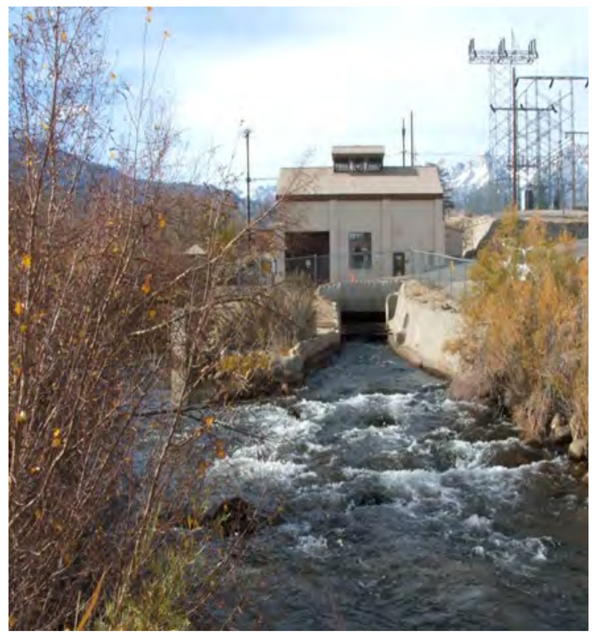
Southern California Edison

Bishop Creek Hydroelectric Project

(FERC Project No. 1394)



Final License Application

Final Technical Reports

Volume III

June 2022

SOUTHERN CALIFORNIA EDISON

Bishop Creek Hydroelectric Project

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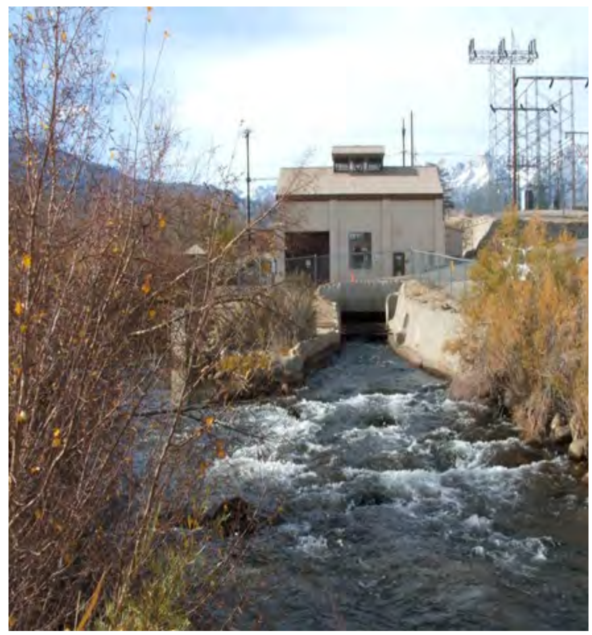

FINAL LICENSE APPLICATION

FINAL TECHNICAL REPORTS

VOLUME III (3 OF 4)

SOUTHERN CALIFORNIA EDISON

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Bishop Creek Hydroelectric Project

(FERC Project No. 1394)

FINAL TECHNICAL REPORT
BISHOP CREEK RESERVOIRS FISH DISTRIBUTION (AQ 4)

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Bishop Creek Hydroelectric Project

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FINAL TECHNICAL REPORT
BISHOP CREEK RESERVOIRS FISH DISTRIBUTION
(AQ 4)

Southern California Edison
1515 Walnut Grove Ave
Rosemead, CA 91770

June 2022

Support from:

Stillwater Sciences

and

Kleinschmidt

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1.0 INTRODUCTION

Project operations may directly or indirectly influence fish resources occupying Project waters, primarily by regulating water levels of reservoirs, or by altering flows in stream reaches. Within in Project reservoirs, indirect effects on fisheries may result from altered habitat due to reservoir water level management or increased public access. The Bishop Creek Reservoirs Fish Distribution Study (AQ 4) characterizes fish species composition and distribution within the two Project reservoirs (South Lake and Lake Sabrina) and Longley Lake following methods described in Study AQ 4, approved by the Federal Energy Regulatory Commission (FERC) on November 4, 2019. This report includes the results of reservoir population sampling in South Lake, Lake Sabrina, and Longley Lake and bathymetric surveys of South Lake and Lake Sabrina, completed during 2020. Information on stream fish populations is included in the Bishop Creek Fish Distribution Study (AQ 3) Final Technical Report (SCE 2021a).

Data and preliminary results for this survey were previously reviewed with the Bishop Creek Aquatics Technical Working Group (TWG) in May 2020, following distribution of Progress Report #2 on April 14, 2020.

Further data was provided in the Intial Study Report filed with FERC on November 10 2020. This report builds on those two previous reports but does not draw conclusions about potential Project effects. These analyses will be completed in conjunction with the rest of relicensing studies as part of the overall National Environmental Policy Act (NEPA) process and in consultation with the aquatics TWG.

2.0 REVIEW OF EXISTING INFORMATION

Project facilities, including thirteen dams and diversions and five powerhouses, are sited along Bishop Creek and nearby Birch and McGee creeks. Bishop Creek has a total drainage area of approximately 70 square miles from its headwaters to the confluence with the Owens River. South Lake and Lake Sabrina are the major storage reservoirs in the watershed (Figure 3.1-1). SCE manages the water releases from the storage reservoirs for purposes of hydro-generation and meeting water allocation requirements in accordance with the Chandler Decree (1922). Longley Lake Dam discharges water to McGee Creek which is diverted to Birch Creek and then to Bishop Creek via Bishop Creek Powerhouse No. 2.

This network of creeks and reservoirs supports both stocked and self-sustaining non-native trout fisheries, including brown trout (*Salmo trutta*), brook trout (*Salvelinus fontinalis*), and rainbow trout (*Oncorhynchus mykiss*). The California Department of Fish and Wildlife (CDFW) introduced each of these three non-native trout species and manages them to support angling harvest. Naturally-spawned trout from tributary headwater creeks upstream of the reservoirs may migrate downstream into Project reservoirs; however, the Project reservoirs also have a heavily stocked put-and-take rainbow trout fishery. The abundance of rainbow trout in the reservoirs is primarily a function of stocking intervals and angler catch rates, and residency time for most stocked rainbow trout in the reservoirs is believed to be very short (N. Buckmaster, CDFW personal communication). “Catchable” size rainbow trout (roughly 12 inches) were scheduled for frequent stocking in South Lake and Lake Sabrina during 2020; no other fish species were included in CDFW’s stocking schedule for the Bishop Creek watershed in 2020 (CDFW 2019). While no stocking currently occurs at Longley Lake, brook trout were historically stocked there and a population is currently present.

Owens suckers (*Catostomus fumeiventris*; California species of special concern) were informally introduced into Lake Sabrina (N. Buckmaster, CDFW, personal communication). The species’ native range includes waters of the Owens River Valley, but it has also become established in the Santa Clara River via water transfers from the Owens Aqueduct. Adult Owens suckers were observed spawning in a shallow arm of Lake Sabrina near the eastern end of the dam during a field visit in early June 2018. EA Engineering (1987) netted an unidentified sucker from Lake Sabrina, which the authors speculated was an Owens sucker. Although there is potential for spillover from Lake Sabrina to downstream reaches of Bishop Creek, Owens suckers are not believed to have colonized other portions of the watershed and were not observed during 2020 surveys (SCE 2021a).

Owens suckers prefer soft-bottomed runs in cool-water streams and the bottoms of lakes and reservoirs. Owens suckers feed at night on aquatic insects, algae, detritus and organic matter, and spawn from early May through early July. Literature on Owens sucker spawning in resevoirs is limited; however, in Crowley Reservoir, spawning occurs in large aggregations near springs and gravel patches along the shoreline at depths of 1–2 meters as well as in tributary streams (Moyle 2002). Larval suckers become juveniles at approximately 19–22 millimeters (mm) total length (TL) and hide under cover along stream margins and in backwaters. Within the Owens River, Owens suckers are most common in stream reaches with long runs and few riffles (Deinstadt et al. 1986, as cited in CDFW n.d.) where habitat is characterized by fine substrate, water temperatures ranging from 7–13 degrees Celsius (°C), and pH ranging from 7.9–8.0 (CDFW n.d.). Adult Owens suckers are bottom-oriented in pool habitat and in lakes regardless of depth (CDFW n.d.).

3.0 STUDY OBJECTIVES

Objectives of the Study include the following:

- Characterize populations and status of fish species in Lake Sabrina and South Lake
    - Document presence and/or absence of Owens suckers in Lake Sabrina and South Lake
    - Assess distribution of other fish species in Project reservoirs
- Evaluate select, localized water quality parameters that may affect the growth and distribution of fish species
- Ensure that future Project facilities and operations are not inconsistent with the Desired Conditions described in the Land Management Plan for the Inyo National Forest (INF) (USDA 2019) as they relate to ecological sustainability and diversity of plant and animal communities

3.1 STUDY AREA

The study area includes South Lake, Lake Sabrina, and Longley Lake (Figure 3.1-1). Individual fish sampling sites within each Project reservoir are described below. South Lake is situated in the upper end of South Fork Bishop Creek at an elevation of 9,750 ft and is the largest of the Project reservoirs with a storage of 12,883 acre-feet at normal maximum reservoir level. Lake Sabrina is located on Middle Fork Bishop Creek at an elevation of 9,131 ft and has a net storage capacity of 8,376 acre-feet at normal maximum reservoir level. Longley Lake is located at the headwaters of McGee Creek at an elevation of 10,708 ft and is the smallest reservoir included in this study with a surface area of approximately 10 acres.

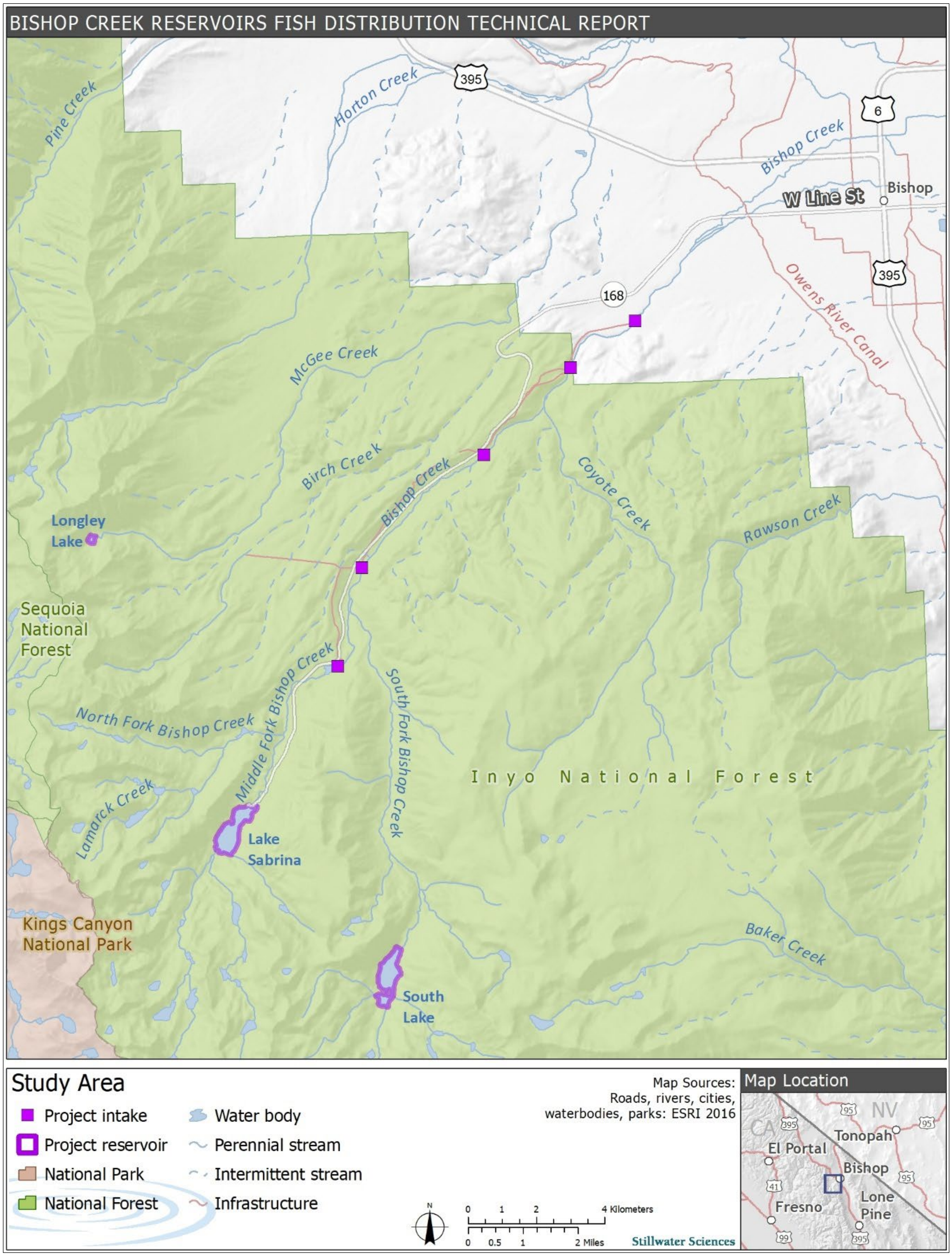

Figure 3.1-1 Bishop Creek Reservoir Fish Distribution survey locations, South Lake, Lake Sabrina, and Longley Lake

4.0 METHODS

Reservoir fish surveys were conducted from June 3 to 16, 2020 and September 7 to 11, 2020. Fish sampling methods included:

- Weekly daytime boat electrofishing and beach seining surveys targeting Owens sucker spawning habitat to document the presence and/or absence of Owens suckers at Lake Sabrina and South Lake during the spawning season (June);
- Early and late summer night electrofishing surveys to characterize reservoir fish population assemblages in Lake Sabrina and South Lake (September); and
- A single, late-summer gill netting effort to characterize the reservoir fish population assemblage in Longley Lake (September).

Additionally, South Lake and Lake Sabrina bathymetry was mapped using vessel-mounted, single beam echo-sounder systems from July 27 to August 6, 2020 to allow assessment of fish habitat in the reservoirs.

4.1 OWENS SUCKER SURVEYS

Owens sucker surveys were conducted in Lake Sabrina and South Lake during the peak spawning season to increase the likelihood of capture. Surveys were conducted in each reservoir once per week over a three-week period between June 3 and 16, 2020. Monitoring locations targeted suitable spawning habitat (i.e., shallow locations with flowing or well-aerated water and coarse sand and/or gravel substrates) but also included locations along the reservoir margins with larger substrate (i.e., boulders) to get full coverage of available habitat (Figure 4.1-1 and Figure 4.1-2). Start and end points for each sample site were obtained using a handheld global positioning system (GPS), and electrofishing shock time was recorded for each pass.

Surveys were conducted during the day using standard beach seining and boat electrofishing methods (Reynolds 1996). Suitable beach seine locations (e.g., shallow water free of obstructions such as large rocks and woody debris) were rare in both reservoirs; therefore, boat electrofishing was used as the primary method. During each monitoring event, biologists recorded the date and time of sampling; measured *in situ* water conditions approximately 1 meter below the water surface, including temperature, dissolved oxygen (DO), conductivity, and pH using a calibrated YSI™ Pro Plus multiparameter meter; and noted other conditions including water clarity and weather conditions (i.e., air temperature, wind speed, and cloud cover/precipitation). Photos were taken at each monitoring location to document general habitat conditions, which primarily focused on bank substrate types (e.g., sand, gravel, boulders), shoreline steepness, and tributary inflow. Observations of Owens suckers spawning activities (e.g., redd formations or spent adults) were also documented during surveys.

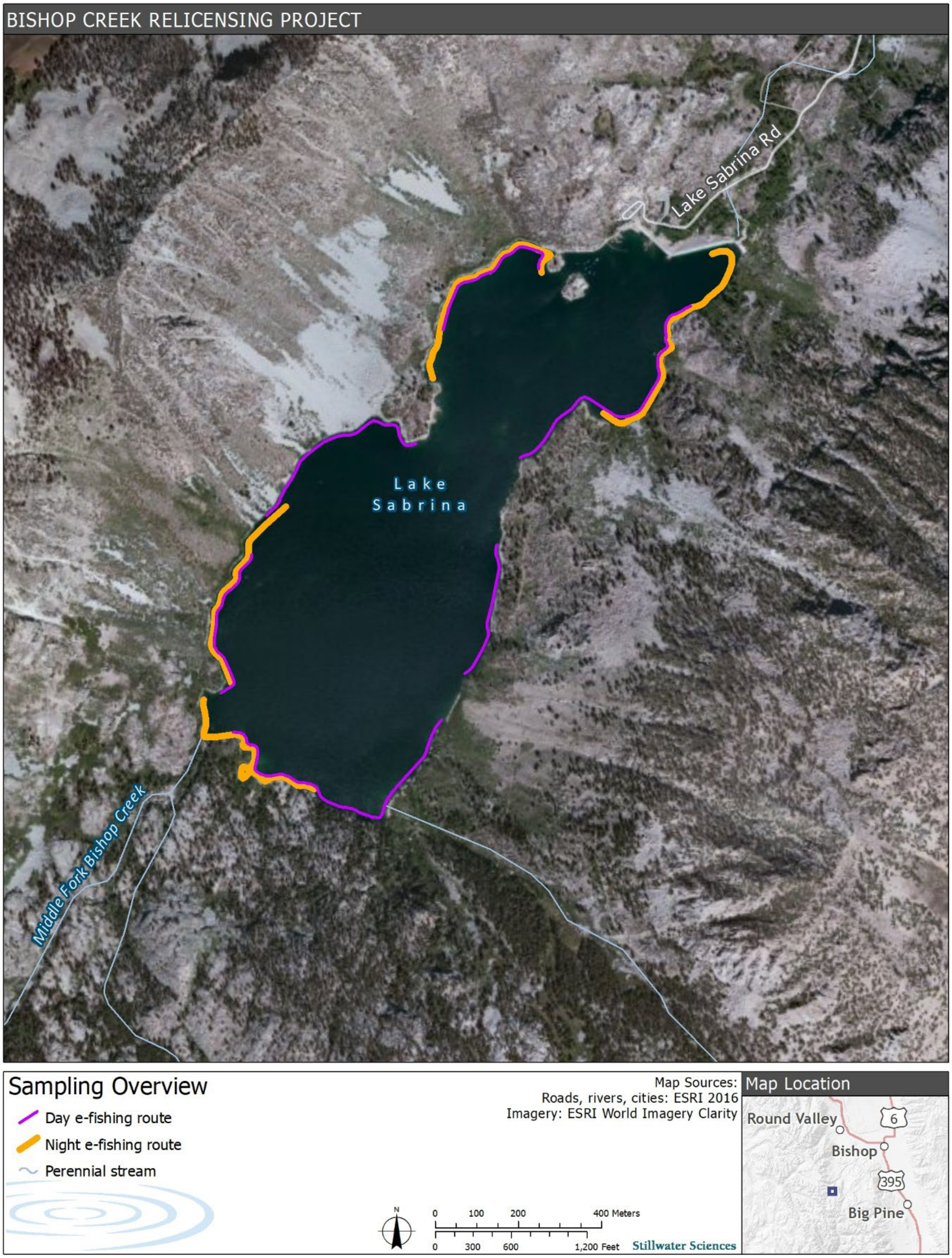

Figure 4.1-1 Lake Sabrina Boat Electrofishing Locations

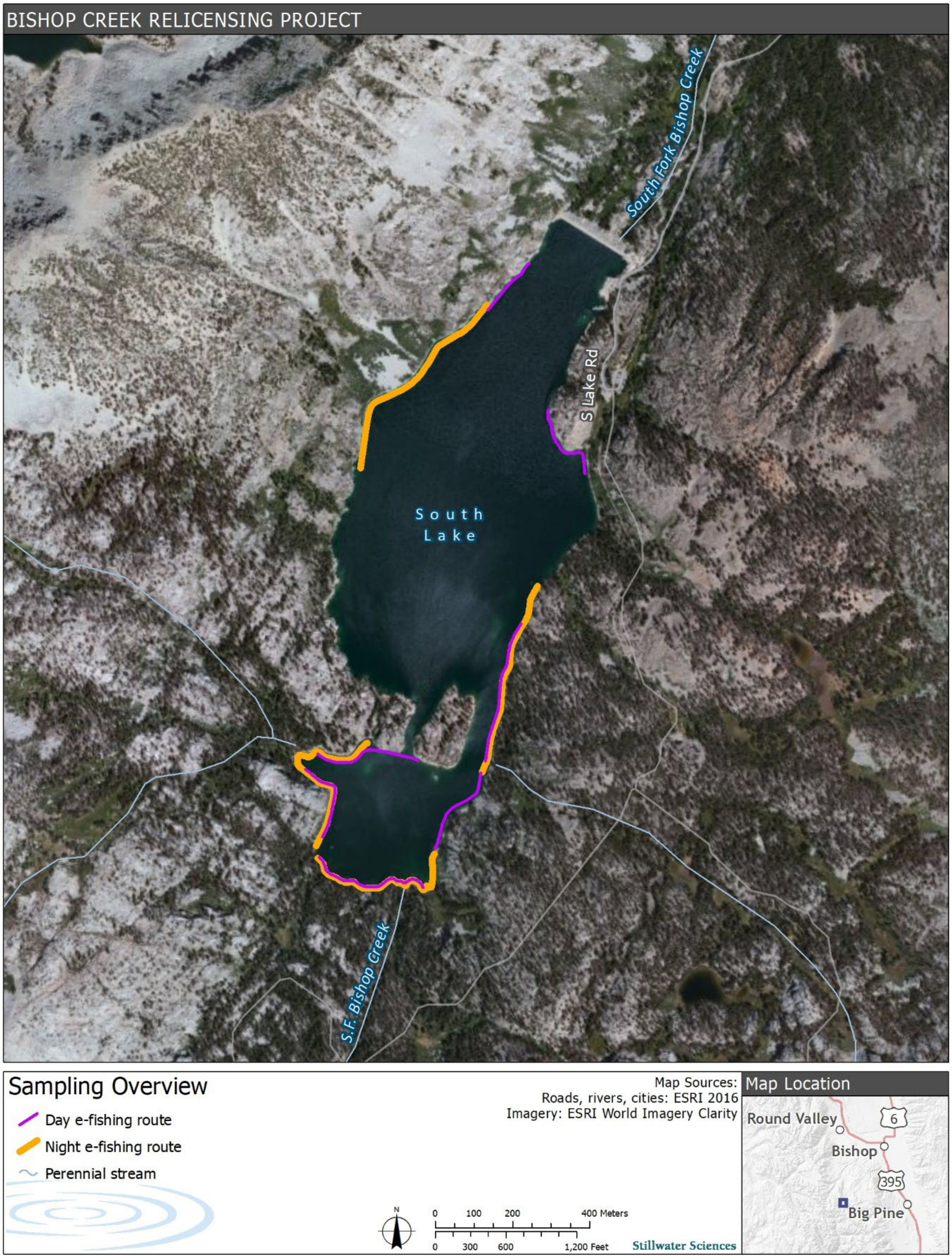

Figure 4.1-2 South Lake Boat Electrofishing Locations

As fish were captured (netted), they were placed in aerated containers with ambient reservoir water until the completion of each pass. Captured fish were processed after sampling at each location. Fish data recorded included species identification, fork length (FL; mm), TL (mm), and weight (grams [g]). A subset of 27 Owens suckers were fatally captured to obtain operculum samples for fish aging and scale samples; all other captured fish were returned to the source water immediately following processing. Operculum bones were removed and placed in individually labeled envelopes. Scales were taken from the left side of the body below the dorsal fin and above the lateral line and placed in individually labeled envelopes. Scale samples were also collected opportunistically from other species (e.g., rainbow trout and brook trout). Operculum and scale samples will be sent to the CDFW Bishop field office for future analyses.

4.2 Reservoir Fish Assemblage Surveys

Reservoir fish assemblage surveys were conducted in Lake Sabrina and South Lake using nighttime boat electrofishing from June 10 to 12, 2020 and September 9 to 11, 2020. Four sites, ranging from approximately 1,600 feet (ft) to 2,200 ft in length, were established along the shorelines of both lakes. Sample sites were established in representative near-shore habitat (Figure 4.1-1 and Figure 4.1-2). Start and end points for each sample site were obtained using hand-held GPS. Electrofishing shock time was recorded. As fish were captured (netted), they were placed in aerated containers with reservoir water until the completion of the pass. Captured fish were processed after sampling at each location. Fish data recorded included species identification, FL (mm), TL (mm), and weight (g). Water temperature and DO profiles were measured with a YSI™ Pro Plus multiparameter meter near the dam of each reservoir. Measurements were recorded at one-meter intervals from the water surface to the substrate.

Reservoir fish assemblage surveys were conducted at Longley Lake using gill netting on September 7 and 8, 2020. Two gill nets, approximately 80-feet-long by 6-feet-tall with variable mesh sizes ranging from 0.75 inch to 2.50 inches, were deployed in different sections of the reservoir (Figure 4.2-1). One net was deployed at the cove in front of the dam with each end attached to the shore and the middle section resting on the reservoir bottom at a depth of approximately 20 feet. The other net was deployed near the southeast corner of the reservoir, oriented perpendicular to the shoreline with one end attached to the shore and the other end anchored in water approximately 20 ft deep. Both gill nets were deployed for two extended periods spanning from 1500 on September 7 to midnight on September 8, 2021 and from approximately 0100 to 1200 on September 8, 2021. Captured fish were placed in an aerated container with ambient reservoir water for processing. Fish data recorded included species identification, FL (mm), TL (mm), and weight (g). Date, time, sample duration, and prevailing weather conditions for each net set period were recorded. Water temperature and DO were measured with a YSI™ Pro Plus multiparameter meter calibrated at the lake.

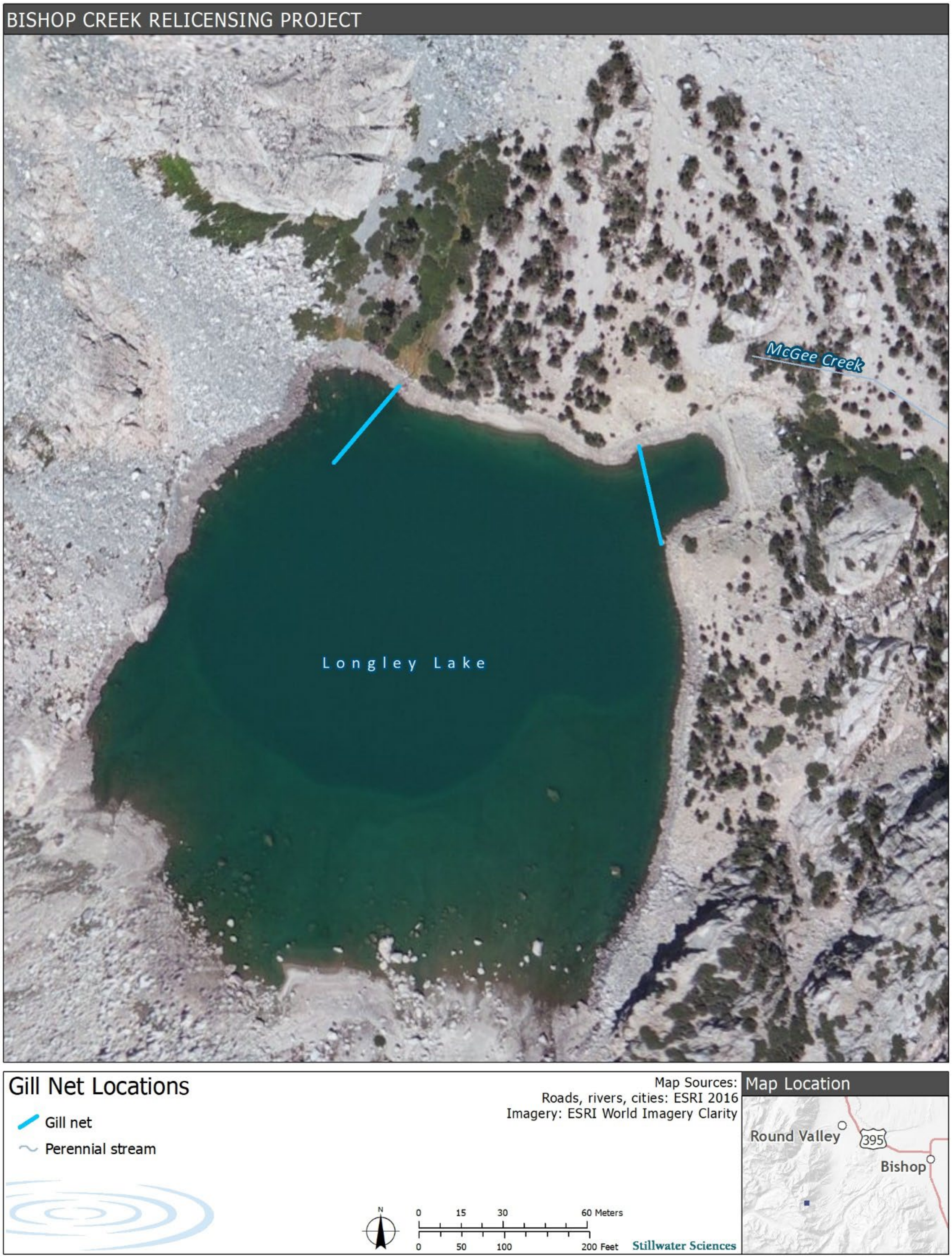

Figure 4.2-1 Longley Lake Gill Net Placement, September 2020

4.3 RESERVOIR BATHYMETRY

South Lake and Lake Sabrina reservoir bathymetry was mapped between July 27 and August 6, 2020. Prior to conducting the reservoir bathymetry surveys, semi-permanent benchmarks were installed in large bedrock outcrops at both reservoirs. Benchmark coordinates were established with National Geodetic Survey Online Positioning User Service (NGS OPUS) processing service. The benchmarks were used as the Global Navigation Satellite System (GNSS) base station location for each subsequent reservoir bathymetry and water surface elevation survey. CEEPULSE 200-kiloHertz (kHz) single beam and Ohmex SonarMite 235-kHz single-beam systems were used to measure reservoir depth.

A 16-foot aluminum survey vessel with a 20-horsepower outboard motor and an electric trolling motor were utilized to survey deep, open-water reservoir areas, and an inflatable kayak was utilized to survey the perimeters and other shallow water areas. Both single-beam systems consisted of a transducer hardwired to a small, portable black box echo processing unit with processed depths output via cable or Bluetooth. For each system, the transducer was mounted directly beneath a global navigation satellite system (GNSS) real-time kinematic (RTK) antenna or robotic total station (RTS) prism, and depth soundings were fed directly to Trimble TSC3 survey controllers and recorded by the survey software. With this setup, precise horizontal and vertical coordinates were recorded simultaneously with depth soundings as a RTS tracked the survey vessel as it moved along transect lines.

Planning transect lines were created prior to fieldwork and loaded on the survey controllers to serve as a navigation guide and ensure adequate transect spacing. The planning transect lines were created with a nominal minimum grid spacing of 200 ft in open water and adjusted to increase transect density in shallow water areas, which were identified as the most likely critical Owens sucker spawning habitat. During data collection, the survey vessels moved along transect lines at speeds up to approximately 4 knots and continuously recorded position and depth at time intervals ranging from 2–5 seconds. Small course corrections or irregular vessel tracks occurred where it was necessary to avoid obstructions and other recreational vessels and to remain on track when strong winds made it difficult to navigate in straight survey lines.

A bar check was performed at the start of each survey day to ensure adequate function of the echo sounder systems. The bar check consisted of holding the sounder in a fixed position over a flat hard surface (bedrock or boat ramp) and comparing continuous depth soundings to physical depth measurements. Cross track survey lines were also conducted to evaluate bathymetry reliability.

4.4 OWENS SUCKER AND RESERVOIR FISH ASSEMBLAGE ANALYSIS METHODS

Fish population data were entered into an Excel spreadsheet for reduction, tabulation, and summary. Capture data were summarized by species composition and capture method. In addition, length-frequency histograms were developed for all fish species captured to estimate age-class structure and growth rates. Breaks or modalities within

the histogram were evaluated for each trout species and compared to available literature to determine approximate age classes.
Fish capture results are reported both as total catch and in terms of catch per unit effort (CPUE). CPUE for fishes captured by beach seine and electrofishing was calculated by dividing number of fish of each species captured by the total surface area of water sampled using site 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. CPUE for fishes captured by gill net was calculated by dividing the number of fish captured by the dimensions of the gill net and the length of time fished (e.g., fish/[ft^2 x hr]). CPUE was summarized by reservoir and species.

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. Condition factor (Ricker 1975), a measure of this nutritional state, was calculated for each trout. Individual condition factors (k) were calculated by the following formula:

$$\mathrm{k} = \frac{\text{wet weight (g)} \times 10^5}{[\text{fork length (mm)}]^3}$$

The mean condition of trout was calculated by averaging individual condition factors for each trout species at each sample site.

5.0 MODIFICATIONS TO METHODS

The methods for the reservoir fish assemblage surveys described in the Study Plan approved by FERC on November 4, 2019 stated that sampling for Owens suckers would include a site visit to each monitoring station at least once per week during the spawning season (approximately early May through early July) to confirm presence/absence of the species. This design assumed that suckers would be potentially difficult to collect. However, large schools of Owens suckers were observed congregating in shallow water along the lake margins in early June and were observed building redds by mid-June with sufficiently high number of fish captured at Lake Sabrina (n = 105) to confirm presence. These data and observations collected between June 3 and June 16, 2020 were adequate to characterize the Owens sucker population, identify spawning areas, and observe spawning activity. Therefore, the surveys were concluded on June 16, 2020.

Total gill net set times in Longley Lake included one approximately 9-hour set time and one approximately 11-hour set time, which were both slightly less than the 12-hour set times included in the study plan. Sampling at Longley Lake occurred during severe wildfire events nearby that complicated already difficult access conditions. These conditions required longer than anticipated travel time to and from the lake, and premature termination of the sampling due to safety concerns, which resulted in a minor decrease in total set times for gill nets. However, sampling periods included times of day when trout species are most active (evening, night, and dawn hours) and when capture efficiency is highest, and it is anticipated that fish capture data collected during this study are sufficient to characterize the fish population in Longley Lake.

Owens sucker opercula were collected for fish age analysis by CDFW; however, opercula aging is not yet complete and is not part of this study.

6.0 RESULTS

6.1 HABITAT CONDITIONS

Both South Lake and Lake Sabrina showed signs of thermal stratification during the June sampling effort, while DO levels remained similar throughout the water column (Figure 6.1-1 and Figure 6.1-2). Thermal stratification occurred between 5 and 6 meters below the water surface in South Lake and between 6 and 8 meters below the water surface in Lake Sabrina. Water temperatures ranged from 6.0°C to 10.9°C in South Lake and from 9.5°C to 12.8°C in Lake Sabrina. Thermal stratification was not observed during the September sampling effort with both South Lake and Lake Sabrina showing uniform temperatures throughout the water column. DO levels in South Lake were slightly lower during September than in June. Equipment malfunction during the September effort resulted in unreliable DO readings below the water surface in Lake Sabrina; however, DO levels measured near the water surface (with a different instrument) showed a similar decrease in levels compared to surface DO levels observed at South Lake. Water temperatures at Longley Lake were slighly lower than the other two reservoirs, but DO levels were simlar between all three reservoirs (Table 6.1-1). Overall, water temperatures were cool and DO levels were high throughout the study area in June with warmer water temperatures and lower DO levels measured in September, although still within the suitable range for the four fish species observed during this study. Sample site conditions are provided in Appendix A and habitat overview photographs are inclulded in Appendix B.

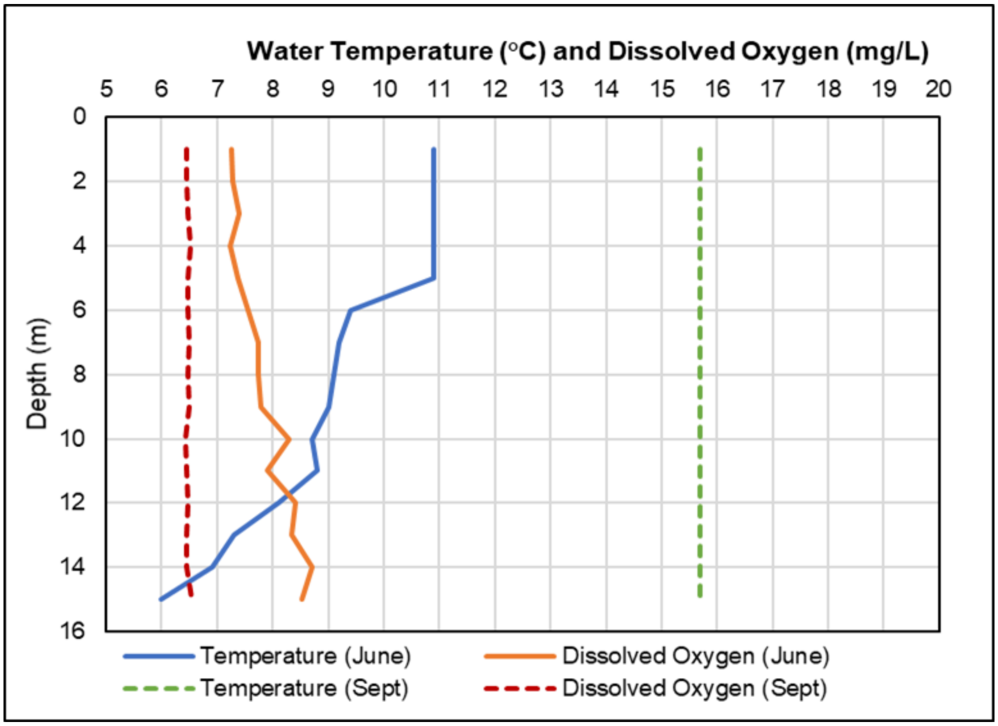

Figure 6.1-1 Water Temperature and Dissolved Oxygen Profiles for South Lake, June and September 2020

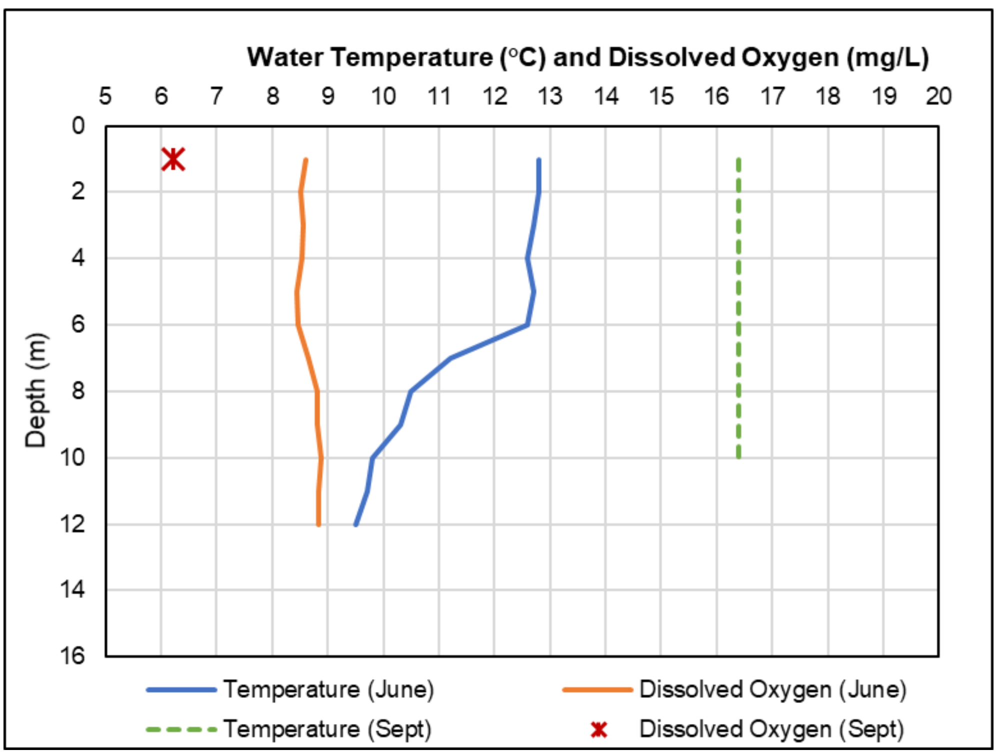

Figure 6.1-2 Water Temperature and Dissolved Oxygen Profiles for Lake Sabrina, June and September 2020

Table 6.1-1 Water Quality Conditions at Fish Sampling Locations in Project Reservoirs during June and September 2020

Reservoir	Survey Month	Dissolved Oxygen mg/L [1]		Conductivity µS/cm [2] (25 °C)		Conductivity µS/cm [2] (adjusted to °C)		Water Temperature (°C)		pH	
		min	max	min	max	min	max	min	max	min	max
South Lake	June	8.60	10.06	15.0	25.8	18.5	25.8	11.4	12.7	5.57	7.9
	Sept.	6.42	6.42	14.6	16.0	17.7	19.8	15.5	15.8	8.13	8.43
Lake Sabrina	June	8.18	9.94	14.5	19.4	14.1	19.2	9.6	11.2	6.36	7.04
	Sept.	5.83	6.21	13.0	13.1	15.6	15.6	16.4	16.6	8.07	8.46
Longley Lake	Sept.	6.31	6.31	7.0	7.0	9.2	9.2	12.8	12.8	7.85	7.85

[1] milligrams per liter (mg/L)

[2] microsiemens per centimeter (µS/cm)

6.2 SPECIES COMPOSITION AND DISTRIBUTION

A total of 677 fish were captured during the June and September 2020 reservoir surveys (including combined Owens sucker and reservoir fish assemblage surveys). The captured species indicate that the fishery in South Lake, Lake Sabrina, and Longley Lake is composed of coldwater trout species. Lake Sabrina also supports a large self-sustaining population of Owens suckers (Table 6.2-1), which were numerically the most abundant fish species captured in Lake Sabrina. Owens suckers were not observed in South Lake or Longley Lake. Of trout species, rainbow trout were the most abundant in Lake Sabrina and South Lake (Figure 6.2-1 and Figure 6.2-2), likely as a result of frequent stocking, while brook trout was the only fish species captured in Longley Lake (Figure 6.2-3).

Catch-per-unit-effort (CPUE) for fishes captured during spring and fall showed some variability by gear type, location, and season (Table 6.2-2). Overall, CPUE was fairly similar when comparing similar methods between South Lake and Lake Sabrina, while gill netting in Longley Lake had the highest CPUE.

Table 6.2-1 Fish Species and Number Captured during 2020 Reservoir Sampling

Family	Scientific Name	Common Name	Lake Sabrina		South Lake		Longley Lake	Total
			JUNE[1]	SEPT.	JUNE[1]	SEPT.	SEPT.	
Salmonidae	*Salmo trutta*	Brown Trout	1	0	26	31	0	58
	Oncorhynchus mykiss	Rainbow Trout	81	58	128	48	0	315
	Salvelinus fontinalis	Brook Trout	27	19	57	24	27	154
Catostomidae	*Catostomus fumeiventris*	Owens Sucker	105	45	0	0	0	150
Total			214	122	211	103	27	677

[1] Results for June include fish captured during day electrofishing and beach seining conducted during the Owens sucker surveys and the night boat electrofishing surveys conducted for the reservoir fish assemblage surveys. Only night electrofishing was conducted in Lake Sabrina and South Lake during the September sampling effort.

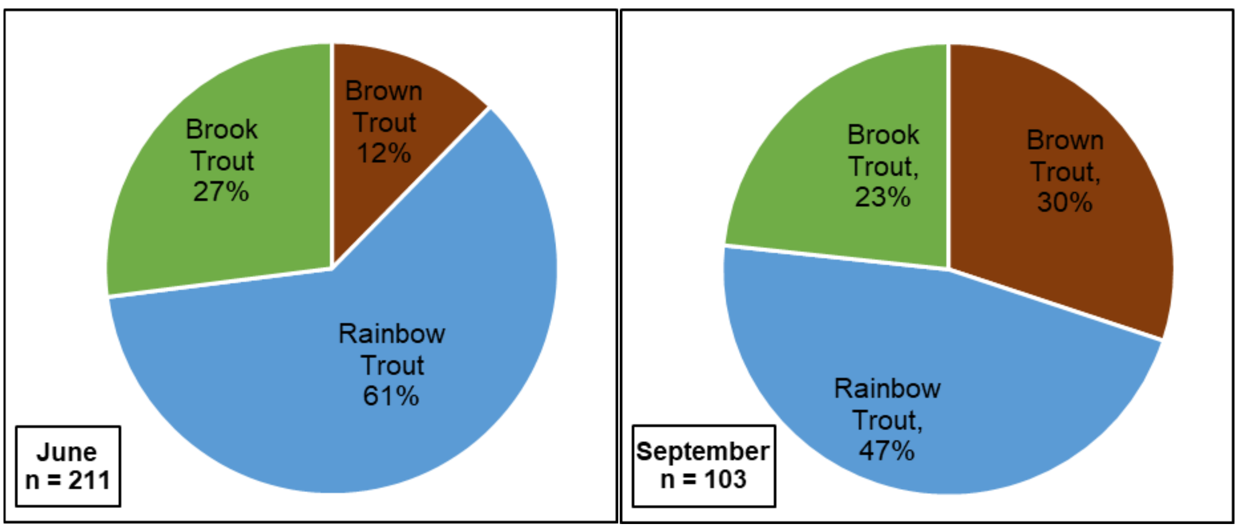

Figure 6.2-1 Fish Species Composition for South Lake during 2020 Sampling

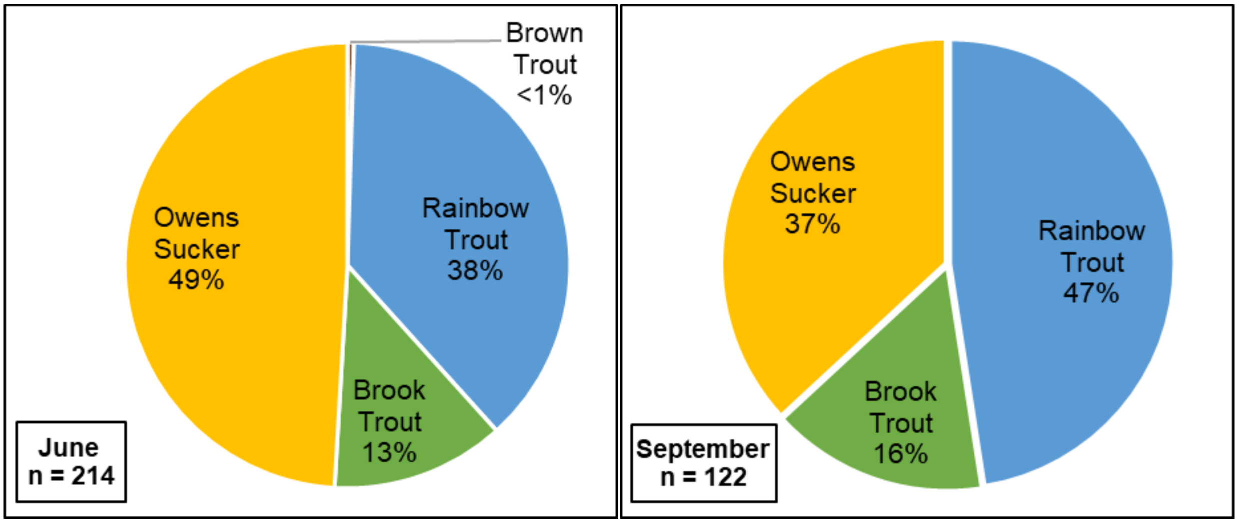

Figure 6.2-2 Fish Species Composition for Lake Sabrina during 2020 Sampling

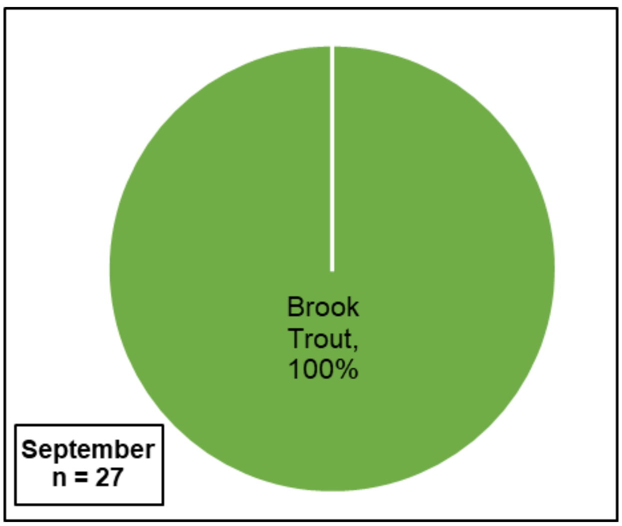

Figure 6.2-3 Fish Species Composition for Longley Lake, September 2020

Table 6.2-2 Fish Catch per Unit Effort by Survey Method During 2020 Sampling

Reservoir	Method	Catch per Unit Effort (CPUE)[1] x 1,000				
		Brown trout	Rainbo w trout	Brook trout	Owens Sucker	Total
June Sampling Efforts						
South Lake	Daytime Boat Electrofishing	0.07	0.31	0.25	0.00	0.63
	Nighttime Boat Electrofishing	0.16	0.85	0.13	0.00	1.15
	Beach Seine	0.07	0.07	1.13	0.00	1.28
Lake Sabrina	Daytime Boat Electrofishing	0	0.20	0.10	0.25	0.55
	Nighttime Boat Electrofishing	0.01	0.48	0.12	0.64	1.25
September Sampling Efforts						
South Lake	Nighttime Boat Electrofishing	0.28	0.43	0.22	0.00	0.93
Lake Sabrina	Nighttime Boat Electrofishing	0.00	0.69	0.22	0.53	1.44
Longley Lake	Gill Net	0.00	0.00	2.12	0.00	2.12

[1] CPUE Gill Nets= Fish/(ft^2 x hr), CPUE Electrofisher and Beach Seine= Fish/ft^2

6.3 AGE CLASS DISTRIBUTION

Length-frequency histograms were generated to assess age classes for fish species captured and were compared with length-at-age information provided by Moyle (2002). Growth rates for the trout species captured during this study are highly variable (Moyle 2002), and rainbow trout reared in hatcheries likely grow at different rates compared with naturally produced fish. Little information exists on the growth rates of Owens suckers, so length frequency was compared with age classes of a similar species, Tahoe suckers (*Catostomus tahoensis*). Despite this variation, the length-frequency distribution of fish observed in all three reservoirs indicated multiple age classes were present, including young-of-the-year (YOY) fish, suggesting natural reproduction is occuring for most species in these locations. Age classes for fishes within the individual Project reservoirs are discussed below.

6.3.1 SOUTH LAKE

Fish captured in South Lake were all members of the family Salmonidae, including brown trout, rainbow trout, and brook trout ranging from approximately 50–550 mm FL. Brown trout included fish expected to be within all age classes from YOY up to approximately age 3+ ; rainbow trout included fish expected to be within all age classes from YOY to well over age 3+; and brook trout included fish expected to be within all age classes from YOY up to 3+ (Figure 6.3-1 through Figure 6.3-3).

