FAMILY										
Acer glabrum	mountain maple				x					
SALICACEAE – WILLOW FAMILY										
Populus tremuloides	quaking aspen				x					
Populus trichocarpa	black cottonwood				x					
Salix boothii	Booth’s willow					x				
Salix eastwoodiae	Sierra willow			x		x		x		x
Salix jepsonii	Jepson's willow	x	x							
Salix melanopsis	dusky willow									x
Salix orestera	gray-leafed Sierra willow	x	x	x	x	x	x	x	x	x

Species [a]	**Common Name**	**SD**	**RD**	**TD**	**PP**	**SM**	**JC**	**EC**	**EO**	**TC**
Salix planifolia	tea-leafed willow							x		
SAXIFRAGACEAE – SAXIFRAGE FAMILY										
Heuchera rubescens	pink alumroot				x					
Micranthes aprica	sun-loving saxifrage	x		x		x	x			x
Pectiantia breweri	Brewer’s pectiantia				x			x		x
SCROPHULARIACEAE – FIGWORT FAMILY										
Verbascum sp. [b]	mullein				x					
VALERIANACEAE – VALERIAN FAMILY										
Valeriana californica	California valerian	x				x				
VIBURNACEAE – MUSKROOT FAMILY										
Sambucus racemosa	red elderberry			x						
VIOLACEAE – VIOLET FAMILY										
Viola macloskeyi	MacLoskey’s violet			x				x		x
Viola purpurea	mountain violet	x								
Viola sp. [c]	violet			x						
MONOCOTS – GRASSES AND ALLIES										
ALLIACEAE – ONION FAMILY										
Allium obtusum	blunt onion					x				
Allium validum	Pacific onion	x	x	x		x	x	x		x
CYPERACEAE – SEDGE FAMILY										
Carex abrupta	abrupt-beaked sedge	x				x			x	x
Carex amplifolia	big-leaf sedge			x						x
Carex aquatilis var. *aquatilis*	water sedge			x						
***Carex congdonii* (CRPR 4.3)**	**Congdon’s sedge**							**x**		
Carex douglasii	Douglas' sedge		x	x	x					
Carex filifolia var. *erostrata*	sagebrush sedge	x	x	x		x	x	x		x
Carex fissuricola	cleft sedge					x				
Carex heteroneura	smooth-fruited sedge		x							
Carex infirminervia	weakly veined sedge	x								
Carex lenticularis var. *lipocarpa*	lakeshore sedge				x					x

Species [a]	Common Name	SD	RD	TD	PP	SM	JC	EC	EO	TC
Carex multicostata	many-ribbed sedge	x								x
Carex raynoldsii	Raynold's sedge					x			x	
Carex simulata	short-beaked sedge				x					
Carex spectabilis	showy sedge	x				x		x	x	
Carex utriculata	southern beaked sedge							x		
IRIDACEAE – IRIS FAMILY										
Iris missouriensis	western blue flag		x			x				
JUNCACEAE – RUSH FAMILY										
Juncus balticus ssp. *ater*	Baltic rush	x	x	x		x	x	x	x	x
Juncus mertensianus	Merten’s rush					x				
Juncus parryi	Parry's rush	x	x		x	x	x	x	x	x
Juncus xiphioides	iris-leaved rush			x						
Luzula comosa var. *laxa*	flattened tufted hairy wood rush	x					x			
Luzula orestera	mountain-dwelling hairy wood rush	x		x						
Luzula parviflora	small-flowered wood rush		x	x						x
LILIACEAE – LILY FAMILY										
Calochortus leichtlinii	Leichtlin’s mariposa lily	x			x	x				
Fritillaria sp.	fritillary					x				
Maianthemum stellatum	little false Solomon’s-seal				x					
MELANTHIACEAE – CAMAS FAMILY										
Veratrum californicum var. *californicum*	Californian false hellebore						x	x		
ORCHIDACEAE – ORCHID FAMILY										
Platanthera dilatata var. *leucostachys*	white-flowered bog-orchid	x								
POACEAE – GRASS FAMILY										
***Agrostis humilis* (CRPR 2B.3)**	**mountain bent grass**	**x**								
Agrostis idahoensis	Idaho redtop	x							x	

Species [a]	**Common Name**	**SD**	**RD**	**TD**	**PP**	**SM**	**JC**	**EC**	**EO**	**TC**
Agrostis scabra	rough bent grass	x			x					
Agrostis variabilis	mountain bent grass	x								
Briza minor	small quaking grass				x					
Bromus sitchensis var. *carinatus*	California brome				x	x	x	x		
Bromus tectorum[b]	cheat grass				x			x		
Calamagrostis canadensis	bluejoint reed grass	x			x					
Danthonia intermedia ssp. *intermedia*	intermediate oat grass	x	x	x						x
Danthonia unispicata	one-spike oat grass	x								
Deschampsia cespitosa ssp. *cespitosa*	tufted hairgrass	x		x		x				
Deschampsia elongata	slender hair grass							x		x
Elymus elymoides var. *elymoides*	common squirreltail	x	x	x	x	x	x	x	x	x
Elymus trachycaulus ssp. *trachycaulus*	slender wheat grass		x	x	x	x		x		
Hordeum brachyantherum	northern barley		x		x	x	x	x		x
Muhlenbergia filiformis	pull-up muhly	x	x	x			x			
Phleum alpinum	alpine timothy	x	x	x		x	x	x		x
Phleum pratense[b]	cultivated timothy		x							
Poa pratensis ssp. *pratensis*[b]	Kentucky blue grass		x			x	x	x	x	x
Poa secunda ssp. *secunda*	one-sided blue grass				x					
Poa wheeleri	Wheeler's blue grass	x	x	x	x	x	x	x		x
Sporobolus cryptandrus	sand dropseed				x					
Stipa kingii	King’s rice grass	x		x		x	x			x
Stipa hymenoides	sand rice grass				x					
Stipa nelsonii var. *dorei*	mountain needle grass					x				
Stipa occidentalis	western needle grass				x	x		x		
Trisetum spicatum	spike false oat	x	x		x		x			x

Species [a]	Common Name	SD	RD	TD	PP	SM	JC	EC	EO	TC
THEMIDACEAE – BRODIAEA FAMILY										
Triteleia montana	mountain triteleia					x				

SD = Saddlebag Dam and Campgrounds; RD = Rhinedollar Dam and Penstock Trail; TD = Tioga Dam; PP = Poole Powerhouse; SM = Sawmill Campground; JC = Junction Campground; EC = Ellery Lake Campground; EO = Ellery Lake Overlook; TC = Tioga Lake Campground; x = species observed; CRPR = California Rare Plant Rank

[a] Special-status species are shown in bold; their status is listed after their scientific name.

[b] Non-native species.

[c] Characteristics present for an identification to species were not present during the survey; however, vegetative characteristics determined that the species was not special status (i.e., golden violet [*Viola purpurea* ssp. *aurea*]).

[d] Species was vegetative; identification not confirmed.