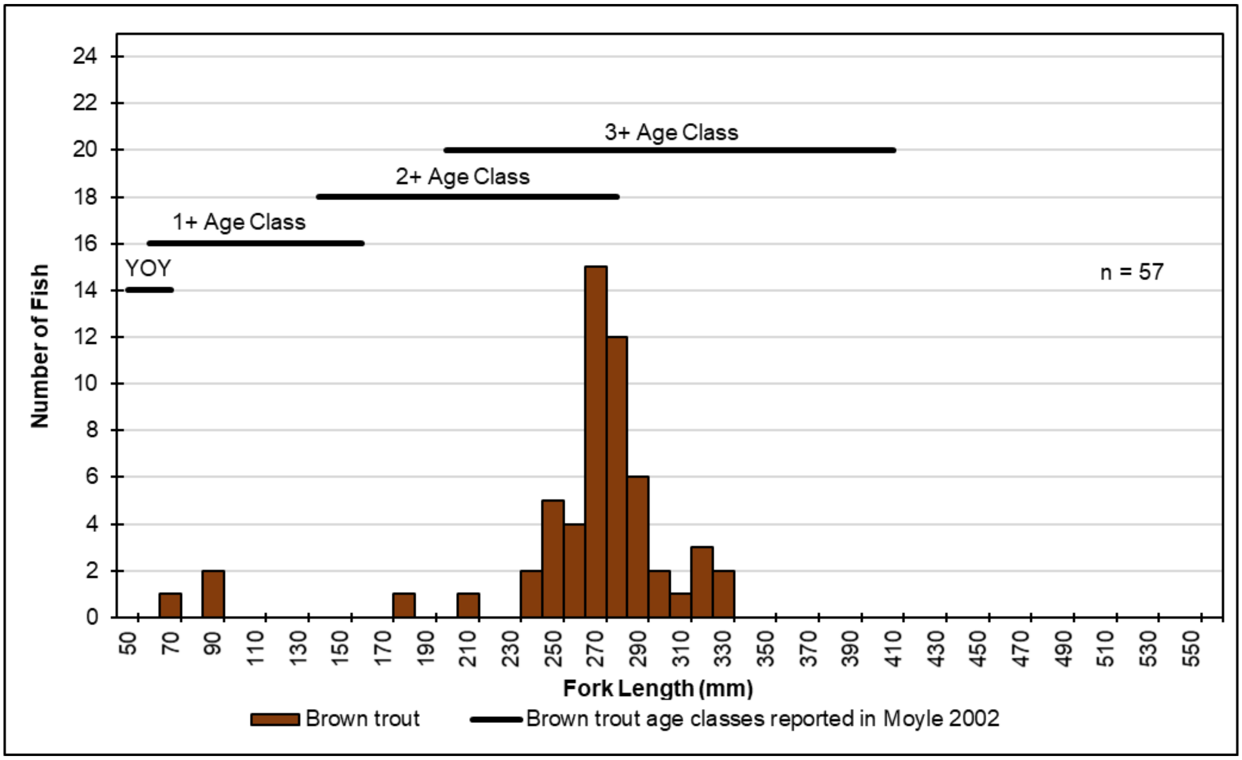

Figure 6.3-1 Length Frequency Histogram for Brown Trout Captured in South Lake during 2020 Sampling

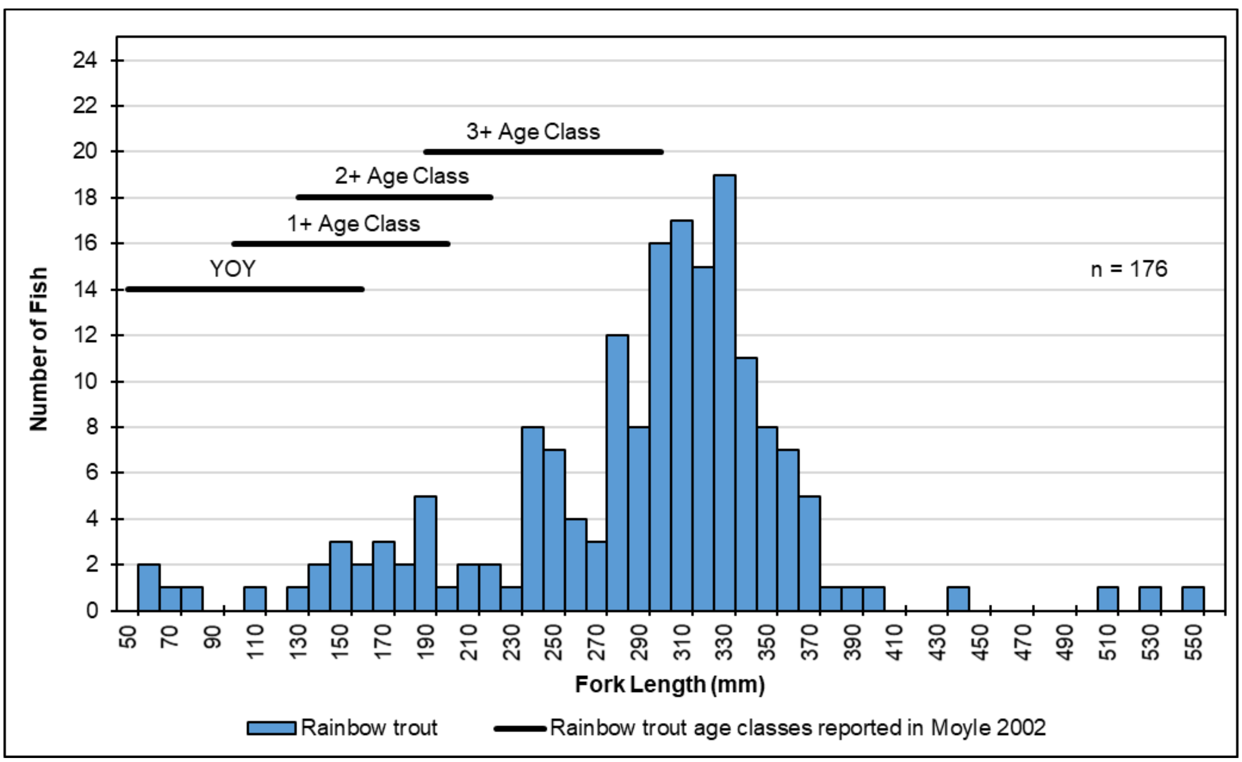

Figure 6.3-2 Length Frequency Histogram for Rainbow Trout Captured in South Lake during 2020 Sampling

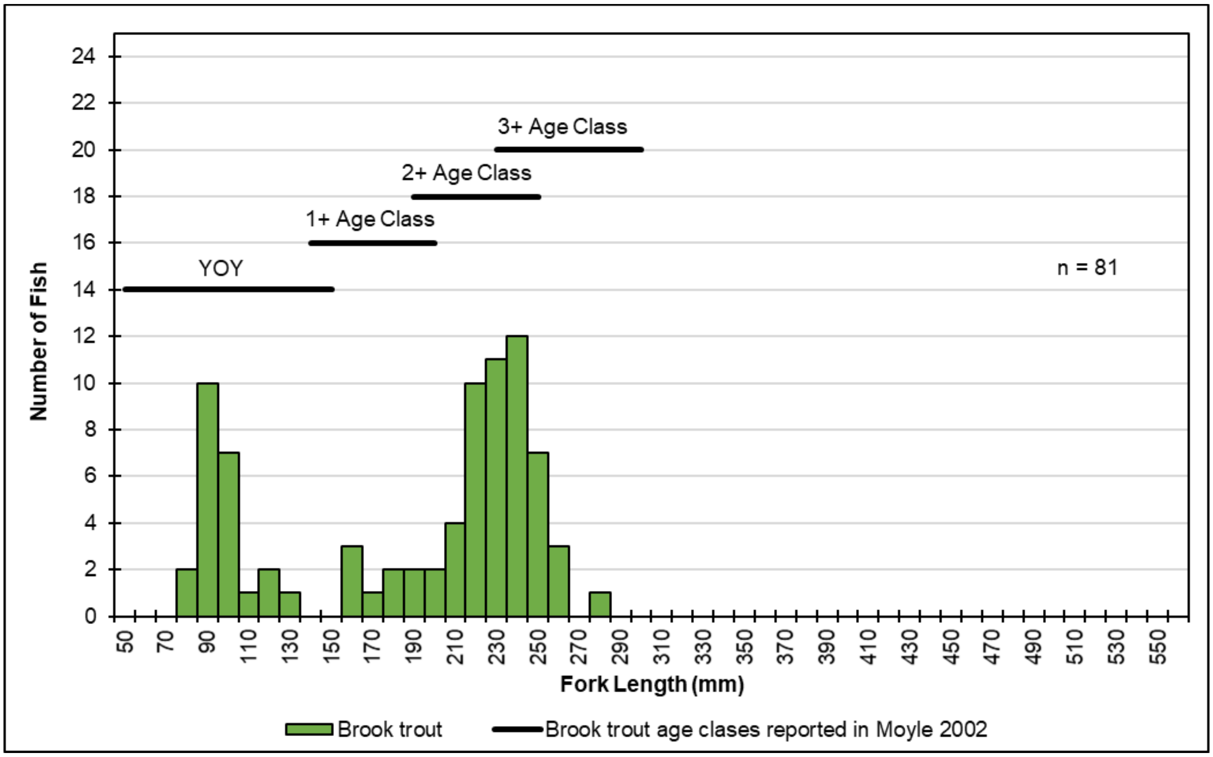

Figure 6.3-3 Length Frequency Histogram for Brook Trout Captured in South Lake during 2020 Sampling

6.3.2 LAKE SABRINA

Fish captured in Lake Sabrina included fish from the family Salmonidae, including brown trout, rainbow trout, and brook trout ranging from approximately 50–650 mm FL, and Owens suckers (family Catastomidae) ranging from approximately 70–380 mm FL. The size distribution of rainbow trout and brook trout captured in Lake Sabrina indicate multiple age classes are present with some fish from both species expected to fall within the YOY age class (Figure 6.3-4 and Figure 6.3-5). A single brown trout was captured that was approximately 650 mm FL which is expected to be in the 5+ age class or older (Figure 6.3-5). Owens suckers likely included fish within all age classes from YOY to age 6+ or older (Figure 6.3-6); however, age and growth have not been well documented for this species.

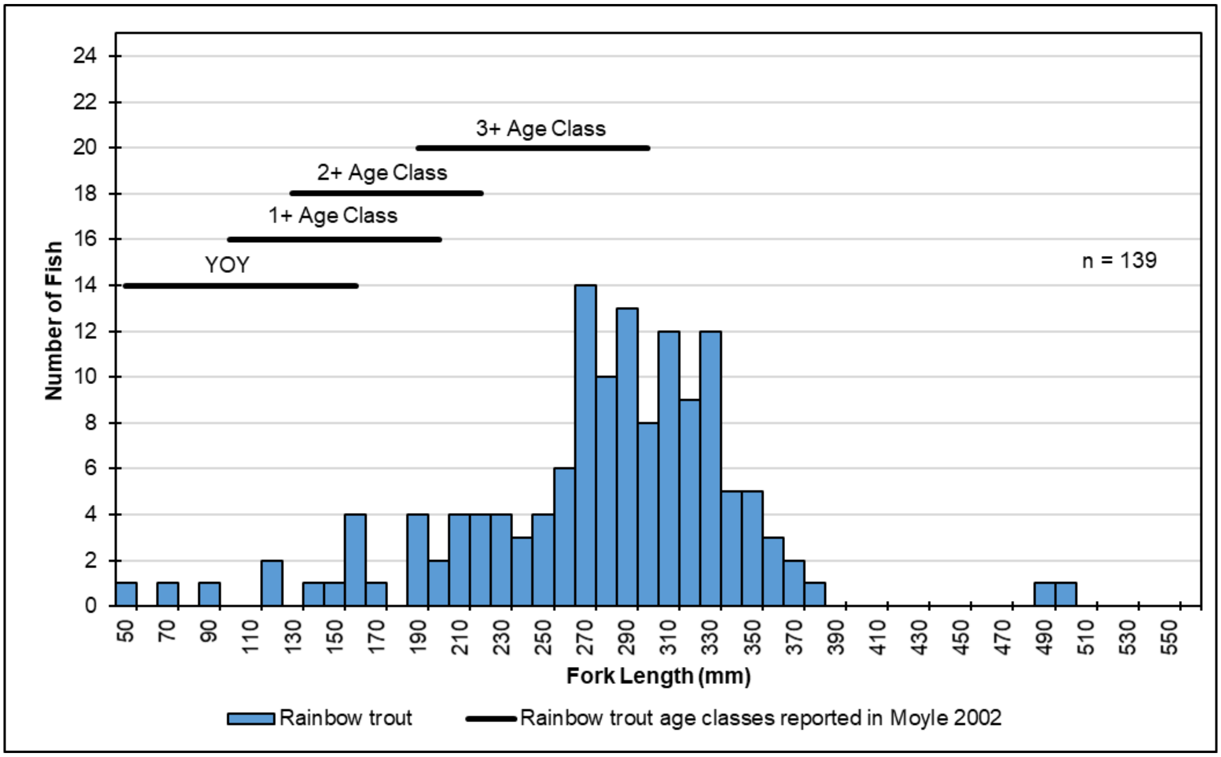

Figure 6.3-4 Length Frequency Histogram for Rainbow Trout Captured in Lake Sabrina during 2020 Sampling

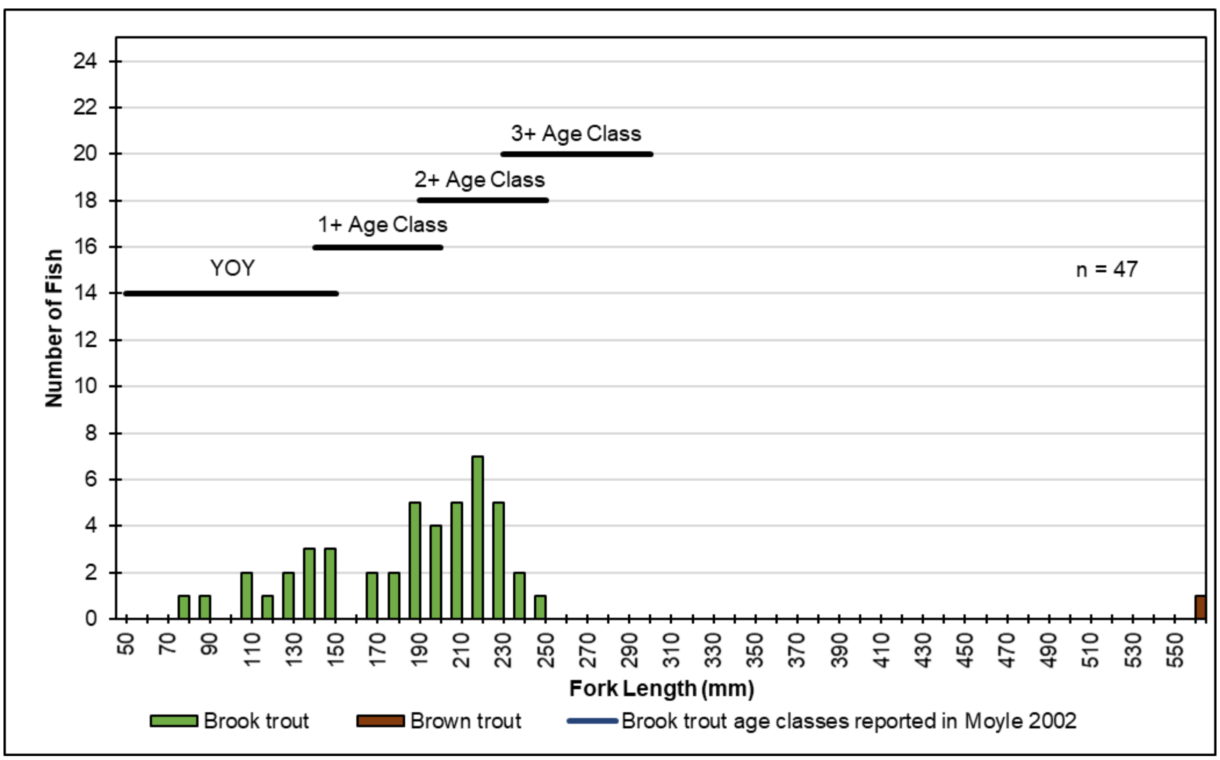

Figure 6.3-5 Length Frequency Histogram for Brook Trout and Brown Trout Captured in Lake Sabrina during 2020 Sampling

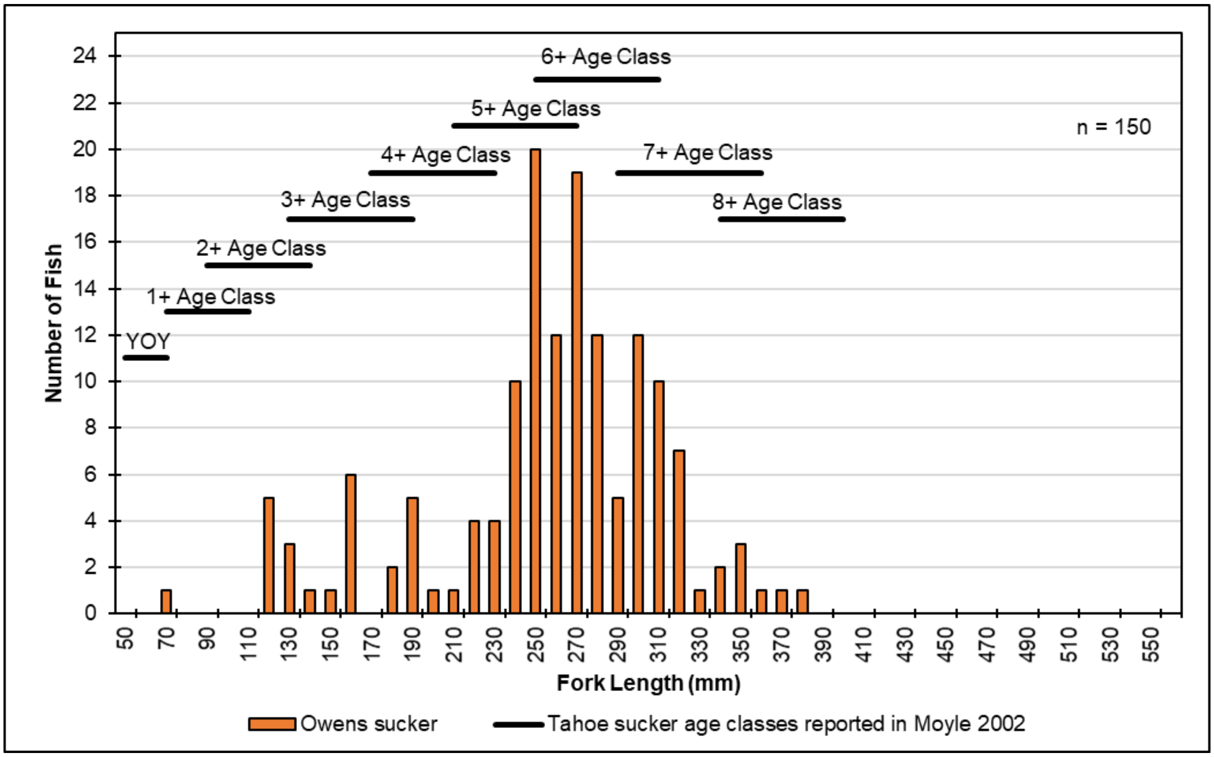

Figure 6.3-6 Length Frequency Histogram for Owens Suckers Captured in Lake Sabrina during 2020 Sampling

6.3.3 LONGLEY LAKE

Brook trout were the only fish species captured in Longley Lake, and the narrow size distribution makes estimating age structure difficult. The brook trout captured in Longley Lake ranged from 190–255 mm FL and the observed sizes likely fall within the 2+ and 3+ age classes, based on size-at-age estimates for brook trout reported in Moyle (2002) and observations in Lake Sabrina (Figure 6.3-7). The absence of brook trout less than 190 mm FL is likely a result of the gill net mesh size which is selective for fish larger than 100 mm.

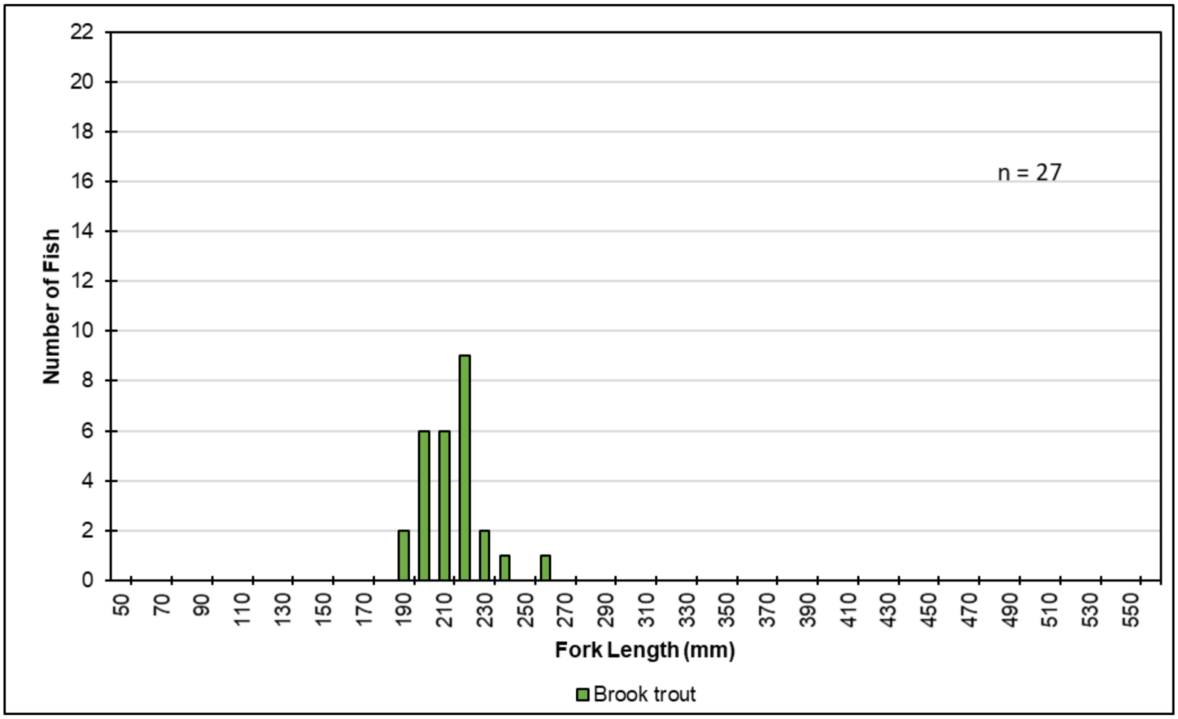

Figure 6.3-7 Length Frequency Histogram for Fish Captured in Longley Lake during 2020 Sampling

6.4 FISH CONDITION

The mean trout condition within the Project reservoirs sampled in 2020 ranged from 1.06–1.34[1], indicating that trout were generally in good condition (Table 6.4-1). Length and weight data for all fish captured during this study are provided in Appendix C.

[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.

Table 6.4-1 Condition Factors (k) for Fish Captured in Project Reservoirs during 2020 Sampling Effort

Reservoir	Species	Number captured	Fork Length (mm)		Average k-value[1]
			min	max	
June Sampling Effort					
South Lake	Brook trout	57	85	280	1.16
	Brown trout	26	68	330	1.08
	Rainbow trout	128	58	437	1.12
Lake Sabrina	Brook trout	27	77	239	1.19
	Brown trout	1	648	648	--[2]
	Rainbow trout	81	44	380	1.11
	Owens sucker	105	114	360	1.34
September Sampling Effort					
South Lake	Brook trout	24	195	255	1.12
	Brown trout	31	180	313	1.06
	Rainbow trout	48	168	168	1.07
Lake Sabrina	Brook trout	19	130	246	1.22
	Brown trout	0	na	na	Na
	Rainbow trout	58	90	495	1.12
	Owens sucker	45	61	375	1.26
Longley Lake	Brook Trout	27	190	255	1.27

Notes: -- Not calculated, mm = millimeters, na = not applicable
[1] Fish condition factor
[2] Fish weight exceeded scale capacity

6.5 RESERVOIR BATHYMETRY

Bathymetric surveys were conducted at water surfacce elevations of 9,753 feet in South Lake and 9,124 feet in Lake Sabrina. Based on the mapping and normal surface elevations of South Lake (9,751.3 feet) and Lake Sabrina (9,131.6 feet), the maximum depth of South Lake would be 223 ft and the maximum depth of Lake Sabrina would be 252 feet. The maximum depth was located near the middle of the northern section of South Lake (Figure 6.5-1) and near the middle section of Lake Sabrina (Figure 6.5-2). Based on the relatively steep reservoir shorelines and limited littoral zones in these reservoirs, overall nutrient levels are anticipated to be low and the productivity is likely limited.

Areas with suitable spawning depths for Owens suckers (i.e., water between 3- and 6-feet-deep) are primarily located along the reservoir margins in both lakes. In South Lake, additional spawning habitat may be provided by a large shoal when water surface elevations reach approximately 9,725 feet, or by a second shoal when the water surface elevation reaches approximately 9,700 feet (Figure 6.5-1). In Lake Sabrina, the littoral zone is realtively restricted, and areas with low gradients may provide suitable spawning habitat that extend well beyond the lake margins, especially along the north shore along the northern section of the reservoir (Figure 6.5-2), and avaialble habitat is likely to be similar under a range of water surface elevations.

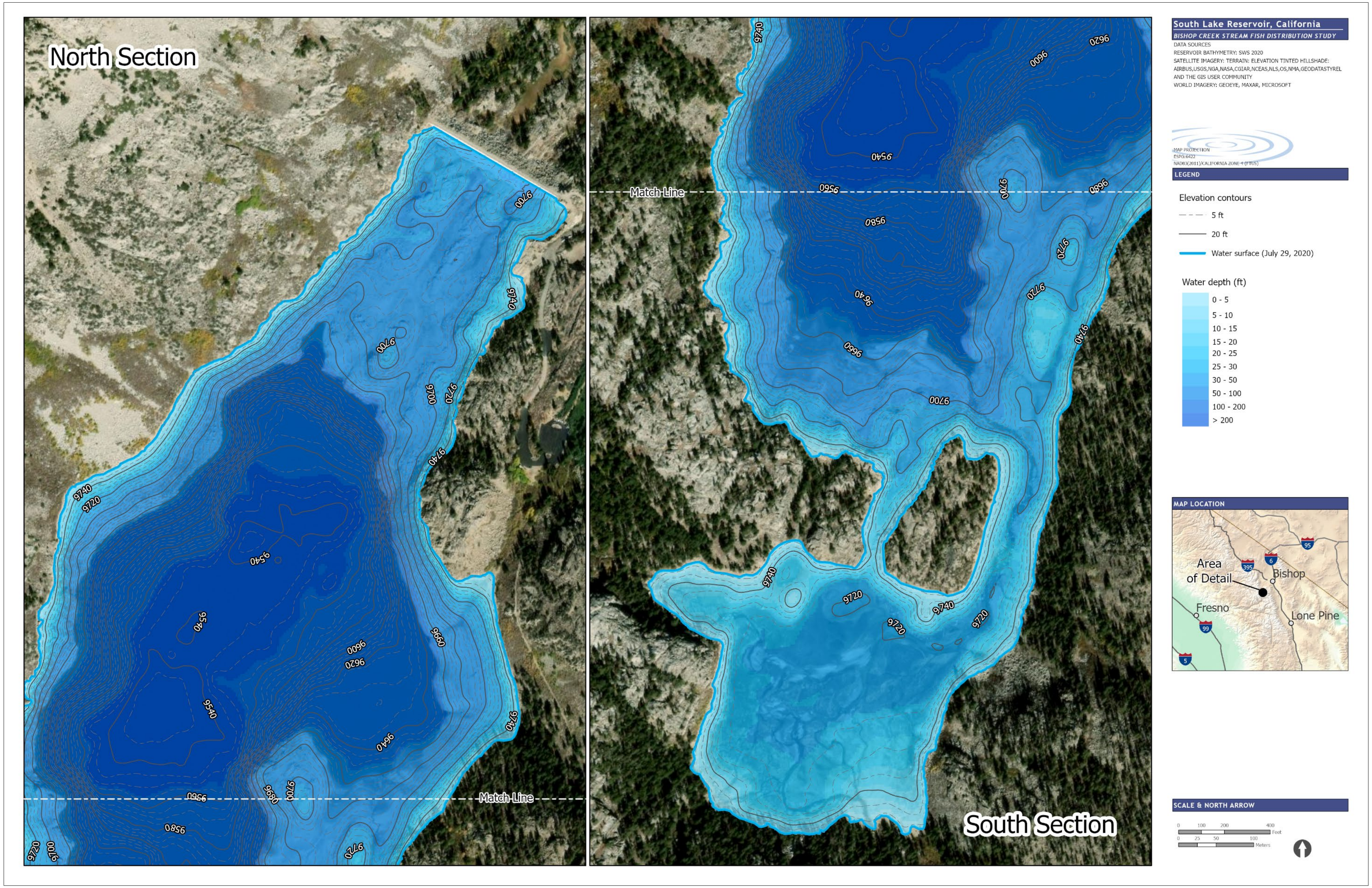

Figure 6.5-1 Bathymetry Map for South Lake

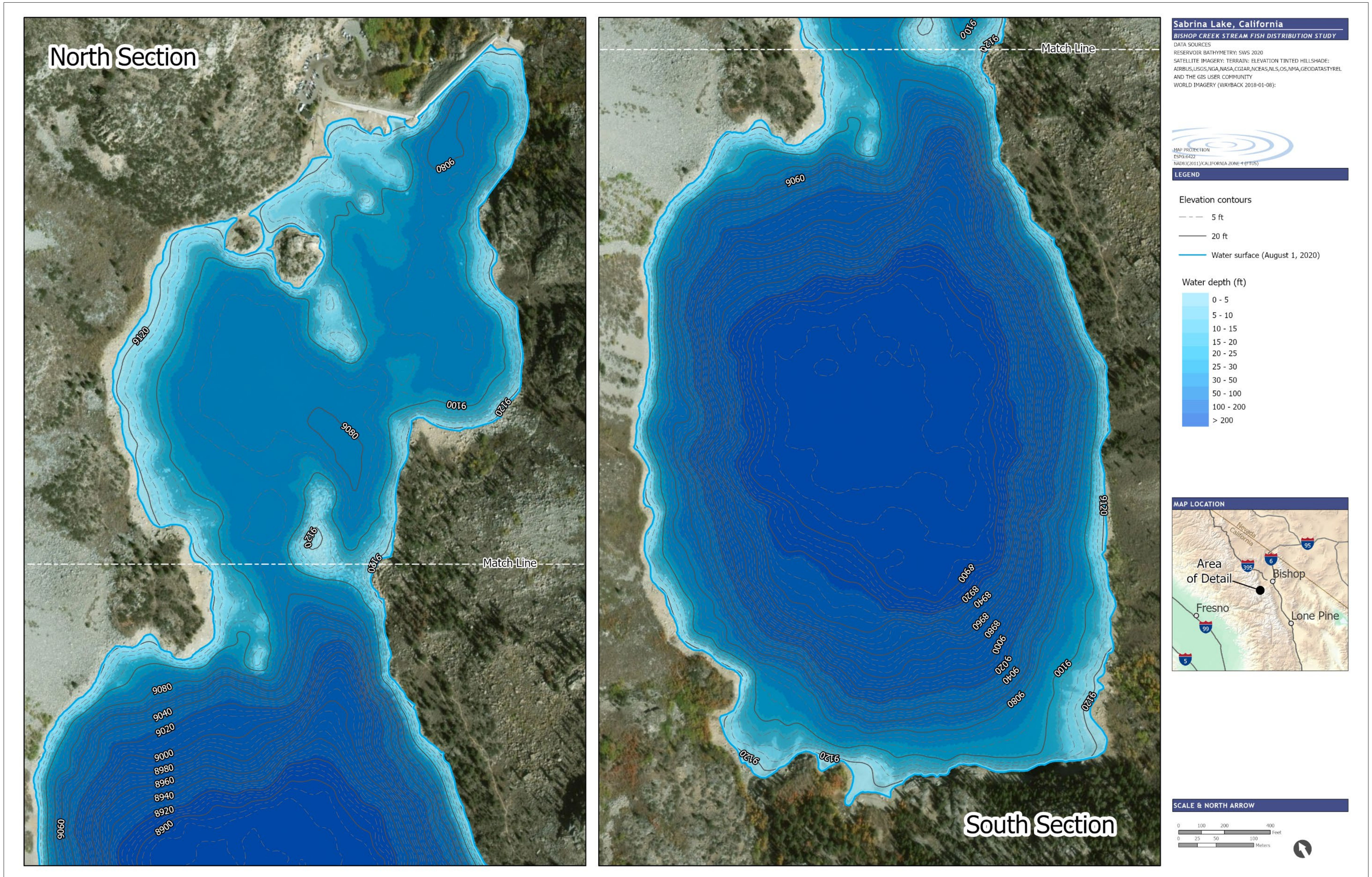

Figure 6.5-2 Bathymetry Map for Lake Sabrina

7.0 DISCUSSION

7.1 Localized Water Quality Parameters that May Affect the Growth and Distribution of Fish Species

The cold-water temperatures and generally high oxygen levels measured in all three reservoirs throughout the study are suitable for trout. Optimal temperatures for growth of rainbow trout are approximately 15–18 °C, but a wide range of temperatures can be tolerated (Moyle 2002). At low temperatures, rainbow trout can tolerate DO levels around 2 mg/L, but growth normally requires DO levels near saturation (Moyle 2002). DO saturation levels are approximately 7 mg/L at 9,000 feet elevation in water that is 15°C, and DO saturation is slightly lower at 10,000 feet. Both brown trout and brook trout require similar conditions for growth but can occur over a wider range of temperature and DO levels (Moyle 2002). Therefore, localized water quality parameters are expected to support sufficient periods of growth for trout in these reservoirs (Table 6.1-1).

7.2 Fish Populations and Distribution in Project Reservoirs

7.2.1 South Lake

Fish populations in South Lake are made up of a mix of hatchery and naturally produced trout. YOY brown trout, rainbow trout, and brook trout were captured during reservoir surveyes suggesting some natural reproduction occurs for each species. Multiple age classes of all three trout species were captured in South Lake during 2020 even though stocking records indicate only rainbow trout were stocked in South Lake during 2019 and 2020 (CDFW 2019). Relatively high numbers of rainbow trout captured in South Lake appeared to be of hatchery descent based on observations of worn fins and other deformities on rainbow trout captured during the study. No other species showed signs of hatchery descent. Angling pressure appears to be high in South Lake based on several fish captured with fishing line in their stomachs and mouths. No Owens suckers were captured or observed in South Lake during this study.

7.2.2 Lake Sabrina

Fish populations in Lake Sabrina are made up of a mix of hatchery and naturally produced trout along with a seemingly large population of naturally reproducing Owens suckers. YOY rainbow trout and brook trout were captured during reservoir surveys suggesting some natural reproduction occurs for these species. Unlike in South Lake, brown trout were nearly absent from the catch, with only a single brown trout captured . Rainbow trout is the only species currently stocked by CDFW and were the most abundant trout species. While hatchery fish cannot always be distinguished from naturally produced fish, a high proportion of rainbow trout captured in Lake Sabrina showed signs indicative of fish from hatchery orgins, such as worn fins and other physical deformities. Angling pressure appears to be greater at Lake Sabrina compared to South Lake, which may account for the near absence of brown trout observed. Several captured fish had fishing line in their stomachs and mouths. Owens suckers appear to have established a self-sustaining population within Lake Sabrina, based on their high relative abundance and age-class distribution, which included fish ranging from YOY to the 6+ age class or older.

7.2.3 Longley Lake

A self-sustaining population of brook trout occurs within Longley Lake. Brook trout density appears to be higher at Longley Lake than at South Lake or Lake Sabrina, as indicated by higher CPUE for fish captured at Longley Lake, even though no stocking currently occurs. The sampling method used at Longley Lake was selective for larger fish, so no YOY fish were captured; however, natural reproduction is likely occuring based on the high abundance of fish and observations of relatively young age 2+ to 3+ fish captured. Overall, brook trout were fairly small in size, but this is typical of high elevation populations in California (Moyle 2002).

7.3 Inyo National Forest Desired Conditions

Results from this study provide only a limited basis for comparison with the Desired Conditions described in the Land Management Plan for the INF (USDA 2019). The conditions included in the Land Management Plan focus on ecological sustainability and diversity of plant and animal communities, both native and non-native; however, heavy angling pressure in South Lake and Lake Sabrina likely limit self-sustaining populations of non-native game species (i.e., trout). Both South Lake and Lake Sabrina are managed as a put-and-take fishery where heavy stocking occurs followed by rapid removal from heavy angling pressure. However, these fisheries do appear to be contributing to economies to the local communities as evident by the marinas and resorts associated with South Lake and Lake Sabrina. Furthermore, no native fish were present within this section of the watershed prior to stocking, so no risk is being posed by non-native game fish species. Therefore, these conditions meet the criteria included in desired condition (SPEC-FW-DC)-05 as listed below:

> ***(SPEC-FW-DC) 05:*** *The Inyo National Forest provides high quality hunting and fishing opportunities. Habitat for non-native fish and game species is managed in locations and ways that do not pose substantial risk to native species, while still contributing to economies of local communities.*

Only Longley Lake appears to support sufficient numbers of brook trout to support a sustainable population of non-native game fish. Owens suckers, while not historically present in the upper Bishop Creek watershed, are native to the basin and appear to have established a self-sustaining population within Lake Sabrina. These populations meet the criteria included under the desired condition (SPEC-FW-DC)-01 as listed below:

> ***(SPEC-FW-DC) 01:*** *Sustainable populations of native and desirable non-native, plant and animal species are supported by healthy ecosystems, essential ecological processes, and land stewardship activities, and reflect the diversity, quantity, quality, and capability of natural habitats on the Inyo National Forest.*

8.0 CONSULTATION SUMMARY

Biologists contacted CDFW on May 21, June 1, and June 2, 2020 to coordinate the reservoir sampling approach and CDFW's aging of Owens sucker opercula collected during the June 2020 surveys. SCE distributed periodic progress reports on the following schedule:

- Progress Report 1: December 19, 2019
- Progress Report 2: April 14, 2020
- Progress Report 3: July 24, 2020
- Initial Study Report (Progress Report 4): October 30, 2020
- Initial Study Meeting: November 10, 2020
- Progress Report 1: March 2, 2021
- Progress Report 2: May 28, 2021
- Progress Report 3: August 27, 2021
- Updated Study Report Filing: November 4, 2021
- Updated Study Report Meeting: November 18, 2021

Three progress reports were filed in 2021 after the ISR, as identified above. This Final Technical Report was submitted to agencies and stakeholders for a 60-day review period on May 14, 2021. The comment period was extended, at the request of the agencies, and comments received on this report are shown in Table 8.1-1. A meeting was held with CDFW and USFS on October 6, 2021 to discuss those comments received as well as SCE's draft responses to them. SCE held a Project Effects meeting on October 28, 2021 for all stakeholders and agencies to discuss what project effects (if any) had been identified through the implementation of each of the approved study plans.

The Updated Study Report (USR) was filed with FERC on November 4, 2021, and a USR Meeting was held on November 18, 2021. At this meeting, SCE only discussed those studies which were still in progress at the time of the ISR (Water Quality, Sediment and Geomorphology, Operations Model, Recreation Use and Needs, Recreation Facilities Condition Assessment, Project Lands and Boundary, and Cultural and Tribal Studies). The Reservoir Fish Distrbution Study was not discussed at the USR, and thus received no comments.

Table 8.1-1 Consultation Summary

Comment Number	Study	Date of Comment	Entity	Comments	SCE Response
1	Fish Distribution Study (Reservoirs) – AQ 4	October 4, 2021	CDFW	CDFW agrees that most rainbow trout captured are hatchery-origin. A plot showing this should be included if data was collected on what percentage of rainbow trout had worn fins. October 14, 2021, CDFW Updated Comment: Size of planted trout will be from 1-inch up to 18-inches, but most trout stocked will be around 7-10 inches. Fin wear has been established as a useful indicator of hatchery origin in some systems. Roger and Jeff (HWT) used fin wear to document hatchery trout in the EF Carson in 2008.	Data collection on fin wear was not included as part of this study plan. However, crews did collect incidental information on general fish health including fish origin as hatchery, wild, or unknown based on fin wear, fish deformities, and coloration. From that qualitative data, a large portion of rainbow trout (53% in Sabrina and 57% in South Lake) appeared to be of hatchery origin, with 27% to 30% identified as unknown origin, while 14% to 18% appeared to be wild. Information on recruitment is also available in the Length- Frequency histograms (i.e., age-class distribution plots), which suggest some natural reproduction is occurring in both South Lake and Lake Sabrina This comment is addressed in Section 8.5 of Exhibit E of the Draft License Application (DLA).
2	Fish Distribution Study (Reservoirs) – AQ 4	October 4, 2021	CDFW	Brook trout recruitment in Longley reservoir appears to be limited (no young of the year were captured)- was there a reason for this. October 14, 2021, CDFW Updated Comment: Trout are typically stream spawners. Very little spawning occurs in the reservoir. However, at times Brook trout may be able to spawn in the lakes with sufficient groundwater inflow, and it may be the case in Longley.	SCE employed gillnets to collect presence-absence data in Longley Reservoir at the recommendation of CDFW and USFS. Neither the gear nor the study methodology was designed to collect YOY trout. This comment is addressed in Section 8.5 of Exhibit E of the DLA.

Comment Number	Study	Date of Comment	Entity	Comments	SCE Response
				Minnow traps or e-fishing the shoreline may have helped to document YOY presence in Longley. Tiered study using unbaited minnow traps in the stream up steams (not in reservoirs) to capture YOY and document spawn could also have been used. CDFW understands we are past proposing new studies. Recruitment should be expressed as survival to age 1. Recruitment and spawn are two different things.	
3	Fish Distribution Study (Reservoirs) – AQ 4	October 4, 2021	CDFW	Use ArcGIS to make Owens sucker (Catostomus fumeiventris) suitability maps a different reservoir levels and use Project operational knowledge to determine when and how Project operations (e.g., increasing or decreasing reservoir levels) could impact the quality or quantity of Owens sucker habitat. October 14, 2021, CDFW Updated Comment: [2]Owens sucker are a CDFW species of special concern. They are not a nuisance species, and they are not a game species. The Sabrina population is the least genetically diverse population of Owens sucker, but it is still the only native fish in the Project area. CDFW interest	Suitability mapping for sucker habitat in Project Reservoirs is outside the scope of the FERC approved study plan. However, general habitat availability can be assessed from the bathymetry figures included in the Technical Report. The bathymetry figure for Lake Sabrina show areas with low gradients that likely provide suitable spawning habitat extend well beyond the lake margins, especially along the north shore along the northern section of the reservoir, and available habitat is likely to be similar under a range of water surface elevations. A large and robust population of Owens sucker was observed in Lake Sabrina while no Owens sucker were observed in South Lake during this study. In Lake Sabrina, spawning behavior was observed with Owens sucker congregating in large groups along sand and gravel substrate along most of the reservoir shoreline, and redds were observed within the back of coves at the southern end of the

[2] https://wildlife.ca.gov/Conservation/SSC/Fishes and https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=104359&inline.

Comment Number	Study	Date of Comment	Entity	Comments	SCE Response
				for Owens sucker are conservation of the species.	reservoir. Owens sucker spawning typically occurs during the late spring and early summer when reservoir levels are rising. Current and proposed reservoir operations appear to be supporting a healthy population. This comment is addressed in Section 8.5 of Exhibit E of the DLA.

9.0 REFERENCES

Bradford, D. F. 1989. Allotropic distribution of native frogs and introduced fishes in high Sierra Nevada lakes of California: implication of the negative effect of fish introductions. Copeia 1989(3):775-778.

Bradford, D.F., S.D. Cooper, T.M. Jenkins, K. Kratz, O. Samelle, and A.D. Brown. 1998. Influences of natural acidity and introduced fish on faunal assemblages in California alpine lakes. Canadian Journal of Fisheries and Aquatic Sciences 55(11):2478-2491.

California Department of Fish and Wildlife (CDFW). 2019. California Department of Fish and Wildlife provisional fish releases - 2019/2020. Available at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=74004&inline.

California Department of Fish and Wildlife (CDFW). n.d. “Owens Sucker: *Catostomus fumeiventris* (Miller).” https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=104359. Accessed March 22, 2019.

Chandler Decree 1922. Hillside Water Company v. William A. Trickey et.al, U.S. District Court, Southern Division of California (Northern Division), No. B-61 EQ, Final Decree in Equity (Chandler Decree), January 27, 1922 (Unreported).

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

Finlay, J. C., and V. T. Vredenburg. 2007. Introduced trout sever trophic connections in watersheds: consequences for a declining amphibian. Ecology 88(9):2187-2198.

Knapp, R.A., and K.R. Matthews. 2000. Non-native fish introductions and the decline of the mountain yellow-legged frog from within protected areas. Conservation Biology 14:428-438.

Moyle, P.B. 2002. Inland fishes of California. Revised edition. University of California Press, Berkeley.

Reynolds, J.B. 1996. Electrofishing. In Fisheries Techniques (2nd edition). Murphy, B. R., and D. W. Willis (eds.). American Fisheries Society, Bethesda, MD. pp 221–252.

Ricker, W.E. 1975. Computation and interpretation of biological statistics of fish populations. Fisheries Research Board of Canada. Bulletin 191.

Southern California Edison (SCE). 2021a. Bishop Creek fish distribution (AQ 3), final technical report. Prepared by Stillwater Sciences and Kleinschmidt. Prepared for Southern California Edison.

Southern California Edison (SCE). 2021b. Bishop Creek Wildlife initial study report (TERR 4), final technical report. Prepared by Kleinschmidt for Southern California Edison.

United States Department of Agriculture (USDA). 2019. Land Management Plan for the Inyo National Forest. https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd589652.pdf.

APPENDIX A

RESERVOIR SAMPLE SITE CONDITIONS

Table A-1 Reservoir Sample Site Conditions Data, June and September 2020

Reservoir Name	Survey	Site Location Description	Site length (ft)	Site width (ft)	Sample Date	Start Time	End Time	Total Area Fished (ft²)	Sample time (seconds, except where noted)	Water Depth (at Site) Max.	Water Depth (at Site) Avg.	Water Depth (at Site) Min.	pH	Dissolved Oxygen (mg/l)[1]	Dissolved Oxygen (%)	Conductivity µS/cm[2] (25 °C)	Conductivity µS/cm[2] (adjusted to °C)	Water Temp. (°C)	Depth of YSI reading (ft):	Weather
June Sampling																				
Lake Sabrina	Owens Sucker	East of southern Inlet	700	20	6/4/2020	12:30	13:30	14,000	1,281	8.0	4.0	2.0	7.04	9.94	92.7	14.4	19.1	12.2	3.0	overcast
Lake Sabrina	Owens Sucker	North shore, western end of lake	1,455	15	6/4/2020	15:15	15:45	21,825	913	8.0	4.0	2.0	7.04	9.94	92.7	14.4	19.1	12.2	3.0	overcast, warm breezy
Lake Sabrina	Owens Sucker	Cove just north of main inlet	200	20	6/4/2020	14:50	15:05	4,000	348	10.0	6.0	4.0	7.04	9.94	92.7	14.4	19.1	12.2	3.0	overcast, sprinkling, breezy
Lake Sabrina	Owens Sucker	Cove near marina	400	20	6/4/2020	10:50	11:30	8,000	932	8.5	5.0	2.0	6.84	9.74	88.7	15.0	19.4	12.7	3.0	Clear, p-cloudy, hot
Lake Sabrina	Owens Sucker	Cove near marina	1,000	20	6/8/2020	12:15	12:40	20,000	566	7.0	5.0	3.0								clear, breezy
Lake Sabrina	Owens Sucker	North shore mid reservoir	700	10	6/8/2020	13:20	13:41	7,000	755	10.0	4.0	2.0								clear, breezy
Lake Sabrina	Owens Sucker	Near SW Trib	1,600	10	6/8/2020	14:50	15:24	16,000	1,432	15.0	5.0	1.0								clear, sunny, breezy
Lake Sabrina	Night Efishing	Cove at dam	2,177	15	6/11/2020	20:40	21:10	32,655	1,406	10.0	4.0	2.0		8.61	81.6			12.8	3.0	clear, windy
Lake Sabrina	Night Efishing	Cove near marina	1,821	15	6/11/2020	22:30	23:00	27,315	1,379	10.0	4.0	1.0		8.61	81.6			12.8	3.0	clear, breezy
Lake Sabrina	Night Efishing	Northwest shore	1,698	15	6/11/2020	23:49	0:30	25,470	1,231	12.0	4.0	2.0		8.61	81.6			12.8	3.0	clear, breezy
Lake Sabrina	Night Efishing	Tributaries	1,643	15	6/11/2020	1:20	1:46	24,645	1,002	10.0	5.0	1.0		8.61	81.6			12.8	3.0	clear, cool
Lake Sabrina	Owens Sucker	South shore, western end of lake	1,000	15	6/16/2020	11:00	11:30	15,000	778	15.0	5.0	2.0	6.36	8.18	76.0	19.2	14.5	12.2	2.0	clear, windy
Lake Sabrina	Owens Sucker	North shore, western end of lake	1,500	15	6/16/2020	12:25	13:00	22,500	1,070	15.0	5.0	2.0	6.36	8.18	76.0	19.2	14.5	12.2	2.0	clear, windy
Lake Sabrina	Owens Sucker	Cove at dam	1,000	10	6/16/2020	10:15	10:45	10,000	904	8.0	5.0	2.0	6.91	8.64	78.9	14.1	19.2	11.4	2.0	clear, windy
South Lake	Seine	Inlet 3	140	90	6/3/2020	13:23	14:23	12,600	na	4.0	2.0	0.5	7.67	10.06	89.7	17.7	24.5	10.5	3.0	clear, breezy
South Lake	Seine	Inlet 1	50	30	6/3/2020	11:32	12:23	1,500	na	5.0	3.0	0.0	7.29	10.00	92.7	15.0	21.1	10.1	3.0	clear, light breeze
South Lake	Owens Sucker	Inlet 1 (northern inlet) to Inlet 2	2,000	20	6/9/2020	12:13	13:03	40,000	2,093	8.0	4.0	1.0	5.92	8.66	78.2	17.5	24.0	11.0	3.0	sunny, breezy
South Lake	Owens Sucker	Inlet 2 to inlet 3	1,500	20	6/9/2020	14:00	14:50	30,000	1,125	10.0	4.0	1.0	5.92	8.66	78.2	17.5	24.0	11.0	3.0	cloudy, breezy
South Lake	Owens Sucker	North of Launch Ramp	150	15	6/9/2020	16:00	16:10	2,250	141	10.0	5.0	1.0	5.57	8.60	76.1	18.3	25.8	9.6	3.0	sunny, breezy
South Lake	Night Efishing	South Shore	1,743	15	6/10/2020	2:20	2:45	26,145	1,031	10.0	5.0	1.0								clear, cold, calm
South Lake	Night Efishing	Inlet 2 to Inlet 3	1,634	15	6/10/2020	0:20	0:52	24,510	809	8.0	3.0	1.0								clear, calm
South Lake	Night Efishing	Inlet 1 (northern inlet) to Inlet 2	1,614	20	6/10/2020	22:50	23:37	32,280	1,581	12.0	4.0	2.0								clear, calm
South Lake	Night Efishing	North Shore	1,882	15	6/10/2020	3:10	3:40	28,230	1,259	15.0	5.0	2.0								clear, cold, calm
South Lake	Owens Sucker	Inlet 3	200	20	6/15/2020	12:25	13:00	4,000	1,053	8.0	3.0	1.0	6.78	8.75	77.3	16.0	22.3	10.3	3.0	cloudy
South Lake	Owens Sucker	Inlet 2	750	15	6/15/2020	13:10	13:50	11,250	1,083	10.0	4.0	2.0	6.78	8.75	77.3	16.0	22.3	10.3	3.0	clear, windy

Reservoir Name	Survey	Site Location Description	Site length (ft)	Site width (ft)	Sample Date	Start Time	End Time	Total Area Fished (ft²)	Sample time (seconds, except where noted)	Water Depth (at Site)			pH	Dissolved Oxygen		Conductivity		Water Temp. (°C)	Depth of YSI reading (ft):	Weather
										Max.	Avg.	Min.		(mg/l)[1]	(%)	µS/cm[2] (25 °C)	µS/cm[2] (adjusted to °C)			
South Lake	Owens Sucker	South Shore	1,000	15	6/15/2020	13:55	14:35	15,000	923	15.0	5.0	2.0	6.09	9.28	84.1	22.5	18.5	10.8	2.0	clear, breezy
September Sampling																				
Lake Sabrina	Night Efishing	NW Shore	1,698	15	9/10/2020	0:00	0:31	25,470	1,125	12.0	5.0	2.0	8.15	6.01	62.3	15.6	13.0	16.4	3.0	clear
Lake Sabrina	Night Efishing	Cove near Marina	1,821	15	09/09/2020	22:21	22:58	27,315	1,424	12.0	4.0	1.5	8.26	5.83	59.9	15.6	13.1	16.4	3.0	clear
Lake Sabrina	Night Efishing	NW Shore to trib	1,643	15	9/10/2020	0:44	1:20	24,645	1,426	15.0	4.0	1.5	8.46	6.07	62.3	15.6	13.1	16.6	3.0	clear
Lake Sabrina	Night Efishing	Cove near Dam	2,177	15	9/9/2020	20:50	21:43	32,655	1,772	14.0	5.0	2.0	8.07	6.21	63.5	15.6	13.1	16.4	3.0	clear
South Lake	Night Efishing	South Shore	1,743	15	9/11/2020	23:40	23:59	26,145	26,145	12.0	6.0	2.0	8.13	6.42	64.4	19.8	16.0	15.5	3.0	clear, cold
South Lake	Night Efishing	Inlet 2 to Inlet 3	1,634	15	9/11/2020	22:15	22:38	24,510	24,510	10.0	5.0	2.0	8.13	6.42	64.4	19.8	16.0	15.5	3.0	clear, cold
South Lake	Night Efishing	Inlet 1 (northern inlet) to Inlet 2	1,614	20	9/11/2020	20:51	21:16	32,280	32,280	10.0	6.0	2.0	8.13	6.42	64.4	19.8	16.0	15.5	3.0	clear, cold
South Lake	Night Efishing	North Shore	1,882	15	9/11/2020	20:00	20:20	28,230	28,230	10.0	6.0	2.0	8.43	6.42	64.4	17.7	14.6	15.8	3.0	clear, cold
Longley Lake	Gill net	Gill net 2, set 2	80	1	9/8/2020	2:00	12:20	80	10 hr 20 min	20.0	8.0	2.0	7.85	6.31	59.8	9.2	7.0	12.8	2.0	clear, smoky, cold
Longley Lake	Gill net	gill net 1, set 2	80	1	9/8/2020	1:15	12:15	80	11 hrs	20.0	8.0	2.0	7.85	6.31	59.8	9.2	7.0	12.8	2.0	clear, smoky, cold
Longley Lake	Gill net	Gill net 2	80	1	9/7/2020	16:00	1:30	80	9.50 hrs	20.0	8.0	2.0	7.85	6.31	59.8	9.2	7.0	12.8	2.0	smoky, windy
Longley Lake	Gill net	Gill net 1	80	1	9/7/2020	15:30	0:30	80	9 hrs	20.0	8.0	2.0	7.85	6.31	59.3	9.2	7.0	12.8	2.0	smoky, windy

[1] milligrams per liter (mg/L)

[2] microsiemens per centimeter (µS/cm)

APPENDIX B

RESERVOIR SAMPLE SITE PHOTOS

Figure B-1 South Lake, shoreline conditions south of inlet 1 (northern inlet), June 3, 2020

Figure B-2 South Lake, shoreline conditions at inlet 1 (northern inlet), June 3, 2020

Figure B-3 South Lake, shoreline conditions at western end of lake, June 3, 2020

Figure B-4 South Lake, shoreline conditions at southern inlet, June 3, 2020

Figure B-5 Lake Sabrina, shoreline conditions at southern inlet, June 4, 2020

Figure B-6 Lake Sabrina, steep shoreline conditions east of southern inlet, June 4, 2020

Figure B-7 Lake Sabrina, general site overview looking west from mid-lake, June 4, 2020

Figure B-8 Lake Sabrina, general site overview looking east from mid-lake, June 8, 2020

Figure B-9 Longley Lake, gill net #1 placement and general site conditions, September 14, 2020

Figure B-10 Longley Lake, gill net #2 placement and general site conditions, September 14, 2020

APPENDIX C

RESERVOIR FISH CAPTURE DATA

Table C-1 South Lake Fish Capture Data, June 2020

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
South Lake	Inlet 3	Seine	Day	brook trout	78	83	4.6	0.97	none	unknown	
South Lake	Inlet 3	Seine	Day	brook trout	79	83	4.7	0.95	none	unknown	
South Lake	Inlet 3	Seine	Day	brook trout	85	94	6.4	1.04	none	unknown	Missing part of tail
South Lake	Inlet 3	Seine	Day	brook trout	88	93	6.6	0.97	none	unknown	
South Lake	Inlet 3	Seine	Day	brook trout	89	93	7.5	1.06	SL-2	unknown	
South Lake	Inlet 3	Seine	Day	brook trout	89	94	7.1	1.01	none	unknown	
South Lake	Inlet 3	Seine	Day	brook trout	90	94	8.2	1.12	none	unknown	
South Lake	Inlet 3	Seine	Day	brook trout	90	95	6.5	0.89	none	unknown	
South Lake	Inlet 3	Seine	Day	brook trout	90	95	6.9	0.95	none	unknown	
South Lake	Inlet 3	Seine	Day	brook trout	90	94	7.4	1.02	none	unknown	
South Lake	Inlet 3	Seine	Day	brook trout	91	96	7.8	1.04	none	unknown	
South Lake	Inlet 3	Seine	Day	brook trout	93	97	8.4	1.04	none	unknown	
South Lake	Inlet 3	Seine	Day	brook trout	94	99	8.4	1.01	none	unknown	
South Lake	Inlet 3	Seine	Day	brook trout	94	100	7.7	0.93	none	unknown	
South Lake	Inlet 3	Seine	Day	brook trout	108	113	11	0.87	none	unknown	
South Lake	Inlet 3	Seine	Day	brook trout	118	125	17.6	1.07	SL-1	unknown	
South Lake	Inlet 3	Seine	Day	brown trout	81	86	5.4	1.02	none	unknown	
South Lake	Inlet 3	Seine	Day	rainbow trout	51	54	1.4	1.06	none	unknown	
South Lake	Inlet 1 to Inlet 2	E-fish	Day	brook trout	85	89	6.8	1.11	none	unknown	
South Lake	Inlet 1 to Inlet 2	E-fish	Day	brook trout	88	93	8.9	1.31	none	unknown	

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
South Lake	Inlet 1 to Inlet 2	E-fish	Day	brook trout	159	167	60	1.49	none	unknown	
South Lake	Inlet 1 to Inlet 2	E-fish	Day	brook trout	172	181	60	1.18	SL2-7	unknown	
South Lake	Inlet 1 to Inlet 2	E-fish	Day	brook trout	184	192	70	1.12	none	unknown	
South Lake	Inlet 1 to Inlet 2	E-fish	Day	brook trout	213	221	110	1.14	none	unknown	
South Lake	Inlet 1 to Inlet 2	E-fish	Day	brook trout	215	224	110	1.11	SL2-9	unknown	Jaw deformed
South Lake	Inlet 1 to Inlet 2	E-fish	Day	brook trout	221	230	120	1.11	SL2-10	unknown	
South Lake	Inlet 1 to Inlet 2	E-fish	Day	brook trout	225	235	80	0.70	SL2-1	unknown	
South Lake	Inlet 1 to Inlet 2	E-fish	Day	brook trout	225	236	70	0.61	SL2-2	unknown	Injured
South Lake	Inlet 1 to Inlet 2	E-fish	Day	brook trout	238	252	160	1.19	SL2-8	unknown	
South Lake	Inlet 1 to Inlet 2	E-fish	Day	brook trout	253	255	140	0.86	SL2-5	unknown	
South Lake	Inlet 1 to Inlet 2	E-fish	Day	brown trout	265	279	110	0.59	SL2-12	unknown	Dead before capture
South Lake	Inlet 1 to Inlet 2	E-fish	Day	brown trout	315	329	340	1.09	SL2-11	unknown	
South Lake	Inlet 1 to Inlet 2	E-fish	Day	rainbow trout	233	247	170	1.34	SL2-6	wild	Ripe male
South Lake	Inlet 1 to Inlet 2	E-fish	Day	rainbow trout	235	250	130	1.00	none	hatchery	Unhealthy
South Lake	Inlet 1 to Inlet 2	E-fish	Day	rainbow trout	313	322	280	0.91	SL2-3	unknown	Mature/ripe male
South Lake	Inlet 1 to Inlet 2	E-fish	Day	rainbow trout	313	320	280	0.91	none	unknown	Ripe female
South Lake	Inlet 1 to Inlet 2	E-fish	Day	rainbow trout	315	322	310	0.99	SL2-4	unknown	Ripe female
South Lake	Inlet 2 to Inlet 3	E-fish	Day	brook trout	93	96	8.6	1.07	none	unknown	
South Lake	Inlet 2 to Inlet 3	E-fish	Day	brook trout	100	104	10.3	1.03	none	unknown	
South Lake	Inlet 2 to Inlet 3	E-fish	Day	brook trout	160	165	40	0.98	none	unknown	
South Lake	Inlet 2 to Inlet 3	E-fish	Day	brook trout	180	189	90	1.54	none	unknown	

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
South Lake	Inlet 2 to Inlet 3	E-fish	Day	brook trout	202	210	120	1.46	none	unknown	
South Lake	Inlet 2 to Inlet 3	E-fish	Day	brook trout	210	221	130	1.40	none	unknown	
South Lake	Inlet 2 to Inlet 3	E-fish	Day	brook trout	211	221	120	1.28	none	unknown	
South Lake	Inlet 2 to Inlet 3	E-fish	Day	brook trout	231	238	130	1.05	none	unknown	
South Lake	Inlet 2 to Inlet 3	E-fish	Day	brook trout	233	243	130	1.03	none	unknown	
South Lake	Inlet 2 to Inlet 3	E-fish	Day	brook trout	234	245	140	1.09	none	unknown	
South Lake	Inlet 2 to Inlet 3	E-fish	Day	brown trout	82	86	5.9	1.07	none	unknown	
South Lake	Inlet 2 to Inlet 3	E-fish	Day	brown trout	330	345	320	0.89	SL2-18	unknown	
South Lake	Inlet 2 to Inlet 3	E-fish	Day	rainbow trout	58	61	2.4	1.23	none	unknown	
South Lake	Inlet 2 to Inlet 3	E-fish	Day	rainbow trout	146	154	50	1.61	none	unknown	Dark w/ parr marks
South Lake	Inlet 2 to Inlet 3	E-fish	Day	rainbow trout	149	156	41.1	1.24	none	wild	Mature male
South Lake	Inlet 2 to Inlet 3	E-fish	Day	rainbow trout	162	171	60	1.41	none	unknown	Parr marks
South Lake	Inlet 2 to Inlet 3	E-fish	Day	rainbow trout	180	194	30	0.51	SL2-17	unknown	Dark color
South Lake	Inlet 2 to Inlet 3	E-fish	Day	rainbow trout	199	215	120	1.52	none	unknown	
South Lake	Inlet 2 to Inlet 3	E-fish	Day	rainbow trout	211	222	100	1.06	none	hatchery	
South Lake	Inlet 2 to Inlet 3	E-fish	Day	rainbow trout	241	256	180	1.29	SL2-14	unknown	Dark color
South Lake	Inlet 2 to Inlet 3	E-fish	Day	rainbow trout	268	284	220	1.14	SL2-15	wild	Mature male & dark
South Lake	Inlet 2 to Inlet 3	E-fish	Day	rainbow trout	275	280	190	0.91	SL2-16	unknown	
South Lake	Inlet 2 to Inlet 3	E-fish	Day	rainbow trout	291	304	100	0.41	none	unknown	
South Lake	Inlet 2 to Inlet 3	E-fish	Day	rainbow trout	314	322	240	0.78	SL2-13	unknown	Male, mature & dark

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
South Lake	Inlet 2 to Inlet 3	E-fish	Day	rainbow trout	315	323	170	0.54	none	unknown	Ripe female, missing pectoral fins
South Lake	Inlet 2 to Inlet 3	E-fish	Day	rainbow trout	325	334	341	0.99	none	unknown	
South Lake	Inlet 2 to Inlet 3	E-fish	Day	rainbow trout	350	380	520	1.21	none	hatchery	All fins worn & operculum partially missing
South Lake	North from launch ramp	E-fish	Day	NO FISH				No Entry	none	unknown	
South Lake	Inlet 2	E-fish	Night	brook trout	219	228	130	1.24	none	unknown	
South Lake	Inlet 2	E-fish	Night	brook trout	225	234	150	1.32	none	unknown	
South Lake	Inlet 2	E-fish	Night	brook trout	241	249	180	1.29	none	unknown	
South Lake	Inlet 2	E-fish	Night	brook trout	250	263	180	1.15	SL3-18	unknown	
South Lake	Inlet 2	E-fish	Night	brook trout	254	261	180	1.10	SL3-11	unknown	
South Lake	Inlet 2	E-fish	Night	brook trout	280	293	190	0.87	SL3-15	unknown	
South Lake	Inlet 2	E-fish	Night	brown trout	238	250	180	1.34	SL3-12	unknown	
South Lake	Inlet 2	E-fish	Night	brown trout	265	279	220	1.18	none	unknown	
South Lake	Inlet 2	E-fish	Night	brown trout	266	280	210	1.12	none	unknown	
South Lake	Inlet 2	E-fish	Night	brown trout	269	275	190	0.98	none	hatchery	
South Lake	Inlet 2	E-fish	Night	brown trout	278	287	260	1.21	none	unknown	
South Lake	Inlet 2	E-fish	Night	brown trout	291	305	320	1.30	none	unknown	
South Lake	Inlet 2	E-fish	Night	brown trout	309	321	240	0.81	SL3-19	unknown	Skinny
South Lake	Inlet 2	E-fish	Night	rainbow trout	125	134	40	2.05	SL3-21	wild	

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
South Lake	Inlet 2	E-fish	Night	rainbow trout	159	167	70	1.74	SL3-20	wild	
South Lake	Inlet 2	E-fish	Night	rainbow trout	240	240	140	1.01	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	245	256	140	0.95	none	hatchery	Skinny
South Lake	Inlet 2	E-fish	Night	rainbow trout	247	261	220	1.46	SL3-17	wild	
South Lake	Inlet 2	E-fish	Night	rainbow trout	250	263	180	1.15	SL3-13	wild	Dark male, ripe
South Lake	Inlet 2	E-fish	Night	rainbow trout	275	285	220	1.06	SL3-16	wild	
South Lake	Inlet 2	E-fish	Night	rainbow trout	280	295	290	1.32	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	280	296	250	1.14	SL3-14	wild	Male
South Lake	Inlet 2	E-fish	Night	rainbow trout	280	300	260	1.18	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	285	305	290	1.25	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	287	295	280	1.18	none	unknown	
South Lake	Inlet 2	E-fish	Night	rainbow trout	290	300	280	1.15	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	291	297	270	1.10	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	295	311	320	1.25	SL3-10	unknown	
South Lake	Inlet 2	E-fish	Night	rainbow trout	295	305	310	1.21	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	300	320	370	1.37	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	301	315	240	0.88	none	unknown	
South Lake	Inlet 2	E-fish	Night	rainbow trout	302	311	280	1.02	none	unknown	
South Lake	Inlet 2	E-fish	Night	rainbow trout	303	319	350	1.26	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	303	321	360	1.29	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	305	310	320	1.13	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	307	315	290	1.00	none	hatchery	

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
South Lake	Inlet 2	E-fish	Night	rainbow trout	309	317	300	1.02	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	310	320	330	1.11	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	310	321	370	1.24	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	311	315	350	1.16	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	316	331	330	1.05	none	unknown	
South Lake	Inlet 2	E-fish	Night	rainbow trout	318	331	320	1.00	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	320	331	380	1.16	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	325	332	380	1.11	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	325	331	360	1.05	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	328	351	350	0.99	none	wild	
South Lake	Inlet 2	E-fish	Night	rainbow trout	335	345	470	1.25	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	335	345	380	1.01	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	340	358	470	1.20	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	344	351	470	1.15	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	345	355	460	1.12	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	347	355	460	1.10	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	360	366	510	1.09	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	365	390	550	1.13	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	365	380	550	1.13	none	hatchery	
South Lake	Inlet 2	E-fish	Night	rainbow trout	110	119	30	2.25	SL3-22	unknown	
South Lake	South Shore	E-fish	Night	brook trout	125	132	20	1.02	SL3-25	wild	
South Lake	South Shore	E-fish	Night	brown trout	285	296	220	0.95	none	unknown	

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
South Lake	South Shore	E-fish	Night	rainbow trout	139	148	45	1.68	SL3-23	wild	
South Lake	South Shore	E-fish	Night	rainbow trout	187	198	90	1.38	SL3-26	unknown	
South Lake	South Shore	E-fish	Night	rainbow trout	235	250	140	1.08	SL3-24	wild	
South Lake	South Shore	E-fish	Night	rainbow trout	280	293	270	1.23	none	hatchery	
South Lake	South Shore	E-fish	Night	rainbow trout	295	315	290	1.13	none	wild	Pretty fish
South Lake	South Shore	E-fish	Night	rainbow trout	323	338	410	1.22	none	unknown	
South Lake	South Shore	E-fish	Night	rainbow trout	355	375	440	0.98	none	hatchery	
South Lake	South Shore	E-fish	Night	rainbow trout	360	370	540	1.16	none	hatchery	
South Lake	North shore	E-fish	Night	brook trout	117	122	20	1.25	SL3-32	unknown	
South Lake	North shore	E-fish	Night	brook trout	188	195	80	1.20	SL3-31	unknown	
South Lake	North shore	E-fish	Night	brook trout	239	252	140	1.03	none	unknown	
South Lake	North shore	E-fish	Night	brown trout	250	263	210	1.34	none	unknown	
South Lake	North shore	E-fish	Night	brown trout	250	265	220	1.41	none	unknown	
South Lake	North shore	E-fish	Night	rainbow trout	162	173	70	1.65	none	unknown	
South Lake	North shore	E-fish	Night	rainbow trout	182	195	80	1.33	none	unknown	
South Lake	North shore	E-fish	Night	rainbow trout	290	305	280	1.15	none	unknown	
South Lake	North shore	E-fish	Night	rainbow trout	300	312	220	0.81	none	Hatchery	
South Lake	North shore	E-fish	Night	brook trout	199	210	120	1.52	SL3-30	unknown	
South Lake	North shore	E-fish	Night	brook trout	214	221	110	1.12	none	unknown	
South Lake	North shore	E-fish	Night	brook trout	230	245	130	1.07	none	unknown	
South Lake	North shore	E-fish	Night	brown trout	264	275	180	0.98	none	unknown	
South Lake	North shore	E-fish	Night	brown trout	270	284	220	1.12	none	unknown	

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
South Lake	North shore	E-fish	Night	rainbow trout	141	150	40	1.43	none	wild	
South Lake	North shore	E-fish	Night	rainbow trout	177	191	80	1.44	none	wild	
South Lake	North shore	E-fish	Night	rainbow trout	182	195	70	1.16	SL3-28	unknown	
South Lake	North shore	E-fish	Night	rainbow trout	207	225	100	1.13	SL3-27	unknown	
South Lake	North shore	E-fish	Night	rainbow trout	220	238	140	1.31	none	hatchery	Tapered body, deformed
South Lake	North shore	E-fish	Night	rainbow trout	240	265	170	1.23	none	hatchery	
South Lake	North shore	E-fish	Night	rainbow trout	268	275	200	1.04	none	hatchery	
South Lake	North shore	E-fish	Night	rainbow trout	280	300	250	1.14	none	hatchery	
South Lake	North shore	E-fish	Night	rainbow trout	280	291	220	1.00	none	hatchery	
South Lake	North shore	E-fish	Night	rainbow trout	288	300	160	0.67	none	unknown	Skinny, likely hatchery
South Lake	North shore	E-fish	Night	rainbow trout	290	298	240	0.98	none	hatchery	
South Lake	North shore	E-fish	Night	rainbow trout	292	307	270	1.08	none	hatchery	
South Lake	North shore	E-fish	Night	rainbow trout	295	319	290	1.13	none	unknown	
South Lake	North shore	E-fish	Night	rainbow trout	300	300	290	1.07	none	hatchery	
South Lake	North shore	E-fish	Night	rainbow trout	300	310	280	1.04	none	unknown	
South Lake	North shore	E-fish	Night	rainbow trout	310	325	320	1.07	none	hatchery	
South Lake	North shore	E-fish	Night	rainbow trout	312	320	285	0.94	none	hatchery	
South Lake	North shore	E-fish	Night	rainbow trout	324	335	330	0.97	none	hatchery	Female, mature
South Lake	North shore	E-fish	Night	rainbow trout	325	340	340	0.99	none	hatchery	
South Lake	North shore	E-fish	Night	rainbow trout	357	375	450	0.99	SL3-29	wild	
South Lake	Inlet 1	E-fish	Night	brook trout	163	171	70	1.62	none	unknown	

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
South Lake	Inlet 1	E-fish	Night	brook trout	216	229	130	1.29	none	unknown	
South Lake	Inlet 1	E-fish	Night	brown trout	261	275	220	1.24	SL3-4	unknown	
South Lake	Inlet 1	E-fish	Night	brown trout	262	277	220	1.22	SL3-5	unknown	
South Lake	Inlet 1	E-fish	Night	brown trout	269	281	220	1.13	SL3-6	unknown	
South Lake	Inlet 1	E-fish	Night	brown trout	287	299	220	0.93	SL3-3	unknown	
South Lake	Inlet 1	E-fish	Night	brown trout	288	301	240	1.00	none	unknown	
South Lake	Inlet 1	E-fish	Night	brown trout	318	335	320	1.00	SL3-8	unknown	
South Lake	Inlet 1	E-fish	Night	rainbow trout	139	146	50	1.86	SL3-9	unknown	
South Lake	Inlet 1	E-fish	Night	rainbow trout	181	191	80	1.35	SL3-7	unknown	
South Lake	Inlet 1	E-fish	Night	rainbow trout	240	253	110	0.80	none	hatchery	Skinny
South Lake	Inlet 1	E-fish	Night	rainbow trout	245	262	150	1.02	none	hatchery	Unhealthy (thin)
South Lake	Inlet 1	E-fish	Night	rainbow trout	249	260	150	0.97	none	hatchery	
South Lake	Inlet 1	E-fish	Night	rainbow trout	259	270	190	1.09	none	wild	Male, ripe
South Lake	Inlet 1	E-fish	Night	rainbow trout	280	294	150	0.68	none	hatchery	Fishing line w/ weight hanging from mouth
South Lake	Inlet 1	E-fish	Night	rainbow trout	294	300	230	0.91	none	unknown	
South Lake	Inlet 1	E-fish	Night	rainbow trout	306	321	230	0.80	none	unknown	
South Lake	Inlet 1	E-fish	Night	rainbow trout	308	315	320	1.10	none	hatchery	Female expelling eggs
South Lake	Inlet 1	E-fish	Night	rainbow trout	310	319	260	0.87	SL3-2	wild	
South Lake	Inlet 1	E-fish	Night	rainbow trout	321	347	330	1.00	none	hatchery	

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
South Lake	Inlet 1	E-fish	Night	rainbow trout	322	329	330	0.99	none	hatchery	
South Lake	Inlet 1	E-fish	Night	rainbow trout	325	340	350	1.02	none	hatchery	
South Lake	Inlet 1	E-fish	Night	rainbow trout	331	345	260	0.72	SL3-1	unknown	Silver color, but no worn fins
South Lake	Inlet 1	E-fish	Night	rainbow trout	331	348	400	1.10	none	hatchery	
South Lake	Inlet 1	E-fish	Night	rainbow trout	345	363	380	0.93	none	hatchery	Worn pectoral fins
South Lake	Inlet 1	E-fish	Night	rainbow trout	353	358	470	1.07	none	hatchery	
South Lake	Inlet 1	E-fish	Night	rainbow trout	358	372	440	0.96	none	hatchery	
South Lake	Inlet 1	E-fish	Night	rainbow trout	365	370	500	1.03	none	hatchery	
South Lake	Inlet 3	E-fish	Day	brook trout	95	101	11.5	1.34	SL-1	unknown	
South Lake	Inlet 3	E-fish	Day	brook trout	236	245	140	1.07	none	unknown	
South Lake	Inlet 3	E-fish	Day	brook trout	244	254	160	1.10	none	unknown	
South Lake	Inlet 3	E-fish	Day	brown trout	282	296	220	0.98	none	unknown	
South Lake	Inlet 3	E-fish	Day	rainbow trout	62	65	3	1.26	none	wild	
South Lake	Inlet 3	E-fish	Day	rainbow trout	271	290	210	1.06	none	hatchery	
South Lake	Inlet 3	E-fish	Day	rainbow trout	329	351	370	1.04	none	wild	
South Lake	Inlet 3	E-fish	Day	rainbow trout	349	365	460	1.08	none	hatchery	
South Lake	Inlet 2	E-fish	Day	brook trout	154	162	41.7	1.14	SL-2	unknown	
South Lake	Inlet 2	E-fish	Day	rainbow trout	331	338	360	0.99	none	unknown	Ripe female
South Lake	South Shore	E-fish	Day	brown trout	68	71	2.8	0.89	none	unknown	
South Lake	South Shore	E-fish	Day	brown trout	324	334	380	1.12	SL-3	unknown	
South Lake	South Shore	E-fish	Day	rainbow trout	72	75	3.5	0.94	none	unknown	

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
South Lake	South Shore	E-fish	Day	rainbow trout	153	157	35	0.98	none	unknown	Mort
South Lake	South Shore	E-fish	Day	rainbow trout	228	241	120	1.01	none	unknown	Mature male
South Lake	South Shore	E-fish	Day	rainbow trout	231	247	150	1.22	none	unknown	
South Lake	South Shore	E-fish	Day	rainbow trout	280	287	190	0.87	none	unknown	
South Lake	South Shore	E-fish	Day	rainbow trout	288	300	290	1.21	none	unknown	Mature male
South Lake	South Shore	E-fish	Day	rainbow trout	437	446	700	0.84	SL-4	unknown	

[1] Fish condition factor

Table C-2 Lake Sabrina Fish Capture Data, June 2020

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
Lake Sabrina	Cove near marina	E-fish	Day	Owens sucker	249	266	130.0	0.84	SAB-2	unknown	
Lake Sabrina	Cove near marina	E-fish	Day	Owens sucker	260	275	165.0	0.94	SAB-1	unknown	
Lake Sabrina	Cove near marina	E-fish	Day	Owens sucker	265	281	180.0	0.97	SAB-3	unknown	
Lake Sabrina	Cove near marina	E-fish	Day	rainbow trout	300	319	220.0	0.81	SAB-4	unknown	
Lake Sabrina	East of southern inlet	E-fish	Day	Owens sucker	115	121	20.9	1.37	SAB-9	unknown	
Lake Sabrina	East of southern inlet	E-fish	Day	Owens sucker	127	135	20.1	0.98	SAB-12	unknown	
Lake Sabrina	East of southern inlet	E-fish	Day	Owens sucker	160	170	56.4	1.38	SAB-8	unknown	
Lake Sabrina	East of southern inlet	E-fish	Day	Owens sucker	218	230	70.0	0.68	none	unknown	
Lake Sabrina	East of southern inlet	E-fish	Day	Owens sucker	245	260	150.0	1.02	none	wild	
Lake Sabrina	East of southern inlet	E-fish	Day	Owens sucker	261	282	160.0	0.90	SAB-6	unknown	
Lake Sabrina	East of southern inlet	E-fish	Day	Owens sucker	263	284	290.0	1.59	SAB-10	unknown	
Lake Sabrina	East of southern inlet	E-fish	Day	Owens sucker	268	287	180.0	0.94	none	unknown	
Lake Sabrina	East of southern inlet	E-fish	Day	Owens sucker	288	305	260.0	1.09	none	unknown	
Lake Sabrina	East of southern inlet	E-fish	Day	Owens sucker	305	325	340.0	1.20	SAB-5	unknown	

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
Lake Sabrina	East of southern inlet	E-fish	Day	Owens sucker	318	335	390.0	1.21	SAB-7	unknown	
Lake Sabrina	East of southern inlet	E-fish	Day	rainbow trout	201	212	106.7	1.31	SAB-14	wild	Mature male (milted)
Lake Sabrina	East of southern inlet	E-fish	Day	rainbow trout	250	265	210.0	1.34	SAB-15	wild	
Lake Sabrina	East of southern inlet	E-fish	Day	rainbow trout	261	272	200.0	1.12	SAB-13	wild	Photos
Lake Sabrina	East of southern inlet	E-fish	Day	rainbow trout	298	314	200.0	0.76	SAB-11	hatchery	Stub nose, mort found floating before capture
Lake Sabrina	East of southern inlet	E-fish	Day	rainbow trout	314	320	320.0	1.03	none	unknown	Missing eyeball
Lake Sabrina	Cove just north of main inlet	E-fish	Day	none				na	none	unknown	
Lake Sabrina	North Shore, western end of lake	E-fish	Day	brook trout	103	107	10.8	0.99	none	unknown	
Lake Sabrina	North Shore, western end of lake	E-fish	Day	brook trout	104	109	9.1	0.81	none	unknown	
Lake Sabrina	North Shore, western end of lake	E-fish	Day	Owens sucker	124	133	27.3	1.43	none	unknown	
Lake Sabrina	North Shore, western end of lake	E-fish	Day	Owens sucker	146	155	42.4	1.36	none	unknown	
Lake Sabrina	North Shore, western end of lake	E-fish	Day	Owens sucker	224	237	90.0	0.80	none	unknown	

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
Lake Sabrina	North Shore, western end of lake	E-fish	Day	Owens sucker	266	285	180.0	0.96	none	unknown	
Lake Sabrina	Cove near marina	E-fish	Day	Owens sucker	255	271	No entry	na	none	Unknown	Male
Lake Sabrina	Cove near marina	E-fish	Day	Owens sucker	341	367	450.0	1.13	SAB2-1	unknown	Female, expelling eggs
Lake Sabrina	North shore mid reservoir	E-fish	Day	brook trout	176	185	100.0	1.83	none	wild	
Lake Sabrina	North shore mid reservoir	E-fish	Day	brook trout	205	215	120.0	1.39	none	wild	
Lake Sabrina	North shore mid reservoir	E-fish	Day	brook trout	230	236	150.0	1.23	none	wild	
Lake Sabrina	North shore mid reservoir	E-fish	Day	brook trout	239	248	160.0	1.17	SAB2-5	wild	
Lake Sabrina	North shore mid reservoir	E-fish	Day	Owens sucker	160	170	30.0	0.73	none	unknown	Female
Lake Sabrina	North shore mid reservoir	E-fish	Day	Owens sucker	210	225	70.0	0.76	SAB2-4	unknown	Female w/ eggs, narrow fin w/o tubercles
Lake Sabrina	North shore mid reservoir	E-fish	Day	Owens sucker	223	236	120.0	1.08	none	unknown	Narrow anal fin w/o tubercle. Female
Lake Sabrina	North shore mid reservoir	E-fish	Day	Owens sucker	234	249	150.0	1.17	none	unknown	Female
Lake Sabrina	North shore mid reservoir	E-fish	Day	Owens sucker	245	261	190.0	1.29	none	unknown	Male
Lake Sabrina	North shore mid reservoir	E-fish	Day	Owens sucker	265	285	220.0	1.18	none	unknown	Male
Lake Sabrina	North shore mid reservoir	E-fish	Day	Owens sucker	299	316	290.0	1.08	SAB2-2	unknown	Female

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
Lake Sabrina	North shore mid reservoir	E-fish	Day	Owens sucker	300	319	210.0	0.78	SAB2-3	unknown	Male, wide anal fin w/ tubercles
Lake Sabrina	North shore mid reservoir	E-fish	Day	rainbow trout	150	157	70.0	2.07	none	wild	
Lake Sabrina	North shore mid reservoir	E-fish	Day	rainbow trout	265	275	210.0	1.13	none	hatchery	
Lake Sabrina	Near SW trib	E-fish	Day	brook trout	82	86	6.1	1.11	none	unknown	
Lake Sabrina	Near SW trib	E-fish	Day	brook trout	112	117	12.6	0.90	none	unknown	
Lake Sabrina	Near SW trib	E-fish	Day	brook trout	187	196	73.3	1.12	SAB2-9	unknown	
Lake Sabrina	Near SW trib	E-fish	Day	brook trout	214	227	110.0	1.12	SAB2-10	unknown	
Lake Sabrina	Near SW trib	E-fish	Day	Owens sucker	250	268	190.0	1.22	none	unknown	Male
Lake Sabrina	Near SW trib	E-fish	Day	rainbow trout	44	46	1.0	1.17	none	unknown	
Lake Sabrina	Near SW trib	E-fish	Day	rainbow trout	68	72	2.4	0.76	none	unknown	
Lake Sabrina	Near SW trib	E-fish	Day	rainbow trout	228	240	140.0	1.18	none	unknown	
Lake Sabrina	Near SW trib	E-fish	Day	rainbow trout	260	274	170.0	0.97	none	hatchery	Really thin
Lake Sabrina	Near SW trib	E-fish	Day	rainbow trout	260	275	200.0	1.14	SAB2-7	wild	Mature male
Lake Sabrina	Near SW trib	E-fish	Day	rainbow trout	267	280	220.0	1.16	SAB2-6	wild	
Lake Sabrina	Near SW trib	E-fish	Day	rainbow trout	276	288	210.0	1.00	none	hatchery	Thin
Lake Sabrina	Near SW trib	E-fish	Day	rainbow trout	282	293	240.0	1.07	none	hatchery	Fungus on anal fin
Lake Sabrina	Near SW trib	E-fish	Day	rainbow trout	288	299	250.0	1.05	none	hatchery	Worn pec fins
Lake Sabrina	Near SW trib	E-fish	Day	rainbow trout	310	319	290.0	0.97	none	hatchery	
Lake Sabrina	Near SW trib	E-fish	Day	rainbow trout	311	320	295.0	0.98	none	unknown	
Lake Sabrina	Near SW trib	E-fish	Day	rainbow trout	313	328	330.0	1.08	none	unknown	Bright silvery/healthy

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
Lake Sabrina	Near SW trib	E-fish	Day	rainbow trout	350	370	450.0	1.05	SAB2-8	unknown	Silvery/healthy
Lake Sabrina	Near SW trib	E-fish	Day	rainbow trout	380	393	630.0	1.15	none	hatchery	
Lake Sabrina	Tributaries	E-fish	Night	brook trout	195	204	115.0	1.55	SAB3-28	unknown	
Lake Sabrina	Tributaries	E-fish	Night	Owens sucker	114	121	20.0	1.35	none	unknown	
Lake Sabrina	Tributaries	E-fish	Night	Owens sucker	155	165	60.0	1.61	SAB3-27	unknown	Female
Lake Sabrina	Tributaries	E-fish	Night	Owens sucker	200	212	120.0	1.50	none	unknown	Male
Lake Sabrina	Tributaries	E-fish	Night	Owens sucker	245	264	260.0	1.77	none	unknown	Female
Lake Sabrina	Tributaries	E-fish	Night	Owens sucker	263	279	250.0	1.37	none	unknown	Female
Lake Sabrina	Tributaries	E-fish	Night	Owens sucker	295	313	380.0	1.48	none	unknown	Female
Lake Sabrina	Tributaries	E-fish	Night	Owens sucker	296	313	370.0	1.43	none	unknown	Female
Lake Sabrina	Tributaries	E-fish	Night	Owens sucker	300	319	340.0	1.26	none	unknown	Female
Lake Sabrina	Tributaries	E-fish	Night	Owens sucker	310	329	410.0	1.38	none	unknown	Female
Lake Sabrina	Tributaries	E-fish	Night	Owens sucker	329	346	515.0	1.45	none	unknown	Female
Lake Sabrina	Tributaries	E-fish	Night	Owens sucker	360	385	550.0	1.18	SAB3-26	unknown	Female
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	289	302	300.0	1.24	none	unknown	
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	290	305	220.0	0.90	none	hatchery	Skinny/unhealthy
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	292	306	290.0	1.16	none	unknown	

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	310	316	320.0	1.07	none	hatchery	Missing operculum and fins
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	316	325	340.0	1.08	none	hatchery	
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	320	325	300.0	0.92	none	hatchery	
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	320	335	330.0	1.01	none	hatchery	
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	321	326	390.0	1.18	none	hatchery	
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	321	335	340.0	1.03	none	hatchery	
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	325	335	340.0	0.99	none	hatchery	No fins
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	327	335	360.0	1.03	none	hatchery	Mature, female
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	329	341	390.0	1.10	none	hatchery	
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	355	369	410.0	0.92	none	hatchery	
Lake Sabrina	Tributaries	E-fish	Night	brook trout	77	81	6.2	1.36	none	unknown	
Lake Sabrina	Tributaries	E-fish	Night	brook trout	206	216	120.0	1.37	none	unknown	
Lake Sabrina	Tributaries	E-fish	Night	brook trout	226	237	150.0	1.30	none	unknown	
Lake Sabrina	Tributaries	E-fish	Night	Owens sucker	115	122	40.0	2.63	none	unknown	
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	135	143	40.0	1.63	SAB3-30	wild	
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	215	231	150.0	1.51	SAB3-29	wild	
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	216	220	140.0	1.39	none	wild	
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	242	255	225.0	1.59	none	wild	
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	256	267	190.0	1.13	none	wild	
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	282	296	295.0	1.32	none	wild	
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	285	302	220.0	0.95	none	hatchery	Old tapered body/ unhealthy
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	289	304	240.0	0.99	none	unknown	
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	291	305	300.0	1.22	none	wild	
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	295	314	280.0	1.09	none	wild	

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	305	325	290.0	1.02	none	unknown	
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	315	324	370.0	1.18	none	hatchery	
Lake Sabrina	Tributaries	E-fish	Night	rainbow trout	357	367	430.0	0.95	none	hatchery	
Lake Sabrina	Cove at dam	E-fish	Night	brook trout	130	139	26.3	1.20	SAB3-2	unknown	
Lake Sabrina	Cove at dam	E-fish	Night	brook trout	195	202	100.0	1.35	SAB3-13	unknown	
Lake Sabrina	Cove at dam	E-fish	Night	brook trout	197	207	90.1	1.18	SAB3-14	unknown	
Lake Sabrina	Cove at dam	E-fish	Night	brook trout	215	223	110.0	1.11	SAB3-12	unknown	
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	230	244	200.0	1.64	none	unknown	Male
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	233	245	160.0	1.26	SAB3-7	unknown	Male
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	240	255	200.0	1.45	SAB3-9	unknown	Male
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	246	260	210.0	1.41	SAB3-10	unknown	Male
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	248	262	220.0	1.44	SAB3-11	unknown	Male
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	254	270	230.0	1.40	none	unknown	Male
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	255	270	220.0	1.33	none	unknown	Male
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	255	270	230.0	1.39	none	unknown	Male
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	265	278	250.0	1.34	none	unknown	Male
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	265	280	240.0	1.29	none	unknown	Male

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	265	285	260.0	1.40	none	unknown	Male
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	270	290	290.0	1.47	none	unknown	Male
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	270	285	260.0	1.32	none	unknown	Male
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	270	283	280.0	1.42	none	unknown	Male
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	272	290	310.0	1.54	none	unknown	Female
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	275	290	290.0	1.39	none	unknown	Female
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	277	295	300.0	1.41	none	unknown	Female
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	278	290	330.0	1.54	none	unknown	Male
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	280	292	250.0	1.14	none	unknown	Male
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	288	304	310.0	1.30	none	unknown	Male
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	295	310	350.0	1.36	none	unknown	Female
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	304	320	420.0	1.49	none	unknown	Female, fat
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	305	320	320.0	1.13	none	unknown	Female
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	310	327	410.0	1.38	none	unknown	
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	315	332	440.0	1.41	SAB3-1	unknown	
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	315	332	420.0	1.34	none	unknown	Female

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	320	340	520.0	1.59	none	unknown	Female
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	340	355	520.0	1.32	none	unknown	Male
Lake Sabrina	Cove at dam	E-fish	Night	Owens sucker	350	370	580.0	1.35	SAB3-8	unknown	Female
Lake Sabrina	Cove at dam	E-fish	Night	rainbow trout	240	255	130.0	0.94	SAB3-3	unknown	
Lake Sabrina	Cove at dam	E-fish	Night	rainbow trout	263	272	160.0	0.88	none	hatchery	
Lake Sabrina	Cove at dam	E-fish	Night	rainbow trout	277	290	180.0	0.85	none	hatchery	
Lake Sabrina	Cove at dam	E-fish	Night	rainbow trout	280	291	250.0	1.14	SAB3-6	unknown	Mort, ripe female
Lake Sabrina	Cove at dam	E-fish	Night	rainbow trout	290	303	260.0	1.07	none	hatchery	
Lake Sabrina	Cove at dam	E-fish	Night	rainbow trout	290	300	300.0	1.23	none	hatchery	
Lake Sabrina	Cove at dam	E-fish	Night	rainbow trout	305	315	290.0	1.02	SAB3-5	unknown	
Lake Sabrina	Cove at dam	E-fish	Night	rainbow trout	307	315	280.0	0.97	none	hatchery	
Lake Sabrina	Cove at dam	E-fish	Night	rainbow trout	330	340	350.0	0.97	SAB3-4	unknown	
Lake Sabrina	Cove at dam	E-fish	Night	rainbow trout	335	350	400.0	1.06	none	hatchery	No dorsal fin
Lake Sabrina	Cove near marina	E-fish	Night	brook trout	215	224	120.0	1.21	SAB3-18	unknown	
Lake Sabrina	Cove near marina	E-fish	Night	brook trout	224	237	140.0	1.25	SAB3-17	unknown	
Lake Sabrina	Cove near marina	E-fish	Night	Owens sucker	115	121	22.0	1.45	SAB3-20	unknown	
Lake Sabrina	Cove near marina	E-fish	Night	Owens sucker	127	134	32.3	1.58	SAB3-19	unknown	
Lake Sabrina	Cove near marina	E-fish	Night	Owens sucker	216	231	140.0	1.39	none	unknown	
Lake Sabrina	Cove near marina	E-fish	Night	Owens sucker	245	260	210.0	1.43	none	unknown	Male

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
Lake Sabrina	Cove near marina	E-fish	Night	Owens sucker	245	262	210.0	1.43	none	unknown	Male
Lake Sabrina	Cove near marina	E-fish	Night	Owens sucker	249	267	210.0	1.36	none	unknown	Male
Lake Sabrina	Cove near marina	E-fish	Night	Owens sucker	255	271	240.0	1.45	none	unknown	Male
Lake Sabrina	Cove near marina	E-fish	Night	Owens sucker	263	280	240.0	1.32	none	unknown	Male
Lake Sabrina	Cove near marina	E-fish	Night	Owens sucker	267	282	260.0	1.37	none	unknown	Male
Lake Sabrina	Cove near marina	E-fish	Night	Owens sucker	273	290	260.0	1.28	none	unknown	Male
Lake Sabrina	Cove near marina	E-fish	Night	Owens sucker	275	295	300.0	1.44	none	unknown	Female
Lake Sabrina	Cove near marina	E-fish	Night	Owens sucker	291	312	300.0	1.22	none	unknown	Male
Lake Sabrina	Cove near marina	E-fish	Night	Owens sucker	295	314	350.0	1.36	none	unknown	Male
Lake Sabrina	Cove near marina	E-fish	Night	Owens sucker	298	318	300.0	1.13	none	unknown	Male
Lake Sabrina	Cove near marina	E-fish	Night	Owens sucker	308	327	360.0	1.23	none	unknown	Female
Lake Sabrina	Cove near marina	E-fish	Night	rainbow trout	248	255	160.0	1.05	SAB3-16	unknown	
Lake Sabrina	Cove near marina	E-fish	Night	rainbow trout	265	273	160.0	0.86	none	unknown	
Lake Sabrina	Cove near marina	E-fish	Night	rainbow trout	268	277	230.0	1.19	none	unknown	Ripe female
Lake Sabrina	Cove near marina	E-fish	Night	rainbow trout	330	341	500.0	1.39	SAB3-15	unknown	
Lake Sabrina	Northwest shore	E-fish	Night	brook trout	190	203	90.0	1.31	SAB3-23	unknown	

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
Lake Sabrina	Northwest shore	E-fish	Night	brook trout	216	223	140.0	1.39	none	unknown	
Lake Sabrina	Northwest shore	E-fish	Night	brook trout	222	222	130.0	1.19	none	unknown	
Lake Sabrina	Northwest shore	E-fish	Night	Owens sucker	120	124	25.0	1.45	SAB3-25	unknown	
Lake Sabrina	Northwest shore	E-fish	Night	Owens sucker	160	172	70.0	1.71	SAB3-24	unknown	Male
Lake Sabrina	Northwest shore	E-fish	Night	brown trout	648	648		No Entry	SAB3-21	wild	Brown trout too large to weigh
Lake Sabrina	Northwest shore	E-fish	Night	Owens sucker	211	221	140.0	1.49	none	unknown	
Lake Sabrina	Northwest shore	E-fish	Night	Owens sucker	228	245	190.0	1.60	none	unknown	Male
Lake Sabrina	Northwest shore	E-fish	Night	Owens sucker	240	255	250.0	1.81	none	unknown	Female
Lake Sabrina	Northwest shore	E-fish	Night	Owens sucker	241	256	200.0	1.43	none	unknown	Male
Lake Sabrina	Northwest shore	E-fish	Night	Owens sucker	249	263	200.0	1.30	none	unknown	Male
Lake Sabrina	Northwest shore	E-fish	Night	Owens sucker	250	265	230.0	1.47	none	unknown	Female
Lake Sabrina	Northwest shore	E-fish	Night	Owens sucker	260	279	260.0	1.48	none	unknown	Male
Lake Sabrina	Northwest shore	E-fish	Night	Owens sucker	268	285	270.0	1.40	none	unknown	Male
Lake Sabrina	Northwest shore	E-fish	Night	Owens sucker	288	308	345.0	1.44	none	unknown	
Lake Sabrina	Northwest shore	E-fish	Night	Owens sucker	289	306	350.0	1.45	none	unknown	Female
Lake Sabrina	Northwest shore	E-fish	Night	Owens sucker	306	323	420.0	1.47	none	unknown	

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
Lake Sabrina	Northwest shore	E-fish	Night	Owens sucker	315	333	440.0	1.41	none	unknown	Female
Lake Sabrina	Northwest shore	E-fish	Night	Owens sucker	345	370	670.0	1.63	none	unknown	Female
Lake Sabrina	Northwest shore	E-fish	Night	rainbow trout	186	202	110.0	1.71	none	unknown	
Lake Sabrina	Northwest shore	E-fish	Night	rainbow trout	201	216	115.0	1.42	SAB3-22	unknown	
Lake Sabrina	Northwest shore	E-fish	Night	rainbow trout	206	222	130.0	1.49	none	unknown	
Lake Sabrina	Northwest shore	E-fish	Night	rainbow trout	253	271	200.0	1.24	none	unknown	
Lake Sabrina	Northwest shore	E-fish	Night	rainbow trout	263	276	290.0	1.59	none	hatchery	
Lake Sabrina	Northwest shore	E-fish	Night	rainbow trout	275	288	170.0	0.82	none	hatchery	Unhealthy/skinny
Lake Sabrina	Northwest shore	E-fish	Night	rainbow trout	281	291	270.0	1.22	none	hatchery	
Lake Sabrina	Northwest shore	E-fish	Night	rainbow trout	291	314	300.0	1.22	none	unknown	
Lake Sabrina	Northwest shore	E-fish	Night	rainbow trout	299	310	210.0	0.79	none	hatchery	Missing eye
Lake Sabrina	Northwest shore	E-fish	Night	rainbow trout	312	327	260.0	0.86	none	hatchery	Unhealthy/skinny
Lake Sabrina	Northwest shore	E-fish	Night	rainbow trout	313	320	240.0	0.78	none	hatchery	
Lake Sabrina	Northwest shore	E-fish	Night	rainbow trout	329	350	400.0	1.12	none	unknown	
Lake Sabrina	Northwest shore	E-fish	Night	rainbow trout	341	360	470.0	1.19	none	hatchery	
Lake Sabrina	Cove at dam	E-fish	Day	Owens sucker	274	292	260.0	1.26	none	unknown	

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
Lake Sabrina	South shore, western end of lake	E-fish	Day	brook trout	133	137	19.8	0.84	SB4-2	unknown	
Lake Sabrina	South shore, western end of lake	E-fish	Day	brook trout	167	178	52.0	1.12	none	unknown	
Lake Sabrina	South shore, western end of lake	E-fish	Day	brook trout	204	211	70.0	0.82	none	unknown	
Lake Sabrina	South shore, western end of lake	E-fish	Day	Owens sucker	239	254	200.0	1.46	none	unknown	Male
Lake Sabrina	South shore, western end of lake	E-fish	Day	Owens sucker	275	291	310.0	1.49	none	unknown	Female
Lake Sabrina	South shore, western end of lake	E-fish	Day	rainbow trout	226	235	180.0	1.56	none	wild	
Lake Sabrina	South shore, western end of lake	E-fish	Day	rainbow trout	270	284	160.0	0.81	none	hatchery	Silvery, no eye
Lake Sabrina	South shore, western end of lake	E-fish	Day	rainbow trout	278	290	190.0	0.88	none	wild	
Lake Sabrina	South shore, western end of lake	E-fish	Day	rainbow trout	279	290	195.0	0.90	none	hatchery	
Lake Sabrina	South shore, western end of lake	E-fish	Day	rainbow trout	287	298	150.0	0.63	none	hatchery	
Lake Sabrina	South shore, western end of lake	E-fish	Day	rainbow trout	350	366	465.0	1.08	SB4-1	unknown	

Reservoir	Site ID	Sample Method	Sample Period (day or night)	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
Lake Sabrina	North Shore, western end of lake	E-fish	Day	brook trout	210	223	90.0	0.97	none	unknown	
Lake Sabrina	North Shore, western end of lake	E-fish	Day	Owens sucker	152	161	60.0	1.71	SB4-3	unknown	Female
Lake Sabrina	North Shore, western end of lake	E-fish	Day	Owens sucker	310	322	370.0	1.24	none	unknown	Female

[1] Fish condition factor

Table C-3 South Lake Fish Capture Data During Nighttime Boat Electrofishing, September 2020

Reservoir	Site ID	Sample Method	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
South Lake	South Shore	E-fish	brook trout	195	200	97.6	1.32	none	wild	
South Lake	South Shore	E-fish	brown trout	180	190	68.9	1.18	none	wild	
South Lake	South Shore	E-fish	rainbow trout	260	273	208.9	1.19	none	hatchery	
South Lake	South Shore	E-fish	brown trout	261	272	174.3	0.98	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	rainbow trout	508	520.7	1,896.0	1.45	none	hatchery	75% fish caught at mouth of inlet
South Lake	Inlet 2- inlet 3	E-fish	rainbow trout	546.1	558.8	2,721.6	1.67	none	hatchery	Mort
South Lake	Inlet 2- inlet 3	E-fish	rainbow trout	520.7	527.1	2,268.0	1.61	none	hatchery	Mort
South Lake	Inlet 2- inlet 3	E-fish	brown trout	280	295	no entry	na	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	brook trout	214	224	112.1	1.14	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	brook trout	250	261	156.0	1.00	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	brook trout	206	216	113.8	1.30	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	brown trout	260	272	163.4	0.93	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	brook trout	245	260	152.9	1.04	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	brook trout	240	254	148.9	1.08	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	brown trout	240	250	150.6	1.09	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	brook trout	234	241	118.0	0.92	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	brook trout	220	227	117.4	1.10	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	brown trout	280	292	no entry	na	none	wild	No weight too heavy
South Lake	Inlet 2- inlet 3	E-fish	brown trout	270	283	no entry	na	none	wild	No weight too heavy
South Lake	Inlet 2- inlet 3	E-fish	brook trout	240	247	142.9	1.03	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	rainbow trout	375	393	no entry	na	none	hatchery	No weight too heavy
South Lake	Inlet 2- inlet 3	E-fish	brown trout	290	296	no entry	na	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	rainbow trout	320	340	no entry	na	none	hatchery	No weight too heavy
South Lake	Inlet 2- inlet 3	E-fish	rainbow trout	248	264	no entry	na	none	hatchery	No weight too heavy
South Lake	Inlet 2- inlet 3	E-fish	rainbow trout	340	358	no entry	na	none	unknown	No weight too heavy

Reservoir	Site ID	Sample Method	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
South Lake	Inlet 2- inlet 3	E-fish	rainbow trout	312	322	no entry	na	none	hatchery	No weight too heavy
South Lake	Inlet 2- inlet 3	E-fish	rainbow trout	308	323	no entry	na	none	unknown	No weight too heavy
South Lake	Inlet 2- inlet 3	E-fish	rainbow trout	365	372	no entry	na	none	hatchery	No weight too heavy
South Lake	Inlet 2- inlet 3	E-fish	brown trout	280	293	no entry	na	none	wild	No weight too heavy
South Lake	Inlet 2- inlet 3	E-fish	rainbow trout	345	363	no entry	na	none	unknown	No weight too heavy
South Lake	Inlet 2- inlet 3	E-fish	rainbow trout	360	378	no entry	na	none	hatchery	No weight too heavy
South Lake	Inlet 2- inlet 3	E-fish	brown trout	265	275	no entry	na	none	wild	No weight too heavy
South Lake	Inlet 2- inlet 3	E-fish	rainbow trout	325	335	no entry	na	none	hatchery	No weight too heavy
South Lake	Inlet 2- inlet 3	E-fish	rainbow trout	320	330	no entry	na	none	hatchery	No weight too heavy
South Lake	Inlet 2- inlet 3	E-fish	rainbow trout	335	352	no entry	na	none	hatchery	No weight too heavy
South Lake	Inlet 2- inlet 3	E-fish	rainbow trout	385	400	no entry	na	none	hatchery	Mort
South Lake	Inlet 2- inlet 3	E-fish	rainbow trout	330	345	no entry	na	none	hatchery	Mort
South Lake	Inlet 2- inlet 3	E-fish	rainbow trout	345	360	no entry	na	none	hatchery	Mort
South Lake	Inlet 2- inlet 3	E-fish	brook trout	230	241	144.6	1.19	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	brook trout	230	240	133.4	1.10	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	rainbow trout	323	338	no entry	na	none	hatchery	Mort
South Lake	Inlet 2- inlet 3	E-fish	brook trout	255	265	172.8	1.04	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	brook trout	223	238	131.0	1.18	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	rainbow trout	300	312	no entry	na	none	hatchery	Mort
South Lake	Inlet 2- inlet 3	E-fish	rainbow trout	337	355	no entry	na	none	hatchery	Mort
South Lake	Inlet 2- inlet 3	E-fish	brown trout	273	283	no entry	na	none	wild	Mort
South Lake	Inlet 2- inlet 3	E-fish	brown trout	271	283	no entry	na	none	wild	Mort
South Lake	Inlet 2- inlet 3	E-fish	brown trout	255	267	164.9	0.99	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	brown trout	260	270	161.5	0.92	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	rainbow trout	233	248	148.9	1.18	none	unknown	
South Lake	Inlet 2- inlet 3	E-fish	brown trout	265	278	no entry	na	none	wild	Mort
South Lake	Inlet 2- inlet 3	E-fish	brook trout	228	236	138.8	1.17	none	wild	

Reservoir	Site ID	Sample Method	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
South Lake	Inlet 2- inlet 3	E-fish	brown trout	290	302	no entry	na	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	brown trout	275	292	no entry	na	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	brown trout	248	258	no entry	na	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	brook trout	215	226	99.8	1.00	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	brown trout	280	292	no entry	na	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	brook trout	235	242	139.8	1.08	none	wild	
South Lake	Inlet 2- inlet 3	E-fish	brown trout	270	283	no entry	na	none	wild	
South Lake	Inlet 1- Inlet 2	E-fish	rainbow trout	308	318	255.0	0.87	none	hatchery	
South Lake	Inlet 1- Inlet 2	E-fish	rainbow trout	293	302	240.0	0.95	none	hatchery	
South Lake	Inlet 1- Inlet 2	E-fish	rainbow trout	400	421	520.0	0.81	none	hatchery	
South Lake	Inlet 1- Inlet 2	E-fish	rainbow trout	328	350	335.0	0.95	none	wild	
South Lake	Inlet 1- Inlet 2	E-fish	rainbow trout	325	340	345.0	1.01	none	hatchery	
South Lake	Inlet 1- Inlet 2	E-fish	rainbow trout	330	350	370.0	1.03	none	hatchery	
South Lake	Inlet 1- Inlet 2	E-fish	rainbow trout	320	333	300.0	0.92	none	unknown	
South Lake	Inlet 1- Inlet 2	E-fish	rainbow trout	335	350	345.0	0.92	none	hatchery	
South Lake	Inlet 1- Inlet 2	E-fish	rainbow trout	365	380	495.0	1.02	none	hatchery	Minimal fin wearing
South Lake	Inlet 1- Inlet 2	E-fish	rainbow trout	320	329	270.0	0.82	none	hatchery	
South Lake	Inlet 1- Inlet 2	E-fish	rainbow trout	340	360	330.0	0.84	none	hatchery	
South Lake	Inlet 1- Inlet 2	E-fish	rainbow trout	295	300	190.0	0.74	none	hatchery	
South Lake	Inlet 1- Inlet 2	E-fish	rainbow trout	328	344	334.5	0.95	none	hatchery	
South Lake	Inlet 1- Inlet 2	E-fish	rainbow trout	310	326	334.5	1.12	none	hatchery	
South Lake	Inlet 1- Inlet 2	E-fish	rainbow trout	330	338	334.5	0.93	none	hatchery	
South Lake	Inlet 1- Inlet 2	E-fish	rainbow trout	262	277	170.1	0.95	none	unknown	Mort
South Lake	Inlet 1- Inlet 2	E-fish	rainbow trout	182	192	70.9	1.18	none	wild	
South Lake	Inlet 1- Inlet 2	E-fish	brown trout	271	289	243.8	1.22	none	wild	
South Lake	Inlet 1- Inlet 2	E-fish	brown trout	273	285	226.8	1.11	none	wild	
South Lake	Inlet 1- Inlet 2	E-fish	brown trout	265	278	187.1	1.01	none	wild	

Reservoir	Site ID	Sample Method	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
South Lake	Inlet 1- Inlet 2	E-fish	brown trout	272	285	215.5	1.07	none	wild	
South Lake	Inlet 1- Inlet 2	E-fish	brown trout	294	309	243.8	0.96	none	wild	
South Lake	Inlet 1- Inlet 2	E-fish	brown trout	260	271	226.8	1.29	none	wild	
South Lake	Inlet 1- Inlet 2	E-fish	brown trout	313	327	328.9	1.07	none	wild	
South Lake	Inlet 1- Inlet 2	E-fish	brown trout	280	291	187.1	0.85	none	wild	
South Lake	Inlet 1- Inlet 2	E-fish	brown trout	210	223	102.1	1.10	none	wild	
South Lake	Inlet 1- Inlet 2	E-fish	brook trout	238	248	141.7	1.05	none	wild	
South Lake	Inlet 1- Inlet 2	E-fish	brook trout	219	231	130.4	1.24	none	wild	
South Lake	Inlet 1- Inlet 2	E-fish	brook trout	242	250	141.7	1.00	none	wild	
South Lake	Inlet 1- Inlet 2	E-fish	brook trout	223	234	130.4	1.18	none	wild	
South Lake	Inlet 1- Inlet 2	E-fish	brook trout	230	237	187.1	1.54	none	wild	
South Lake	Inlet 1- Inlet 2	E-fish	brook trout	202	212	102.1	1.24	none	wild	
South Lake	Inlet 1- Inlet 2	E-fish	brook trout	245	253	158.8	1.08	none	wild	
South Lake	Inlet 1- Inlet 2	E-fish	brook trout	238	243	113.4	0.84	none	wild	
South Lake	Inlet 1- Inlet 2	E-fish	rainbow trout	205	225	85.0	0.99	none	wild	
South Lake	Inlet 1- Inlet 2	E-fish	rainbow trout	168	178	56.7	1.20	none	wild	
South Lake	Inlet 1- Inlet 2	E-fish	brown trout	250	265	170.1	1.09	none	wild	
South Lake	Inlet 1- Inlet 2	E-fish	brown trout	250	262	187.1	1.20	none	wild	
South Lake	North Shore	E-fish	rainbow trout	280	289	250.0	1.14	none	hatchery	Worn fins
South Lake	North Shore	E-fish	rainbow trout	260	271	125.0	0.71	none	unknown	Snake-like, skinny
South Lake	North Shore	E-fish	rainbow trout	287	297	290.0	1.23	none	hatchery	
South Lake	North Shore	E-fish	rainbow trout	306	332	460.0	1.61	none	unknown	
South Lake	North Shore	E-fish	rainbow trout	257	266	175.0	1.03	none	hatchery	
South Lake	North Shore	E-fish	rainbow trout	300	312	270.0	1.00	none	hatchery	

[1] Fish condition factor

Table C-4 Lake Sabrina Fish Capture Data During Nighttime Boat Electrofishing, September 2020

Reservoir	Site ID	Sample Method	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
Lake Sabrina	NW shore	E-fish	Owens sucker	368	391	570.0	1.14	none	wild	
Lake Sabrina	NW shore	E-fish	Owens sucker	256	273	250.0	1.49	none	wild	
Lake Sabrina	NW shore	E-fish	rainbow trout	217	224	140.0	1.37	none	hatchery	Worn fins
Lake Sabrina	NW shore	E-fish	rainbow trout	321	328	335.0	1.01	none	hatchery	Worn fins
Lake Sabrina	NW shore	E-fish	rainbow trout	296	301	270.0	1.04	none	hatchery	Worn fins
Lake Sabrina	NW shore	E-fish	rainbow trout	220	232	135.0	1.27	none	hatchery	Worn fins
Lake Sabrina	NW shore	E-fish	rainbow trout	230	240	150.0	1.23	none	unknown	
Lake Sabrina	NW shore	E-fish	rainbow trout	205	216	100.0	1.16	none	unknown	
Lake Sabrina	NW shore	E-fish	rainbow trout	196	210	100.0	1.33	none	unknown	
Lake Sabrina	NW shore	E-fish	rainbow trout	120	129	20.0	1.16	none	wild	
Lake Sabrina	Cove near marina	E-fish	Owens sucker	139	147	55.0	2.05	none	wild	
Lake Sabrina	Cove near marina	E-fish	Owens sucker	220	233	165.0	1.55	none	wild	
Lake Sabrina	Cove near marina	E-fish	Owens sucker	305	324	375.0	1.32	none	wild	
Lake Sabrina	Cove near marina	E-fish	Owens sucker	182	192	115.0	1.91	none	wild	
Lake Sabrina	Cove near marina	E-fish	Owens sucker	250	264	190.0	1.22	none	wild	
Lake Sabrina	Cove near marina	E-fish	Owens sucker	244	260	210.0	1.45	none	wild	
Lake Sabrina	Cove near marina	E-fish	Owens sucker	263	277	240.0	1.32	none	wild	
Lake Sabrina	Cove near marina	E-fish	Owens sucker	305	324	295.0	1.04	none	wild	
Lake Sabrina	Cove near marina	E-fish	Owens sucker	299	316	220.0	0.82	none	wild	
Lake Sabrina	Cove near marina	E-fish	Owens sucker	240	256	190.0	1.37	none	wild	
Lake Sabrina	Cove near marina	E-fish	Owens sucker	244	260	225.0	1.55	none	wild	
Lake Sabrina	Cove near marina	E-fish	Owens sucker	257	275	250.0	1.47	none	wild	
Lake Sabrina	Cove near marina	E-fish	Owens sucker	157	166	60.0	1.55	none	wild	
Lake Sabrina	Cove near marina	E-fish	Owens sucker	175	185	80.0	1.49	none	wild	
Lake Sabrina	Cove near marina	E-fish	brook trout	190	199	95.0	1.39	none	unknown	

Reservoir	Site ID	Sample Method	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
Lake Sabrina	Cove near marina	E-fish	brook trout	195	206	105.0	1.42	none	unknown	
Lake Sabrina	Cove near marina	E-fish	brook trout	220	232	130.0	1.22	none	unknown	
Lake Sabrina	Cove near marina	E-fish	rainbow trout	345	360	380.0	0.93	none	hatchery	Worn fins
Lake Sabrina	Cove near marina	E-fish	rainbow trout	310	319	275.0	0.92	none	hatchery	Worn fins
Lake Sabrina	Cove near marina	E-fish	rainbow trout	333	341	275.0	0.74	none	hatchery	Worn fins
Lake Sabrina	Cove near marina	E-fish	rainbow trout	187	200	90.0	1.38	none	unknown	
Lake Sabrina	Cove near marina	E-fish	rainbow trout	257	267	190.0	1.12	none	unknown	
Lake Sabrina	Cove near marina	E-fish	rainbow trout	252	266	190.0	1.19	none	unknown	
Lake Sabrina	Cove near marina	E-fish	rainbow trout	156	163	50.0	1.32	none	wild	
Lake Sabrina	Cove near marina	E-fish	brook trout	227	239	140.0	1.20	none	unknown	
Lake Sabrina	Tributaries	E-fish	rainbow trout	482.6	495.3	1485.0	1.32	none	hatchery	Worn top of caudal fin
Lake Sabrina	Tributaries	E-fish	rainbow trout	495.3	508	1750.0	1.44	none	hatchery	Worn top of caudal fin
Lake Sabrina	Tributaries	E-fish	Owens sucker	375	395	1105.0	2.10	none	wild	
Lake Sabrina	Tributaries	E-fish	rainbow trout	325	346	320.0	0.93	none	hatchery	
Lake Sabrina	Tributaries	E-fish	rainbow trout	250	255	175.0	1.12	none	hatchery	
Lake Sabrina	Tributaries	E-fish	rainbow trout	335	351	0.0	na	none	hatchery	Very thin
Lake Sabrina	Tributaries	E-fish	rainbow trout	326	341	330.0	0.95	none	hatchery	Hook and line sticking out of mouth
Lake Sabrina	Tributaries	E-fish	rainbow trout	310	325	295.0	0.99	none	hatchery	
Lake Sabrina	Tributaries	E-fish	rainbow trout	188	205	150.0	2.26	none	hatchery	
Lake Sabrina	Tributaries	E-fish	rainbow trout	340	357	275.0	0.70	none	hatchery	Very tiny/snake-like
Lake Sabrina	Tributaries	E-fish	rainbow trout	305	320	275.0	0.97	none	hatchery	
Lake Sabrina	Tributaries	E-fish	rainbow trout	280	291	220.0	1.00	none	hatchery	
Lake Sabrina	Tributaries	E-fish	rainbow trout	361	371	430.0	0.91	none	hatchery	

Reservoir	Site ID	Sample Method	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
Lake Sabrina	Tributaries	E-fish	rainbow trout	355	364	430.0	0.96	none	hatchery	Ripe female, spraying eggs
Lake Sabrina	Tributaries	E-fish	rainbow trout	340	355	370.0	0.94	none	hatchery	
Lake Sabrina	Tributaries	E-fish	rainbow trout	306	319	275.0	0.96	none	hatchery	
Lake Sabrina	Tributaries	E-fish	rainbow trout	350	365	420.0	0.98	none	hatchery	
Lake Sabrina	Tributaries	E-fish	rainbow trout	240	249	165.0	1.19	none	hatchery	
Lake Sabrina	Tributaries	E-fish	rainbow trout	309	320	240.0	0.81	none	hatchery	
Lake Sabrina	Tributaries	E-fish	brook trout	180	188	75.0	1.29	none	unknown	
Lake Sabrina	Tributaries	E-fish	brook trout	131	136	35.0	1.56	none	unknown	
Lake Sabrina	Tributaries	E-fish	rainbow trout	365	379	400.0	0.82	none	wild	
Lake Sabrina	Tributaries	E-fish	rainbow trout	306	333	300.0	1.05	none	wild	
Lake Sabrina	Tributaries	E-fish	rainbow trout	185	193	150.0	2.37	none	wild	
Lake Sabrina	Tributaries	E-fish	rainbow trout	264	273	195.0	1.06	none	wild	
Lake Sabrina	Tributaries	E-fish	brook trout	131	141	25.0	1.11	none	wild	
Lake Sabrina	Tributaries	E-fish	Owens sucker	335	356	490.0	1.30	none	wild	
Lake Sabrina	Tributaries	E-fish	Owens sucker	240	255	220.0	1.59	none	wild	
Lake Sabrina	Tributaries	E-fish	rainbow trout	290	304	220.0	0.90	none	hatchery	
Lake Sabrina	Tributaries	E-fish	brook trout	190	200	75.0	1.09	none	unknown	
Lake Sabrina	Tributaries	E-fish	Owens sucker	285	305	290.0	1.25	none	wild	
Lake Sabrina	Tributaries	E-fish	rainbow trout	158	169	60.0	1.52	none	wild	
Lake Sabrina	Tributaries	E-fish	brook trout	246	248	160.0	1.07	none	wild	
Lake Sabrina	Tributaries	E-fish	brook trout	212	219	105.0	1.10	none	wild	
Lake Sabrina	Tributaries	E-fish	rainbow trout	90	95	8.4	1.15	none	wild	
Lake Sabrina	Tributaries	E-fish	brook trout	144	152	36.0	1.21	none	wild	
Lake Sabrina	Tributaries	E-fish	brook trout	145	154	32.6	1.07	none	wild	
Lake Sabrina	Tributaries	E-fish	brook trout	189	198	67.0	0.99	none	wild	
Lake Sabrina	Tributaries	E-fish	brook trout	130	137	25.5	1.16	none	wild	
Lake Sabrina	Tributaries	E-fish	brook trout	150	160	43.6	1.29	none	wild	

Reservoir	Site ID	Sample Method	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
Lake Sabrina	Tributaries	E-fish	rainbow trout	113	120	15.5	1.07	none	wild	
Lake Sabrina	Tributaries	E-fish	Owens sucker	61	65	3.2	1.41	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	320	334	395.0	1.21	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	276	292	310.0	1.47	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	269	275	265.0	1.36	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	318	335	380.0	1.18	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	300	316	360.0	1.33	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	280	298	320.0	1.46	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	295	313	385.0	1.50	none	wild	Male- super long anal fin
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	260	275	275.0	1.56	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	187	203	110.0	1.68	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	250	266	240.0	1.54	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	241	257	220.0	1.57	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	248	264	250.0	1.64	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	178	197	no entry	na	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	237	253	210.0	1.58	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	233	247	195.0	1.54	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	189	200	no entry	na	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	276	293	no entry	na	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	237	252	no entry	na	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	243	258	no entry	na	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	262	278	220.0	1.22	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	260	273	260.0	1.48	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	183	193	no entry	na	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	258	268	250.0	1.46	none	wild	
Lake Sabrina	Cove at Dam	E-fish	Owens sucker	182	191	105.0	1.74	none	wild	
Lake Sabrina	Cove at Dam	E-fish	rainbow trout	262	266	245.0	1.36	none	hatchery	Worn fins
Lake Sabrina	Cove at Dam	E-fish	rainbow trout	240	243	200.0	1.45	none	hatchery	Worn fins
Lake Sabrina	Cove at Dam	E-fish	rainbow trout	161	172	65.0	1.56	none	unknown	Fat
Lake Sabrina	Cove at Dam	E-fish	rainbow trout	290	295	no entry	na	none	unknown	

Reservoir	Site ID	Sample Method	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
Lake Sabrina	Cove at Dam	E-fish	rainbow trout	151	160	50.0	1.45	none	unknown	
Lake Sabrina	Cove at Dam	E-fish	brook trout	210	219	120.0	1.30	none	unknown	
Lake Sabrina	Cove at Dam	E-fish	rainbow trout	264	276	165.0	0.90	none	hatchery	Worn fins
Lake Sabrina	Cove at Dam	E-fish	brook trout	214	223	130.0	1.33	none	unknown	
Lake Sabrina	Cove at Dam	E-fish	rainbow trout	269	278	220.0	1.13	none	unknown	
Lake Sabrina	Cove at Dam	E-fish	rainbow trout	152	163	40.0	1.14	none	unknown	
Lake Sabrina	Cove at Dam	E-fish	rainbow trout	261	274	210.0	1.18	none	unknown	
Lake Sabrina	Cove at Dam	E-fish	rainbow trout	280	285	235.0	1.07	none	hatchery	Photos of worn fins
Lake Sabrina	Cove at Dam	E-fish	brook trout	167	175	55.0	1.18	none	unknown	
Lake Sabrina	Cove at Dam	E-fish	rainbow trout	264	272	195.0	1.06	none	hatchery	
Lake Sabrina	Cove at Dam	E-fish	rainbow trout	226	233	135.0	1.17	none	hatchery	
Lake Sabrina	Cove at Dam	E-fish	rainbow trout	276	291	240.0	1.14	none	unknown	
Lake Sabrina	Cove at Dam	E-fish	rainbow trout	325	335	395.0	1.15	none	hatchery	Fishing line out of anal vent
Lake Sabrina	Cove at Dam	E-fish	rainbow trout	275	286	285.0	1.37	none	hatchery	
Lake Sabrina	Cove at Dam	E-fish	rainbow trout	196	204	90.0	1.20	none	hatchery	
Lake Sabrina	Cove at Dam	E-fish	rainbow trout	310	314	325.0	1.09	none	hatchery	Worn fins
Lake Sabrina	Cove at Dam	E-fish	brook trout	231	247	150.0	1.22	none	unknown	

[1] Fish condition factor

Table C-5 Longley Lake Gillnetting Fish Capture Data, September 2020

Reservoir	Site ID	Sample Method	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
Longley Lake	Gill net 1, set 1	gill net	brook trout	211	221	105.0	1.12	LR-1	wild	Mort
Longley Lake	Gill net 1, set 1	gill net	brook trout	215	222	105.0	1.06	LR-2	wild	
Longley Lake	Gill net 1, set 1	gill net	brook trout	205	213	85.0	0.99	LR-3	wild	
Longley Lake	Gill net 1, set 1	gill net	brook trout	214	224	105.0	1.07	LR-4	wild	
Longley Lake	Gill net 1, set 1	gill net	brook trout	190	200	90.0	1.31	LR-5	wild	
Longley Lake	Gill net 1, set 2	gill net	brook trout	203	212	120.0	1.43	none	wild	Mort
Longley Lake	Gill net 1, set 2	gill net	brook trout	207	217	95.0	1.07	none	wild	
Longley Lake	Gill net 2, set 1	gill net	brook trout	220	228	120.0	1.13	LR-6	wild	
Longley Lake	Gill net 2, set 1	gill net	brook trout	192	203	80.0	1.13	LR-7	wild	
Longley Lake	Gill net 2, set 1	gill net	brook trout	219	231	135.0	1.29	LR-8	wild	Mort
Longley Lake	Gill net 2, set 1	gill net	brook trout	197	206	105.0	1.37	LR-9	wild	
Longley Lake	Gill net 2, set 1	gill net	brook trout	194	206	105.0	1.44	LR-10	wild	
Longley Lake	Gill net 2, set 1	gill net	brook trout	191	198	105.0	1.51	LR-11	wild	Mort
Longley Lake	Gill net 2, set 1	gill net	brook trout	215	224	120.0	1.21	LR-12	wild	
Longley Lake	Gill net 2, set 1	gill net	brook trout	255	205	225.0	1.36	LR-13	wild	Mort
Longley Lake	Gill net 2, set 1	gill net	brook trout	210	217	125.0	1.35	LR-14	wild	
Longley Lake	Gill net 2, set 1	gill net	brook trout	194	207	85.0	1.16	LR-15	wild	
Longley Lake	Gill net 2, set 1	gill net	brook trout	211	221	120.0	1.28	none	wild	
Longley Lake	Gill net 2, set 1	gill net	brook trout	218	221	120.0	1.16	none	wild	
Longley Lake	Gill net 2, set 1	gill net	brook trout	203	209	135.0	1.61	none	wild	Mort
Longley Lake	Gill net 2, set 1	gill net	brook trout	221	231	150.0	1.39	none	wild	
Longley Lake	Gill net 2, set 1	gill net	brook trout	193	199	115.0	1.60	none	wild	
Longley Lake	Gill net 2, set 1	gill net	brook trout	190	204	105.0	1.53	none	wild	
Longley Lake	Gill net 2, set 2	gill net	brook trout	237	252	170.0	1.28	none	wild	
Longley Lake	Gill net 2, set 2	gill net	brook trout	228	238	120.0	1.01	none	wild	

Reservoir	Site ID	Sample Method	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	k-value[1]	Otolith/ Scale Sample ID	Origin	Notes
Longley Lake	Gill net 2, set 2	gill net	brook trout	208	215	120.0	1.33	none	wild	
Longley Lake	Gill net 2, set 2	gill net	brook trout	215	226	110.0	1.11	none	wild	

[1] Fish condition factor

SOUTHERN CALIFORNIA EDISON
Bishop Creek Hydroelectric Project
(FERC Project No. 1394)

FINAL TECHNICAL REPORT
BISHOP CREEK WATER QUALITY TECHNICAL STUDY (AQ 5)

JUNE 2022

SOUTHERN CALIFORNIA EDISON

Bishop Creek Hydroelectric Project
(FERC Project No. 1394)

FINAL TECHNICAL REPORT
BISHOP CREEK WATER QUALITY
TECHNICAL STUDY
(AQ 5)

Southern California Edison
1515 Walnut Grove Ave
Rosemead, CA 91770

June 2022

Prepared by:

Kleinschmidt

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Acronyms

°C	degrees Celsius
°F	degrees Fahrenheit
μS/cm	microSiemens per centimeter

A

AQ 4	Final Technical Report Bishop Creek Reservoirs Fish Distribution Study

B

Basin Plan	Water Quality Control Plan
BCWQIP	Bishop Creek Water Quality Implementation Plan
Bishop Creek Project	Bishop Creek Hydroelectric Project
BWS	below water surface

C

Ca	Calcium
CDWP	California Drinking Water Program
CFR	Code of Federal Regulation
cfu	colony forming unit
cfs	cubic feet per second
CWA	Clean Water Act

D

DLA	Draft License Application
DO	dissolved oxygen

E

E coli	*Escherichia coli*

F

FERC	Federal Energy Regulatory Commission

I

ILP	Integrated Licensing Process
ISR	Initial Study Report

L

LRWQCB	Lahontan Region Water Quality Control Board

M

MPN	most probable number
MCL	maximum contaminant level
mg/L	milligrams per liter
ml	milliliter
msl	mean sea level
MST	microbial source tracking methods

N

ND	not detected
NOI	Notification of Intent
NTU	Nephelometric turbidity units

P

PAD	Pre-Application Document
Project	Bishop Creek Hydroelectric Project

R

RSP	Revised Study Plan
RWQCB	Regional Water Quality Control Board)

S

SCE	Southern California Edison Company
SMCL	secondary maximum contaminant level
SNARL	Sierra Nevada Aquatic Research Laboratory
SOP	Standard Operating Procedure

SWAMP	Surface Water Ambient Monitoring Program
SWRCB	State Water Resources Control Board

T

TDS	total dissolved solids
TWG	Technical Working Group

U

USEPA	United States Environmental Protection Agency
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
USR	Updated Study Report

1.0 INTRODUCTION

1.1. BACKGROUND

Southern California Edison Company (SCE) is the licensee, owner, and operator of the Bishop Creek Hydroelectric Project (Project) Federal Energy Regulatory Commission (FERC) Project No. 1394. The Project is located on Bishop Creek in Inyo County, California, approximately 5 miles southwest of the city of Bishop (Figure 1.1-1). SCE operates Bishop Creek Project under a 30-year license issued by FERC on July 19, 1994. As the current license is due to expire on June 30, 2024, SCE initiated the formal relicensing process utilizing the Integrated Licensing Process (ILP) by filing the Notification of Intent (NOI) and Pre-Application Document (PAD) with FERC on May 1, 2019.

During the Technical Working Group (TWG) meetings, and in written comments, stakeholders identified the need to develop an understanding of water quality parameters in the Project area. Draft study plans were distributed with the PAD and revised after receiving comments pursuant to 18 CFR § 5.9 (Code of Federal Regulation). FERC approved the Revised Study Plan (RSP) with its Study Plan Determination on November 4, 2019. As described in Section 7.0 of this document, SCE kept FERC and the TWGs informed regarding study plan implementation. After filing the Updated Study Report (USR) with FERC on November 4, 2021, SCE held an USR meeting on November 18, 2021. Preliminary data on the water quality study program was presented in the USR; this Water Quality Annual Report builds on those materials and presents the results of the 2021 monitoring program.

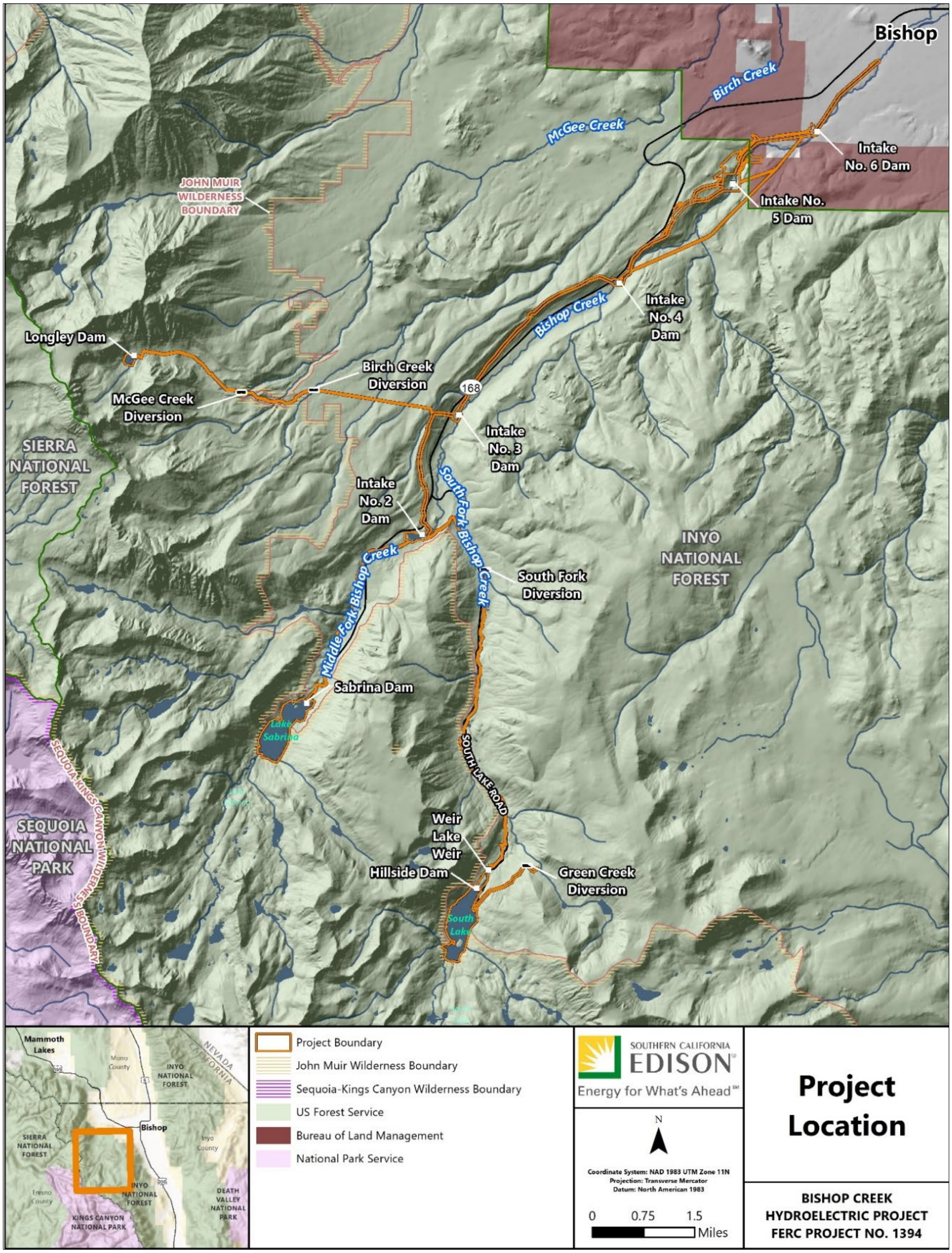


Figure 1.1-1 Project Location Map

2.0 PROJECT NEXUS

Although the Project is located in a relatively clean granitic watershed with limited factors to impact water quality, stakeholders expressed a need to establish baseline conditions for the future. Water storage and diversion activities could affect water quality in the Bishop Creek Project waters or contribute to water quality issues downstream.

The goals and objectives of this study were to:

- Monitor water quality[1] for 2 years on a regular basis at multiple monitoring sites:
    - **Above-Project**: establish reference baseline conditions of inflow from natural runoff in the watershed
    - **In-Project**: assess how/if water quality changes throughout various facilities within the Project Area (i.e., various depths and locations in South Lake and Lake Sabrina, powerhouse discharges)
    - **Below-Project**: assess any/all potential impacts Project operations may have on water quality that is leaving the Project Area
- Monitor water temperature for 2 years on a regular basis at multiple monitoring sites
    - **Above-Project:** establish reference baseline conditions of inflow from natural runoff in watershed
    - **In-Project**: assess how/if water temperature changes throughout various facilities within Project Area (various depths and locations in South Lake and Lake Sabrina, powerhouse discharges)
    - **Below-Project**: assess any/all impacts Project operations may have on water temperature that is leaving the Project Area
- Ensure that future Project facilities and operations are:
    - Consistent with the water quality goals and objectives for Bishop Creek in the Water Quality Control Plan (Basin Plan) for the Lahontan Region (LRWQCB, 1995)
    - Consistent with the desired conditions described in the 2018 Land Management Plan for the Inyo National Forest for Social and Economic Sustainability and Multiple Uses with the desired conditions described in "Land Management Plan for the Inyo National Forest" (USDA, 2019) as

[1] For the purposes of this study, water quality was monitored for dissolved oxygen (DO), water temperature, turbidity, conductivity, total dissolved solids, orthophosphate, nitrate, total nitrogen, and *E.coli*.

they relate to ecological sustainability and diversity of plant and animal communities.

3.0 REVIEW OF EXISTING INFORMATION

3.1. WATER QUALITY BENEFICIAL USES, OBJECTIVES, GOALS

The state of California is responsible for maintaining water quality standards through the federal Clean Water Act (CWA). The State Water Resources Control Board (SWRCB) and Lahontan Regional Water Quality Control Board (LRWQCB) are responsible for the protection of beneficial uses of water resources within its jurisdiction and use planning, permitting, and enforcement authorities to meet this responsibility. Every water body within the LRWQCB jurisdiction is designated a set of beneficial uses that are protected by appropriate water quality objectives as described in the Basin Plan for the Lahontan Region (LRWQCB, 1995).

For smaller tributary streams in which beneficial uses are not specifically designated, they are granted with the same beneficial uses as the streams, lakes, or reservoirs to which they are a tributary. Table 3.1-1 lists the water bodies to which this Project drains and their beneficial use designations.

The Basin Plan defines the beneficial use abbreviations as the following:

- **Municipal and Domestic Supply (MUN) –** Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.
- **Agricultural Supply (AGR) –** Beneficial uses of waters used for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, and support of vegetation for range grazing.
- **Industrial Process Supply (PRO)** – Uses of water for industrial activities that depend primarily on water quality.
- **Industrial Service Supply (IND) –** Uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, geothermal energy production, hydraulic conveyance, gravel washing, fire protection, or oil well re-pressurization.
- **Ground Water Recharge (GWR)** - Beneficial uses of waters used for natural or artificial recharge of ground water for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.
- **Freshwater Replenishment (FRSH) -** Beneficial uses of waters used for natural or artificial maintenance of surface water quantity or quality (e.g., salinity).
- **Hydropower Generation (POW) –** Uses of water for hydroelectric power generation.
- **Water Contact Recreation (REC-1) –** Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, whitewater activities, fishing, or use of natural hot springs.

- **Non-Contact Water Recreation (REC-2) –** Uses of water for recreational activities involving proximity to water, but not normally involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tide pool and marine life study, hunting, sightseeing, and aesthetic enjoyment in conjunction with the above activities.

- **Commercial and Sportfishing (COMM) -** Beneficial uses of waters used for commercial or recreational collection of fish or other organisms including, but not limited to, uses involving organisms intended for human consumption.

- **Cold Freshwater Habitat (COLD) –** Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

- **Wildlife Habitat (WILD)** – Uses of water that support terrestrial or wetland ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats or wetlands, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

- **Preservation of Biological Habitats of Special Significance (BIOL)** - Beneficial uses of waters that support designated areas or habitats, such as established refuges, parks, sanctuaries, ecological reserves, and Areas of Special Biological Significance (ASBS), where the preservation and enhancement of natural resources requires special protection.

- **Spawning, Reproduction, and/or Early Development (SPWN)** – Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.

The water quality objectives include both numeric and narrative standards for surface water that are based on criteria that protect both human health and aquatic life. If water quality is maintained at levels consistent with these objectives, beneficial uses are considered protected. Applicable water quality objectives and standards in the Basin Plan are provided in Table 3.1-2 and Table 3.1-3.

Table 3.1-1. Water Body Beneficial Use Designations

SURFACE WATER BODY	Beneficial Use																					
	MUN	AGR	PRO	IND	GWR	FRSH	NAV	POW	REC1	REC-2	COMM	AQUA	WARM	COLD	SAL	WILD	BIOL	RARE	MIGR	SPWN	WQE	FLD
	Municipal and Domestic Supply	Agricultural Supply	Industrial Process Supply	Industrial Service Supply	Groundwater Recharge	Freshwater Replenishment	Navigation	Hydropower Gen.	Water Contact Recreation	Non-Contact Water Recreation	Commercial and Sport Fishing	Aquaculture	Warm Freshwater Habitat	Cold Freshwater Habitat	Inland Saline Water Habitat	Wildlife Habitat	Special Biological Habitats	Rare, Threatened & Endangered Species	Migration of Aquatic Organisms	Spawning, Reproduction & Dev.	Water Quality Enhancement	Flood Peak Attenuation/Flood Water Storage
Upper Owens Hydrologic Area Hydrologic Unit 603.20																						
McGee Creek	X	X			X	X		X	X	X	X			X		X	X			X		
Bishop Creek (above intakes)	X	X						X	X	X	X			X		X				X		
Intake 2 Reservoir	X							X	X	X	X			X		X						
Bishop Creek (below intakes)	X							X	X	X	X			X		X				X		
Bishop Creek (below last Powerhouse)	X	X		X	X				X	X	X			X		X				X		

Table 3.1-2. Water Quality Objectives for Hydrologic Unit 603.20 - Upper Owens River Hydrologic Unit

Constituent/ Parameter	Water Quality Objective
Ammonia	Shall not exceed the values in Tables 3-1 to 3-4 in LRWQCB Basin Plan.
Bacteria	The fecal coliform concentration during any 30-day period shall not exceed a log mean of 20/100 milliliters (ml), nor shall more than 10 percent of all samples collected during any 30-day period exceed 40/100 ml.
Biostimulatory Substances	Waters 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 exceeding the maximum contaminant level (MCL) or secondary maximum contaminant level (SMCL) based upon drinking water standards specified in Title 22.
Chlorine, total residual	For the protection of aquatic life, total chlorine residual shall not exceed either a median value of 0.002 mg/L or a maximum value of 0.003 mg/L. Median values shall be based on daily measurements taken within any 6-month period.
Color	Water shall be free of discoloration that causes nuisance or adversely affects beneficial uses.
Dissolved Oxygen (DO)	The 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. For waters with the beneficial uses of COLD, COLD with SPWN, WARM, and WARM with SPWN, the minimum DO concentration shall not be less than that specified in Table 3-6 of the LRWQCB Basin Plan.
Floating Material	Water shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses.
Oil & Grease	Waters shall not contain oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water that cause nuisance, or that otherwise adversely affect the water for beneficial uses.
pH	In fresh waters with designated beneficial uses of COLD or WARM, changes in normal ambient pH levels shall not exceed 0.5 pH units. For all other waters of the region, the pH shall not be depressed below 6.5 nor raised above 8.5.
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.
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 beneficial uses.
Settleable Material	Waters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.
Suspended Material	Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.
Tastes and Odors	Waters shall not contain taste or odor-producing substances in concentrations that impart undesirable tastes or odors to fish or other edible products of aquatic origin that cause nuisance, or that adversely affect the water for beneficial uses.

Temperature	The natural receiving water temperature of intrastate waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Water Quality Control Board (RWQCB) that such alteration in temperature does not adversely affect beneficial uses.
Toxicity	All waters shall be maintained free of toxic substances in concentrations 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, 1995

Table 3.1-3. Water Quality Objectives for Certain Water Bodies in Upper Owens River Hydrologic Unit

Surface Waters	**Objective (mg/L) [a,b]**						
	TDS	**Cl**	**F**	**B**	**NO_3-N**	**Total N**	**PO_4**
Lake Sabrina	10 17	2.0 3.0	0.10 0.10	0.05 0.05	0.2 0.3	0.3 0.6	0.03 0.05
South Lake	12 20	3.7 4.3	0.10 0.10	0.02 0.02	0.1 0.1	0.1 0.4	0.03 0.04
Bishop Creek (Intake 2)	27 29	1.9 3.0	0.15 0.15	0.02 0.02	0.1 0.2	0.1 0.4	0.05 0.09

Source: LRWQCB, 1995

a Annual average value/90th percentile value.

b Objectives are in mg/L and are defined as follows:

B = Boron

Cl = Chloride

F = Fluoride

N = Nitrogen, Total

NO_3-N = Nitrate as Nitrogen

PO_4 = Orthophosphate, dissolved

TDS = Total Dissolved Solids (Total Filterable Residue)

3.2. Previous Investigations

3.2.1. Bishop Creek

In 1974, Environmental Science and Engineering (ESE, 1975) in cooperation with the University of California at Los Angeles conducted an environmental baseline study of the water quality of Bishop Creek. The report concluded that the water quality of Bishop Creek was excellent and displayed the following characteristics:

- Total dissolved solids (TDS) remained very low throughout the summer, less than 30 milligrams per liter (mg/L)

- Calcium (Ca) was the predominant cation in all sampled waters and surface water composition reflected the general geology of the drainage basin

- Nitrate and phosphate levels were low, generally less than 0.10 mg/L and 0.05 mg/L, respectively

Water temperatures generally increased downstream; the report further stated that Ca was the dominant cation and that the North Fork of Bishop Creek had higher values than other drainages and appeared to be related to the geology (marble roof pendants) that is found in the upper reaches of the North Fork. In addition, the report noted that as flow decreased in Bishop Creek increases in various ions were noted and was attributed to groundwater providing a larger percentage of the baseflow of the stream. The groundwater generally has more contact time with the underlying bedrock resulting in higher concentrations of major ions (ESE, 1975).

The ESE report (1975) determined that, similar water characteristics reported from previous investigations, increasing dissolved constituents coincides with decreasing elevation. The dominant anion was bicarbonate, and the dominant cations were Ca and sodium. In addition, the water quality of Bishop Creek at the furthest downstream site (below Plant No. 6) had lower concentrations of alkalinity and dissolved constituents. The 1975 ESE Report stated that the likely reason for the decrease was the routing of water for power generation purposes. Table 3.2-1 and Table 3.2-2 provide a summary of the water quality characteristics for the various watersheds sampled.

Minor amounts of boron, barium, aluminum, iron, and manganese were found in the various drainages with the highest levels generally found in Bishop Creek below the confluence with South Fork.

3.2.2. South Lake and Lake Sabrina

In 1986, the University of California at Riverside conducted a water quality investigation of Bishop Creek and selected eastern Sierra Nevada lakes for SCE (Lund, n.d.). The results of that investigation are presented in the following text.

Like most Sierra reservoirs, South Lake and Lake Sabrina have very steep sides and considerable annual fluctuations in surface elevations which severely limit the production of littoral aquatic vegetation. There have been no comprehensive limnological studies of these lakes. Limited water quality profiling of the lakes was conducted from June 1986 until November 1987 and are presented in Table 3.2-3 and Table 3.2-4. Field measurements of water temperature, pH and DO was conducted at one location on each lake. In general, water temperature varied from lows of 32.3 degrees Fahrenheit (°F) in March to 59.7°F in late August. Overall, water temperature decreased with increasing depth. DO ranged from 11.98 mg/L in early March to 2.44 mg/L in late August and was generally above 100 percent saturation except in August when DO values dropped to less than 38 percent saturation.

Table 3.2-1. Bishop Creek – Project No. 1394 Physical and Chemical Characteristics of North and Middle Forks of Bishop Creek June-November 1974

Parameter	Sample Location										
	S1	S2	S2A	S3	S4	S6	S6A	S7	S8	S19 Bishop Creek @ Hwy 395 (*)	
	Range	Range	Range	Range	Range	Range	Range	Range	Range	Sprin g	Fall
Ca (mg/L)	1.7-3.7	2.3-4.9	1.9-2.9	1.9-3.2	2.2-2.6	2.3-3.0	2.3-3.3	2.1-2.7	2.1-3.0	9.6	8.8
Magnesium (mg/L)	0.1-0.16	0.13-0.18	0.12-0.16	0.14-0.22	0.17-0.19	0.18-0.22	0.18-0.23	0.13-0.22	0.13-0.16	0.7	0.5
Sodium (mg/L)	0.4-0.8	0.8-1.1	0.6-1.0	0.5-1.0	0.6-0.8	0.80.8-1.1	0.7-1.1	0.8-1.2	0.6-0.7	4.5	3.4
Nitrate as N (mg/L)	0.03-0.11	0.08-0.13	0.05-0.12	0.05-0.1	0.05-0.12	0.05-0.13	0.06-0.12	0.06-0.12	0.06-0.1	0.3	0.8
Phosphate as P (mg/L)	0.03-0.04	0.02-0.05	0.02-0.05	0.02-0.04	0.02-0.05	0.02-0.03	0.01-0.03	0.01-0.04	0.01-0.03	--	--
TDS (mg/L)	6-27	8-26	7-20	8-21	9-16	11-21	20	11-21	8-10	--	--
Water Temperature (deg °C)	10.0-11.5	8.5-11.0	10.0-13.5	9.0-13.5	10.0-14.0	10.0-15.0	12.5-14.5	11.0-15.0	9.9-15.0	12.5	8.5
pH (units)	5.5-7.5	5.0-7.1	5.0-8.8	5.0-7.4	5.0-6.8	5.0-8.2	5.5-7.2	5.0-8.4	5.0-7.3	7.5	7.29
DO (mg/L)	6.6-8.1	6.7-9.4	6.8-9.1	6.8-8.8	6.8-7.5	6.4-8.6	6.3-7.7	7.46.6-8.1	6.2-7.8	9.2	9.3

Source: ESE, 1975
(*) Spring: May 1974; Fall: November 1974
(--) indicates analysis not performed.

Table 3.2-2. Physical and Chemical Characteristics of Middle and South Forks of Bishop Creek, McGee Creek and Birch Creek ([a, b]) May 1986 - December 1987

	Watershed/Sample Locations (c)					
	Middle Fork of Bishop Creek	South Fork of Bishop Creek	Bishop Creek Below South Fork	McGee Creek	North Fork of Birch Creek	South Fork of Birch Creek
Parameter	1, 2, 3, 4	1S, 2S, 3S, 4S	5, 6, 7, 8, 9, 10, 17	11, 12	13, 14,	15, 16
Calcium (mg/L)	1.3-10.0	2.5-47.3	4.1-20	2.58-10.3	5.5-13.9	13.8-15.3
Magnesium (mg/L)	0.1-0.9	0.3-5.7	0.4-4.9	0.20-0.77	0.3-0.5	1.34-1.59
Sodium (mg/L)	0.3-2.7	0.7-4.8	1.2-16.7	1.00-2.77	1.8-2.5	1.93-2.85
Potassium (mg/L)	0.04-1.0	0.4-3.3	0.1-2.0	0.50-1.67	0.6-1.3	1.38-1.56
ANC (μeq/L) (d)	122-447	146-2,532	235-1,537	153-651	321-789	893-1,006
Chloride (mg/L)	0.1-0.5	0.2-1.0	0.2-5.6	0.12-0.28	0.2-0.3	0.23-0.25
Nitrate (mg/L)	ND(e)-1.1	ND-0.8	ND-1.2	0.55-0.59	ND-0.5	ND
Sulfate (mg/L)	0.1-13.3	1.3-23.2	1.7-13.0	1.16-2.76	2.9-3.5	1.78-2.25
Silica (mg/L)	1.5-9.1	2.52-13.9	5.65-22.7	NS (f)	9.65-11.4	16.63-19.58
Boron (mg/L)	ND-0.01	ND-0.02	ND-0.04	NS	ND	ND
Barium (mg/L)	ND	ND-0.019	ND-0.054	NS	ND-0.003	0.001-0.005
Aluminum (mg/L)	ND-0.07	ND-0.09	ND-0.60	NS	ND-0.16	ND-0.15
Iron (mg/L)	ND-0.83	ND-0.19	ND-0.74	NS	ND-0.002	0.02-0.04
Manganese (mg/L)	ND-0.042	ND-0.035	ND-0.028	NS	ND	ND-0.002

Source: Lund, n.d.
[a] Derived from Lund undated.
[b] Values presented are estimated. Original values were reported in μmoles/L (Lund, n.d.) and converted to mg/L.
[c] ANC=Acid Neutralizing Capacity.
[d] ND=Not detected (no detection limit provided).
[e] NS=Not sampled.

Table 3.2-3. 1986 Field Water Quality Depth Profiles for Lake Sabrina

Date	Depth (meters)	Water Temperature (deg °C)	pH (units)	Dissolved Oxygen	
				mg/L	% Saturation
June 24, 1986	0.5	12.61	7.25	8.31	108.3
	2.5	11.16	7.26	8.72	110.1
	4.5	9.33	7.33	9.07	110.0
	6.5	8.64	7.34	9.31	111.3
	8.5	8.01	7.43	9.46	111.5
	10.3	7.50	7.46	9.59	111.8
August 8, 1986	0.5	15.41	7.27	7.93	109.9
	2.5	15.25	7.23	7.72	106.6
	4.5	15.23	7.25	7.63	105.3
	6.5	14.91	7.45	8.11	111.1
	8.5	14.50	7.71	8.23	111.8
	10.3	14.03	8.06	8.44	113.5
	12.5	12.81	7.89	8.45	110.6
	14.5	10.82	7.65	8.43	105.7
	16.5	10.05	7.30	6.97	85.9
October 27, 1986	0.5	7.29	6.81	9.33	108.3
	2.5	7.29	7.01	8.96	104.0
	4.5	7.31	7.09	8.91	103.4
	6.5	7.30	7.13	8.85	102.7
	8.5	7.26	7.15	8.82	102.3

Source: Lund, n.d.

Table 3.2-4. 1987 Field Water Quality Depth Profiles for Lake Sabrina

Date	Depth (meters)	Water Temperature (deg °C)	pH (units)	Dissolved Oxygen	
				mg/L	% Saturation
March 18, 1987	0.5	0.14	7.14	11.98	114
	1.0	0.49	7.21	11.03	106
	2.0	1.66	7.26	10.45	105
	3.0	2.24	7.31	10.09	103
	4.0	2.80	7.35	9.70	100
	4.6	2.94	7.38	9.47	98
June 30, 1098	0.0	14.8	*	8.61	121
	0.5	14.5	*	8.70	122
	1.5	14.4	*	8.64	121
	2.5	14.4	*	8.62	120
	3.5	14.3	*	8.64	120
	4.5	14.3	*	8.64	120
	5.5	14.3	*	8.61	120
	6.5	14.2	*	8.74	122
	7.5	13.7	*	9.05	124
	8.5	13.1	*	9.26	126
	9.5	12.8	*	9.41	127
	10.5	12.1	*	9.64	128
	11.5	11.6	*	9.81	128
	12.5	10.5	*	10.41	133
August 24, 1987[1]	0.5	15.39	7.74	2.58	37
	2.5	15.42	7.69	2.44	35
	4.5	15.42	7.66	2.44	35
	6.5	15.41	7.66	2.44	35
	8.5	15.37	7.62	2.48	35
	10.5	14.91	7.62	2.55	36
	12.5	13.47	7.63	2.60	36
	14.5	12.25	7.78	2.71	36
	15.l	11.92	7.75	2.72	36
November 3, 1987	0.5	8.48	7.04	8.42	102
	2.5	8.50	7.23	8.25	100
	4.5	8.52	9.32	7.87	95
	6.5	8.51	7.55	8.34	101
	8.5	8.53	7.66	8.07	98
	10.5	8.42	7.40	7.82	95
	11.0	8.52	7.66	8.14	99

Source: Lund, n.d.

[1] Low DO readings do not appear to correspond with any reported fish-kill and may be suspect. However, the Lund report shows similar data at other lakes in the Sierras at the same time-period, include Gem and Waugh lakes.

DO inversely followed water temperature and decreased values were observed as water temperatures increased. Values for pH ranged from 6.81 to 9.32; however, most values were between 7 and 8 pH units.

Measurements of the chemical characteristics of the lakes were taken in fall 1985 and are presented in Table 3.2-5. The chemical composition of these lake waters appears typical for reservoirs in the Sierra Nevada elevation and latitude. There are three basic factors which cause the high elevation reservoirs of this portion of the High Sierra to be mineral and nutrient-poor. First, the watersheds are generally undisturbed and support very little human habitation. Second, the substrates in these drainages are dominantly igneous intrusive rocks, and third, the drainages contain very shallow and poorly vegetated soils. The combination of these factors results in very little leaching of minerals and nutrients into waters entering the reservoirs.

Table 3.2-5. Chemical Characteristics for South Lake and Lake Sabrina[a]

Parameter	South Lake		Lake Sabrina	
	Surface	Bottom	Surface	Bottom
Calcium (mg/L)	1.98	1.98	1.94	1.88
Magnesium (mg/L)	0.16	0.16	0.11	0.11
Sodium (mg/L)	0.34	0.34	0.18	0.28
Potassium (mg/L)	0.98	0.98	0.78	0.78
Nitrate as N (mg/L)	0.035	0.026	0.016	0.013
Sulfate as S (mg/L)	0.438	0.399	0.136	0.138
Bicarbonate	---	---	---	---

Source: Lund, n.d.

Notes: [a] Samples collected September 1985

As part of the California's Surface Water Ambient Monitoring Program (SWAMP) for perennial streams, the California SWRCB undertook a water quality monitoring program on Bishop Creek from 2013 to 2016. The results of the study are summarized in Table 3.2-6.

The water quality was similar to that observed in previous studies with Ca and sodium the dominant cations. TDS was low, ranging from 25 to 66 mg/L, but averaged above the Basin Plan value of 27 mg/L above Intake No. 2. Water temperature was generally less than 62.6 °F. Two biological parameters detected were fecal coliform and *Escherichia coli* (E coli.) and ranged from 1 to 66 colony forming units (cfu) per100 ml and 1 cfu to 61 cfu per 100 milliliter (ml), respectively; exceeding the basin standard of 20 cfu/100 ml for fecal coliform.

Samples collected over the 2-year period of 2015 and 2016 indicated non-detectable values for fecal coliform or *E. coli* for Bishop Creek (total of three samples) at the U.S. Forest Service (USFS) boundary. Studies conducted by the LRWQCB for Bishop Creek concluded that the impaired portion of Bishop Creek was located below Plant No. 6 and was likely the result of cattle grazing in or near Bishop Creek and potentially leaking sanitary sewer systems in lower Bishop Creek (Knapp and Craig, 2016).

Table 3.2-6. Summary of Swamp Water Quality Sampling on Bishop Creek at National Forest Boundary (Station 603BSP111)

Parameter/Constituent (a)	Units	No. of Samples	Maximum	Minimum	Mean	Basin Standards
Oxygen, dissolved	(mg/L)	1	10.7	10.7	'---	varies
Water Temperature	(deg °C)	12	16.4	2.2	9.84	NA
pH	(units)	12	**10.3**	7	7.97	6.5-8.5 (b)
Alkalinity (as calcium carbonate [$CaCO_3$])	(mg/L)	12	44	19	30.4	NA (c)
Turbidity	(NTU)	12	1.54	0.33	0.724	5 (d)
Specific Conductance	(µS/cm)	12	104.4	40.7	74.63	900-1,600 (d)
TDS	(mg/L)	12	**66**	25	**46.0**	27 (a)
Ca	(mg/L)	12	13.7	0.6	7.99	NA
Magnesium	(mg/L)	11	1.63	0.43	1.032	NA
Sodium	(mg/L)	11	4.82	1.1	3.085	NA
Potassium	(mg/L)	10	2.86	0.31	1.636	NA
Chloride	(mg/L)	12	1.6	0.36	0.884	1.9 (a)
Sulfate (as SO_4)	(mg/L)	12	9.55	3.15	6.157	250-500 (d)
Fluoride	(mg/L)	11	0.143	0.046	0.1014	0.15 (a)
Boron	(mg/L)	12	**0.481**	0.0058	0.1271	0.2 (a)
Nitrate and Nitrite (as N)	(mg/L)	11	0.0475	0.0065	0.01999	10 (e)
Nitrogen, Total	(mg/L)	12	**0.125**	0.049	0.0794	0.1 (a)
Phosphorus as P	(mg/L)	9	0.0094	0.0054	0.00752	NA
Orthophosphate as P	(mg/L)	12	0.0132	0.0051	0.00880	0.05 (a)
Fecal Coliform	cfu/100 ml(f)	27	**66**	**1**	**8.9**	20 (g)
E. coli	cfu/100	24	**61**	**1**	**8.0**	100/320 (h)

Source: CEDEN, 2018

Notes:

[a] Basin Plan for Bishop Creek at Intake 2

[b] United States Environmental Protection Agency (USEPA) secondary standard for pH

[c] NA = Not Applicable – no current MCL

[d] California Drinking Water Program (CDWP) secondary MCL

[e] CDWP primary MCL.

[f] .cfu

[g] Lahontan Basin Plan

[h] Basin Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California

BOLD Equal to or above current MCLs or notification levels

3.3. STUDY AREA

Figure 3.3-1 shows the study areas for the Bishop Creek Water Quality Study.

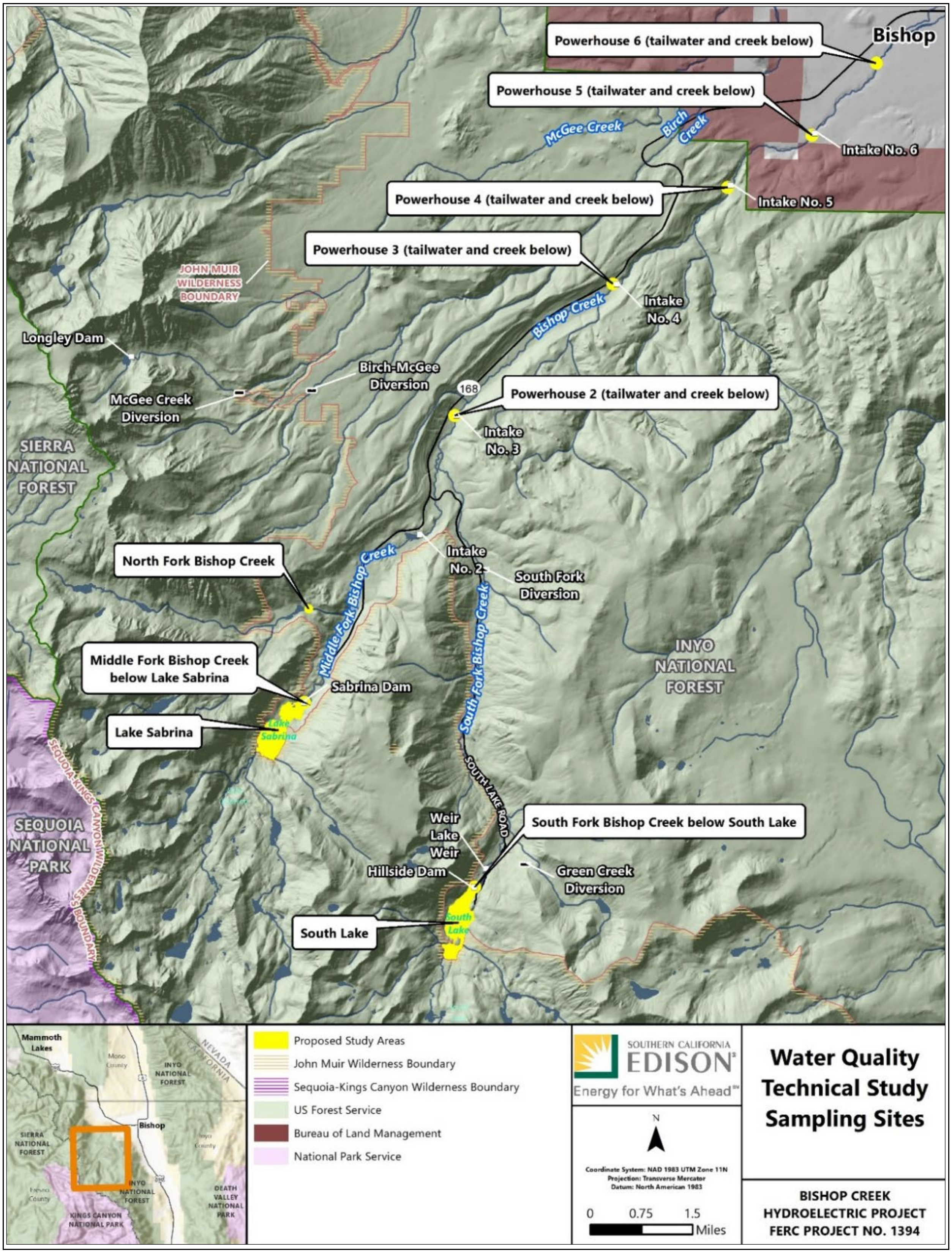


Figure 3.3-1 Water Quality Technical Study Area

4.0 METHODS

This section is a summary of parameters monitored and methodologies used during the study period. Further detail regarding sampling procedures and methods is discussed in Section 4.5 of this document. The overall program is summarized in Table 4.4-1.

4.1. PARAMETERS MONITORED

The Study Plan identified the below parameters to be monitored:

- Water Temperature in degrees Celsius (°C)
- TDS
- DO in mg/l
- Conductivity in µmhos/cm)
- TDS
- Total Nitrogen
- Nitrate (NO_3) as Nitrogen
- Orthophosphate (PO_4) as P dissolved
- Turbidity
- Water Clarity (Secchi Disk)
- *E. coli*

4.2. VERTICAL PROFILES OF DISSOLVED OXYGEN AND WATER TEMPERATURE

Vertical profiles of DO and temperature were collected at the deepest location(s) in South Lake and Lake Sabrina. The purpose of the survey is to identify the timing, extent, and duration of any lake stratification. Vertical profiles of DO and temperature were taken monthly in June and ending in October 2021. The following schedule was proposed for collecting the vertical profiles for each year of the study:

- June, July, August, September, and October

The following sampling locations were proposed:

- Deepest point in Lake Sabrina (estimated at 220-feet-deep at full capacity)
- Deepest Point in South Lake (estimated at 220-feet-deep at full capacity)

When collecting DO and temperature profiles, the same sampling location was visited each time so that the relative change in the profile (DO and temperature) could be determined throughout the summer. DO and temperature readings were taken every meter from the water surface to the lake bottom. Lake surface elevation was recorded during each sampling date.

4.3. Bishop Creek Dissolved Oxygen and Temperature Sampling

Bishop Creek DO and water temperature sampling was conducted during the same periods as the lake sampling, monthly in June and October and bi-monthly from early July and terminating in late September. DO and temperature measurements would be sampled mid-depth in the middle, if accessible, otherwise adjacent to the bank of the stream. DO and water temperature data were recorded using a calibrated hand-held digital instrument. The following sampling locations were sampled:

- North Fork Bishop Creek (background)
- Middle Fork Bishop Creek below Lake Sabrina
- South Fork Bishop Creek below South Lake
- Bishop Creek below Plant No. 2
- Tailwater of Plant No. 2
- Bishop Creek below Plant No. 3
- Tailwater of Plant No. 3
- Bishop Creek below Plant No. 4
- Tailwater of Plant No. 4
- Bishop Creek below Plant No. 5
- Tailwater of Plant No. 5
- Bishop Creek below Plant No. 6
- Tailwater of Plant No. 6

4.4. Sampling for Secchi Disk, Turbidity, Conductivity, Total Dissolved Solids, Orthophosphate, Total Nitrogen, Nitrate and *E. Coli*

Sampling for Secchi disk, turbidity, conductivity, TDSs, Orthophosphate, Total Nitrogen, Nitrate, and *E.Coli* was generally conducted starting in June and ending in October. Specific sampling periods for each parameter are described below.

4.4.1. Secchi Disk Readings

The sampling period for Secchi disk readings occurred in June, July, August, September, and October. Locations sampled were within the deepest portion of Lake Sabrina and South Lake at the same locations used for water temperature and DO profiles. At each site, one sample was taken using the Secchi disk to approximate depth of the euphotic zone/light penetration.

4.4.2. Turbidity, Conductivity, Total Dissolved Solids, Orthophosphate, Total Nitrogen and Nitrate

The sampling period for turbidity, conductivity, TDSs, orthophosphate, total nitrogen, and nitrate occurred a minimum of once per month during June, July, August, and late September. Sampling locations included lakes and rivers. Lake sampling occurred within a deep hole of Lake Sabrina and South Lake, and at two points: one point above and one point below the thermocline[2]. The riverine sampling locations included: North Fork Bishop Creek (background); Middle Fork Bishop Creek below Lake Sabrina; South Fork Bishop Creek below South Lake; Bishop Creek below Plant No. 2; Bishop Creek below Plant No. 3; Bishop Creek below Plant No. 4; Bishop Creek below Plant No. 5; and Bishop Creek below Plant No. 6. The U.S. Geological Survey (USGS) sampling protocol and procedures were followed for all sampling events.

4.4.3. *E. coli*[3]

The sampling frequency for *E. coli* occurred on six separate events starting July 1 and ending August 15. Locations sampled included South Lake and Lake Sabrina, adjacent to the boat ramp; and Intake No. 2 Forebay from an easily accessible location adjacent to the shore.

4.4.4. General

At each of the creek sampling events the following information was recorded:

- Streamflow in cubic feet per second (cfs)
- Air temperature
- Wind speed and direction
- Percent cloud cover
- Date, duration, and amount of most recent precipitation event (if known or obtainable)

[2] A thermocline is the horizontal plane in a thermally stratified lake located at the depth where water temperature decreases most rapidly (greater than 1 ºC per meter) with depth.
[3] If any sample detects greater than 50 col/100 ml of *E. coli*, microbial source tracking methods (MST [qPCR]) were performed to assess if the *E. coli* originates from humans.

Table 4.4-1. Locations, Parameters and Sampling Frequency for Water Quality Study

LOCATION	PARAMETERS										
	Water Temperature	**Dissolved Oxygen**	**Secchi Disk**	**Turbidity**	**Conductivity**	**Total Dissolved Solids**	**Total Kjeldahl Nitrogen (a)**	**Nitrite + Nitrate as N (a)**	**Nitrate as N**	**Orthophosphate as PO4**	***E. coli***
LAKES											
Lake Sabrina											
Deepest Point	J, Jy, A, S, O (b, c)	J, Jy, A, S, O (b)	J, Jy, A, S, O	NA (d)	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	NA
Adjacent to Boat Ramp	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	July 1-August 15 (e)
South Lake											
Deepest Point	J, Jy, A, S, O (b)	J, Jy, A, S, O (b)	J, Jy, A, S, O	NA	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	NA
Adjacent to Boat Ramp	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	July 1-August 15 (e)
Intake # 2 Forebay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	July 1-August 15 (e)
SURFACE FLOWS											
North Fork Bishop Creek (background)	J, 2Jy, 2A, 2S, O	J, 2Jy, 2A, 2S, O	NA	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	NA
Middle Fork Bishop Creek below Lake Sabrina	J, 2Jy, 2A, 2S, O	J, 2Jy, 2A, 2S, O	NA	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	NA
South Fork Bishop Creek below South Lake	J, 2Jy, 2A, 2S, O	J, 2Jy, 2A, 2S, O	NA	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	NA
Bishop Creek below Powerhouse No. 2	J, 2Jy, 2A, 2S, O	J, 2Jy, 2A, 2S, O	NA	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	NA
Bishop Creek below Powerhouse No. 3	J, 2Jy, 2A, 2S, O	J, 2Jy, 2A, 2S, O	NA	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	NA
Bishop Creek below Powerhouse No. 4	J, 2Jy, 2A, 2S, O	J, 2Jy, 2A, 2S, O	NA	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	NA
Bishop Creek below Powerhouse No. 5	J, 2Jy, 2A, 2S, O	J, 2Jy, 2A, 2S, O	NA	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	NA
Bishop Creek below Powerhouse No. 6	J, 2Jy, 2A, 2S, O	J, 2Jy, 2A, 2S, O	NA	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	J, Jy, A, S	NA
Tailwater of Powerhouse No. 2	J, 2Jy, 2A, 2S, O	J, 2Jy, 2A, 2S, O	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tailwater of Powerhouse No. 3	J, 2Jy, 2A, 2S, O	J, 2Jy, 2A, 2S, O	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tailwater of Powerhouse No. 4	J, 2Jy, 2A, 2S, O	J, 2Jy, 2A, 2S, O	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tailwater of Powerhouse No. 5	J, 2Jy, 2A, 2S, O	J, 2Jy, 2A, 2S, O	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tailwater of Powerhouse No. 6	J, 2Jy, 2A, 2S, O	J, 2Jy, 2A, 2S, O	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

(a) – Lab analysis parameters needed to calculate Total Nitrogen.
(b) –Vertical profile of dissolved oxygen and water temperature at the deepest point on the lake.
(c) – J=June, Jy=July, A=August, S=September, O=October. All locations indicated are sampled once per month unless month is preceded by a number which indicates the number of times samples were collected during that month.
(d) – NA=Not Applicable.
(e) – A total of 6 samples were collected and analyzed during the 45-day period,

4.5. Sampling Procedures and Methods

This section specifies the procedures used for collecting surface water measurements and/or water quality samples for chemical analysis. Several methods for collecting surface water samples were used, depending on the type of surface water to be sampled (i.e., tailraces, streams, lakes).

4.5.1. Lake Sampling Procedures

Field measurements of DO and water temperature were collected at the deepest portion of the lake based on the 1980 bathymetric survey (refer to Bishop Creek Water Quality Implementation Plan [BCWQIP] [SCE 2020]). The maximum depth for Lake Sabrina and South Lake was initially reported to be 78 feet and 130 feet, respectively. However, subsequent onsite measurements indicated that Lake Sabrina and South Lake were approximately 240-and 223-feet-deep, respectively. Field measurements of DO and water temperature measurements were collected starting at 0.5 meter below the water surface and at 1 meter below water surface and continuing in 1-meter increments until the total depth of the lake was obtained. Measurements were recorded on the appropriate forms and/or field notebook. Copies of the field forms are included in Appendix A.

Secchi disk measurements were collected at the same location as the field measurements for DO and water temperature. The Secchi depth measurement procedures are summarized in Standard Operating Procedure (SOP) for surface water sampling (SW-001) in the BCWQIP (SCE, 2020).

If a thermocline is identified from the monthly field measurements of water temperature and DO, water quality samples for laboratory analysis and field measurement of conductivity were collected at above and below the thermocline. If no thermocline is identified, water samples were collected at one-half of the Secchi depth and 80 percent of the total depth of the lake at the time of sampling.

Water samples for conductivity, TDS, orthophosphate, total nitrogen, and nitrate were collected using either a peristaltic pump or discrete depth sampler (Kemmerer or Van Dorn bottle) in accordance with SOP for surface water sampling (SW-001) in BCWQIP (SCE, 2020). Water samples for *E. coli* and MST (qPCR) were collected near shore using a grab sampling method.

4.5.2. Surface Water Sampling Procedures

Surface water sampling refers to the collection of water samples for the purposes of field or laboratory testing of water collected from a flowing water site. A flowing water site can refer to streams and tailraces in which water flows unidirectionally.

Field measurements of DO, turbidity, conductivity, and water temperature were collected from straight reaches having uniform flow, and having a uniform and stable bottom contour, and where constituents are well mixed along the cross-section. Field measurements were collected in accordance with SOP for surface water sampling (SW-001) in BCWQIP (SCE, 2020).

Water samples for laboratory testing were collected using either the grab sample method or swing sampler in accordance with SOP for surface water sampling (SW-001) in BCWQIP (SCE, 2020).

4.5.3. FIELD ANALYTICAL METHODS

Field measurements of DO, turbidity, conductivity, and water temperature were conducted using the methods indicated in Table 4.5-1 and with SOP for surface water sampling (SW-001) in BCWQIP (SCE, 2020).

Table 4.5-1. Field Methods

Analysis	Method	Method REPORTING Limit
Dissolved Oxygen in mg/L	USEPA 360.1	0.1 mg/L
Water Temperature in ºC	USEPA 170.1	0.1 ºC
Conductivity in µmhos/cm @25 ºC	USEPA 120.1	1 µS/cm
Turbidity in NTUs	USEPA 180.1	varies

Notes:
mg/L=milligrams per liter
ºC=degrees Centigrade
µmhos/cm=micro-mhos per centimeter
NTU=Nephelometric turbidity units

4.5.4. FIELD CALIBRATION METHODS

The equipment used in collecting field data includes a variety of instruments. Proper maintenance, calibration, and operation of each instrument are the responsibility of the individual assigned to each task. Instruments and equipment used during the study are maintained, calibrated, documented for calibration, and operated according to the manufacturers' guidelines and recommendations and SOP for field instrument calibration (SW-002) in BCWQIP (SCE, 2020).

4.5.5. Laboratory Methods

In general, the selected laboratory will adhere to those recommendations promulgated in Title 21, CFR Part 58, Good Laboratory Practices; and criteria described in Methods for Chemical Analysis of Water and Wastes (USEPA 1979; USEPA-600/4-79-202). Water samples collected for chemical analysis during the Bishop Creek Project were tested in accordance with the standard analytical procedures established by the U.S. Environmental Protection Agency (EPA) Methods for Chemical Analysis of Water and Wastes (USEPA 1979; USEPA-600/4-79-202), American Society for Testing and Materials, or Standard Methods for the Examination of Water and Wastewater and are indicated in Table 4.5-2.

Table 4.5-2. Laboratory Methods

ANALYSIS	Method	Method REPORTING Limit (units)	Holding TIME
Total Dissolved Solids	SM 2540C	10 mg/L	7 days
Total Nitrogen by calculation	calculation	---	---
Nitrite + Nitrate as N	USEPA 353.2	0.20 mg/L	28 days
Total Kjeldahl Nitrogen	USEPA 351.2	0.10 mg/L	28 days
Nitrate as N	USEPA 300.0	0.11 mg/L	2 days
Orthophosphate as P	USEPA 365.3	0.10 mg/L	2 days
E. coli	SM 9222G	20 col/100 ml	24 hours*
MST (qPCR)	BacHum or HF183	---	48 ours

Notes:
*- Per SWAMP guidelines for monitoring *E. coli* in ambient water.
SM=Standard Methods for the Examination of Water and Wastewater; USEPA= Method for Chemical Analysis of Waters And Wastes, USEPA-600/4-79-020; N=Nitrogen; P=Phosphorus.

The samples for each analytical parameter were collected and preserved in the appropriate sample containers as presented in Table 4.5-3. The sample containers provided by the analytical laboratories were new, pre-cleaned, pre-loaded with the appropriate preservative, and delivered in a clean cooler.

Table 4.5-3. Sampling Container and Preservation Requirements

ANALYSIS	Method	Container	Preservation
Total Dissolved Solids	SM 2540C	500 ml -poly	<6ºC
Nitrite + Nitrate as N	USEPA 353.2	250 ml - poly	<6ºC, H_2SO_4
Total Kjeldahl Nitrogen	USEPA 351.2	250 ml - poly	<6ºC, H_2SO_4
Nitrate as N	USEPA 300.0	60 ml - poly	<6ºC
Orthophosphate as P	USEPA 365.3	250 ml - poly, filtered	<6ºC
E. coli	SM 9222G	100 ml, glass	<6ºC
MST (qPCR)	BacHum or HF183	1000 ml, polypropylene	<10ºC

Notes:
SM=Standard Methods for the Examination of Water and Wastewater; USEPA= Method for Chemical Analysis of Waters and Wastes, USEPA-600/4-79-020; N=Nitrogen; P=Phosphorus; poly=polyethylene; ml=milliliters; ºC= degrees centigrade; H_2SO_4=sulfuric acid.

4.5.6. SAMPLE LABELING AND CHAIN-OF-CUSTODY

Sample labels were completed for each sample using indelible ink. The labels include sample number and location, type of sample, date and time of sampling, sampler's name (or initials), preservation method, and analyses to be performed. The completed sample labels were affixed to each sample container.

A chain-of-custody record accompanied all samples. During transfer, individuals relinquishing and receiving the samples sign, date, and note the time on the record. The chain-of-custody form documents the sample custody transfer from the sampler, to a courier, to the laboratory.

All laboratory water quality samples were managed in accordance with SOP for Sample Management (SW-003) in BCWQIP (SCE, 2020). All laboratory reports for each sampling period are included in Appendix B.

4.5.7. MODIFICATION TO METHODS

The original Study Plan specified the use of the Sierra Nevada Aquatic Research Laboratory (SNARL) to conduct the laboratory analysis of *E. coli* and MST (qPCR). Due to the Covid-19 pandemic, SNARL was not available to conduct the analyses. Weck Laboratories was engaged to conduct the *E. coli* analysis using Standard Method 9223B along with a holding time of 24-hours which followed the SWAMP guidelines for monitoring *E. coli* in ambient water. Source Molecular (acquired by LuminUltra in August 2021), in Florida, was engaged to conduct the MST (qPCR) analysis for any samples that exceeded 50 MPN/100 ml of *E. coli*. Three samples exceeded the 50 MPN/100 ml of *E. coli,* and the MST analysis is reported in Section 5.0.

Additionally, the total depth for both lakes was greater than was previously reported. Equipment used to collect vertical profiles of DO and water temperature were unable to obtain the maximum depth of the lakes during the June 2020 sampling period. Additional equipment was obtained to reach the bottom of the lakes in subsequent profiles conducted in June 2021 through October 2021. Lake profile locations and bathymetry data from the Final Technical Report Bishop Creek Reservoirs Fish Distribution Study (AQ 4) (SCE, 2021) is included in Appendix D.

5.0 RESULTS

5.1. SOUTH LAKE

5.1.1. DISSOLVED OXYGEN AND WATER TEMPERATURE PROFILES

5.1.1.1. June 2021

A DO and water temperature profile was conducted on June 16, 2021, at the deepest point in South Lake. The maximum depth at the profile point on June 16, 2021, was 48.5 meters (159.1 feet) with a lake surface elevation of 9693.20-feet mean sea level (msl). DO ranged from 9.53 mg/L at a depth of 18 meters (59.1 feet) below water surface (BWS) to 0.0 mg/L at a depth of 40 meters (131.2 feet) BWS. In general, DO saturation was above 95 percent and often exceeded 100 percent in the upper portion of the lake. DO saturation declined sharply to less than 10 percent at 35 meters (114.8 feet) BWS (refer to Appendix C, Table C-1). No thermocline was identified.

Figure 5.1-1 presents a profile of DO and water temperature over the surveyed water column and Appendix C (Table C-1) presents the individual values recorded for each depth interval.

5.1.1.2. July 2021

The DO and water temperature profile was conducted on July 27, 2021, at the deepest point in South Lake. The maximum depth at the profile point on July 27, 2021, was 44.8 meters (147.0 feet) with a lake surface elevation of 9676.00-feet msl. DO ranged from 8.80 mg/L at a depth of 17 meters (55.8 feet) BWS and 0.00 mg/L at a depth of 33 meters (108.3 feet) BWS. In general, DO saturation was above 95 percent and often exceeded 100 percent in the upper portion of the lake. DO saturation declined sharply to less than 0 percent at 33 meters (108.3 feet) BWS (refer to Appendix C, Table C-2). A thermocline was identified at approximately 15 to 18 meters (49.2 – 59.1 feet) BWS. Figure 5.1-2 presents a profile of DO and water temperature over the surveyed water column and Appendix C (Table C-2) presents the individual values recorded for each depth interval.

5.1.1.3. August 2021

The DO and water temperature profile was conducted on August 23, 2021, at the deepest point in South Lake. The maximum depth at the profile point on August 23, 2021, was 39.8 meters (130.6 feet) with a lake surface elevation of 9664.61-feet msl. DO ranged from 8.61 mg/L at a depth of 13.5 meters (44.3 feet) BWS and 0.00 mg/L at a depth of 21 meters (68.9 feet) BWS. In general, DO saturation was above 100 percent in the upper portion of the lake. DO saturation declined sharply to less than 10 percent at 26 meters (85.3 feet) BWS (refer to Appendix C, Table C-3). A thermocline was identified at approximately 11-14 meters (36.1 – 45.9 feet) BWS. Figure 5.1-3 presents a profile of DO and water temperature over the surveyed water column and Appendix C (Table C-3) presents the individual values recorded for each depth interval.

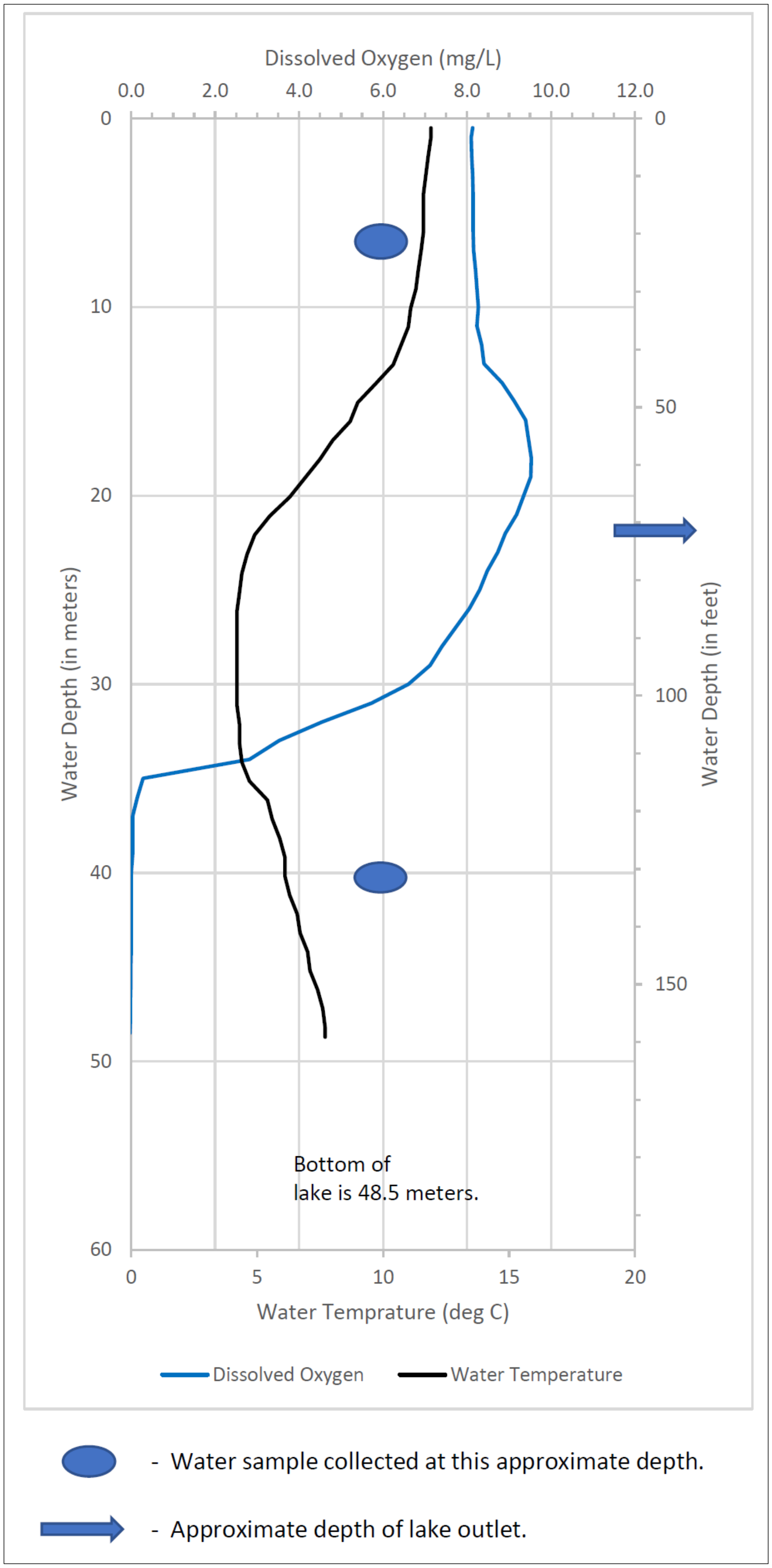


Figure 5.1-1 South Lake Dissolved Oxygen and Water Temperature Profile June 2021

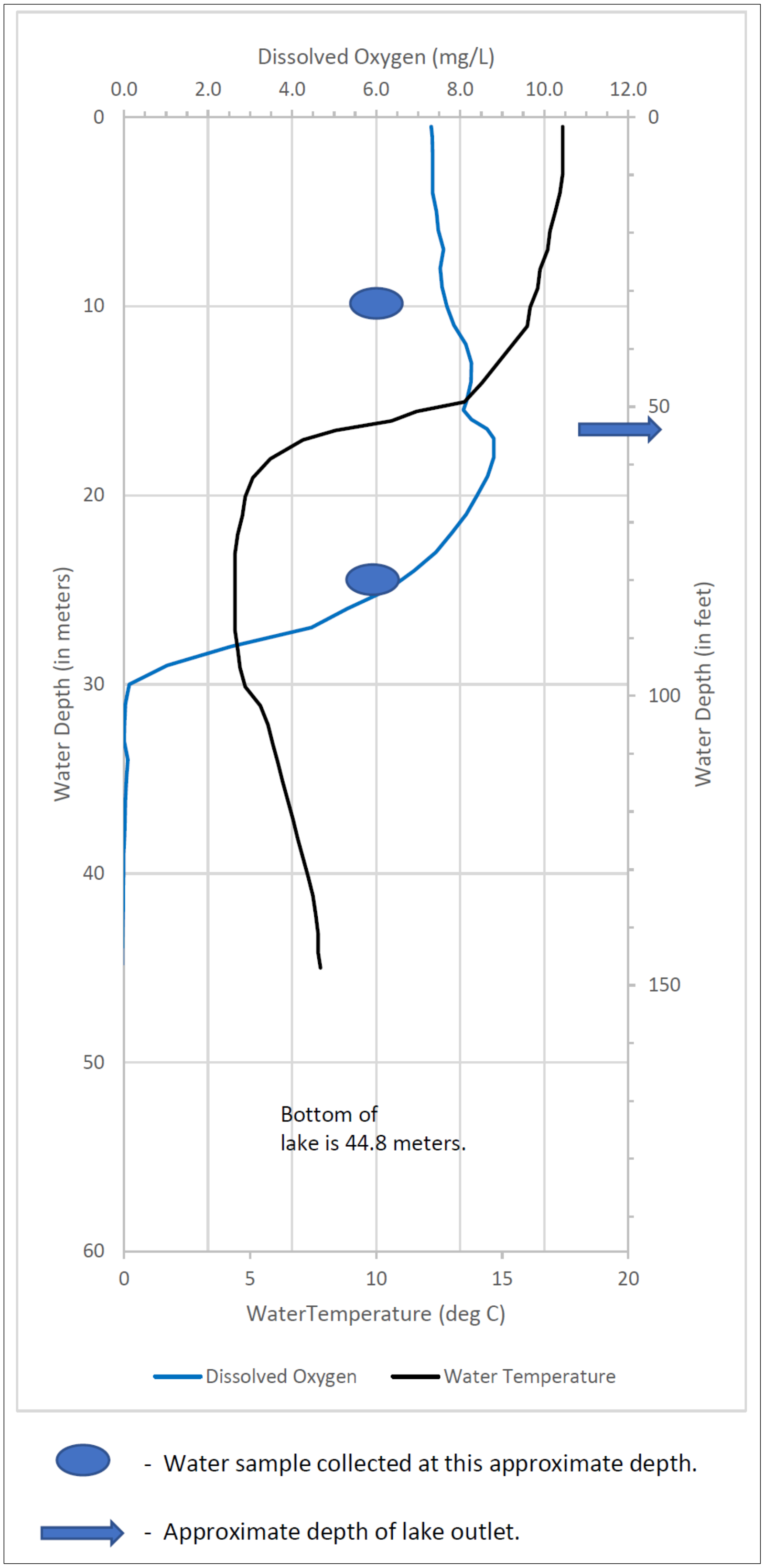


Figure 5.1-2 South Lake – Dissolved Oxygen and Water Temperature Profile – July 2021

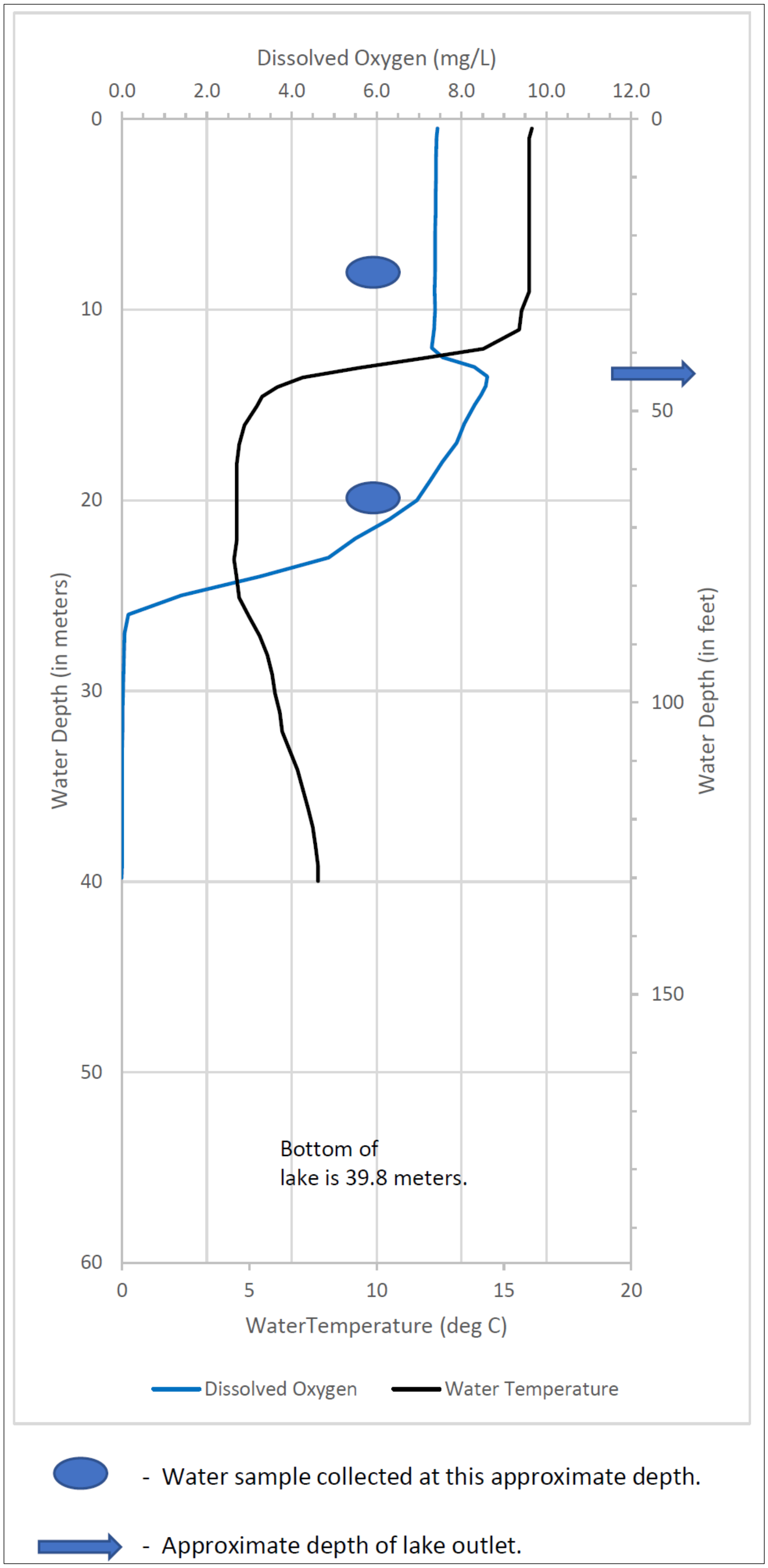


Figure 5.1-3 South Lake – Dissolved Oxygen and Water Temperature Profile – August 2021

5.1.1.4. September 2021

The DO and water temperature profile was conducted on September 21, 2021, at the deepest point in South Lake. The maximum depth at the profile point on September 21, 2021, was 35.1 meters with a lake surface elevation of 9648.37 feet msl. DO ranged from 8.94 mg/L at a depth of 9.25 meters BWS and 0.00 mg/L at a depth of 33 meters BWS. DO saturation was above 100 percent in the upper portion of the lake. DO saturation declined sharply to less than 5 percent at 20 meters BWS (refer to Appendix C, Table C-4). A thermocline was identified at approximately 8 to 10 meters BWS. Figure 5.1-4 presents a profile of DO and water temperature over the surveyed water column and Appendix C (Table C-4) presents the individual values recorded for each depth interval.

5.1.1.5. October 2021

The DO and water temperature profile was conducted on October 5, 2021, at the deepest point in South Lake. The maximum depth at the profile point on October 5, 2021, was 32.5 meters with a lake surface elevation of 9641.70-feet msl. DO ranged from 8.51 mg/L at a depth of 9.5 meters BWS and 0.04 mg/L at a depth of 32.5 meters BWS. DO saturation was above 100 percent in the upper portion of the lake. DO saturation declined sharply to less than 5 percent at 18 meters BWS (refer to Appendix C, Table C-5). A thermocline was identified at approximately 7 to 10 meters BWS. Figure 5.1-5 presents a profile of DO and water temperature over the surveyed water column and Appendix C (Table C-5) presents the individual values recorded for each depth interval.

5.1.1.6. Summary

The DO and water temperature profiles for South Lake were similar for each monitoring period throughout the summer and early fall. Each exhibited elevated DO readings in the upper two thirds of the lake and extremely low DO readings in the bottom portion of the lake (approximately 12 meters below the outlet). When compared to the previous monitoring period, the ranges for DO in 2021 were similar to ranges observed in 2020 (Table 5.1-1).

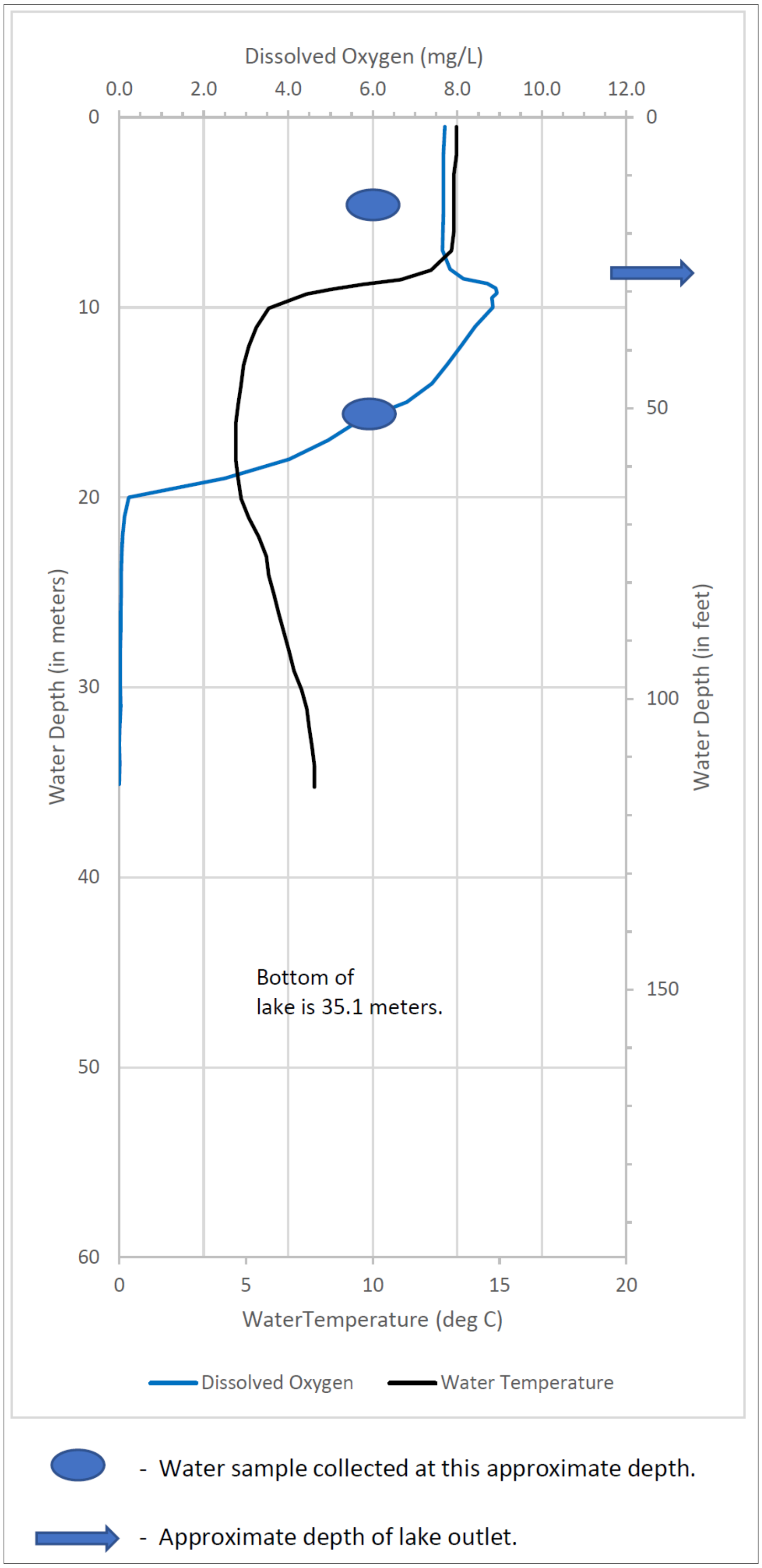


Figure 5.1-4 South Lake – Dissolved Oxygen and Water Temperature Profile – September 2021

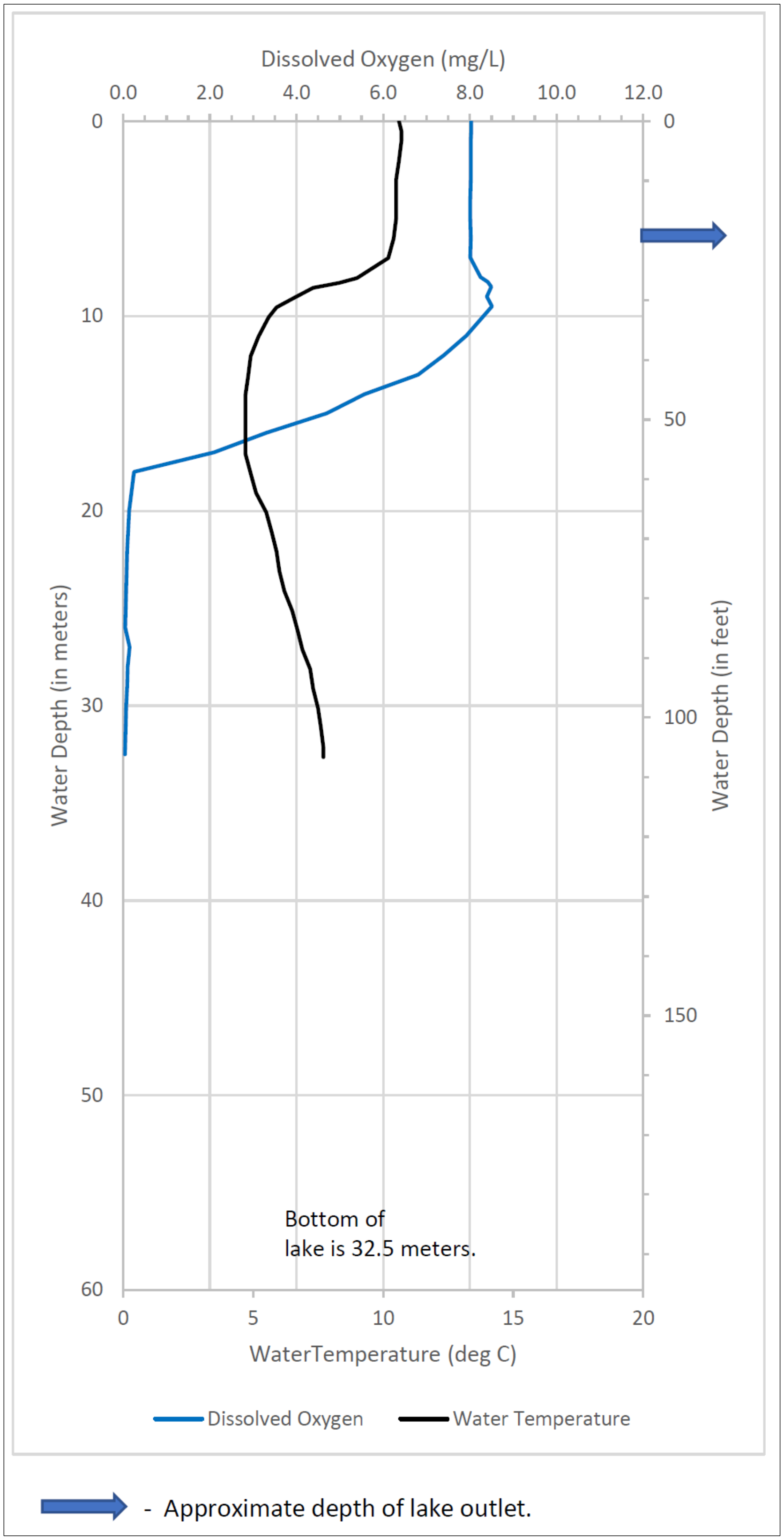


Figure 5.1-5 South Lake – Dissolved Oxygen and Water Temperature Profile – October 2021

Table 5.1-1. Summary of Dissolved Oxygen Levels in South Lake from Vertical Transects

Year (a)	Lake Surface Elevation Range (ft msl)	Range of Dissolved Oxygen above/below Outlet (b)		
		Position (c)	Maximum	Minimum
2020	9747.82 – 9734.02	Above	9.61	7.07
		Below	8.55	0.00
2021	9693.20 – 9641.70	Above	9.53	7.30
		Below	8.94	0.00

Notes:
a – Five transects were conducted in each calendar year
b – From instantaneous measurements at 1-meter intervals from lake surface to bottom of survey/lake
c – Position above or below lake outlet

Except for the decrease in lake level elevation observed in 2021 versus 2020, the graph for DO versus elevation were similar between monitoring periods (Figure 5.1-6).

The very low DO readings and the rise in water temperature in the lower portion of the lake (Figure 5.1-6) is suggestive of a stratified lake. Boehrer and Schultze (2008) indicated that meromictic lakes can occur when chemically different bottom layer, called a monimolimnion, has continuously been present for a least one annual cycle. Higher concentrations of dissolved substances have increased density sufficiently to resist deep recirculation and the exchange rates with the mixolimnion (the freely circulating upper layer of a meromictic lake) are small enough that chemically different conditions are sustained continuously. Figure 5.1-7 presents an example of DO, water temperature and conductivity with depth in a meromictic lake observed in Germany's Former Mining Area of Merseburg-Ost. As the stratification remained into the 2021 monitoring period, this suggests that South Lake for the monitoring period of 2020-2021 indicates that South Lake is exhibiting the characteristics of a meromictic lake.

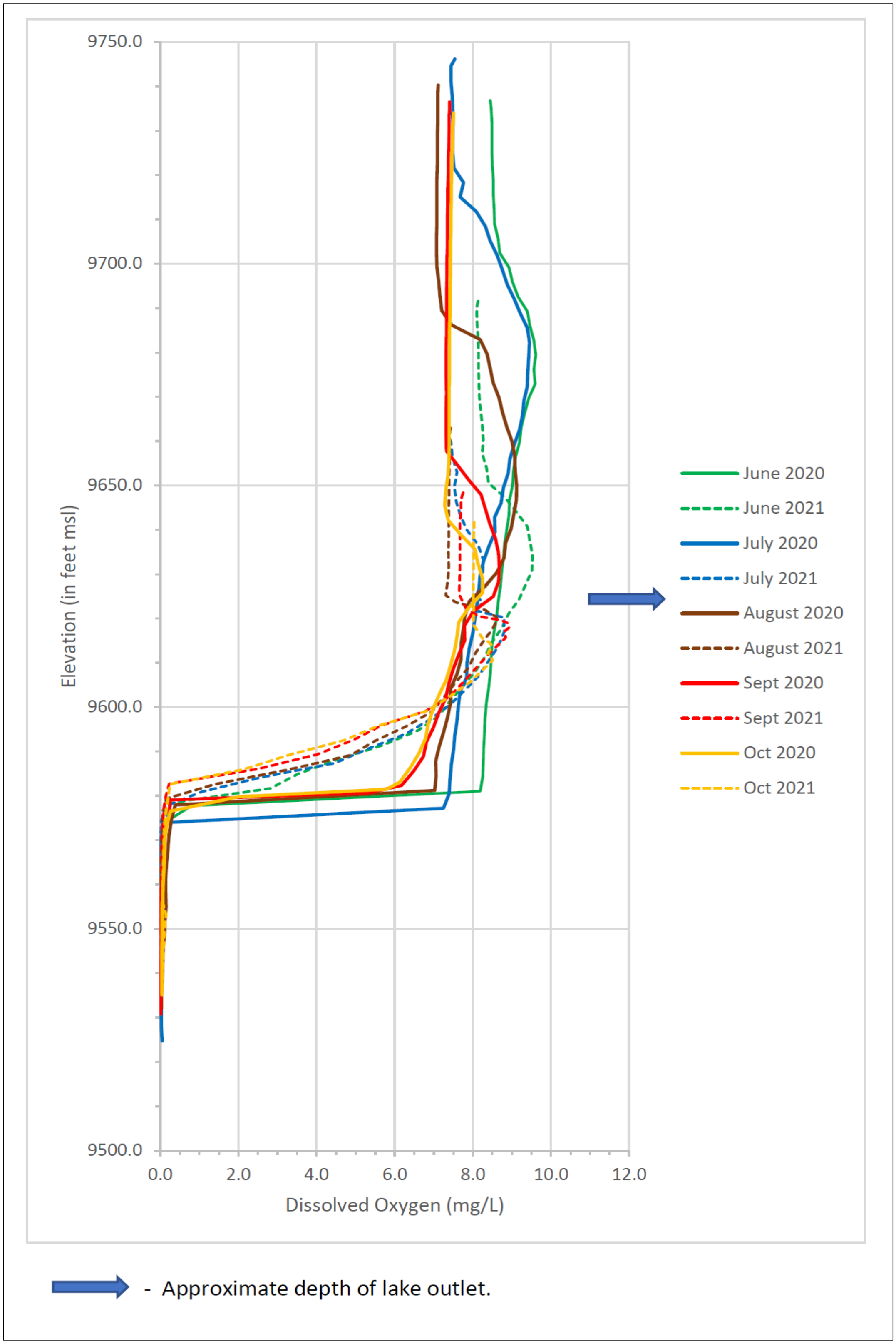
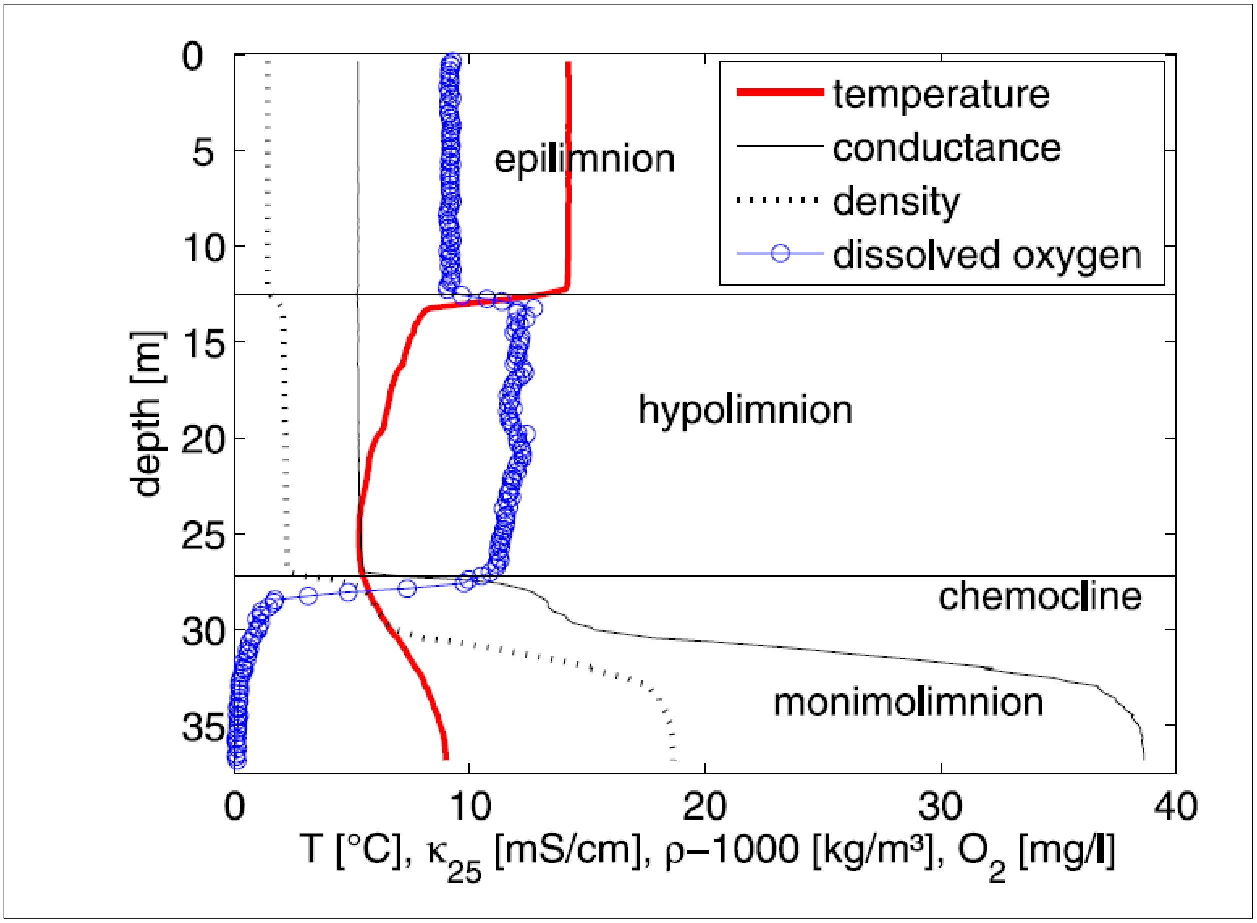


Figure 5.1-6 South Lake - Comparison of 2020 to 2021 Vertical DO Profiles with Lake Elevation



Source: Boehrer & Schultze 2008

Figure 5.1-7 DO, Water Temperature and Conductivity in a Meromictic Lake in Rassnitzer in Former Mining Area Merseburg-Ost, Germany

5.1.2. GENERAL WATER QUALITY OF SOUTH LAKE

5.1.2.1. 2021 Monitoring Period

Field water quality testing and laboratory water quality samples were collected during the same time periods that DO profiles were conducted and are presented in Table 5.1-3. Field measurements indicated Secchi disk depth ranged from 6.25 to 13.5 meters BWS between June and October sampling periods. A thermocline was not identified in the June sampling period however thermoclines were detected in the subsequent monitoring periods and ranged from 7 to 10 meters in the October sampling period to 15 to 18 meters in the July sampling period. The following water quality measurements are based on collection of measurements above and below the observed thermoclines (which also corresponds to above and below the outlet of the lake).

Conductivity ranged from 30 microSiemens/cm (µS/cm) to 40 µS/cm in the shallow sampling zone and 68 µS/cm to 2,230 µS/cm in the deeper sampling zone. Laboratory water quality analysis indicated values of TDS ranging from not detected (ND) less than 10 mg/L to 40 mg/L in the shallow sampling zone (above the thermocline) to 36 mg/L to 1,300 mg/L in the deeper sampling zone (below the thermocline).

Nitrate as Nitrogen (NO_3-N) was ND less than 0.110 to less than 0.230 for all samples collected in South Lake. Total nitrogen as N ranged from ND less than 0.10 to 0.17 mg/L in the shallow sampling zone to ND less than 0.10 mg/L to 5.5 mg/L in the deeper sampling zone. Orthophosphate as phosphorus (PO_4-P) was not detected in all samples from the shallow sampling zone and ranged from ND less than 0.010 mg/L to 0.12 mg/L in the deeper sampling zone.

5.1.2.2. Comparison to 2020 Monitoring Period

During the 2020 monitoring period TDS ranged from ND less than 10 mg/L to 1,100 mg/L for all samples with an average of 18 mg/L for samples collected above the outlet. During the 2021 monitoring period, TDS values were similar ranging from ND less than 10 mg/L to 1,300 mg/L for all samples with an average of 21.5 mg/L for samples collected above the outlet. Total Nitrate as Nitrogen (NO3-N) was not detected in any samples for both monitoring periods. Total Nitrogen (Total-N) was detected and ranged from ND less than 0.30 mg/L to 5.2 mg/L with an average of ND less than 0.30 mg/L for samples collected above the outlet in the 2020 monitoring period. Total-N had similar values in the 2021 monitoring period and ranged from ND less than 0.10 mg/L to 5.5 mg/L for all samples with an average of 0.108 mg/L for samples collected above the outlet. Ortho-Phosphate as P (PO4-P) ranged from ND less than 0.01 mg/L to 0.17 mg/L with an average on ND less than 0.01 mg/L for samples collected above the outlet in the 2020 monitoring period. PO4-P had similar values in the 2021 monitoring period ranging from ND less than 0.01 mg/L to 0.12 mg/L with all samples collected above the outlet reporting ND less than 0.01 mg/L (Table 5.1-3.).

5.1.3. BACTERIOLOGICAL

Bacteriological samples were collected between July 1 and August 15, 2021 and analyzed for *E. coli*. A total of seven samples were collected with all samples reporting non-detect at ND less than 1.0 most probable number in 100 milliliters (MPN/100ml) and are presented in Table 5.1-4.

5.1.3.1. Comparison to Basin Plan Objectives

For samples collected above the outlet, TDS averaged 18 mg/L for the 2020 monitoring period and 21.5 mg/L for the 2021 monitoring period which are both above the basin objective for South Lake of 12 mg/L. Considering that South Lake is a headwaters lake in the Bishop Creek drainage, the elevated number appears to reflect background conditions and the original basin plan objectives for South Lake are indicative of limited data used to establish the water quality objectives for South Lake.

NO3-N was not detected in any samples for both monitoring periods. Total-N was not detected in the 2020 monitoring period and averaged 0.1 mg/L for the 2021 monitoring period and equal to the South Lake basin plan objective of 0.1 mg/L. PO4-P was detected but all values were below basin plan objectives for samples collected above the outlet (Table 5.1-2).

Table 5.1-2. Summary of Laboratory Results for South Lake for Samples Collected above the Outlet Depth for 2020-2021 Monitoring Periods

Year	Parameter	Total Dissolved Solids (mg/L)	Nitrate as N (mg/L)	Total Nitrogen (mg/L)	Ortho phosphate as P (mg/L)
2020	Maximum	33	ND<0.110	ND<0.30	0.011
	Minimum	ND<10	ND<0.110	ND<0.30	ND<0.010
	Average*	18	ND<0.110	ND<0.30 (ND<0.10)**	ND<0.010
2021	Maximum	40	ND<0.110	0.17	ND<0.010
	Minimum	ND<10	ND<0.110	ND<0.10	ND<0.010
	Average*	21.5	ND<0.110	0.11	ND<0.010
Basin Objective (annual average/90th percentile)		12/20	0.1/0.1	0.1/0.4	0.03/0.04

Notes:
* Arithmetic average is for all samples collected. For samples with ND values, 1/2 of the ND value was used to calculate average when more than one sample had detectable values, otherwise the ND value was used.
** Data collected during 2020 and 2021 have indicated that TKN makes up the entire amount of Total-N. The average for TKN is used as an average for the 2020 period.

Table 5.1-3. Field Water Quality Measurements and Laboratory Results of South Lake Samples, June - October 2021

							POSITION IN RELATION TO OUTLET		FIELD MEASUREMENTS (a)		LABORATORY ANALYSIS					
													Total Nitrogen			
YEAR	SAMPLE DESIGNATION	DATE	TIME	LAKE SURFACE ELEVATION (b) (ft msl)	THERMO-CLINE	SAMPLE DEPTH (meters)	Outlet Depth (meters)	Above/Below Outlet	Secchi Disk Depth (meters)	Conductivity (µS/cm @25°C)	Total Dissolved Solids (mg/L)	Nitrate as N (mg/L)	Total Nitrogen (mg/L)	Nitrite + Nitrate as N (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Ortho phosphate as P (mg/L)
2020	SL-DP-5	6/15/2020	9:15	9738.50	No	5	36	above	10.5	30	15	ND<0.110	ND<0.30	ND<0.200	ND<0.10	ND<0.010
	SL-DP-31.5	6/15/2020	9:00			31.5	36	above		110	16	ND<0.110	ND<0.30	ND<0.200	ND<0.10	0.011
	SL-DP-4	7/28/2020	10:30	9747.82	No	4	39	above	8.5	30	ND<10	ND<0.110	ND<0.30	ND<0.200	ND<0.10	ND<0.010
	SL-DP-54	7/28/2020	10:05			54	39	below		1,880	1,100	ND<0.110	5.2	ND<0.200	5.2	0.17
	SL-DP-15	8/25/2020	12:20	9741.96	Yes, 17-18 meters	15	37	above	11.75	40	30	ND<0.110	ND<0.30	ND<0.200	ND<0.10	ND<0.010
	SL-DP-20	8/25/2020	11:55			20	37	above		70	33	ND<0.110	ND<0.30	ND<0.200	ND<0.10	ND<0.010
	SL-DP-20	9/23/2020	12:05	9736.50	Yes, 34-35 meters	20	35	above	9.75	37	10	ND<0.110	ND<0.30	ND<0.200	ND<0.10	ND<0.010
	SL-DP-42	9/23/2020	12:50			42	35	below		53	31	ND<0.110	ND<0.30	ND<0.200	ND<0.10	ND<0.010
	(c)	10/5/2020	(c)	9734.02	Yes, 28-35 meters	(c)	(c)	(c)	12.0	(c)						
										Maximum	1,100	ND<0.110	5.2 (e)	ND<0.200	ND<0.10	0.17 (e)
										Minimum	ND<10	ND<0.110	ND<0.30	ND<0.200	ND<0.10	ND<0.010
										Arithmetic Average (d)	18	ND<0.110	ND<0.30	ND<0.200	ND<0.10	0.011
2021	SL-DP-7	6/16/2021	10:30	9693.20	No	7	22	above	13.5	37	40	ND<0.230	ND<0.10	ND<0.200	ND<0.10	ND<0.010
	SL-DP-40	6/16/2021	11:00			40	22	below		2,230	1,300	ND<0.110	5.5	ND<0.200	5.5	0.12
	SL-DP-10	7/27/2021	9:45	9676.00	Yes, 15-18 meters	10	17	above	8.75	31	23	ND<0.110	0.17	ND<0.200	0.17	ND<0.010
	SL-DP-24	7/27/2021	10:15			24	17	below		73	36	ND<0.110	0.15	ND<0.200	0.15	ND<0.010
	SL-DP-8	8/23/2021	10:30	9664.61	Yes, 11-14 meters	8	13	above	8.75	40	18	ND<0.110	0.16	ND<0.200	0.16	ND<0.010
	SL-DP-20	8/23/2021	11:05			20	13	below		68	46	ND<0.110	ND<0.10	ND<0.200	ND<0.10	0.029
	SL-DP-4	9/21/2021	10:25	9648.37	Yes, 8-10 meters	4	8	above	6.25	30	ND<10	ND<0.110	ND<0.10	ND<0.200	ND<0.10	ND<0.010
	SL-DP-16	9/21/2021	10:50			16	8	below		90	42	ND<0.110	ND<0.10	ND<0.200	ND<0.10	ND<0.010
	(c)	10/5/2021	(c)	9641.70	Yes, 7-10 meters	(c)	(c)	(c)	(c)	(c)						
										Maximum	1,300	ND<0.230	5.5 (e)	ND<0.200	5.5 (e)	0.12 (e)
										Minimum	ND<10	ND<0.110	ND<0.10	ND<0.200	ND<0.10	ND<0.010
										Arithmetic Average (d)	21.5	ND<0.110	0.108	ND<0.200	0.108	ND<0.010
										Basin Objective (annual average/90th percentile)	12/20	0.1/0.1	0.1/0.4	---	---	0.03/0.04

Notes:
a – for dissolved oxygen and water temperature, see vertical profiles
b – at time of sampling
c – no laboratory water quality sample collected
d – average is for samples collected above the outlet. For samples with ND values, ½ of the ND value was used to calculate average when more than one sample had a detectable value, otherwise the ND value was used.
e – maximum values for these constituencies were collected below the outlet
ND = not detected at the indicated detection limit

Table 5.1-4. Summary of Water Quality Analysis for *E. Coli* from Various Lakes in the Bishop Creek Watershed July 1 - August 15, 2020 and 2021

DATE	*E. COLI* (MPN/100 ml)		
	South Lake Boat Ramp	Lake Sabrina Boat Ramp	Intake 2 Reservoir
7/13/2020 (a)	ND<1.0	ND<1.0	24
7/16/2020	1.0	ND<1.0	3.1
7/27/2020	ND<1.0	ND<1.0	18
7/30/2020	ND<1.0	ND<1.0	6.3
7/31/2020	ND<1.0	ND<1.0	6.3
8/3/2020	ND<1.0	ND<1.0	ND<1.0
8/5/2020	ND<1.0	3.1	1.0
2020 Maximum	1.0	3.1	24
2020 Minimum	ND<1.0	ND<1.0	ND<1.0
2020 Geometric Mean (b)	1.0	1.21	4.73
7/12/2021 (a)	ND<1.0	ND<1.0	28
7/15/2021	ND<1.0	ND<1.0	8.6
7/26/2021	ND<1.0	310 (c)	2.0
7/28/2021	ND<1.0	6.3	4.1
7/29/2021	ND<1.0	180 (c)	210 (c)
8/2/2021	ND<1.0	17	6.3
8/5/2021	ND<1.0	3.1	5.2
2021 Maximum	ND<1.0	310	210
2021 Minimum	ND<1.0	ND<1.0	2.0
2021 Geometric Mean (b)	ND<1.0	16.3	8.86
Inland Surface Water Objective	100/320 (d)		

Notes:
a – The initial sampling dates were excluded from the geometric mean calculation as the samples were analyzed outside of the holding time of 24 hours.
b – For samples with ND values, ND value of 1 was used to calculate the geometric mean when more than one sample had a detectable value, otherwise the ND value was used.
c – qPCR analysis was conducted on this sample and the laboratory reported Non-Detect at the method detection limit of 150 human biomarkers per 100 ml. No human DNA was detectable.
d – From Basin Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California:
Geometric Mean/Maximum

5.2. Lake Sabrina

5.2.1. Dissolved Oxygen and Water Temperature Profiles

5.2.1.1. June 2021

A DO and water temperature profile was conducted on June 17, 2021, at the deepest point in Lake Sabrina. The maximum depth achieved at the profile point on June 17, 2020, was 65.3 meters with a lake surface elevation of 9099.50-feet msl. DO ranged from 10.16 mg/L at a depth of 14 meters BWS and 4.70 mg/L at a depth of 65.3 meters BWS. A thermocline was identified between 8 to 10 meters BWS. Figure 5.2-1 presents a profile of DO and water temperature over the surveyed water column and Appendix C (Table C-6) presents the individual values recorded for each depth interval.

5.2.1.2. July 2021

The DO and water temperature profile was conducted on July 28, 2021, at the deepest point in Lake Sabrina. The maximum depth at the profile point on July 28, 2021, was 63 meters with a lake surface elevation of 9098.58-feet msl. DO ranged from 9.77 mg/L at a depth of 13 meters BWS and 4.33 mg/L at a depth of 63 meters BWS. DO saturation was above 100 percent in the upper portion of the lake. DO saturation gradually declined to less than 60 percent at 59 meters BWS (refer to Appendix C, Table C-7). A thermocline was identified between 7 to 11 meters BWS. Figure 5.2-2 presents a profile of DO and water temperature over the surveyed water column and Appendix C (Table C-7) presents the individual values recorded for each depth interval.

5.2.1.3. August 2021

A DO and water temperature profile was conducted on August 24, 2021, at the deepest point in Lake Sabrina. The maximum depth at the profile point on August 24, 2021, was 62.2 meters with a lake surface elevation of 9099.31-feet msl. DO ranged from 10.41 mg/L at a depth of 12 meters BWS and 4.23 mg/L at a depth of 62.2 meters BWS. DO saturation was above 100 percent in the upper portion of the lake and gradually declined to less than 60 percent at 60 meters BWS (refer to Appendix C, Table C-8). A thermocline was identified between 9 to 11 meters BWS. Figure 5.2-3 presents a profile of DO and water temperature over the surveyed water column and Appendix C (Table C-8) presents the individual values recorded for each depth interval.

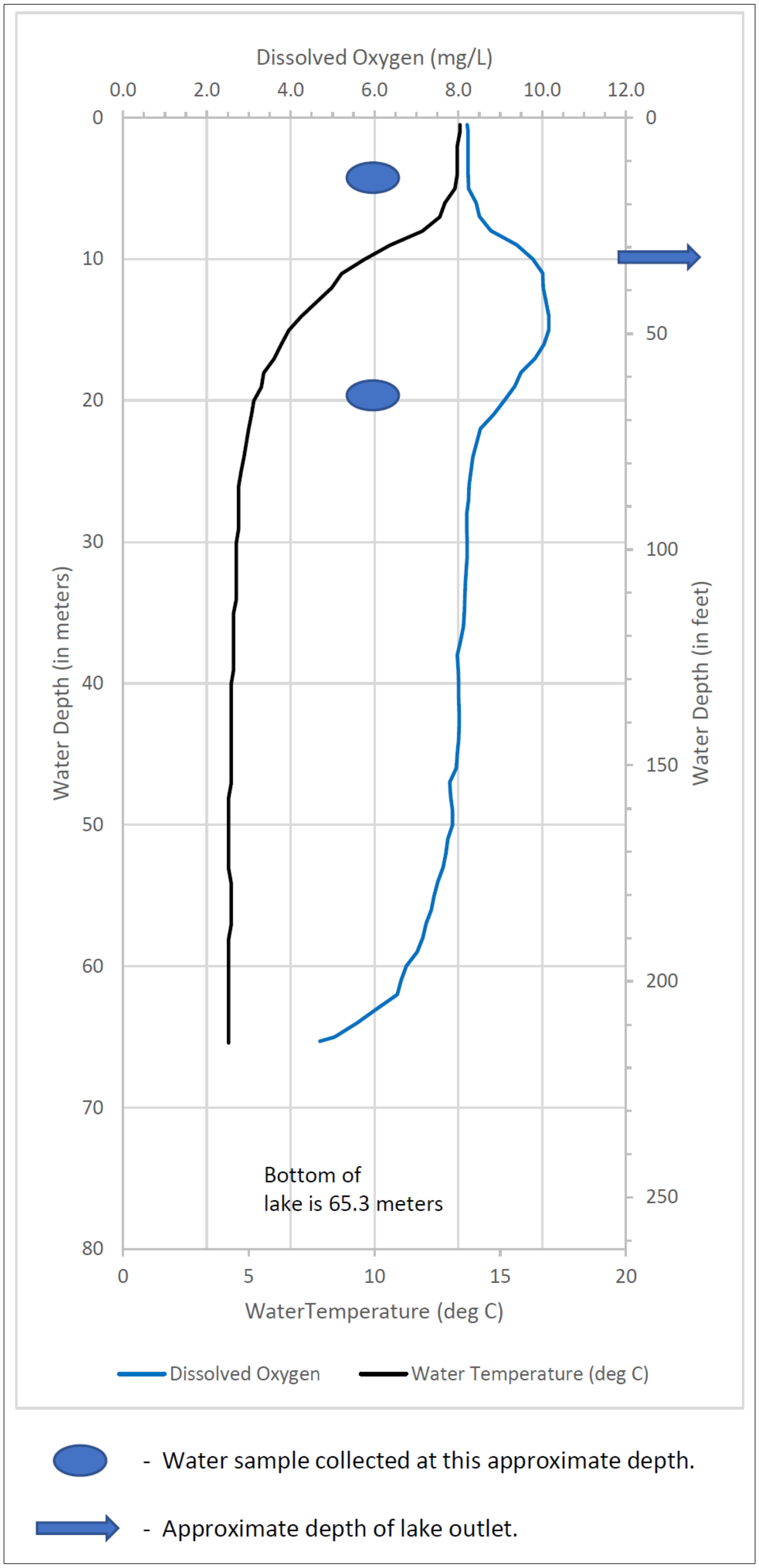


Figure 5.2-1 Lake Sabrina Dissolved Oxygen and Water Temperature Profile – June 2021

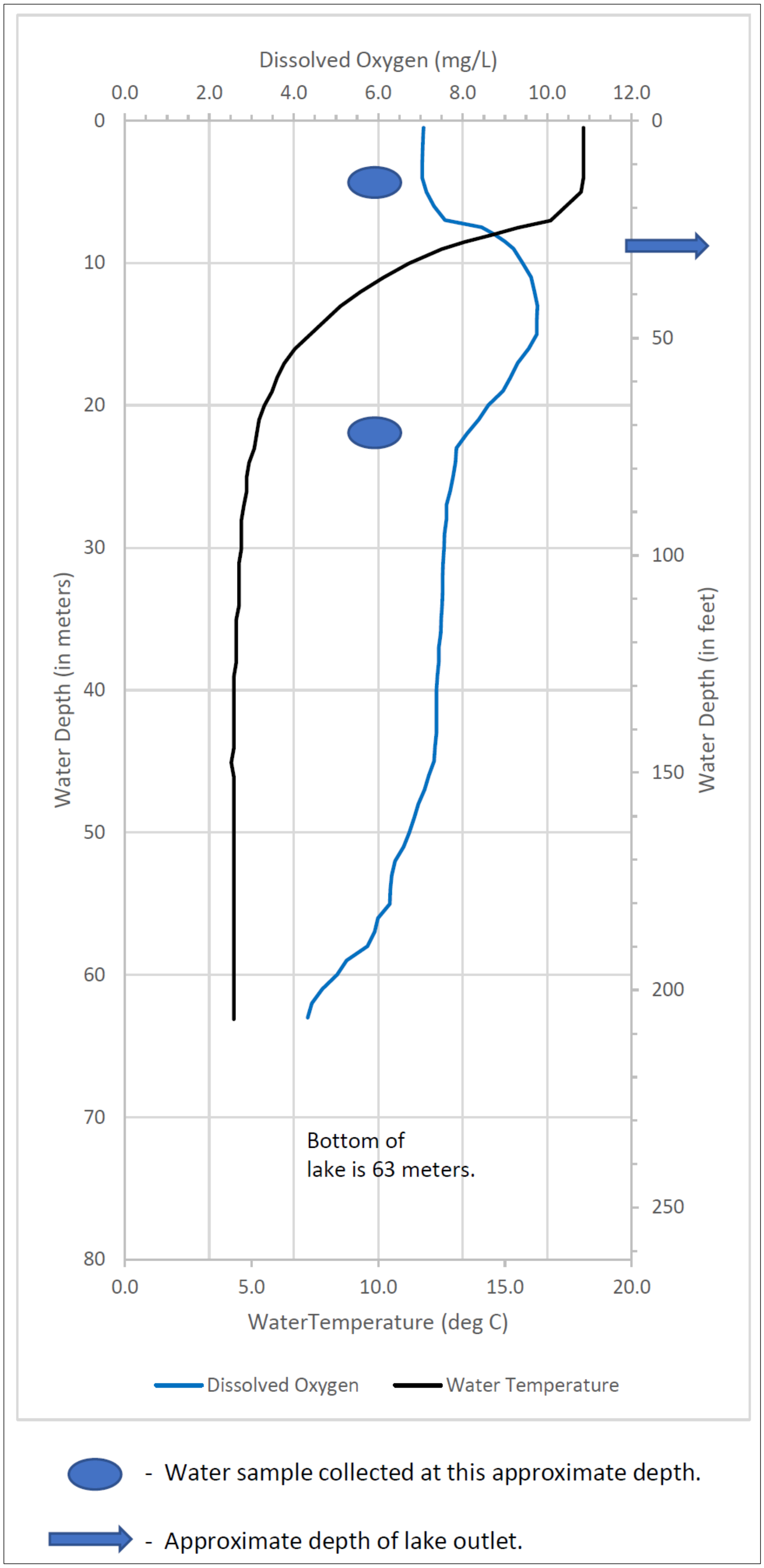


Figure 5.2-2 Lake Sabrina Dissolved Oxygen and Water Temperature Profile – July 2021

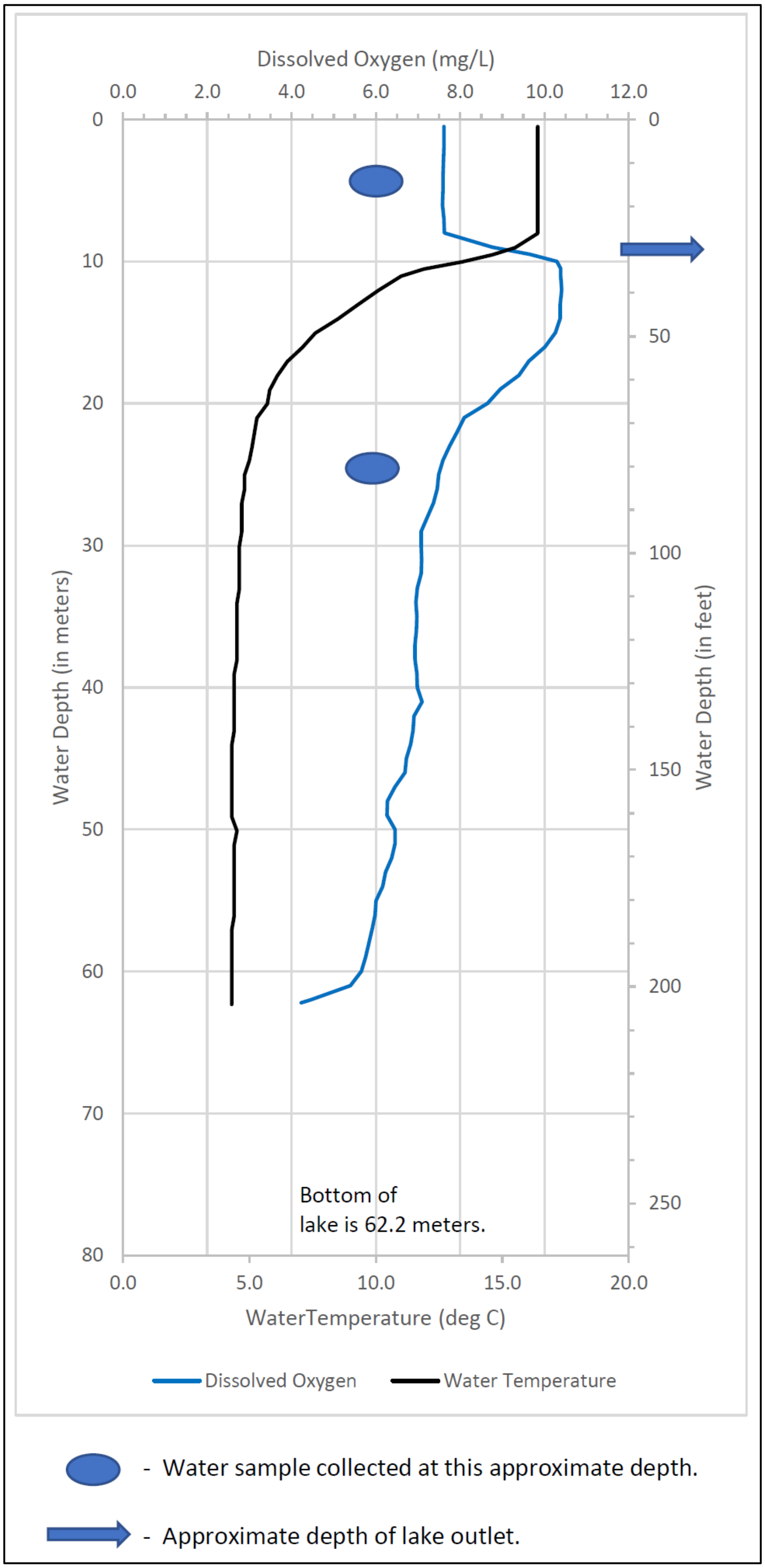


Figure 5.2-3 Lake Sabrina Dissolved Oxygen and Water Temperature Profile – August 2021

5.2.1.4. September 2021

A DO and water temperature profile was conducted on September 20, 2021, at the deepest point in Lake Sabrina. The maximum depth at the profile point on September 20, 2021, was 62.9 meters with a lake surface elevation of 9096.74-feet msl. DO ranged from 10.31 mg/L at a depth of 13 meters BWS and 2.17 mg/L at a depth of 62.9 meters BWS. DO saturation was above 100 percent in the upper portion of the lake and gradually declined to less than 60 percent at 52 meters BWS (refer to Appendix C, Table C-9). A thermocline was identified between 11 to 16 meters BWS. Figure 5.2-4 presents a profile of DO and water temperature over the surveyed water column and Appendix C (Table C-9) presents the individual values recorded for each depth interval.

5.2.1.5. October 2021

A DO and water temperature profile was conducted on October 5, 2021, at the deepest point in Lake Sabrina. The maximum depth at the profile point on October 5, 2021, was 63.5 meters with a lake surface elevation of 9095.09-feet msl. DO ranged from 10.14 mg/L at a depth of 14 meters BWS and 0.11 mg/L at a depth of 63.5 meters BWS. DO saturation was above 100 percent in the upper portion of the lake. DO saturation gradually declined to less than 10 percent at 63 meters BWS (refer to Appendix C, Table C-10). A thermocline was identified between 12 to 14 meters BWS. Figure 5.2-5 presents a profile of DO and water temperature over the surveyed water column and Appendix C (Table C-10) presents the individual values recorded for each depth interval.

5.2.1.6. Summary

The DO and water temperature profiles for Lake Sabrina were similar for each monitoring period throughout the summer and early fall. Each exhibited elevated DO readings in the upper two thirds of the lake and a gradual decline in DO near the bottom portion of the lake (well below the lake outlet). When compared to the previous monitoring period, the ranges for DO in 2021 were similar to ranges observed in 2020 (Table 5.2-1).

Table 5.2-1. Summary of Dissolved Oxygen Levels in Lake Sabrina from Vertical Transects

Year (a)	Lake Surface Elevation Range (ft msl)	Range of Dissolved Oxygen above and below Outlet (b)		
		Position (c)	Maximum	Minimum
2020	9118.62 – 9108.97	Above	9.87	7.00
		Below	10.03	0.05
2021	9099.50 – 9095.09	Above	9.78	7.04
		Below	10.41	0.11

Notes:
a – Five transects were conducted in each calendar year.
b – From instantaneous measurements at 1-meter intervals from lake surface to bottom of survey/lake.
c – Position above or below lake outlet.

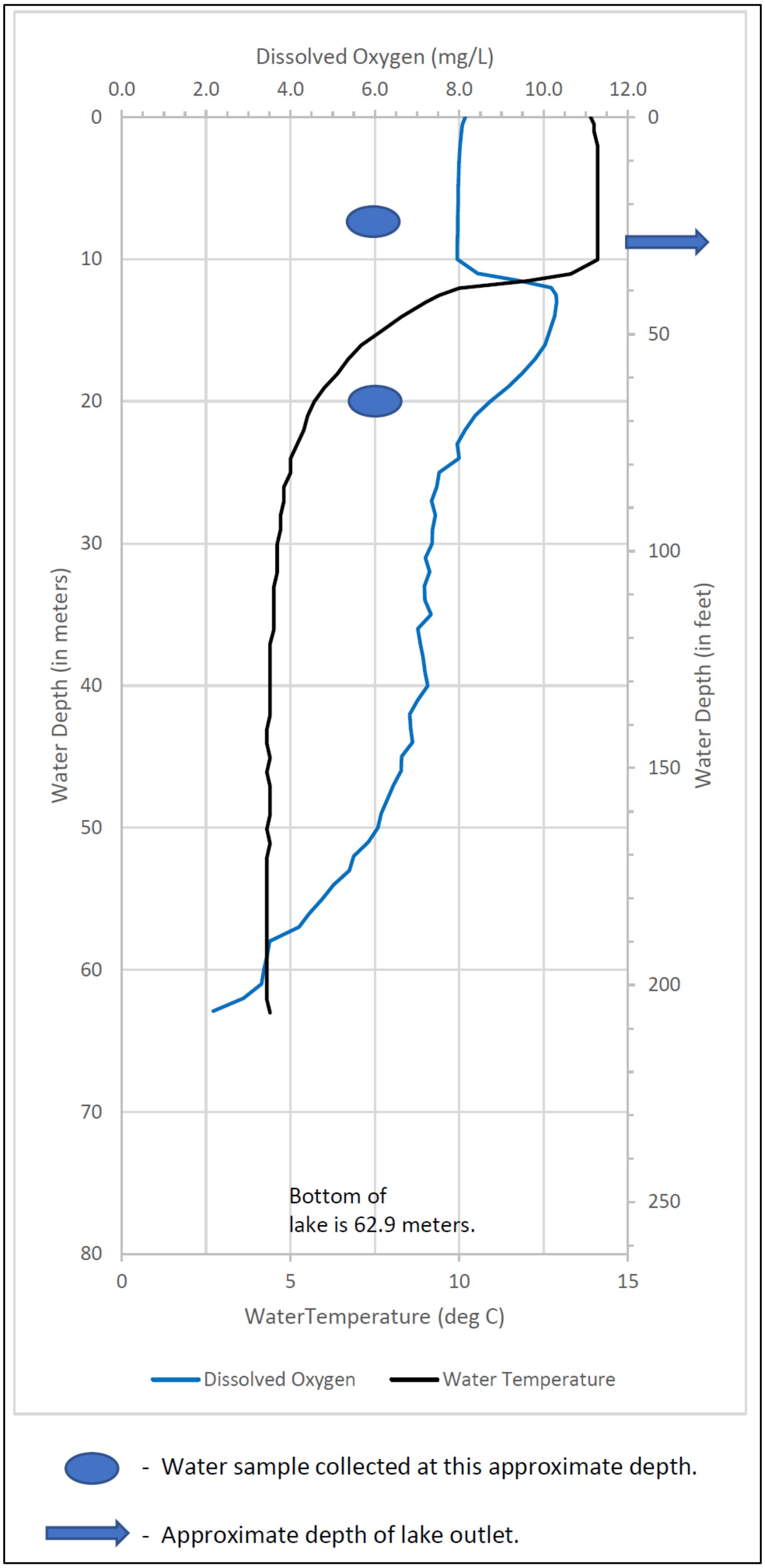


Figure 5.2-4 Lake Sabrina – Dissolved Oxygen and Water Temperature Profile – September 2021

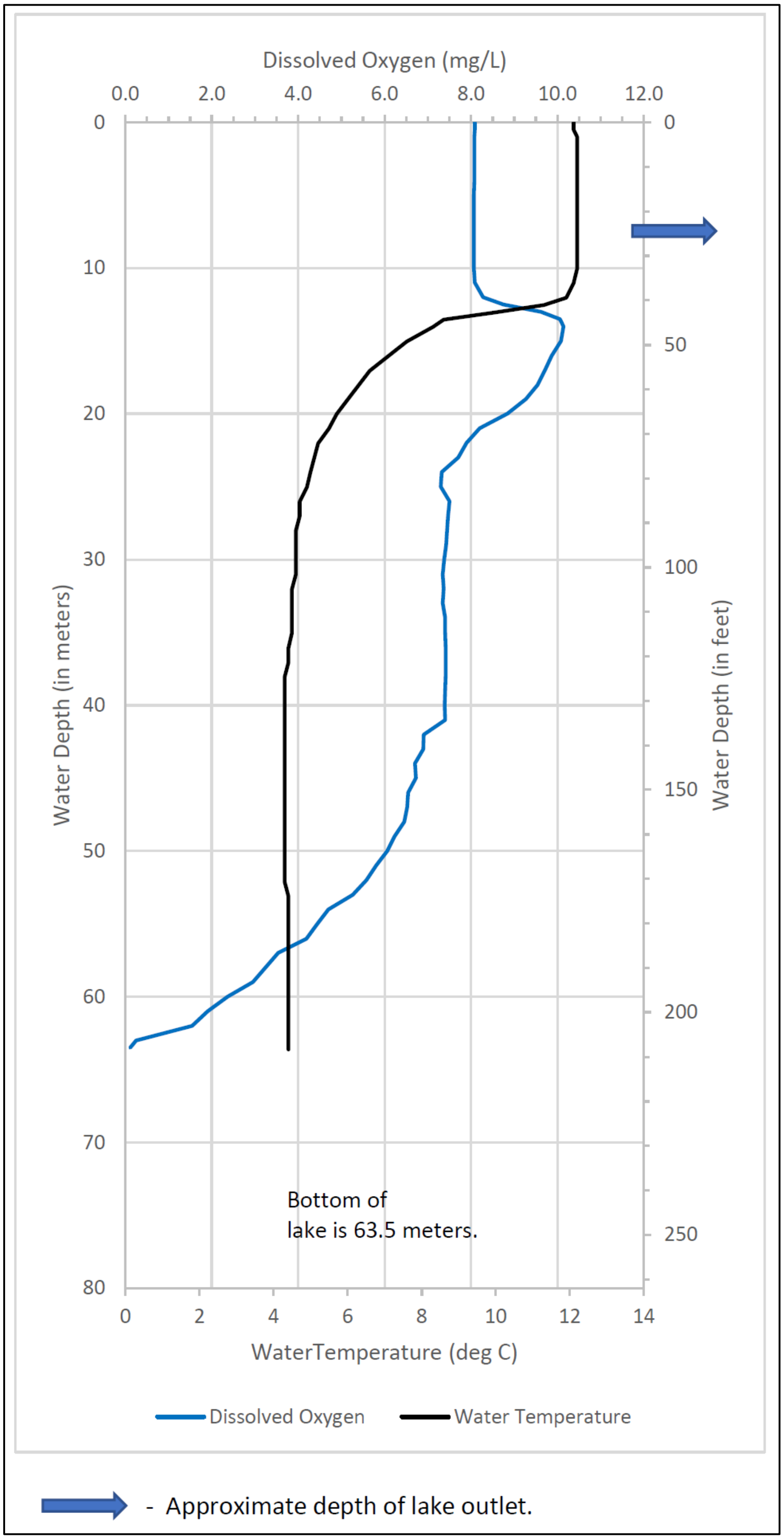


Figure 5.2-5 Lake Sabrina – Dissolved Oxygen and Water Temperature Profile – October 2021

Except for the decrease in lake level elevation observed in 2021 versus 2020, the graph for DO versus elevation were similar between monitoring periods (Figure 5.2-6).

5.2.2. General Water Quality of Lake Sabrina

5.2.2.1. 2021 Monitoring Period

Field water quality testing and laboratory water quality samples were collected during the same time periods that DO profiles were conducted and are presented in Table 5.2-2. Field measurements indicated Secchi disk depth of 8.75 to 12.25 meters between June and October sampling periods. Thermoclines were identified during all sampling periods and ranged from 7 to 11 meters in the July sampling period and 11 to 16 meters during the September sampling period. The following measurements are based on collection of measurements above and below the observed thermoclines (which corresponds to above and below the outlet). Conductivity ranged from 23 to 34 µS/cm in the shallow zone (above the thermocline) to 26 to 30 µS/cm in the deeper zone (below the thermocline).

Laboratory water quality analysis for all sampling periods indicated very low values of TDS ranging from 12 mg/L to 19 mg/L in the shallow sampling zone and 14 mg/L to 24 mg/L in the deeper zone.

NO_3-N was ND less than 0.110 for all samples collected in Lake Sabrina. Total nitrogen as N ranged from ND less than 0.10 mg/L to 0.11 mg/L in the shallow sampling zone and ND less than 0.10 mg/L to 0.15 mg/L in the deeper sampling zone. PO_4-P was not detected at ND less than 0.010 mg/L for all samples collected.

5.2.2.2. Comparison to 2020 Monitoring

During the 2020 monitoring period, TDS ranged from 11 mg/L to 39 mg/L for all samples with an average of 21 mg/L for samples collected above the outlet. During the 2021 monitoring period, TDS values were similar ranging from 12 mg/L to 24 mg/L for all samples with an average of 16 mg/L for samples collected above the outlet. NO3-N was not detected in any samples for both monitoring periods. Total-N was detected and ranged from ND to 0.30 mg/L to 0.52 mg/L for all samples with an average of ND to 0.30 mg/L for samples collected above the outlet in the 2020 monitoring period. Total-N had similar values in the 2021 monitoring period and ranged from ND to 0.10 mg/L to 0.11 mg/L for all samples with an average of ND to 0.10 mg/L for samples collected above the outlet. PO4-P was detected once at 0.022 mg/L during the 2020 monitoring period for all samples. PO4-P was not detected in the 2021 monitoring period. Table 5.2-2 presents a summary of the laboratory results for Lake Sabrina.

5.2.2.3. Comparison to Basin Plan Objectives

For samples collected above the outlet, TDS averaged 21 mg/L for the 2020 monitoring period and 16 mg/L for the 2021 monitoring period which are both above the basin plan objective for Lake Sabrina of 10 mg/L. Considering that Lake Sabrina is a headwaters lake in the Bishop Creek drainage, the elevated number appears to reflect background conditions and the original basin objectives for Lake Sabrina are indicative of limited data used to establish the original water quality objectives.

NO3-N was not detected in any samples for both monitoring periods. Total-N was not detected in the 2020 monitoring period and was detected only once at 0.11 mg/L and averaged ND less than 0.1 mg/L for the 2021 monitoring period and below the Lake Sabrina basin objective of 0.3 mg/L. PO4-P was detected once but all values were below basin objectives for samples collected above the outlet (Table 5.2-2).

Table 5.2-2 Summary of Laboratory Results for Lake Sabrina for Samples collected above the Outlet Depth for 2020-2021 Monitoring Periods

Year	Parameter	Total Dissolved Solids (mg/L)	Nitrate as N (mg/L)	Total Nitrogen (mg/L)	Ortho phosphate as P (mg/L)
2020	Maximum	31	ND<0.110	ND<0.30	0.022
	Minimum	11	ND<0.110	ND<0.30	ND<0.010
	Average*	21	ND<0.110	ND<0.30 (0.1)**	ND<0.010
2021	Maximum	19	ND<0.110	0.17	ND<0.010
	Minimum	12	ND<0.110	ND<0.10	ND<0.010
	Average*	16	ND<0.110	ND<0.10	ND<0.010
Basin Objective (annual average/90th percentile)		10/17	0.2/0.3	0.3/0.6	0.03/0.05

Notes:
* Arithmetic average is for all samples collected. For samples with ND values, 1/2 of the ND value was used to calculate average when more than one sample had detectable values, otherwise the ND value was used.
** Data collected during 2020 and 2021 have indicated that TKN makes up the entire amount of Total-N. The average for TKN is used as an average for the 2020 period.

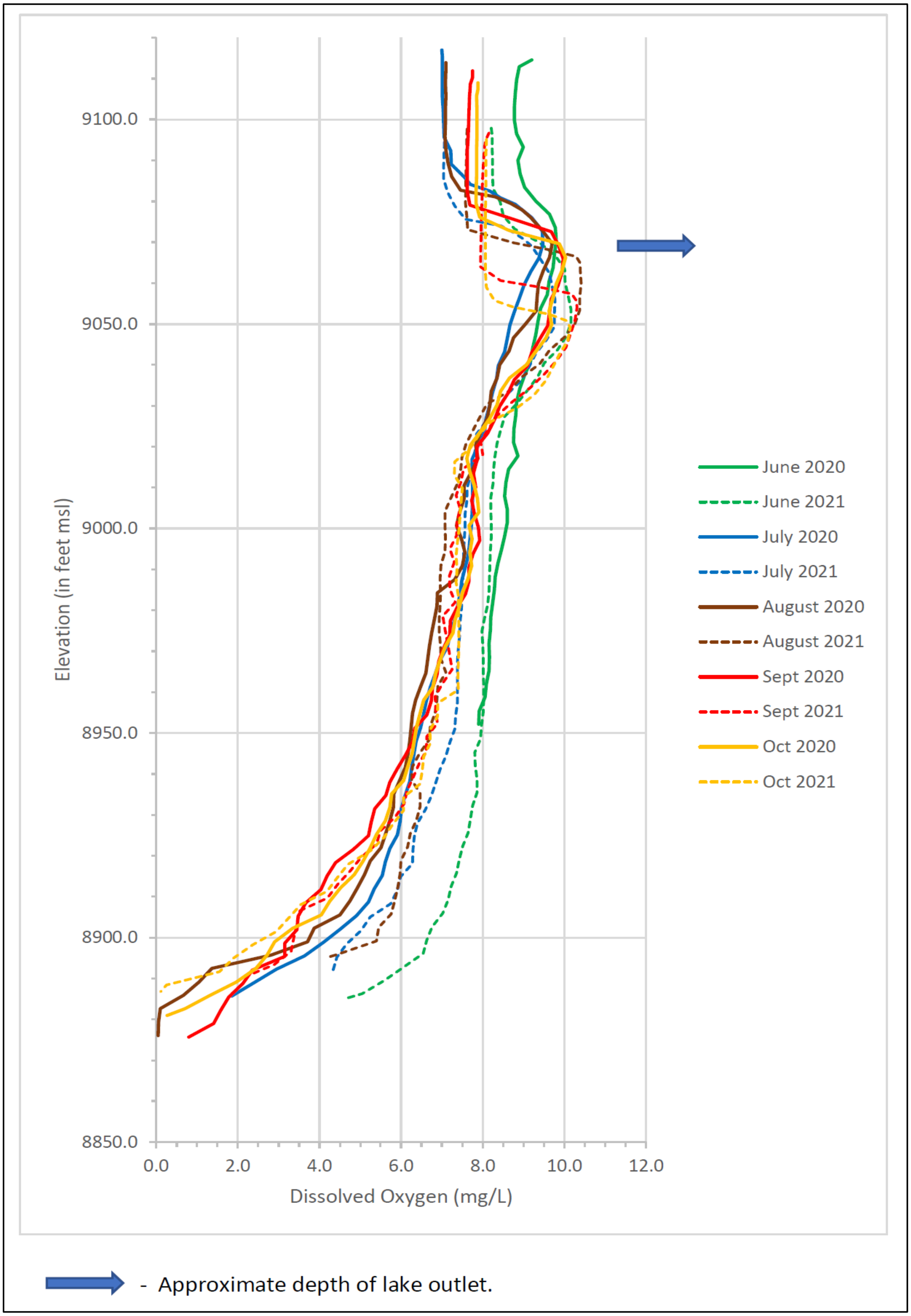


Figure 5.2-6 Lake Sabrina - Comparison of 2020 with 2021 Vertical DO Profiles with Lake Elevation

Table 5.2-2. Field Water Quality Measurements and Laboratory Results of Lake Sabrina Samples, June - October 2021

YEAR	SAMPLE DESIGNATION	DATE	TIME	LAKE SURFACE ELEVATION (b) (ft msl)	THERMO-CLINE	SAMPLE DEPTH (meters)	POSITION IN RELATION TO OUTLET: Outlet Depth (meters)	POSITION IN RELATION TO OUTLET: Above/Below Outlet	FIELD MEASUREMENTS (a): Secchi Disk Depth (meters)	FIELD MEASUREMENTS (a): Conductivity (µS/cm @25°C)	LABORATORY ANALYSIS: Total Dissolved Solids (mg/L)	LABORATORY ANALYSIS: Nitrate as N (mg/L)	LABORATORY ANALYSIS: Total Nitrogen: Total Nitrogen (mg/L)	LABORATORY ANALYSIS: Total Nitrogen: Nitrite + Nitrate as N (mg/L)	LABORATORY ANALYSIS: Total Nitrogen: Total Kjeldahl Nitrogen (mg/L)	LABORATORY ANALYSIS: Ortho phosphate as P (mg/L)
2020	LS-DP-8	6/17/2020	9:00	9116.20	Yes, 11-12 meters	8	15	above	7.5	30	16	ND<0.110	ND<0.30	ND<0.200	ND<0.10	ND<0.010
	LS-DP-15	6/17/2020	9:30			15	15	above		20	25	ND<0.110	0.30	ND<0.200	0.30	ND<0.010
	LS-DP-7	7/29/2020	11:25	9118.62	Yes, 9-14 meters	7	15	above	12.0	20	11	ND<0.110	ND<0.30	ND<0.200	ND<0.10	ND<0.010
	LS-DP-16	7/29/2020	10:55			16	15	below		30	12	ND<0.110	ND<0.30	ND<0.200	ND<0.10	ND<0.010
	LS-DP-8	8/24/2020	12:30	9115.53	Yes, 10-14 meters	8	14	above	10.0	30	31	ND<0.110	ND<0.30	ND<0.200	ND<0.10	ND<0.010
	LS-DP-17	8/24/2020	12:05			17	14	below		40	39	ND<0.110	0.52	ND<0.200	0.52	ND<0.010
	LS-DP-7	9/21/2020	11:10	9111.89	Yes, 10-14 meters	7	13	above	10.25	23	20	ND<0.110	ND<0.30	ND<0.200	ND<0.10	0.022
	LS-DP-28	9/21/2020	11:50			28	13	below		39	25	ND<0.110	ND<0.30	ND<0.200	0.11	ND<0.010
	(c)	10/5/2020	(c)	9108.97	Yes, 10-13 meters	(c)	(c)	(c)	11.0	(c)						
										Maximum	39	ND<0.110	0.52	ND<0.200	0.52	0.022
										Minimum	11	ND<0.110	ND<0.30	ND<0.200	ND<0.10	ND<0.010
										Average (d)	21	ND<0.110	ND<0.30	ND<0.200	0.10	ND<0.010
2021	LS-DP-5	6/17/2021	9:30	9099.50	Yes, 8-10 meters	5	10	above	8.75	23	19	ND<0.110	ND<0.10	ND<0.200	ND<0.10	ND<0.010
	LS-DP-20	6/17/2021	10:00			20	10	below		26	24	ND<0.110	0.11	ND<0.200	0.11	ND<0.010
	LS-DP-5	7/28/2021	9:45	9098.58	Yes, 7-11 meters	5	9	above	12.25	26	12	ND<0.110	0.11	ND<0.200	0.11	ND<0.010
	LS-DP-22	7/28/2021	10:05			22	9	below		27	20	ND<0.110	0.15	ND<0.200	0.15	ND<0.010
	LS-DP-5	8/24/2021	10:15	9099.31	Yes, 9-11 meters	5	9.5	above	11.75	23	15	ND<0.110	ND<0.10	ND<0.200	ND<0.10	ND<0.010
	LS-DP-25	8/24/2021	10:40			25	9.5	below		26	14	ND<0.110	ND<0.10	ND<0.200	ND<0.10	ND<0.010
	LS-DP-8	9/20/2021	10:20	9096.74	Yes, 11-16 meters	8	9	above	10.25	34	16	ND<0.110	ND<0.10	ND<0.200	ND<0.10	ND<0.010
	LS-DP-20	9/20/2021	10:45			20	9	below		30	20	ND<0.110	ND<0.10	ND<0.200	ND<0.10	ND<0.010
	(c)	10/5/2021	(c)	9095.09	Yes, 12-14 meters	(c)	(c)	(c)	(c)	(c)						
										Maximum	24	ND<0.110	0.11	ND<0.200	0.11	ND<0.010
										Minimum	12	ND<0.110	ND<0.10	ND<0.200	ND<0.10	ND<0.010
										Arithmetic Average (d)	16	ND<0.110	ND<0.10	ND<0.200	0.065	ND<0.010
										Basin Objective (annual average/90th percentile)	10/17	0.2/0.3	0.3/0.6	---	---	0.03/0.05

Notes:
a - For dissolved oxygen and water temperature, see vertical profiles.
b - At time of sampling.
c – No laboratory water quality sample collected.
d - average is for samples collected above the outlet. For samples with ND values, 1/2 of the ND value was used to calculate average when more than one sample had a detectable value, otherwise the ND value was used.
ND=Not detected at the indicated detection limit.

5.2.3. BACTERIOLOGICAL

A total of seven samples were collected during the 2020 monitoring period and only one sample had a detectable value of *E. coli* with a value of 3.1 MPN/100 ml. The 2021 monitoring period had five detectable values ranging from 3.1 to 310 MPN/100 ml detectable values for *E. coli*. The geometric mean was calculated at 16.3 MPN/100 ml and was well below the Inland Surface Water Plan objective of 100 MPN/100 ml. The highest value of 310 MPN/100 ml is below the Inland Surface Water Plan 90th percentile level of 320 MPN/100 ml (Table 5.1-4.). Table 5.1-4. summarizes the results for *E. coli* for Lake Sabrina. Two samples exceeded the 50 MPN/100 ml for conducting qPCR analysis; one sample collected on July 26, 2021, had 310 MPN/100 ml and one sample collected on July 29, 2021, had 180 MPN/100 ml. The qPCR analysis revealed that both samples had no detectable human DNA present.

5.3. INTAKE 2 RESERVOIR

5.3.1. BACTERIOLOGICAL

A total of seven samples were collected during the 2020 monitoring period and values ranged from ND less than 1.0 to 24 MPN/100 ml. The geometric mean was calculated at 4.73 MPN which is well below the Inland Surface Water Plan objective of 100 MPN/100 ml. The 2021 monitoring period ranged from 2.0 to 210 MPN/100 ml for *E. coli*. The geometric mean was calculated at 8.86 MPN/100 ml and was well below the Inland Surface Water Plan objective of 100 MPN/100 ml. The highest value of 210 MPN/100 ml is below the Inland Surface Water Plan 90th percentile objective level of 320 MPN/100 ml (Table 5.1-4.). Table 5.1-4. summarizes the results for *E. coli* for Intake No. 2 Reservoir. One sample exceeded the 50 MPN/100 ml for conducting qPCR analysis; the sample collected on July 29, 2021, had 210 MPN/100 ml. The qPCR analysis revealed that the sample had no detectable human DNA present.

5.4. BISHOP CREEK

5.4.1. DISSOLVED OXYGEN AND WATER TEMPERATURE

5.4.1.1. 2021 Monitoring Period

Water temperature ranged from 8.4 °C to 18.4 °C with the lower values occurring near the upper reaches of Bishop Creek and the higher values generally occurring in the lower reaches of Bishop Creek. DO occurred in a narrow range from 7.08 mg/L to 9.74 mg/L. The oxygen saturation level for the observed water temperature and air pressure was generally above 98 percent and often exceeded 100 percent for all monitored reaches of Bishop Creek.

Table 5.4-1 presents the DO and water temperature values obtained during the June-October 2021 monitoring period.

Table 5.4-1. Dissolved Oxygen and Water Temperature Measurements for Bishop Creek June - October 2021

LOCATION	STATION DESIGNATION	DATE	TIME	MEAN DAILY DISCHARGE * (cfs)	AIR TEMPERATURE Measured (deg F)	AIR TEMPERATURE Calculated (deg C)	WATER TEMPERATURE (deg C)	DISSOLVED OXYGEN (mg/L)	BAROMETRIC PRESSURE (in Hg)	CALCULATED DO SATURATION ** (%)
North Fork of Bishop Creek	BC-NF-1	6/14/2021	10:40	11	70	21.1	14.3	8.27	21.35	113.0%
		7/12/2021	7:30	13	63	17.2	16.2	7.92	21.60	111.4%
		7/26/2021	8:30	13	58	14.4	15.8	7.41	21.40	103.5%
		8/5/2021	11:15	12	71	21.7	16.6	7.86	21.55	110.6%
		8/25/2021	10:20	9.0	68	20.0	13.8	8.30	21.40	110.9%
		9/9/2021	11:30	6.4	78	25.6	16.1	8.17	21.47	116.6%
		9/22/2021	10:55	5.8	65	18.3	12.4	8.35	21.55	107.6%
		10/4/2021	11:20	5.8	46	7.8	8.5	8.70	21.43	103.5%
South Fork of Bishop Creek below South Lake	BC-blw-SL	6/14/2021	11:25	41	70	21.1	8.4	8.61	21.10	103.9%
		7/12/2021	9:45	36	70	21.1	12.7	7.91	21.34	103.4%
		7/26/2021	10:00	35	61	16.1	14.1	7.46	21.15	103.4%
		8/5/2021	12:23	30	71	21.7	15.8	7.26	21.27	101.4%
		8/25/2021	11:05	29	65	18.3	15.6	7.24	21.25	102.6%
		9/9/2021	12:45	25	71	21.7	15.2	7.40	21.19	104.8%
		9/22/2021	11:45	20	65	18.1	14.3	7.51	21.25	104.1%
		10/4/2021	12:50	24	52	11.1	11.0	7.96	21.13	113.4%
Middle Fork of Bishop Creek below Lake Sabrina	BC-blw-LS	6/14/2021	9:35	31	64	17.8	14.1	7.44	21.55	100.3%
		7/12/2021	8:55	36	66	18.9	17.4	7.46	21.74	107.2%
		7/26/2021	9:15	14	60	15.6	18.4	7.08	21.55	103.9%
		8/5/2021	11:30	14	71	21.7	17.4	7.37	21.69	105.9%
		8/25/2021	10:35	15	68	20.0	16.2	7.22	21.55	101.6%
		9/9/2021	12:20	15	72	22.2	16.7	7.25	21.61	102.0%
		9/22/2021	10:20	15	68	20.0	14.2	7.60	21.70	102.4%
		10/4/2021	12:15	16	46	7.8	11.5	7.93	21.56	109.8%
Bishop Creek below Plant No. 2	BC-blw-PH2	6/14/2021	12:05	14	74	23.3	12.6	8.73	---	---
		7/13/2021	8:45	14	73	22.8	15.1	8.09	23.22	104.2%
		7/29/2021	10:25	14	69	20.6	14.2	8.21	23.20	103.5%
		8/5/2021	10:45	14	83	28.3	15.3	7.94	23.20	102.3%
		8/25/2021	9:20	14	67	19.4	13.0	8.47	---	---
		9/9/2021	10:55	13	79	25.8	14.7	8.10	23.18	102.1%
		9/22/2021	10:00	16	69	20.6	11.5	8.68	23.30	112.4%
		10/4/2021	13:45	16	61	16.1	9.1	9.25	23.15	103.9%
Bishop Creek below Plant No. 3	BC-blw-PH3	6/14/2021	12:30	6.4	75	23.9	13.9	8.57	23.75	103.0%
		7/13/2021	9:35	6.3	79	26.1	15.8	8.21	23.90	103.1%
		7/29/2021	9:45	6.4	70	21.1	14.6	8.30	23.90	101.9%
		8/5/2021	10:10	6.4	84	28.9	16.5	7.95	23.88	102.0%
		8/25/2021	8:50	6.4	68	20.0	13.5	8.51	23.85	102.2%
		9/9/2021	10:20	6.4	80	26.7	15.2	8.19	23.88	102.8%
		9/22/2021	9:30	6.5	70	20.9	12.4	8.80	23.95	102.1%
		10/4/2021	14:10	6.5	65	18.3	9.7	9.36	23.84	102.5%
Bishop Creek below Powerhouse No. 4	BC-blw-PH4	6/15/2021	8:05	19	74	23.3	12.8	9.14	24.75	103.4%
		7/13/2021	10:20	20	85	29.4	16.0	8.53	24.89	104.1%

LOCATION	STATION DESIGNATION	DATE	TIME	MEAN DAILY DISCHARGE * (cfs)	AIR TEMPERATURE Measured (deg F)	AIR TEMPERATURE Calculated (deg C)	WATER TEMPERATURE (deg C)	DISSOLVED OXYGEN (mg/L)	BAROMETRIC PRESSURE (in Hg)	CALCULATED DO SATURATION ** (%)
		7/29/2021	9:10	21	70	21.1	15.0	8.60	24.85	102.8%
		8/5/2021	9:45	21	83	28.3	16.4	8.33	24.86	101.7%
		8/25/2021	8:15	21	67	19.4	13.5	8.87	24.80	102.7%
		9/9/2021	9:35	21	80	26.7	15.0	8.62	24.82	104.2%
		9/22/2021	8:45	20	72	22.2	12.2	9.27	24.95	103.6%
		10/4/2021	14:35	21	67	19.4	9.8	9.69	24.79	102.2%
Bishop Creek below Plant No. 5	BC-blw-PH5	6/15/2021	8:35	1.0	75	23.9	13.2	8.80	25.15	99.4%
		7/13/2021	10:55	1.1	87	30.6	17.1	8.32	25.21	102.5%
		7/29/2021	8:35	1.2	70	21.1	15.3	8.42	25.20	99.4%
		8/5/2021	9:25	1.2	81	27.2	17.0	8.15	25.20	100.4%
		8/25/2021	7:40	1.3	70	21.1	14.0	8.65	25.15	99.9%
		9/9/2021	8:55	1.3	77	25.0	15.6	8.58	25.17	101.3%
		9/22/2021	8:15	1.3	68	20.2	12.3	9.11	25.35	100.6%
		10/4/2021	14:55	1.1	71	21.7	10.7	9.55	25.15	100.7%
Bishop Creek below Plant No. 6	BC-blw-PH6	6/15/2021	9:05	103	76	24.4	12.8	9.30	25.35	102.7%
		7/13/2021	11:20	105	88	31.1	16.8	8.61	25.44	102.6%
		7/29/2021	8:05	79	70	21.1	15.2	8.65	25.45	100.9%
		8/5/2021	8:45	74	81	27.2	16.6	8.30	25.44	98.9%
		8/25/2021	7:15	65	68	20.0	13.6	8.94	25.40	101.0%
		9/9/2021	8:25	57	76	24.4	15.4	8.70	25.41	102.7%
		9/22/2021	7:45	54	67	19.2	11.9	9.36	25.60	109.8%
		10/4/2021	15:15	52	71	21.7	10.5	9.74	25.37	102.7%
				2021 Maximum	88	31.1	18.4	9.74	25.60	116.6%
				2021 Minimum	46	7.8	8.4	7.08	21.10	98.9%
				2021 Average	71	21.4	14.1	8.33	23.36	104.0%

Notes:

* - Instantaneous measurements made on North Fork of Bishop Creek. All other values were calculated on a mean daily average discharge.

** - Saturation based on calculated DO saturation at reported water temperature and ambient barometric pressure.

5.4.1.2. Comparison to 2020 Monitoring Period

During the 2020 monitoring period, DO ranged from 7.12 mg/L to 9.68 mg/L with an average of 8.62 mg/L. During the 2021 monitoring period, DO values were similar ranging from 7.08 mg/L to 9.74 mg/L with an average of 8.33 mg/L. DO saturation for all values during both monitoring periods was above 98 percent saturation. Table 5.4-2 presents a summary of DO and water temperature for Bishop Creek for both monitoring periods.

Table 5.4-2. Summary of Dissolved Oxygen and Water Temperature for Bishop Creek 2020-2021 Monitoring Periods

Year	Parameter	Water Temperature (deg C)	Dissolved Oxygen (mg/L)	Barometric Pressure (in Hg)	Calculated DO Saturation (%)
2020	Maximum	17.8	9.68	25.53	124.9%
	Minimum	6.9	7.12	21.15	98.0%
	Average*	12.7	8.62	23.36	104.3%
2021	Maximum	18.4	9.74	25.60	116.6%
	Minimum	8.4	7.08	21.10	98.9%
	Average*	14.1	8.33	23.36	104.0%

Notes:
* Arithmetic average is for all samples collected.

5.4.2. GENERAL WATER QUALITY OF BISHOP CREEK

Field and laboratory water quality samples were collected along Bishop Creek in June, July, August, and September 2021 and are summarized in Table 5.4-3 Turbidity ranged from 1.57 to 6.26 Nephelometric turbidity units (NTU) with the highest concentration at Bishop Creek below Plant No. 5 during the July sampling period. Generally, Bishop Creek had values of turbidity below 5 NTU for all locations and all sampling periods. Conductivity ranged from 23 to 70 µS/cm@25°C with the highest concentration observed at Middle Fork of Bishop Creek below Lake Sabrina during the July sampling period. Generally, conductivity increased in value as you progressed downstream in the Bishop Creek watershed.

TDS ranged from 14 mg/L to 46 mg/L with the highest concentration occurring below Plant No. 4 in August 2021.

NO_3-N was reported to below the detection limit (ND less than 0.110 mg/L) in all samples. Total Nitrogen ranged from ND<0.10 mg/L to 0.37 mg/L with the highest concentration detected in the South Forth of Bishop Creek below South Lake during the September sampling period.

Table 5.4-3. Field Water Quality Measurements and Laboratory Results of Bishop Creek Samples for Bishop Creek June - September 2021

					FIELD MEASUREMENTS (a)				LABORATORY MEASUREMENTS					
											Total Nitrogen			
LOCATION	STATION DESIGNATION	DATE	TIME	MEAN DAILY DISCHARGE (cfs) (b)	Water Temperature (deg C)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Conductivity (µS/cm@25C)	TDS (mg/L)	NO_3 as N (mg/L)	Total Nitrogen (mg/L)	$NO_2 + NO_3$ as N (mg/L)	TKN (mg/L)	PO_4 as P (mg/L)
North Fork of Bishop Creek	BC-NF-1	6/14/2021	10:40	11	14.3	8.27	1.96	32	32	ND<0.110	ND<0.10	ND<0.200	ND<0.10	ND<0.010
		7/26/2021	8:30	13	15.8	7.41	1.85	30	29	ND<0.110	0.13	ND<0.200	0.13	ND<0.010
		8/25/2021	10:20	9.0	13.8	8.30	2.78	32	25	ND<0.110	0.12	ND<0.200	0.12	ND<0.010
		9/22/2021	10:55	5.8	12.4	8.35	2.23	38	28	ND<0.110	0.17	ND<0.200	0.17	ND<0.010
South Fork of Bishop Creek below South Lake	BC-blw-SL	6/14/2021	11:25	41	8.4	8.61	1.57	37	37	ND<0.110	0.15	ND<0.200	0.15	ND<0.010
		7/26/2021	10:00	35	14.1	7.46	2.03	33	24	ND<0.110	0.12	ND<0.200	0.12	ND<0.010
		8/25/2021	11:05	29	15.6	7.24	2.95	31	14	ND<0.110	0.11	ND<0.200	0.11	ND<0.010
		9/22/2021	11:45	20	14.3	7.51	4.68	40	29	ND<0.110	0.37	ND<0.200	0.37	ND<0.010
Middle Fork of Bishop Creek below Lake Sabrina	BC-blw-LS	6/14/2021	9:35	31	14.1	7.44	2.13	29	26	ND<0.110	0.16	ND<0.200	0.16	ND<0.010
		7/26/2021	9:15	14	18.4	7.08	1.75	70	28	ND<0.110	0.12	ND<0.200	0.12	ND<0.010
		8/25/2021	10:35	15	16.2	7.22	2.94	23	14	ND<0.110	0.12	ND<0.200	0.12	ND<0.010
		9/22/2021	10:20	15	14.2	7.60	3.09	29	23	ND<0.110	0.11	ND<0.200	0.11	ND<0.010
Bishop Creek below Powerhouse No. 2	BC-blw-PH2	6/14/2021	12:05	14	12.6	8.73	2.45	42	34	ND<0.110	0.19	ND<0.200	0.19	ND<0.010
		7/29/2021	10:25	14	14.2	8.21	3.23	47	45	ND<0.110	ND<0.10	ND<0.200	ND<0.10	0.018
		8/25/2021	9:20	14	13.0	8.47	3.11	50	27	ND<0.110	0.12	ND<0.200	0.12	ND<0.010
		9/22/2021	10:00	16	11.5	8.68	3.42	54	31	ND<0.110	ND<0.10	ND<0.200	ND<0.10	ND<0.010
Bishop Creek below Powerhouse No. 3	BC-blw-PH3	6/14/2021	12:30	6.4	13.9	8.57	2.24	46	43	ND<0.110	0.11	ND<0.200	0.11	ND<0.010
		7/29/2021	9:45	6.4	14.6	8.30	2.55	50	40	ND<0.110	0.19	ND<0.200	0.19	ND<0.010
		8/25/2021	8:50	6.4	13.5	8.51	2.12	52	23	ND<0.110	0.19	ND<0.200	0.19	ND<0.010
		9/22/2021	9:30	6.5	12.4	8.80	3.97	58	40	ND<0.110	ND<0.10	ND<0.200	ND<0.10	ND<0.010
Bishop Creek below Powerhouse No. 4	BC-blw-PH4	6/15/2021	8:05	19	12.8	9.14	5.60	52	41	ND<0.110	ND<0.10	ND<0.200	ND<0.10	ND<0.010
		7/29/2021	9:10	21	15.0	8.60	2.61	51	43	ND<0.110	0.13	ND<0.200	0.13	ND<0.010
		8/25/2021	8:15	21	13.5	8.87	2.64	55	46	ND<0.110	0.11	ND<0.200	0.11	ND<0.010
		9/22/2021	8:45	20	12.2	9.27	2.69	62	35	ND<0.110	ND<0.10	ND<0.200	ND<0.10	ND<0.010
Bishop Creek below Powerhouse No. 5	BC-blw-PH5	6/15/2021	8:35	1.0	13.2	8.80	3.31	51	33	ND<0.110	0.13	ND<0.200	0.13	ND<0.010
		7/29/2021	8:35	1.2	15.3	8.42	6.26	52	44	ND<0.110	0.12	ND<0.200	0.12	ND<0.010
		8/25/2021	7:40	1.3	14.0	8.65	2.86	54	35	ND<0.110	ND<0.10	ND<0.200	ND<0.10	ND<0.010
		9/22/2021	8:15	1.3	12.3	9.11	3.15	62	19	ND<0.110	ND<0.10	ND<0.200	ND<0.10	ND<0.010
Bishop Creek below Powerhouse No. 6	BC-blw-PH6	6/15/2021	9:05	103	12.8	9.30	2.50	47	38	ND<0.110	ND<0.10	ND<0.200	ND<0.10	ND<0.010
		7/29/2021	8:05	79	15.2	8.65	2.89	51	44	ND<0.110	0.12	ND<0.200	0.12	ND<0.010
		8/25/2021	7:15	65	13.6	8.94	2.28	56	26	ND<0.110	0.10	ND<0.200	0.10	ND<0.010
		9/22/2021	7:45	54	11.9	9.36	2.61	60	35	ND<0.110	ND<0.10	ND<0.200	ND<0.10	ND<0.010
				2021 Maximum	(c)	(c)	6.26	70	46	ND<0.110	0.37	ND<0.200	0.37	0.018
				2021Minimum	(c)	(c)	1.57	23	14	ND<0.110	ND<0.10	ND<0.200	ND<0.10	ND<0.010
				2021 Average	(c)	(c)	2.89	46	32	ND<0.110	0.12	ND<0.200	0.12	ND<0.010

Notes:
[a] Concurrent measurement when laboratory samples were collected
[b] Instantaneous measurements made on North Fork of Bishop Creek. All other values were calculated on a mean daily average discharge
[c] See Table 5.4-1 for DO and water temperature values.
N= Nitrogen; NO_2=Nitrite; NO_3=Nitrate, P= Phosphorus; PO_4=Orthophosphate; TDS=Total Dissolved Solids; TKN=Total Kjeldahl Nitrogen.

PO_4-P was detected in only one sample at 0.018 mg/L collected from Bishop Creek below Plant No. 2 during the July sampling period. All other samples were below the detection limit of ND<0.010 mg/L.

5.4.3. COMPARISON TO 2020 MONITORING PERIOD

During the 2020 monitoring period, TDS ranged for all locations along Bishop Creek from ND less than 10 mg/L to 41 mg/L with an average of 26 mg/L. During the 2021 monitoring period, TDS was similar ranging from 14 mg/L to 46 mg/L with an average of 32 mg/L. NO3-N was not detected in any samples for both monitoring periods. Total-N was detected and ranged from ND less than 0.30 mg/L to 1.1 mg/L with an average of 0.19 mg/L in the 2020 monitoring period. Total-N had similar values in the 2021 monitoring period and ranged from ND less than 0.10 mg/L to 0.37 mg/L with an average of 0.12 mg/L. PO4-P was detected but all values were below basin objectives. presents a summary of the laboratory results for Bishop Creek.

Table 5.4-4. Summary of Laboratory Results for Bishop Creek 2020-2021 Monitoring Periods

Year	Parameter	Total Dissolved Solids (mg/L)	Nitrate as N (mg/L)	Total Nitrogen (mg/L)	Ortho phosphate as P (mg/L)
2020	Maximum	41	ND<0.110	1.1	0.044
	Minimum	ND<10	ND<0.110	ND<0.30	ND<0.010
	Average*	26	ND<0.110	0.19	ND<0.010
2021	Maximum	46	ND<0.110	0.37	0.018
	Minimum	14	ND<0.110	ND<0.10	ND<0.010
	Average*	32	ND<0.110	0.12	ND<0.010
Bishop Creek Below Lake Sabrina**					
2020	Maximum	30	ND<0.11	0.41	0.017
	Minimum	10	ND<0.11	ND<0.30	ND<0.010
	Average*	19	ND<0.11	0.2	0.01
	Average***	19	ND<0.11	0.1	0.01
2021	Maximum	28	ND<0.11	0.16	ND<0.010
	Minimum	14	ND<0.11	0.11	ND<0.010
	Average*	23	ND<0.11	0.1	ND<0.010
	Average***	23	ND<0.11	0.1	ND<0.010
Basin Objective (annual average/90th percentile)		27/29	0.1/0.2	0.1/0.4	0.05/0.09

Notes:
* Arithmetic average is for all samples collected. For samples with ND values, 1/2 of the ND value was used to calculate average when more than one sample had detectable values, otherwise the ND value was used.
** Closest Bishop Creek monitoring location to Basin Plan objective location (Bishop Creek near Intake No. 2).
*** Arithmetic average is for all samples collected. For samples with ND values, Zero was used for ND values to calculate average when more than one sample had detectable values, otherwise the ND value was used.

5.4.4. Comparison to Basin Plan Objectives

A comparison was made of general water quality for Bishop Creek below Lake Sabrina (BC-blw-LS) to water quality objectives for Bishop Creek near Intake No. 2 in the Basin Plan. For the 2020 monitoring period, TDS ranged from 10 mg/L to 30 mg/L with an average of 19 mg/L which is below the Basin Plan objective of 27 mg/L. During the 2021 monitoring period, TDS was similar ranging from 14 mg/L to 28 mg/L with an average of 23 mg/L which is below the basin plan objective. NO3-N was not detected in any samples for both monitoring periods. Total-N was detected and ranged from ND<0.30 mg/L to 0.41 mg/L with an average of between 0.1 mg/L and 0.2 mg/L in the 2020 monitoring period which is at or slightly above the 0.1 Basin Plan objective. Total-N had similar values in the 2021 monitoring period and ranged from ND less than 0.11 mg/L to 0.16 mg/L with an average of 0.1 mg/L which is equal to the basin plan objective. PO4-P was detected in 2020 but was ND less than 0.010 mg/L in 2021. All values for both periods were below Basin Plan objectives. Table 5.4-4 presents a summary of the laboratory results for Bishop Creek.

5.5. Powerhouse Tailwater

5.5.1. Field Water Temperature and Dissolved Oxygen

Water temperature ranged from 9.1 °C to 16.8 °C with generally the lower values occurring in tailwater in the powerhouses in the upper reaches of Bishop Creek and the higher values generally occurring in the powerhouse tailraces from the lower reach of Bishop Creek. DO occurred in a very narrow range from 7.77 mg/L to 9.72 mg/L. The oxygen saturation level for the observed water temperature and air pressure at each of the tailraces was generally above 96 percent and often exceeded 100 percent for the monitored tailraces of each of the powerhouses.

Table 5.5-1 presents the field DO and water temperature values obtained from the various tailraces during the June-August 2021 monitoring period.

Table 5.5-1. Field Water Quality Measurements for Powerhouse Tailwater June - October 2021

LOCATION	STATION DESIGNATION	DATE	TIME	FIELD MEASUREMENTS: Air Temperature Measured (deg F)	Air Temperature Calculated (deg C)	Water Temperature (deg C)	Dissolved Oxygen (mg/L)	Barometric Pressure (in Hg)	CALCULATED DISSOLVED OXYGEN SATURATION * (%)
Tailwater at Powerhouse No. 2	TW@PH2	6/14/2021	11:55	74	23.3	12.4	8.58	23.05	103.4%
		7/13/2021	8:30	73	22.8	15.4	7.94	23.22	102.3%
		7/29/2021	10:15	69	20.6	14.4	8.06	23.20	101.6%
		8/5/2021	10:30	83	28.3	16.0	7.77	23.20	102.2%
		8/25/2021	9:10	67	19.4	13.7	8.22	23.15	101.3%
		9/9/2021	10:45	80	26.7	15.3	7.95	23.15	102.4%
		9/22/2021	9:50	69	20.3	11.3	8.72	23.25	112.9%
		10/4/2021	13:30	61	16.1	9.1	9.17	23.11	103.0%
Tailwater at Powerhouse No. 3	TW@PH3	6/14/2021	12:20	75	23.9	13.2	8.65	23.70	103.9%
		7/13/2021	9:15	79	26.1	15.5	8.22	23.90	103.2%
		7/29/2021	9:30	70	21.1	14.4	8.33	23.90	102.3%
		8/5/2021	10:00	83	28.3	16.2	8.00	23.88	102.6%
		8/25/2021	8:35	68	20.0	13.7	8.46	23.80	101.6%
		9/9/2021	10:00	80	26.7	14.9	8.25	23.84	101.3%
		9/22/2021	9:10	71	21.4	13.0	8.64	23.95	102.5%
		10/4/2021	14:00	65	18.3	9.6	9.25	23.80	101.3%
Tailwater at Powerhouse No. 4	TW@PH4	6/15/2021	7:55	73	22.8	12.1	8.99	24.75	101.7%
		7/13/2021	10:00	84	28.9	16.0	8.43	24.85	102.9%
		7/29/2021	9:00	70	21.1	14.7	8.57	24.85	100.2%
		8/5/2021	9:35	83	28.3	16.3	8.16	24.83	100.8%
		8/25/2021	8:00	66	18.9	13.6	8.69	24.80	100.6%
		9/9/2021	9:20	80	26.7	15.0	8.48	24.80	102.6%
		9/22/2021	8:35	67	19.3	11.7	9.18	24.95	110.3%
		10/4/2021	14:30	67	19.4	9.9	9.57	24.76	101.0%
Tailwater at Powerhouse No. 5	TW@PH5	6/15/2021	8:25	75	23.9	12.3	8.80	25.15	97.2%
		7/13/2021	10:40	87	30.6	16.3	8.21	25.21	99.0%
		7/29/2021	8:25	70	21.1	14.9	8.44	25.20	97.5%
		8/5/2021	9:15	81	27.2	16.8	8.26	25.20	99.6%
		8/25/2021	7:30	70	21.1	13.7	8.54	25.15	96.5%
		9/9/2021	8:45	77	25.0	15.3	8.61	25.17	101.6%
		9/22/2021	8:00	66	19.0	12.0	8.88	25.35	98.1%
		10/4/2021	14:45	71	21.7	10.0	9.45	25.14	99.7%
Tailwater at Powerhouse No. 6	TW@PH6	6/15/2021	8:55	76	24.4	13.2	9.14	25.35	103.3%
		7/13/2021	11:10	88	31.1	16.6	8.59	25.44	102.4%
		7/29/2021	7:50	70	21.1	15.3	8.54	25.45	99.6%
		8/5/2021	8:55	81	27.2	16.6	8.40	25.44	100.1%
		8/25/2021	7:05	68	20.0	13.7	8.89	25.40	100.4%
		9/9/2021	8:15	76	24.4	15.8	8.53	25.41	100.7%
		9/22/2021	7:30	66	18.9	12.1	9.07	25.60	99.0%
		10/4/2021	15:05	71	21.7	10.4	9.72	25.37	102.5%
			2021 Maximum	88	31.1	16.8	9.72	25.60	112.9%
			2021 Minimum	61	16.1	9.1	7.77	23.05	96.5%
			2021 Average	74	23.2	13.8	8.61	24.49	101.6%

Notes:
* - Saturation based on calculated DO saturation at reported water temperature and ambient barometric pressure.

5.5.2. Comparison to 2020 Monitoring Period

During the 2020 monitoring period, water temperature ranged from 10.5°C to 15.4°C with an average of 12.9°C. During the 2021 monitoring period, water temperature of the powerhouse tailwater was similar ranging from 9.1°C to 16.8°C with an average of 13.8°C. DO ranged from 8.17 mg/L to 9.64 mg/L in 2020 and 7.77 mg/L to 9.72 mg/L in 2021. DO saturation of the powerhouse tailwater averaged over 100 percent for both monitoring periods. Table 5.5-2 summarizes the results for the 2020-2021 monitoring periods.

Table 5.5-2. Summary of Dissolved Oxygen and Water Temperature for Powerhouse Tailwaters 2020-2021 Monitoring Periods

Year	Parameter	Water Temperature (deg C)	Dissolved Oxygen (mg/L)	Barometric Pressure (in Hg)	Calculated DO Saturation (%)
2020	Maximum	15.4	9.64	25.54	114.1%
	Minimum	10.5	8.17	23.11	95.6%
	Average*	12.9	8.82	24.53	102.9%
2021	Maximum	16.8	9.72	25.60	112.9%
	Minimum	9.1	7.77	23.05	96.5%
	Average*	13.8	8.61	24.49	101.6%

Notes:
* Arithmetic average is for all samples collected.

6.0 DISCUSSION

The Water Quality Study was completed the second year of the proposed 2-year investigation. Water quality data was collected on water quality of upstream lakes and creeks as well as Project facilities. The water quality data will assist in establishing baseline conditions and assist in assessing any impacts that the Project operations may have on the existing water quality. In addition, the water quality data will assist in assuring Project facilities and operations are consistent with the current water quality goals and objectives for Bishop Creek in the Water Quality Control Plan.

7.0 CONSULTATION SUMMARY

SCE consulted with the TWGs regularly through the filing of periodic progress reports. The following key milestones were observed:

- Progress Report 1: December 19, 2019
- Progress Report 2: April 14, 2020
- Progress Report 3: July 24, 2020
- Initial Study Report (ISR; Progress Report 4): October 30, 2020
- ISR Meeting: November 10, 2020
- Progress Report 1: March 2, 2021
- Progress Report 2: May 28, 2021
- Progress Report 3: August 27, 2021
- USR filing: November 4, 2021
- USR meeting: November 18, 2021

Eight technical memoranda summarizing the 2019 study implementation were submitted with Progress Report 2. Following the Progress Report 2 filing, SCE hosted a TWG meeting on May 7, 2020, to discuss the 2019 study season, work completed to date and the technical memoranda. After the meeting, TWG members submitted comments on the technical memoranda and SCE provided a general response to those comments as part of Progress Report 3. ISR was filed with FERC on October 30, 2020, and a virtual ISR Meeting was held on November 10, 2020. The SWRCB filed a comment letter during the comment period offering support for the ongoing study program with no requested changes or modifications. No other comments were received from TWG members or stakeholders on the ISR materials or on the previously provided responses to comments.

Three progress reports were filed in 2021 after filing the ISR, as identified above. SCE held a Project Effects meeting on October 28, 2021 for all stakeholders and agencies to discuss what Project effects (if any) were identified through the implementation of each of the approved study plans.

The USR was filed with FERC on November 4, 2021. A Water Quality Technical Memorandum was filed with the USR and was then distributed to agencies and stakeholders for a 60-day review period on November 5, 2021. No comments were received on that memorandum: however, comments were received on the USR as shown in Table 7.1-1.

SCE held a USR meeting held November 18, 2021 to discussed only those studies which were still in progress at the time of the ISR (Water Quality, Sediment and Geomorphology, Operations Model, Recreation Use and Needs, Recreation Facilities Condition Assessment, Project Lands and Boundary, and Cultural and Tribal Studies).

This study was filed with the Draft License Application (DLA) in January 2022. No additional comments were received. Comments received to date on the Water Quality study are included in the table below.

Table 7 7-1. Comment Response Table

Comment No.	Study	Date of Comment	Entity	Comment	Response
33	Water Quality Technical Memo	May 21, 2020	CDFW	In Section 5.2, CDFW recommends identifying the range of minimum as well as maximum possible depths in this section, as well as use of consistent units of depth (feet or meters) in future reports.	The Water Quality Study Report will provide the total depth of the lake at the monitoring point at the time of sampling in both feet and meters. This comment is addressed in Section 8.4 of Exhibit E of the Draft License Application.
34	Water Quality Technical Memo	May 21, 2020	CDFW	Section 6.1.1 indicates vertical profiles will be taken at 1-meter increments. To better understand the strength and stability of potential thermal stratification, CDFW recommends adding an additional vertical station at the spacing of 0.5 m wherever the temperature difference between two vertical stations is equal to or greater than 2^{o} C.	SCE does not believe that the additional granularity is warranted for the vertical dissolved oxygen and water temperature profiles planned at South Lake and Lake Sabrina. See note in Section 6.1.1 of the WQ Implementation Plan where thermocline is defined as greater than 1 degree centigrade per meter with depth. The Study Plan as well as the Water Quality Implementation Plan were previously distributed to the TWG for comment (most recently on Feb 14, 2020). The INF and the SWRCB both provided comments which were addressed; at this point, the methods and level of effort have been established. As provided in the ILP process, the TWG can discuss whether a change of methods is warranted during Study Report meeting scheduled for fall of 2020. This comment is addressed in Section 8.4 of Exhibit E of the Draft License Application.
1a	Updated Study Report	December 31, 2021	State Water Board	Section 401 of the Clean Water Act requires any applicant for a federal license or permit for an activity that may result in	As required by 18 CFR 5.23(b), SCE plans to file, no later than 60 days following the date of issuance of the notice of

	Meeting Summary			any discharge to navigable waters, to obtain certification from the State that the discharge will comply with the applicable water quality requirements, including the requirements of section 303 of the Clean Water Act for water quality standards and implementation plans. Clean Water Act section 401 directs that certifications shall prescribe effluent limitations and other conditions necessary to ensure compliance with the Clean Water Act and with any other appropriate requirements of state law, such as the Porter-Cologne Water Quality Control Act (Wat. Code, § 13000 et seq.). Conditions of certification shall become a condition of any federal license or permit subject to certification. The Project will continue to result in a discharge to navigable waters and must obtain certification from the State Water Board as part of relicensing for continued operations.	acceptance and ready for environmental analysis provided for in 18 CFR §5.22: (1) a copy of the water certification; (2) a copy of the request for certification, including proof of the date on which the certifying agency received the request; or (3) evidence of waiver of WQC. This comment is addressed in Section 4.2 of Exhibit E of the Draft License Application.
1b	Updated Study Report Meeting Summary	December 31, 2021	State Water Board	A certification issued by the State Water Board for Project relicensing must ensure compliance with the applicable water quality standards in the Lahontan Regional Water Quality Control Board's Water Quality Control Plan for the Lahontan Region (Lahontan Basin Plan). Water quality control plans designate the beneficial uses of water that are to be protected, water quality objectives for the reasonable protection of the beneficial uses and the prevention of nuisance, and a program of implementation to achieve the water quality objectives. (Cal. Wat. Code, §§ 13170, 13241, 13050, subds. (h), (j).) The beneficial uses, together with the water quality objectives contained in the water quality control plans and applicable	This comment is addressed in Section 8.4 of Exhibit E of the DLA.

				anti-degradation requirements, constitute California's water quality standards for purposes of the Clean Water Act. In issuing water quality certification for a project, the State Water Board must ensure consistency with the designated beneficial uses of waters affected by the project, the water quality objectives developed to protect those uses, and anti-degradation requirements. (PUD No. 1 of Jefferson County v. Washington Dept. of Ecology (1994) 511 U.S. 700, 714-719.)	
1c	Updated Study Report Meeting Summary	December 31, 2021	State Water Board	The Project facilities are located on Bishop Creek, McGee Creek, and Birch Creek. The Lahontan Basin Plan sets forth water quality standards for waterbodies in the region including Project-related waters of Bishop Creek, McGee, and Birch Creek, including Sabrina Lake and South Lake. Beneficial uses established by the Lahontan Basin Plan for these waters include municipal and domestic supply; navigation; hydropower generation; water contact recreation; water non-contact recreation; commercial sportfishing; cold freshwater habitat; warm freshwater habitat; wildlife habitat; spawning, reproduction and/or early development and agricultural supply. Additional beneficial uses listed in the Lahontan Basin Plan include groundwater recharge and freshwater replenishment and industrial service supply uses.	This comment is addressed in Section 8.5 of Exhibit E of the DLA.
1	Updated Study Report Meeting Summary	December 31, 2021	State Water Board	In addition to being the state agency with certification authority for the proposed Project relicensing, it is the State Water Board's understanding that it will also be the California Environmental Quality Act (CEQA) lead agency. CEQA requires the lead agency to evaluate a project's potential impacts to environmental resources as well	This comment is addressed in Section 4.8 of Exhibit E of the DLA.

				as identify mitigation measures and alternatives to reduce project impacts. CEQA also requires public input on identified impacts and mitigation measures. CEQA documentation must analyze and evaluate the proposed Project impacts to all relevant resources, including aquatic biological resources, special status species, water quality standards, and water quality control plans. Information from studies and data gathering during FERC's relicensing process may inform CEQA document development. Please note, the State Water Board's preference is to begin the CEQA process following issuance of a Draft License Application in order to provide adequate time to complete the CEQA process prior to taking a final action on SCE's future water quality certification request. In early 2022, State Water Board staff will reach out to SCE's to discuss the CEQA process.	
2	Updated Study Report Meeting Summary	December 31, 2021	State Water Board	Data provided in the USR appears to indicate annual averages for Total Dissolved Solids (TDS) in Lake Sabrina, South Lake, and Bishop Creek may be above the Lahontan Basin Plan TDS water quality objectives. Lake Sabrina averages for TDS (2020: 21 mg/L and 2021: 16 mg/L) are above the Lahontan Basin Plan water quality objective of 10 mg/L (annual average). South Lake averages for TDS (2020: 18 mg/L and 2021: 21 mg/L) are above the Lahontan Basin Plan water quality objective of 12 mg/L (annual average). Bishop Creek averages (2021: 32 mg/L) are above the Lahontan Basin Plan water quality objective of 27 mg/L (annual average).	The elevated numbers appear to reflect background conditions, and the original Basin Plan objectives are indicative of limited data used to establish the water quality objectives for Lake Sabrina, South Lake, and Bishop Creek. This comment has been addressed in this Final Technical Report and in Section 8.4 of Exhibit E of the DLA.

				Additionally, USR data indicates Total Nitrogen readings in Bishop Creek (2020: 0.19 mg/L and 2021: 0.12 mg/L) are above the Lahontan Basin Plan water quality objective of 0.1 mg/L. Please provide additional information in the Draft License Application on whether and, if so, how the existing Project may be contributing to TDS and Total Nitrogen concentrations. Additionally, State Water Board staff request that in future reports SCE clearly indicate if any applicable water quality objectives have been exceeded within Project-related waters.	

8.0 REFERENCES

Boehrer, B., and M. Schultze, 2008. Stratification of lakes, Rev. Geophys., 46, RG2005, doi:10.1029/2006RG000210

California Environmental Data Exchange Network (CEDEN). 2018. http://www.ceden.org/. Accessed May 2018.

California Regional Water Quality Control Board Lahontan Region (LRWQCB). 1995. Water Quality Control Plan for the Lahontan Region (Basin Plan).

Environmental Science and Engineering (ESE). 1975. Wilderness Water Quality: Bishop Creek Baseline Study. Prepared in cooperation with University of California at Los Angeles.

Knapp, R. and Craig, C. 2016. Microbial Source Tracking (MST) at Bacteria –Impaired Waters of the Lahontan Region. Prepared for the California Regional Water Quality Control Board – Lahontan Region. March 2016.

Lund, L.J., n.d. Water Quality of Bishop Creek and Selected Eastern Sierra Nevada Lakes. University of California at Riverside, Department of Soil and Environmental Sciences.

Southern California Edison (SCE). 2021. Final Technical Report – Bishop Creek Reservoirs Fish Distribution (AQ 4). May 2021.

SCE, 2020. Initial Study Report: Bishop Creek Hydroelectric Project. October 2020.

United States Department of Agriculture (USDA). 2019. Land Management Plan for the Inyo National Forest. https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd589652.pdf.

U.S. Environmental Protection agency (USEPA), EPA-600/4-79-202, Method for Chemical Analysis of Waters and Wastes Manual. Cincinnati, OH, 1983.

APPENDIX A

2021 COMPLETED FIELD FORMS

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below LS DATE: 6/14/21 TIME: 9:35am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 14.1 (ºF or ºC) Dissolved Oxygen: 7.44 (mg/L)

Conductivity: 29 (µmhos/cm@25 ºC) Stream or Lake gage reading: NA

Turbidity: 2.13 (NTUs) Air Temperature 64 (ºF or ºC) Baro. Pressure 21.55 (in Hg)

Winds 8-12 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: – meters Depth of Reappearance: ________ meters

Secchi Depth: ________ meters

Visual Condition of Stream (check all that apply):
Clear ✓ Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks: ________

Notes

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-LS Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ________

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: North Fork DATE: 6/14/21 TIME: 10:40am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS | WEATHER CONDITIONS

Water Temperature: 14.3 (ºF or ºC) Dissolved Oxygen: 8.27 (mg/L)

Conductivity: 32 (μmhos/cm@25 ºC) Stream ~~or Lake gage reading~~ flow measurement: 11.3 cfs

Turbidity: 1.96 (NTUs) Air Temperature 70 (ºF or ºC) Baro. Pressure 21.35 (in Hg)

Winds 1-2 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear ✓ Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks:

Notes

Average stream flow measured by cross-section and flow meter. Flow = 11.3 cfs. Was 24 cfs in June 2020.

WATER QUALITY SAMPLE DATA

Sample No. BC-NF-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below South Lake DATE: 6/14/21 TIME: 11:25 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 8.4 (ºF or ºC) Dissolved Oxygen: 8.61 (mg/L)

Conductivity: 37 (μmhos/cm@25 ºC) Stream or Lake gage reading: NA

Turbidity: 1.57 (NTUs) Air Temperature 70 (ºF or ºC) Baro. Pressure 21.10 (in Hg)

Winds 4-10 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: _____ meters Depth of Reappearance: _____ meters

Secchi Depth: _____ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy _____ Colored _____

Floating Material _____ Other: _____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-SL Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH2 DATE: 6/14/21 TIME: 11:55am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS — WEATHER CONDITIONS

Water Temperature: 12.4 (ºF or ºC) Dissolved Oxygen: 8.58 (mg/L)

Conductivity: - (µmhos/cm@25 ºC) Stream or Lake gage reading: NA

Turbidity: - (NTUs) Air Temperature 74 (ºF or ºC) Baro. Pressure 23.05 (in Hg)

from N

Winds 2-4 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ________ meters Depth of Reappearance: ________ meters

Secchi Depth: ________ meters

Visual Condition of Stream (check all that apply):

Clear ✓ Cloudy ________ Colored ________

Floating Material ________ Other: ________

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ________ Preservatives: ________

REMARKS

SIGNED BY: [signature] REVIEWED BY: ________

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH2 DATE: 6/14/21 TIME: 12:05 pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS WEATHER CONDITIONS

Water Temperature: 12.6 (ºF or ºC) Dissolved Oxygen: 8.73 (mg/L)

Conductivity: 42 (µmhos/cm@25 ºC) Stream or Lake gage reading: 1.70'

Turbidity: 2.45 (NTUs) Air Temperature 74 (ºF or ºC) Baro. Pressure ____ (in Hg)

N Winds 2-4 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear x Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks: ____

Notes

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-PH2 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH3 DATE: 6/14/21 TIME: 12:20 p

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 13.2 (ºF or ºC)

Dissolved Oxygen: 8.65 (mg/L)

Conductivity: – (µmhos/cm@25 ºC)

Stream or Lake gage reading: NA

Turbidity: – (NTUs)

Air Temperature 75 (ºF or ºC)

Baro. Pressure 23.70 (in Hg)

Winds 0-1 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ________meters

Depth of Reappearance: ________meters

Secchi Depth: ________meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ________ Colored ________

Floating Material ________ Other: ________

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ________ Preservatives: ________

REMARKS

SIGNED BY: [signature] REVIEWED BY: ________

002

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH3 DATE: 6/14/21 TIME: 12:30pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS WEATHER CONDITIONS

Water Temperature: 13.9 (ºF or ºC) Dissolved Oxygen: 8.57 (mg/L)

Conductivity: 46 (µmhos/cm@25 ºC) Stream or Lake gage reading: 0.70'

Turbidity: 2.24 (NTUs) Air Temperature 75 (ºF or ºC) Baro. Pressure 23.75 (in Hg)

Winds 1-2 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-PH3 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH 4 DATE: 6/15/21 TIME: 7:55am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 12.1 (ºF or ºC) Dissolved Oxygen: 8.99 (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: NA

Turbidity: – (NTUs) Air Temperature 73 (ºF or ºC) Baro. Pressure 24.75 (in Hg)

Winds 1 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):

Clear x Cloudy ______ Colored ______

Floating Material ______ Other: ______

Remarks: ______

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ______ Preservatives: ______

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH 4 DATE: 6/15/21 TIME: 8:05am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

Water Temperature: 12.8 (ºF or ºC)

Conductivity: 52 (µmhos/cm@25 ºC)

Turbidity: 5.6 (NTUs)

WEATHER CONDITIONS

Dissolved Oxygen: 9.14 (mg/L)

Stream or Lake gage reading: NA

Air Temperature 74 (ºF or ºC) Baro. Pressure 24.75 (in Hg)

Winds 0-1 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ________meters Depth of Reappearance: ________meters

Secchi Depth: ________meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ________ Colored ________

Floating Material ________ Other: ________

Remarks: ________

Notes

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-PH4 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ________

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH5 DATE: 6/15/21 TIME: 8:25am

DRAINAGE: Bishop Creek INVESTIGATORS: JB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 12.3 (ºF or ºC) Dissolved Oxygen: 8.80 (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: NA

Turbidity: – (NTUs) Air Temperature 75 (ºF or ºC) Baro. Pressure 25.15 (in Hg)

Winds 0-1 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear x Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH5 DATE: 6/15/21 TIME: 8:35 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 13.2 (ºF or ºC) Dissolved Oxygen: 8.80 (mg/L)

Conductivity: 51 (μmhos/cm@25 ºC) Stream or Lake gage reading: NA

Turbidity: 3.31 (NTUs) Air Temperature 75 (ºF or ºC) Baro. Pressure 25.15 (in Hg)

Winds 0 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear:______meters Depth of Reappearance: ______meters

Secchi Depth: ______meters

Visual Condition of Stream (check all that apply):

Clear ______ Cloudy ______ Colored ______

Floating Material x Other: x leaf litter

Remarks: Algae growing on rocks in the streamflow

Notes

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-PH5 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH 6 DATE: 6/15/21 TIME: 8:55 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 13.2 (ºF or ºC) Dissolved Oxygen: 9.14 (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: NA

Turbidity: – (NTUs) Air Temperature 76 (ºF or ºC) Baro. Pressure 25.35 (in Hg)

Winds 0-1 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ________meters Depth of Reappearance: ________meters

Secchi Depth: ________meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ________ Colored ________

Floating Material ________ Other: ________

Remarks: ________

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ________ Preservatives: ________

REMARKS

SIGNED BY: [signature] REVIEWED BY: ________

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH6 DATE: 6/15/21 TIME: 9:05am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 12.8 (ºF or ºC) Dissolved Oxygen: 9.30 (mg/L)

Conductivity: 47 (µmhos/cm@25 ºC) Stream or Lake gage reading: NA

Turbidity: 2.5 (NTUs) Air Temperature 76 (ºF or ºC) Baro. Pressure 25.35 (in Hg)

Winds 0 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear ✓ Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-PH6 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: South Lake DATE: 6/16/21 TIME: 10:30am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS | WEATHER CONDITIONS

Water Temperature: See Profile (ºF or ºC) Dissolved Oxygen: See Profile (mg/L)

Conductivity: 37 (µmhos/cm@25 ºC) Stream or Lake gage reading: 9693.2' msl

Turbidity: Secchi (NTUs) Air Temperature 55 (ºF or ºC) Baro. Pressure 21.2 (in Hg)

Winds 5-8 (mph) Cloud cover 30 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: Depth of Disappear: 14.5 meters Depth of Reappearance: 12.5 meters

Secchi Depth: 13.5 meters

Visual Condition of Stream (check all that apply):

Clear ✓ Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks: Sample taken at 1/2 Secchi depth: = 7 m depth
No thermocline.

Notes

WATER QUALITY SAMPLE DATA

Sample No. SL-DP-7 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: South Lake DATE: 6/16/21 TIME: 11:00am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS — WEATHER CONDITIONS

Water Temperature: See Profile (ºF or ºC) Dissolved Oxygen: See Profile (mg/L)

Conductivity: 2230 (µmhos/cm@25 ºC) Stream or Lake gage reading: 9693.2' msl

Turbidity: Secchi (NTUs) Air Temperature 55 (ºF or ºC) Baro. Pressure 21.2 (in Hg)

Winds 5-8 (mph) Cloud cover 30 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: Depth of Disappear: 14.5 meters Depth of Reappearance: 12.5 meters

Secchi Depth: 13.5 meters

Visual Condition of Stream (check all that apply):

Clear ______ Cloudy X Colored ______

Floating Material ______ Other: ______

Remarks: Sample taken in anoxic zone at 40m below surface
No thermocline.

Notes

WATER QUALITY SAMPLE DATA

Sample No. SL-DP-40 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one.

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Lake Sabrina DATE: 6/17/21 TIME: 9:30am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS | **WEATHER CONDITIONS**

Water Temperature: See Profile (ºF or ºC) Dissolved Oxygen: See Profile (mg/L)

Conductivity: 23 (µmhos/cm@25 ºC) Stream or Lake gage reading: 9099.5' msl

Turbidity: Secchi (NTUs) Air Temperature 57 (ºF or ºC) Baro. Pressure 21.60 (in Hg)

Winds 0-3 (mph) Cloud cover 30 (%) Precipitation ___ Fog ___ Rain ___ Sleet ___ Hail ___ Snow

Secchi Disk: Depth of Disappear: 8 meters Depth of Reappearance: 9.5 meters

Secchi Depth: 8.75 meters

Visual Condition of Stream (check all that apply):
Clear ✓ Cloudy ___ Colored ___
Floating Material ___ Other: ___

Remarks: Thermocline at ~ 8-10 m depth. Sampled at 5m depth

Site Drawing

WATER QUALITY SAMPLE DATA

Sample No. LS-DP-5 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ___

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Lake Sabrina DATE: 6/17/21 TIME: 10:00am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS | **WEATHER CONDITIONS**

Water Temperature: See Profile (ºF or ºC) Dissolved Oxygen: See Profile (mg/L)

Conductivity: 26 (µmhos/cm@25 ºC) Stream or Lake gage reading: 9099.5' msl

Turbidity: Secchi (NTUs) Air Temperature 57 (ºF or ºC) Baro. Pressure 21.60 (in Hg)

Winds 0-3 (mph) Cloud cover 30 (%) Precipitation ___ Fog ___ Rain ___ Sleet ___ Hail ___ Snow

Secchi Disk: Depth of Disappear: 8 meters Depth of Reappearance: 9.5 meters

Secchi Depth: 8.75 meters

Visual Condition of Stream (check all that apply):
Clear ✓ Cloudy ___ Colored ___
Floating Material ___ Other: ___

Remarks: Thermocline at ~8-10m. Sampled at 20 m depth

Site Drawing

WATER QUALITY SAMPLE DATA

Sample No. LS-DP-20 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ___

WATER TEMPERATURE AND DISSOLVED OXYGEN LAKE PROFILE DATA FORM

Location: South Lake 6/16/21

DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)	DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)	
0.5	11.9	8.13	31	4.2	5.72	
1	11.9	8.10	32	4.3	4.54	R.P.
2	11.8	8.11	33	4.3	3.53	
3	11.7	8.13	34	4.4	2.82	
4	11.6	8.14	35	4.7	0.28	
5	11.6	8.14	36	5.4	0.15	
6	11.6	8.15	37	5.6	0.04	
7	11.5	8.16	38	5.9	0.03	
8	11.4	8.20	39	6.1	0.03	
9	11.3	8.24	40	6.1	0.00	
10	11.1	8.27	41	6.3	-0.00	
11	11.0	8.24	42	6.6	-0.00	
12	10.7	8.35	43	6.7	-0.00	
13	10.4	8.4	44	7.0	-0.00	
14	9.7	8.83	45	7.1	-0.01	
15	9.0	9.12	46	7.4	-0.01	
16	8.7	9.4	47	7.6	-0.02	
17	8.0	9.46	48	7.7	-0.02	
18	7.5	9.53	48.5 ~~49~~	7.7	-0.03	BOTTOM
19	6.9	9.52	50			
20	6.3	9.35	51			
21	5.5	9.18	52			
22	4.9	8.91	53			
23	4.6	8.73	54			
24	4.4	8.48	55			
25	4.3	8.30	56			
26	4.2	8.05	57			
27	4.2	7.73	58			
28	4.2	7.40	59			
29	4.2	7.12	60			
30	4.2	6.60	61			

WATER TEMPERATURE AND DISSOLVED OXYGEN LAKE PROFILE DATA FORM

Location: Lake Sabrina 6/17/21

1
68.7

Thermo-cline

DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (ºC)	DISSOLVED OXYGEN (mg/L)	DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (ºC)	DISSOLVED OXYGEN (mg/L)
0.5	13.4	8.21	31	4.5	8.21
1	13.4	8.23	32	4.5	8.19
2	13.3	8.23	33	4.5	8.17
3	13.3	8.24	34	4.5	8.16
4	13.3	8.24	35	4.4	8.15
5	13.2	8.25	36	4.4	8.12
6	12.8	8.43	37	4.4	8.05
7	12.6	8.50	38	4.4	7.98
8	11.9	8.77	39	4.4	8.00
9	10.6	9.39	40	4.3	8.01
10	9.6	9.78	41	4.3	8.01
11	8.7	10.01	42	4.3	8.02
12	8.3	10.02	43	4.3	8.02
13	7.7	10.09	44	4.3	8.01
14	7.1	10.16	45	4.3	7.97
15	6.6	10.16	46	4.3	7.95
16	6.3	10.05	47	4.3	7.80
17	6.0	9.83	48	4.2	7.82
18	5.6	9.50	49	4.2	7.86
19	5.5	9.35	50	4.2	7.86
20	5.2	9.10	51	4.2	7.75
21	5.1	8.84	52	4.2	7.70
22	5.0	8.53	53	4.2	7.64
23	4.9	8.44	54	4.3	7.51
24	4.8	8.35	55	4.3	7.42
25	4.7	8.30	56	4.3	7.36
26	4.6	8.26	57	4.3	7.23
27	4.6	8.25	58	4.2	7.15
28	4.6	8.20	59	4.2	7.02
29	4.6	8.20	60	4.2	6.76
30	4.5	8.21	61	4.2	6.63

WATER TEMPERATURE AND DISSOLVED OXYGEN LAKE PROFILE DATA FORM

Location: Lake Sabrina

DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)	DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)
62	4.2	6.54	91		
63	4.2	6.06	92		
64	4.2	5.59	93		
65	4.2	5.05	94		
65.3 ~~66~~	4.2	4.70	95		
67			96		
68			97		
69			98		
70			99		
71			100		
72			101		
73			102		
74			103		
75			104		
76			105		
77			106		
78			107		
79			108		
80			109		
81			110		
82			111		
83			112		
84			113		
85			114		
86			115		
87			116		
88			117		
89			118		
90			119		

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: North Fork DATE: 7/12/21 TIME: 7:30am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 16.2 (ºF or ºC)

Dissolved Oxygen: 7.92 (mg/L)

Conductivity: - (µmhos/cm@25 ºC)

Stream or Lake gage reading: 13.4 cfs

Turbidity: - (NTUs)

Air Temperature 63 (ºF or ºC)

Baro. Pressure 21.60 (in Hg)

Winds 0-1 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):

Clear ✓ Cloudy ______ Colored ______

Floating Material ______ Other: ______

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ______ Preservatives: ______

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Middle Fork DATE: 7/12/21 TIME: 8:55am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 17.4 (ºF or ºC) Dissolved Oxygen: 7.46 (mg/L)

Conductivity: — (μmhos/cm@25 ºC) Stream or Lake gage reading: —

Turbidity: — (NTUs) Air Temperature 66 (ºF or ºC) Baro. Pressure 21.74 (in Hg)

Winds 0-1 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ___ meters Depth of Reappearance: ___ meters

Secchi Depth: ___ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ___ Colored ___

Floating Material ___ Other: ___

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ___ Preservatives: ___

REMARKS

SIGNED BY: [signature] REVIEWED BY: ___

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: South Fork DATE: 7/12/21 TIME: 9:45 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS — WEATHER CONDITIONS

Water Temperature: 12.7 (ºF or ºC) Dissolved Oxygen: 7.91 (mg/L)

Conductivity: - (μmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: - (NTUs) Air Temperature 70 (ºF or ºC) Baro. Pressure 21.34 (in Hg)

Winds 1-2 (mph) Cloud cover 15 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear ✓ Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: South Lake DATE: 7/12/21 TIME: 11:15am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS — WEATHER CONDITIONS

Water Temperature: – (ºF or ºC) Dissolved Oxygen: – (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: 9683.28'

Turbidity: – (NTUs) Air Temperature 72 (ºF or ºC) Baro. Pressure 21.23 (in Hg)

Winds 5-9 (mph) Cloud cover 30 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ___ meters Depth of Reappearance: ___ meters

Secchi Depth: ___ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ___ Colored ___
Floating Material ___ Other: ___

Remarks: ___

Notes

Lake is very low. Approx. 15' lower than during June trip. Collected sample for below usual boat ramp location. Signs of people using this area (footprints).

WATER QUALITY SAMPLE DATA

Sample No. SL-BR-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 2 Preservatives: None

REMARKS

1 Weck bottle

1 Source Molecular

SIGNED BY: [signature] REVIEWED BY: ___

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Lake Sabrina DATE: 7/12/21 TIME: 11:45am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: – (ºF or ºC) Dissolved Oxygen: – (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: 9098.08

Turbidity: – (NTUs) Air Temperature 76 (ºF or °C) Baro. Pressure 21.68 (in Hg)

Winds 5-11 (mph) Cloud cover 30 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear ____ Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. LS-BR-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 2 Preservatives: None

REMARKS

1 weck bottle
1 source Molecular bottle

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Intake 2 Reservoir DATE: 7/12/21 TIME: 12:05 pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS WEATHER CONDITIONS

Water Temperature: – (ºF or ºC) Dissolved Oxygen: – (mg/L)

Conductivity: – (μmhos/cm@25 ºC) Stream or Lake gage reading: ____

Turbidity: – (NTUs) Air Temperature 79 (ºF or ºC) Baro. Pressure 22.49 (in Hg)

Winds 3-7 (mph) Cloud cover 40 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear ✓ Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks: ____

Notes

WATER QUALITY SAMPLE DATA

Sample No. INT2-RES-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 2 Preservatives: None

REMARKS

1 Weck bottle

1 Source Molecular bottle

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH2 DATE: 7/13/21 TIME: 8:30am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 15.4 (ºF or ºC) Dissolved Oxygen: 7.94 (mg/L)

Conductivity: — (µmhos/cm@25 ºC) Stream or Lake gage reading: ______

Turbidity: — (NTUs) Air Temperature 73 (ºF or ºC) Baro. Pressure 23.22 (in Hg)

Winds 2-3 (mph) Cloud cover 10 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks: ______

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ______ Preservatives: ______

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC Below PH2 DATE: 7/13/21 TIME: 8:45am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS | WEATHER CONDITIONS

Water Temperature: 15.1 (ºF or ºC) Dissolved Oxygen: 8.09 (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: 1.7'

Turbidity: – (NTUs) Air Temperature 73 (ºF or ºC) Baro. Pressure 23.22 (in Hg)

Winds 0-1 (mph) Cloud cover 10 (%) Precipitation __Fog __Rain __Sleet __Hail __Snow

Secchi Disk: NA Depth of Disappear: ___ meters Depth of Reappearance: ___ meters

Secchi Depth: ___ meters

Visual Condition of Stream (check all that apply):
Clear ✓ Cloudy ___ Colored ___
Floating Material ___ Other: ___

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ___ Preservatives: ___

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH3 DATE: 7/13/21 TIME: 9:15am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS WEATHER CONDITIONS

Water Temperature: 15.5 (ºF or ºC) Dissolved Oxygen: 8.22 (mg/L)

Conductivity: - (µmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: - (NTUs) Air Temperature 79 (ºF or ºC) Baro. Pressure 23.90 (in Hg)

Winds 2-4 (mph) Cloud cover 10 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH3 DATE: 7/13/21 TIME: 9:35am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 15.8 (ºF or ºC)

Dissolved Oxygen: 8.21 (mg/L)

Conductivity: - (µmhos/cm@25 ºC)

Stream or Lake gage reading: 0.7'

Turbidity: - (NTUs)

Air Temperature 79 (ºF or ºC)

Baro. Pressure 23,90 (in Hg)

Winds 0 (mph) Cloud cover 10 (%) Precipitation __Fog __Rain __Sleet __Hail __Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH 4 DATE: 7/13/21 TIME: 10:00 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 16.0 (ºF or ºC) Dissolved Oxygen: 8.43 (mg/L)

Conductivity: — (µmhos/cm@25 ºC) Stream or Lake gage reading: —

Turbidity: — (NTUs) Air Temperature 84 (ºF or °C) Baro. Pressure 24.85 (in Hg)

Winds 2-4 (mph) Cloud cover 10 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):

Clear ✓ Cloudy ______ Colored ______

Floating Material ______ Other: ______

Remarks: ______

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ______ Preservatives: ______

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH 4 DATE: 7/13/21 TIME: 10:20am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 16.0 (ºF or ºC) Dissolved Oxygen: 8.53 (mg/L)

Conductivity: — (µmhos/cm@25 ºC) Stream or Lake gage reading: —

Turbidity: — (NTUs) Air Temperature 85 (ºF or ºC) Baro. Pressure 24.89 (in Hg)

Winds 0 - 1 (mph) Cloud cover 10 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear:________meters Depth of Reappearance: ________meters

Secchi Depth: ________meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ______ Preservatives: ______

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH5 DATE: 7/13/21 TIME: 10:40 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 16.3 (ºF or ºC) Dissolved Oxygen: 8.21 (mg/L)

Conductivity: - (μmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: - (NTUs) Air Temperature 87 (ºF or ºC) Baro. Pressure 25.21 (in Hg)

Winds 3-7 (mph) Cloud cover 10 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks: ______

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ______ Preservatives: ______

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH5 DATE: 7/13/21 TIME: 10:55am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 17.1 (ºF or ºC) Dissolved Oxygen: 8.32 (mg/L)

Conductivity: - (μmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: - (NTUs) Air Temperature 87 (ºF or ºC) Baro. Pressure 25.21 (in Hg)

Winds 0-1 (mph) Cloud cover 10 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH 6 DATE: 7/13/21 TIME: 11:10 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS WEATHER CONDITIONS

Water Temperature: 16.6 (ºF or ºC) Dissolved Oxygen: 8.59 (mg/L)

Conductivity: - (µmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: - (NTUs) Air Temperature 88 (ºF or ºC) Baro. Pressure 25.44 (in Hg)

Winds 4-14 (mph) Cloud cover 15 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: _____ meters Depth of Reappearance: _____ meters

Secchi Depth: _____ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy _____ Colored _____

Floating Material _____ Other: _____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles _____ Preservatives: _____

REMARKS

SIGNED BY: [signature] REVIEWED BY: _____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH6 DATE: 7/13/21 TIME: 11:20am

DRAINAGE: Bishop Creek INVESTIGATORS: +B

PHYSICAL WATER QUALITY PARAMETERS

Water Temperature: 16.8 (ºF or ºC)

Conductivity: – (µmhos/cm@25 ºC)

Turbidity: – (NTUs)

WEATHER CONDITIONS

Dissolved Oxygen: 8.61 (mg/L)

Stream or Lake gage reading: –

Air Temperature 88 (ºF or ºC) Baro. Pressure 25.44 (in Hg)

Winds 0-1 (mph) Cloud cover 15 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks: ____

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: South Lake DATE: 7/15/21 TIME: 12:05 pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: — (ºF or ºC) Dissolved Oxygen: — (mg/L)

Conductivity: — (µmhos/cm@25 ºC) Stream or Lake gage reading: 9682.18

Turbidity: — (NTUs) Air Temperature 70 (ºF or ºC) Baro. Pressure 21.16 (in Hg)

gusts to 25 mph

Winds 8-20 (mph) Cloud cover 15 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks: Lake level low, far below original boat ramp

Notes

WATER QUALITY SAMPLE DATA

Sample No. SL-BR-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 2 Preservatives: None

REMARKS

1 Weck

1 Source Molecular

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Lake Sabrina DATE: 7/15/21 TIME: 12:30pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS WEATHER CONDITIONS

Water Temperature: — (ºF or ºC) Dissolved Oxygen: — (mg/L)

Conductivity: — (µmhos/cm@25 ºC) Stream or Lake gage reading: 9097.69'

Turbidity: — (NTUs) Air Temperature 74 (ºF or ºC) Baro. Pressure 21.62 (in Hg)

Winds 4-10 gusts to 13 (mph) Cloud cover 15 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear ____ Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks: ____

Notes

WATER QUALITY SAMPLE DATA

Sample No. LS-BR-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 2 Preservatives: ____

REMARKS

1 Weck
1 Source Molecular

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Intake 2 Reservoir DATE: 7/15/21 TIME: 12:50 pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS — WEATHER CONDITIONS

Water Temperature: - (ºF or ºC) Dissolved Oxygen: - (mg/L)

Conductivity: - (µmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: - (NTUs) Air Temperature 77 (ºF or ºC) Baro. Pressure 22.44 (in Hg)

Winds 2-5 (mph) Cloud cover 15 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ______ Colored ______
Floating Material X Other: ______

Remarks: Algae mats floating on surface

Notes

WATER QUALITY SAMPLE DATA

Sample No. INT2-RES-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 2 Preservatives: None

REMARKS

1 Week
1 Source Molecular

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: North Fork DATE: 7/26/21 TIME: 8:30 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 15.8 (ºF or ºC) Dissolved Oxygen: 7.41 (mg/L)

Conductivity: 30 (µmhos/cm@25 ºC) Stream or Lake gage reading: 13 cfs

Turbidity: 1.85 (NTUs) Air Temperature 58 (ºF or °C) Baro. Pressure 21.40 (in Hg)

Winds 0-1 (mph) Cloud cover 30 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear ✓ Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks: Some smoke in air

Notes

WATER QUALITY SAMPLE DATA

Sample No. BC-NF-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Middle Fork DATE: 7/26/21 TIME: 9:15a

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 18.4 (ºF or ºC) Dissolved Oxygen: 7.08 (mg/L)

Conductivity: 0.07 (µmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: 1.75 (NTUs) Air Temperature 60 (ºF or ºC) Baro. Pressure 21.55 (in Hg)

Winds 0-1 (mph) Cloud cover 30 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-LS Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: South Fork DATE: 7/26/21 TIME: 10:00 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 14.1 (ºF or ºC) Dissolved Oxygen: 7.46 (mg/L)

Conductivity: 33 (μmhos/cm@25 ºC) Stream or Lake gage reading: –

Turbidity: 2.03 (NTUs) Air Temperature 61 (ºF or ºC) Baro. Pressure 21.15 (in Hg)

Winds 1-3 (mph) Cloud cover 25 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: Depth of Disappear: _____ meters Depth of Reappearance: _____ meters

Secchi Depth: _____ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks: ____

Notes

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-SL Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: South Lake DATE: 7/26/21 TIME: 12:00pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS | WEATHER CONDITIONS

Water Temperature: – (ºF or ºC) Dissolved Oxygen: – (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: ____

Turbidity: – (NTUs) Air Temperature 62 (ºF or ºC) Baro. Pressure 21.10 (in Hg)

Winds 4-9 (mph) Cloud cover 25 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks: Lake lower than mid-July visit

Notes

WATER QUALITY SAMPLE DATA

Sample No. SL-BR-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 2 Preservatives: None

REMARKS

1 Week
1 Source Molecular

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Lake Sabrina DATE: 7/24/21 TIME: 12:40pm

DRAINAGE: Bishop Creek INVESTIGATORS: JB JB

PHYSICAL WATER QUALITY PARAMETERS WEATHER CONDITIONS

Water Temperature: — (ºF or ºC) Dissolved Oxygen: — (mg/L)

Conductivity: — (μmhos/cm@25 ºC) Stream or Lake gage reading: ____

Turbidity: — (NTUs) Air Temperature 66 (°F or °C) Baro. Pressure 21.55 (in Hg)

Winds 4-7 (mph) Cloud cover 40 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear x Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks: ____

Notes

WATER QUALITY SAMPLE DATA

Sample No. LS-BR-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 2 Preservatives: None

REMARKS

1 Week
1 Source Molecule

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Intake 2 Reservoir DATE: 7/26/21 TIME: 1:00pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS | WEATHER CONDITIONS

Water Temperature: – (ºF or ºC) Dissolved Oxygen: – (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: –

Turbidity: – (NTUs) Air Temperature 67 (ºF or ºC) Baro. Pressure 22.15 (in Hg)

Winds 3-8 (mph) Cloud cover 40 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ___ meters Depth of Reappearance: ___ meters

Secchi Depth: ___ meters

Visual Condition of Stream (check all that apply):
Clear x Cloudy ___ Colored ___
Floating Material ___ Other: ___

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. INT-RES-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 2 Preservatives: Non

REMARKS

1 Weck
1 Source Melcember

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: South Lake DATE: 7/27/21 TIME: 9:45 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS | WEATHER CONDITIONS

Water Temperature: See profile (ºF or ºC) Dissolved Oxygen: See profile (mg/L)

Conductivity: 31 (µmhos/cm@25 ºC) Stream or Lake gage reading: 9676'

Turbidity: Secchi (NTUs) Air Temperature 58 (ºF or ºC) Baro. Pressure 21.18 (in Hg)

Winds 4-6 gusts to 16 (mph) Cloud cover 10 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: Y Depth of Disappear: 9.5 meters Depth of Reappearance: 8 meters

Secchi Depth: 8.75 meters

Visual Condition of Stream (check all that apply):
Clear ____ Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks:

Notes

Sampled at 10m depth

WATER QUALITY SAMPLE DATA

Sample No. SL-DP-10 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: South Lake DATE: 7/27/21 TIME: 10:15am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS WEATHER CONDITIONS

Water Temperature: See profile (ºF or ºC) Dissolved Oxygen: See profile (mg/L)

Conductivity: 73 (µmhos/cm@25 ºC) Stream or Lake gage reading: 9676'

Turbidity: Secchi (NTUs) Air Temperature 55 (ºF or ºC) Baro. Pressure 21.10 (in Hg)

Winds 4-6 gust to 16 (mph) Cloud cover 10 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: Y Depth of Disappear: 9.5 meters Depth of Reappearance: 8 meters

Secchi Depth: 8.75 meters

Visual Condition of Stream (check all that apply):
Clear ______ Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks: ______

Notes

Sampled at 24m depth

WATER QUALITY SAMPLE DATA

Sample No. SL-DP-24 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Lake Sabrina DATE: 7/28/21 TIME: 9:45am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: See profile (ºF or ºC) Dissolved Oxygen: See profile (mg/L)

Conductivity: 26 (μmhos/cm@25 ºC) Stream or Lake gage reading: 9098.58'

Turbidity: Secchi (NTUs) Air Temperature 58 (ºF or ºC) Baro. Pressure 21.70 (in Hg)

Winds 3-6 (mph) Cloud cover 50 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: Y Depth of Disappear: 13 meters Depth of Reappearance: 11.5 meters

Secchi Depth: 12.25 meters

Visual Condition of Stream (check all that apply):

Clear ______ Cloudy ______ Colored ______

Floating Material ______ Other: ______

Remarks: ______

Notes

Sampled at 5m depth

WATER QUALITY SAMPLE DATA

Sample No. LS-DP-5 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Lake Sabrina DATE: 7/28/21 TIME: 10:05am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: See profile (ºF or ºC) Dissolved Oxygen: see profile (mg/L)

Conductivity: 27 (µmhos/cm@25 ºC) Stream or Lake gage reading: 9098.58'

Turbidity: Secchi (NTUs) Air Temperature 58 (ºF or °C) Baro. Pressure 21.70 (in Hg)

Winds 3-6 (mph) Cloud cover 50 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: Y Depth of Disappear: 13 meters Depth of Reappearance: 11.5 meters

Secchi Depth: 12.25 meters

Visual Condition of Stream (check all that apply):

Clear ______ Cloudy ______ Colored ______

Floating Material ______ Other: ______

Remarks: ______

Notes

Sampled at 22m depth

WATER QUALITY SAMPLE DATA

Sample No. LS-DP-22 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Lake Sabrina DATE: 7/28/21 TIME: 12:05pm

DRAINAGE: Bishop Creek INVESTIGATORS: JB JB

PHYSICAL WATER QUALITY PARAMETERS | WEATHER CONDITIONS

Water Temperature: - (ºF or ºC) Dissolved Oxygen: - (mg/L)

Conductivity: - (µmhos/cm@25 ºC) Stream or Lake gage reading: 9098.58'

Turbidity: - (NTUs) Air Temperature 65 (ºF or ºC) Baro. Pressure 21.56 (in Hg)

Winds 3-6 (mph) Cloud cover 50 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ___ meters Depth of Reappearance: ___ meters

Secchi Depth: ___ meters

Visual Condition of Stream (check all that apply):
Clear ___ Cloudy ___ Colored ___
Floating Material ___ Other: ___

Remarks: ___

Notes

WATER QUALITY SAMPLE DATA

Sample No. LS-BR-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 2 Preservatives: None

REMARKS

1 Weck
1 Source Molecular

SIGNED BY: [signature] REVIEWED BY: ___

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Intake 2 Reservoir DATE: 7/28/21 TIME: 12:15pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: – (ºF or ºC) Dissolved Oxygen: – (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: –

Turbidity: – (NTUs) Air Temperature 65 (ºF or °C) Baro. Pressure 22.15 (in Hg)

Winds 0 - 1 (mph) Cloud cover 40 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):
Clear ______ Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks: ______

Notes

WATER QUALITY SAMPLE DATA

Sample No. INT2-RES-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 2 Preservatives: None

REMARKS

1 Weck

1 Source Molecular

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: South Lake DATE: 7/20/21 TIME: 12:40pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS | WEATHER CONDITIONS

Water Temperature: – (ºF or ºC) Dissolved Oxygen: – (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: 9676.54'

Turbidity: – (NTUs) Air Temperature 66 (ºF or ºC) Baro. Pressure 21.10 (in Hg)

Winds 1-3 (mph) Cloud cover 60 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):
Clear ______ Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks: ______

Notes

WATER QUALITY SAMPLE DATA

Sample No. SL-BR-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 2 Preservatives: None

REMARKS

1 Weck

1 Source Molecular

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH6 DATE: 7/29/21 TIME: 7:50 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS WEATHER CONDITIONS

Water Temperature: 15.3 (ºF or ºC) Dissolved Oxygen: 8.54 (mg/L)

Conductivity: - (µmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: - (NTUs) Air Temperature 70 (ºF or ºC) Baro. Pressure 25.45 (in Hg)

Winds 0 (mph) Cloud cover 70 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks: ____

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC-blw-PH6 DATE: 7/29/21 TIME: 8:05 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS | WEATHER CONDITIONS

Water Temperature: 15.2 (ºF or ºC) Dissolved Oxygen: 8.65 (mg/L)

Conductivity: 51 (µmhos/cm@25 ºC) Stream or Lake gage reading: –

Turbidity: 2.89 (NTUs) Air Temperature 70 (ºF or ºC) Baro. Pressure 25.45 (in Hg)

Winds 0 (mph) Cloud cover 70 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ________ meters Depth of Reappearance: ________ meters

Secchi Depth: ________ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-PH6 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH5 DATE: 7/29/21 TIME: 8:25 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS | WEATHER CONDITIONS

Water Temperature: 14.9 (ºF or ºC) Dissolved Oxygen: 8.44 (mg/L)

Conductivity: - (μmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: - (NTUs) Air Temperature 70 (ºF or ºC) Baro. Pressure 25.20 (in Hg)

Winds 0 - 1 (mph) Cloud cover 80 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ___ meters Depth of Reappearance: ___ meters

Secchi Depth: ___ meters

Visual Condition of Stream (check all that apply):
Clear ✓ Cloudy ___ Colored ___
Floating Material ___ Other: ___

Remarks: ___

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ___ Preservatives: ___

REMARKS

SIGNED BY: [signature] 7/29/21 REVIEWED BY: ___

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC b\w PH5 DATE: 7/24/21 TIME: 8:35am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS — WEATHER CONDITIONS

Water Temperature: 15.3 (ºF or ºC) Dissolved Oxygen: 8.42 (mg/L)

Conductivity: 52 (µmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: 6.26 (NTUs) Air Temperature 70 (ºF or °C) Baro. Pressure 25.20 (in Hg)

Winds 0-1 (mph) Cloud cover 80 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks: some algae on creek bottom

Notes

WATER QUALITY SAMPLE DATA

Sample No. BC-b\w-PH5 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH4 DATE: 7/29/21 TIME: 9:00 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 14.7 (ºF or ºC) Dissolved Oxygen: 8.57 (mg/L)

Conductivity: - (µmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: - (NTUs) Air Temperature 70 (ºF or ºC) Baro. Pressure 24.85 (in Hg)

Winds 0-2 (mph) Cloud cover 70 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks: ____

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC-blw-PH4 DATE: 7/29/21 TIME: 9:10 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 15.0 (ºF or ºC) Dissolved Oxygen: 8.60 (mg/L)

Conductivity: 51 (µmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: 2.61 (NTUs) Air Temperature 70 (ºF or ºC) Baro. Pressure 24.85 (in Hg)

Winds 0-2 (mph) Cloud cover 70 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks: ____

Notes

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-PH4 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH3 DATE: 7/29/21 TIME: 9:30 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS | WEATHER CONDITIONS

Water Temperature: 14.4 (ºF or ºC) Dissolved Oxygen: 8.33 (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: –

Turbidity: – (NTUs) Air Temperature 70 (ºF or ºC) Baro. Pressure 23.90 (in Hg)

Winds 0-1 (mph) Cloud cover 70 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear ✓ Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks: ____

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC-blw-PH3 DATE: 7/29/21 TIME: 9:45am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 14.6 (ºF or ºC) Dissolved Oxygen: 8.30 (mg/L)

Conductivity: 50 (µmhos/cm@25 ºC) Stream or Lake gage reading: 0.72

Turbidity: 2.55 (NTUs) Air Temperature 70 (ºF or ºC) Baro. Pressure 23.90 (in Hg)

Winds 0-1 (mph) Cloud cover 70 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ______ Colored ______

Floating Material ______ Other: ______

Remarks: ______

Notes

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-PH3 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH2 DATE: 7/29/21 TIME: 10:15am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS | WEATHER CONDITIONS

Water Temperature: 14.4 (ºF or ºC) Dissolved Oxygen: 8.06 (mg/L)

Conductivity: - (μmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: - (NTUs) Air Temperature 69 (ºF or ºC) Baro. Pressure 23.20 (in Hg)

Winds 1-3 (mph) Cloud cover 70 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):
Clear ✓ Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks: ______

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ______ Preservatives: ______

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC-blw-PH2 DATE: 7/29/21 TIME: 10:25am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 14.2 (ºF or ºC) Dissolved Oxygen: 8.21 (mg/L)

Conductivity: 47 (μmhos/cm@25 ºC) Stream or Lake gage reading: 1.74'

Turbidity: 3.23 (NTUs) Air Temperature 69 (ºF or ºC) Baro. Pressure 23.20 (in Hg)

Winds 0-1 (mph) Cloud cover 70 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-PH2 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: South Lake DATE: 7/29/21 TIME: 11:45am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS — WEATHER CONDITIONS

Water Temperature: – (ºF or ºC) Dissolved Oxygen: – (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: 9676'

Turbidity: – (NTUs) Air Temperature 64 (ºF or ºC) Baro. Pressure 21.10 (in Hg)

Winds 2-4 (mph) Cloud cover 80 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear ____ Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. SL-BR-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 2 Preservatives: None

REMARKS

1 Week
1 Seven Nalgene

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Lake Sabrina DATE: 7/29/21 TIME: 12:10pm

DRAINAGE: Bishop Creek INVESTIGATORS: JB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: – (ºF or ºC) Dissolved Oxygen: – (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: 9098.5'

Turbidity: – (NTUs) Air Temperature 67 (ºF or ºC) Baro. Pressure 21.60 (in Hg)

Winds 0-1 (mph) Cloud cover 90 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):
Clear ______ Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks: ______

Notes

WATER QUALITY SAMPLE DATA

Sample No. LS-BR-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 2 Preservatives: None

REMARKS

1 Weck
1 Source Molecular

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Intake 2 Reservoir DATE: 7/29/21 TIME: 12:20 pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: — (ºF or ºC) Dissolved Oxygen: — (mg/L)

Conductivity: — (μmhos/cm@25 ºC) Stream or Lake gage reading: —

Turbidity: — (NTUs) Air Temperature 68 (ºF or ºC) Baro. Pressure 22.40 (in Hg)

Winds 0-1 (mph) Cloud cover 90 (%) Precipitation __Fog __Rain __Sleet __Hail __Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear ____ Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. INT2-RES-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 2 Preservatives: None

REMARKS

1 Week
1 Source Molecular

SIGNED BY: [signature] REVIEWED BY:

SURFACE Temp
17.4 °C

TD ~ 46m

WATER TEMPERATURE AND DISSOLVED OXYGEN
LAKE PROFILE DATA FORM

Location: South Lake 7/27/21

	DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)	DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)	
	0.5	17.4	7.31	31	5.4	Ø.Ø3	
	1	17.4	7.33	32	5.7	Ø.Ø1	
	2	17.4	7.34	33	5.9	Ø.ØØ	DEPTH =39m
	3	17.4	7.34	34	6.1	Ø.Ø9	* NL →
	4	17.3	7.35	35	6.3	Ø.Ø6	
	5	17.1	7.44	36	6.5	Ø.Ø3	
	6	16.9	7.48	37	6.7	Ø.Ø2	
	7	16.8	7.6Ø	38	6.9	Ø.Ø1	
	8	16.5	7.53	39	7.1	-Ø.Ø1	
	9	16.4	7.57	40	7.3	-Ø.Ø1	
*	10	16.1	7.68	41	7.5	-Ø.Ø2	
	11	16.Ø	7.85	42	7.6	-Ø.Ø2	
	12	15.4	8.13	43	7.7	-Ø.Ø3	
	13	14.8	8.27	44	7.7	-Ø.Ø4	
T	14	14.2	8.26	~~45~~ 44.75	7.8	-Ø.Ø4	
	15	13.5	8.16	46			
15.5m →		11.6	8.Ø8				
	16	1Ø.6	8.27	47			
16.5m ⇒	16.5	8.4	8.64				
	17	7.1	8.8Ø	48			
	18	5.8	8.8Ø	49			
	19	5.1	8.65	50			
	20	4.8	8.4Ø	51			
	21	4.7	8.15	52			
	22	4.5	7.8Ø	53			
	23	4.4	7.42	54			
*	24	4.4	6.91	55			
	25	4.4	6.29	56			
	26	4.4	5.32	57			
	27	4.4	4.46	58			
	28	4.5	2.55	59			
	29	4.6	1.Ø3	60			
	30	4.8	Ø.13	61			

SURFACE T
18°C
7.10 ppm (DO)

WATER TEMPERATURE AND DISSOLVED OXYGEN
LAKE PROFILE DATA FORM

Location: Lake Sabrina 7/28/21

DEPTH
64.8m
67.4m

7.5m
8.5m

DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)	DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)
0.5	18.1	7.08	31	4.5	7.54
1	18.1	7.06	32	4.5	7.53
2	18.1	7.05	33	4.5	7.52
3	18.1	7.04	34	4.5	7.51
4	18.1	7.04	35	4.4	7.49
* 5	18.0	7.14	36	4.4	7.48
6	17.4	7.32	37	4.4	7.44
7	16.8	7.58	38	4.4	7.43
8	15.5 14.5	8.45 8.75	39	4.3	7.40
9	13.4 12.5	9.00 9.20	40	4.3	7.38
10	11.2	9.42	41	4.3	7.38
11	10.2	9.62	42	4.3	7.38
12	9.3	9.7	43	4.3	7.38
13	8.5	9.77	44	4.3	7.34
14	7.9	9.76	45	4.2	7.32
15	7.3	9.75	46	4.3	7.20
16	6.7	9.56	47	4.3	7.10
17	6.3	9.30	48	4.3	6.95
18	6.0	9.13	49	4.3	6.85
19	5.8	8.95	50	4.3	6.74
20	5.5	8.61	51	4.3	6.60
21	5.3	8.38	52	4.3	6.40
* 22	5.2	8.10	53	4.3	6.32
23	5.1	7.85	54	4.3	6.29
24	4.9	7.83	55	4.3	6.28
25	4.8	7.77	56	4.3	5.99
26	4.8	7.71	57	4.3	5.91
27	4.7	7.62	58	4.3	5.75
28	4.6	7.61	59	4.3	5.25
29	4.6	7.57	60	4.3	5.02
30	4.6	7.56	61	4.3	4.67

CLOUDY WATER @ 30m CAMERA

(61.8 BOT)

WATER TEMPERATURE AND DISSOLVED OXYGEN LAKE PROFILE DATA FORM

Location: SABRINA – 7/28/21

DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)	DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)
62	4.3	4.43	91		
63	4.3	4.33	92		
64			93		
65			94		
66			95		
67			96		
68			97		
69			98		
70			99		
71			100		
72			101		
73			102		
74			103		
75			104		
76			105		
77			106		
78			107		
79			108		
80			109		
81			110		
82			111		
83			112		
84			113		
85			114		
86			115		
87			116		
88			117		
89			118		
90			119		

(67.2) m (67.2m)

N 37.20327

W 118.62099

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: South Lake DATE: 8/2/21 TIME: 11:50 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS | WEATHER CONDITIONS

Water Temperature: — (ºF or ºC) Dissolved Oxygen: — (mg/L)

Conductivity: — (µmhos/cm@25 ºC) Stream or Lake gage reading: ______

Turbidity: — (NTUs) Air Temperature 64 (ºF or ºC) Baro. Pressure 21.20 (in Hg)

Winds 3-4 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):
Clear ______ Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks: ______

Notes

WATER QUALITY SAMPLE DATA

Sample No. SL-BR-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 2 Preservatives: None

REMARKS

1 Weck
1 Source Molecular

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Lake Sabrina DATE: 8/2/21 TIME: 12:15pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS WEATHER CONDITIONS

Water Temperature: - (ºF or ºC) Dissolved Oxygen: - (mg/L)

Conductivity: - (µmhos/cm@25 ºC) Stream or Lake gage reading: ____

Turbidity: - (NTUs) Air Temperature 69 (ºF or ºC) Baro. Pressure 21.65 (in Hg)

Winds 3-4 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear ____ Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks: ____

Notes

WATER QUALITY SAMPLE DATA

Sample No. LS-BR-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 2 Preservatives: None

REMARKS

1 Week

1 Source Molecular

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Intake 2 Reservoir DATE: 8/2/21 TIME: 12:30pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS | WEATHER CONDITIONS

Water Temperature: – (ºF or ºC) Dissolved Oxygen: – (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: –

Turbidity: – (NTUs) Air Temperature 74 (ºF or ºC) Baro. Pressure 22.50 (in Hg)

Winds 1-2 (mph) Cloud cover 5 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):
Clear ______ Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks: ______

Notes

WATER QUALITY SAMPLE DATA

Sample No. INT2-RES-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 2 Preservatives: None

REMARKS

1 Week
1 Source Molecular

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC Below PH-6 DATE: 9/5/21 TIME: 8:45AM

DRAINAGE: Bishop Creek INVESTIGATORS: KD & TB

PHYSICAL WATER QUALITY PARAMETERS

Water Temperature: 16.6 (ºF or ºC)

Conductivity: — (µmhos/cm@25 ºC)

Turbidity: — (NTUs)

WEATHER CONDITIONS

Dissolved Oxygen: 8.30 (mg/L)

Stream or Lake gage reading: —

Air Temperature 81 (ºF or ºC) Baro. Pressure 25.44 (in Hg)

Winds 0 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: N/A Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear ✓ Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks: ____

Notes

WATER QUALITY SAMPLE DATA

Sample No. N/A Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH-6 DATE: 8/5/21 TIME: 8:55AM

DRAINAGE: Bishop Creek INVESTIGATORS: KD - TB

PHYSICAL WATER QUALITY PARAMETERS — WEATHER CONDITIONS

Water Temperature: 16.6 (ºF or ºC) Dissolved Oxygen: 8.40 (mg/L)

Conductivity: — (μmhos/cm@25 ºC) Stream or Lake gage reading: —

Turbidity: — (NTUs) Air Temperature 81 (ºF or ºC) Baro. Pressure 25.44 (in Hg)

Winds 0 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear ✓ Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks: ____

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH-5 DATE: 8/5/21 TIME: 9:15 am

DRAINAGE: Bishop Creek INVESTIGATORS: KO & TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 16.8 (ºF or ºC) Dissolved Oxygen: 8.26 (mg/L)

Conductivity: — (μmhos/cm@25 ºC) Stream or Lake gage reading: —

Turbidity: — (NTUs) Air Temperature 81 (ºF or ºC) Baro. Pressure 25.20 (in Hg)

Winds 0 (mph) Cloud cover 0 (%) Precipitation __Fog __Rain __Sleet __Hail __Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear ✓ Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC Below PH-5 DATE: 8/5/21 TIME: 9:25AM

DRAINAGE: Bishop Creek INVESTIGATORS: KD TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 17 (ºF or ºC) Dissolved Oxygen: 8.15 (mg/L)

Conductivity: — (µmhos/cm@25 ºC) Stream or Lake gage reading: —

Turbidity: — (NTUs) Air Temperature 81 (ºF or ºC) Baro. Pressure 25.20 (in Hg)

Winds 0 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

NA

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear ✓ Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks: ____

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH-4 DATE: 8/5/21 TIME: 9:35

DRAINAGE: Bishop Creek INVESTIGATORS: KD TB

PHYSICAL WATER QUALITY PARAMETERS — WEATHER CONDITIONS

Water Temperature: 16.3 (ºF or ºC) Dissolved Oxygen: 8.16 (mg/L)

Conductivity: — (µmhos/cm@25 ºC) Stream or Lake gage reading: —

Turbidity: — (NTUs) Air Temperature 83 (ºF or ºC) Baro. Pressure 24.83 (in Hg)

Winds 1 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

NA Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear ✓ Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC Below PH-4 DATE: 8/5/21 TIME: 9:45

DRAINAGE: Bishop Creek INVESTIGATORS: TB KD

PHYSICAL WATER QUALITY PARAMETERS — WEATHER CONDITIONS

Water Temperature: 16.4 (ºF or ºC) Dissolved Oxygen: 8.33 (mg/L)

Conductivity: — (µmhos/cm@25 ºC) Stream or Lake gage reading: —

Turbidity: — (NTUs) Air Temperature 83 (ºF or ºC) Baro. Pressure 24.86 (in Hg)

Winds 1-2 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

NA

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear ✓ Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH-3 DATE: 8/5/21 TIME: 10:00 AM

DRAINAGE: Bishop Creek INVESTIGATORS: KD & TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 16.2 (ºF or ºC) Dissolved Oxygen: 8.00 (mg/L)

Conductivity: — (µmhos/cm@25 ºC) Stream or Lake gage reading: —

Turbidity: — (NTUs) Air Temperature 83 (ºF or ºC) Baro. Pressure 23.88 (in Hg)

Winds 1-2 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear ✓ Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC Below PH - 3 DATE: 8/5/21 TIME: 10:10AM

DRAINAGE: Bishop Creek INVESTIGATORS: KD & TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 16.5 (ºF or ºC) Dissolved Oxygen: 7.95 (mg/L)

Conductivity: — (μmhos/cm@25 ºC) Stream or Lake gage reading: 0.7 ft

Turbidity: — (NTUs) Air Temperature 84 (ºF or ºC) Baro. Pressure 23.88 (in Hg)

Winds 1 (mph) Cloud cover 0 (%) Precipitation __Fog __Rain __Sleet __Hail __Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear ✓ Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH-2 DATE: 8/5/21 TIME: 10:30AM

DRAINAGE: Bishop Creek INVESTIGATORS: KD TB

PHYSICAL WATER QUALITY PARAMETERS | WEATHER CONDITIONS

Water Temperature: 16.0 (ºF or ºC) Dissolved Oxygen: 7.77 (mg/L)

Conductivity: — (μmhos/cm@25 ºC) Stream or Lake gage reading: —

Turbidity: — (NTUs) Air Temperature 83 (ºF or ºC) Baro. Pressure 23.2 (in Hg)

Winds 2-4 (mph) Cloud cover 0 (%) Precipitation ___ Fog ___ Rain ___ Sleet ___ Hail ___ Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):
Clear ✓ Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks: ______

Site Drawing

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ______ Preservatives: ______

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH-2 DATE: 8/5/21 TIME: 10:45AM

DRAINAGE: Bishop Creek INVESTIGATORS: KD TB

PHYSICAL WATER QUALITY PARAMETERS **WEATHER CONDITIONS**

Water Temperature: 15.3 (ºF or ºC) Dissolved Oxygen: 7.94 (mg/L)

Conductivity: - (µmhos/cm@25 ºC) Stream or Lake gage reading: 1.72 ft

Turbidity: - (NTUs) Air Temperature 83 (ºF or ºC) Baro. Pressure 23.2 (in Hg)

Winds 1 (mph) Cloud cover 0 (%) Precipitation ___ Fog ___ Rain ___ Sleet ___ Hail ___ Snow

Secchi Disk: Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

NA

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear ✓ Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks: ____

Site Drawing

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: North Fork DATE: 8/5/21 TIME: 11:15AM

DRAINAGE: Bishop Creek INVESTIGATORS: KD TB

PHYSICAL WATER QUALITY PARAMETERS

Water Temperature: 16.6 (ºF or ºC)

Conductivity: — (μmhos/cm@25 ºC)

Turbidity: — (NTUs)

WEATHER CONDITIONS

Dissolved Oxygen: 7.86 (mg/L)

Stream or Lake gage reading: 12.3 cfs

Air Temperature 71 (ºF or ºC) Baro. Pressure 21.55 (in Hg)

Winds 2-11 (mph) Cloud cover 0 (%) Precipitation __Fog __Rain __Sleet __Hail __Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear ✓ Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Middle Fork DATE: 8/5/21 TIME: 11:30AM

DRAINAGE: Bishop Creek INVESTIGATORS: TB KD

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 17.4 (ºF or ºC) Dissolved Oxygen: 7.37 (mg/L)

Conductivity: — (μmhos/cm@25 ºC) Stream or Lake gage reading: —

Turbidity: — (NTUs) Air Temperature 71 (ºF or ºC) Baro. Pressure 21.69 (in Hg)

Winds 8-12 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear ✓ Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Lake Sabrina DATE: 8/5/21 TIME: 11:40 AM

DRAINAGE: Bishop Creek INVESTIGATORS: KD TB

PHYSICAL WATER QUALITY PARAMETERS WEATHER CONDITIONS

Water Temperature: — (ºF or ºC) Dissolved Oxygen: — (mg/L)

Conductivity: — (μmhos/cm@25 ºC) Stream or Lake gage reading: 9099.69 ft

Turbidity: — (NTUs) Air Temperature 71 (ºF or ºC) Baro. Pressure 21.65 (in Hg)

Winds 9-16 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ___ meters Depth of Reappearance: ___ meters

Secchi Depth: ___ meters

Visual Condition of Stream (check all that apply):
Clear ✓ Cloudy ___ Colored ___
Floating Material ___ Other: ___

Remarks: ___

Notes

0

WATER QUALITY SAMPLE DATA

Sample No. LS-BR-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 2 Preservatives: No

REMARKS

1 Weck

1 source molecular

SIGNED BY: [signature] REVIEWED BY: ___

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Intake 2 reservoir DATE: 8/5/21 TIME: 12:10PM

DRAINAGE: Bishop Creek INVESTIGATORS: KD TB

PHYSICAL WATER QUALITY PARAMETERS WEATHER CONDITIONS

Water Temperature: — (ºF or ºC) Dissolved Oxygen: — (mg/L)

Conductivity: — (µmhos/cm@25 ºC) Stream or Lake gage reading: —

Turbidity: — (NTUs) Air Temperature 76 (ºF or ºC) Baro. Pressure 22.44 (in Hg)

Winds 4-12 (mph) Cloud cover 0 (%) Precipitation __Fog __Rain __Sleet __Hail __Snow

Secchi Disk: N/A Depth of Disappear: ___ meters Depth of Reappearance: ___ meters

Secchi Depth: ___ meters

Visual Condition of Stream (check all that apply):

Clear ✓ Cloudy ___ Colored ___

Floating Material ___ Other: ___

Remarks: Algal mats floating reservoir surface

Notes

WATER QUALITY SAMPLE DATA

Sample No. INT2-RES-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 2 Preservatives: None

REMARKS

1 week

1 source molecular

SIGNED BY: [signature] REVIEWED BY: ___

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: South Fork DATE: 8/5/21 TIME: 12:23PM

DRAINAGE: Bishop Creek INVESTIGATORS: KD TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 15.8 (ºF or ºC) Dissolved Oxygen: 7.26 (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: –

Turbidity: – (NTUs) Air Temperature 71 (ºF or °C) Baro. Pressure 21.27 (in Hg)

Winds 4-8 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: Depth of Disappear: ________ meters Depth of Reappearance: ________ meters

N/A

Secchi Depth: ________ meters

Visual Condition of Stream (check all that apply):

Clear √ Cloudy ________ Colored ________

Floating Material ________ Other: ________

Remarks: ________

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ________ Preservatives: ________

REMARKS

SIGNED BY: [signature] REVIEWED BY: ________

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: South Lake DATE: 8/5/21 TIME: 12:35PM

DRAINAGE: Bishop Creek INVESTIGATORS: KP TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: – (ºF or ºC) Dissolved Oxygen: – (mg/L)

Conductivity: – (μmhos/cm@25 ºC) Stream or Lake gage reading: 9673.73 ft

Turbidity: – (NTUs) Air Temperature 68 (ºF or ºC) Baro. Pressure 21.17 (in Hg)

Winds 12-24 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear ✓ Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. SL-BR-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 2 Preservatives: None

REMARKS

1 Week

1 source molecular

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: South Lake DATE: 8/23/21 TIME: 10:30am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JTB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: See profile (ºF or ºC) Dissolved Oxygen: see profile (mg/L)

Conductivity: 40 (µmhos/cm@25 ºC) Stream or Lake gage reading: 9664.6' msl

Turbidity: Secchi (NTUs) Air Temperature 65 (ºF or ºC) Baro. Pressure 20.95 (in Hg)

Winds 4-8 (mph) Cloud cover 10 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: Y Depth of Disappear: 9.5 meters Depth of Reappearance: 8 meters

Secchi Depth: 8.75 meters

Visual Condition of Stream (check all that apply):

Clear ______ Cloudy ______ Colored ______

Floating Material ______ Other: ______

Remarks: Smokey conditions

Notes

Sampled at 8m depth

WATER QUALITY SAMPLE DATA

Sample No. SL-DP-8 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: South Lake DATE: 8/23/21 TIME: 11:05am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS WEATHER CONDITIONS

Water Temperature: see profile (ºF or ºC) Dissolved Oxygen: see profile (mg/L)

Conductivity: 68 (µmhos/cm@25 ºC) Stream or Lake gage reading: 9664.61' msl

Turbidity: Secchi (NTUs) Air Temperature 65 (ºF or ºC) Baro. Pressure 20.95 (in Hg)

Winds 4-8 (mph) Cloud cover 10 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: Y Depth of Disappear: 9.5 meters Depth of Reappearance: 8 meters

Secchi Depth: 8.75 meters

Visual Condition of Stream (check all that apply):
Clear ______ Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks: Smokey

Notes

Sampled at 20m depth

WATER QUALITY SAMPLE DATA

Sample No. SL-DP-20 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

SURFACE @ 16.1 °C DO=7.47 ppm GARMIN = 44M

WATER TEMPERATURE AND DISSOLVED OXYGEN LAKE PROFILE DATA FORM

Location: South Lake 8/23/21

DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (ºC)	DISSOLVED OXYGEN (mg/L)	DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (ºC)	DISSOLVED OXYGEN (mg/L)
0.5	16.1	7.43	31	6.2	0.01
1	16.0	7.41	32	6.3	0.01
2	16.0	7.40	33	6.6	0.00
3	16.0	7.40	34	6.9	0.00
4	16.0	7.39	35	7.1	0.00
5	16.0	7.39	36	7.3	0.00
6	16.0	7.38	37	7.5	0.00
7	16.0	7.38	38	7.6	0.00
8	16.0	7.38	39	7.7	0.00
9	16.0	7.37	39.8 ~~40~~	7.7	0.00
10	15.7	7.38	41		
11	15.6	7.36	42		
12	14.2	7.30	43		
12.5	11.8	7.56			
13	9.3	8.30	44		
13.5	7.1	8.61			
14	6.1	8.57	45		
14.5	5.5	8.46			
15	5.3	8.31	46		
16	4.8	8.06	47		
17	4.6	7.88	48		
18	4.5	7.55	49		
19	4.5	7.26	50		
20	4.5	6.95	51		
21	4.5	6.30	52		
22	4.5	5.50	53		
23	4.4	4.87	54		
24	4.5	3.27	55		
25	4.6	1.40	56		
26	5.0	0.15	57		
27	5.4	0.06	58		
28	5.7	0.05	59		
29	5.9	0.03	60		
30	6.0	0.02	61		

GARMIN 43.8

thermo:

<=>

@ 12.5 m 11.8 7.56

GARMIN → = 43M

GARMIN = 42m → moved

GARMIN = 43m →

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Lake Sabrina DATE: 8/24/21 TIME: 10:15am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS WEATHER CONDITIONS

Water Temperature: see profile (ºF or ºC) Dissolved Oxygen: see profile (mg/L)

Conductivity: 23 (µmhos/cm@25 ºC) Stream or Lake gage reading: 9099.31' msl

Turbidity: Secchi (NTUs) Air Temperature 65 (ºF or ºC) Baro. Pressure 21.50 (in Hg)

Winds 2-8 (mph) Cloud cover 0 (%) Precipitation __Fog __Rain __Sleet __Hail __Snow

Secchi Disk: ✓ Depth of Disappear: 12.5 meters Depth of Reappearance: 11 meters

Secchi Depth: 11.75 meters

Visual Condition of Stream (check all that apply):
Clear ____ Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks:

Notes

Sampled at 5m depth

WATER QUALITY SAMPLE DATA

Sample No. LS-DP-5 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Lake Sabrina DATE: 8/24/21 TIME: 10:40am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS WEATHER CONDITIONS

Water Temperature: see profile (ºF or ºC) Dissolved Oxygen: see profile (mg/L)

Conductivity: 26 (µmhos/cm@25 ºC) Stream or Lake gage reading: 9099.31' msl

Turbidity: Secchi (NTUs) Air Temperature 65 (ºF or ºC) Baro. Pressure 21.50 (in Hg)

Winds 2-8 (mph) Cloud cover 0 (%) Precipitation __ Fog __ Rain __ Sleet __ Hail __ Snow

Secchi Disk: Y Depth of Disappear: 12.5 meters Depth of Reappearance: 11 meters

Secchi Depth: 11.75 meters

Visual Condition of Stream (check all that apply):
Clear __ Cloudy __ Colored __
Floating Material __ Other: __

Remarks: Clear, very little smoke in air

Notes

Sampled at 25 m

WATER QUALITY SAMPLE DATA

Sample No. LS-DP-25 Sample Method: Grab ~~Preservatives:~~ Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY:

SURFACE
16.3 C
7.63 ppm

WATER TEMPERATURE AND DISSOLVED OXYGEN
LAKE PROFILE DATA FORM

Location: Lake Sabrina 8/24/21

GARMIN

DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (ºC)	DISSOLVED OXYGEN (mg/L)	DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (ºC)	DISSOLVED OXYGEN (mg/L)
0.5	16.4	7.62	31	4.6	7.09
1	16.4	7.61	32	4.6	7.08
2	16.4	7.61	33	4.6	6.98
3	16.4	7.60	34	4.5	6.95
4	16.4	7.59	35	4.5	6.97
5	16.4	7.59	36	4.5	6.96
6	16.4	7.58	37	4.5	6.93
7	16.4	7.61	38	4.5	6.93
8	16.4	7.63	39	4.4	6.97
9	15.5	8.76	40	4.4	6.98
9.5	14.6	9.65			
10	13.4	10.29	41	4.4	7.10
10.5	11.9	10.39			
11	11.0	10.39	42	4.4	6.90
12	10.1	10.41	43	4.4	6.88
13	9.3	10.38	44	4.3	6.83
14	8.5	10.38	45	4.3	6.72
15	7.6	10.26	46	4.3	6.69
16	7.1	10.01	47	4.3	6.45
17	6.5	9.63	48	4.3	6.28
18	6.1	9.40	49	4.3	6.26
19	5.8	8.95	50	4.5	6.46
20	5.7	8.65	51	4.4	6.46
21	5.3	8.10	52	4.4	6.38
22	5.2	7.93	53	4.4	6.23
23	5.1	7.75	54	4.4	6.16
24	5.0	7.59	55	4.4	6.00
25	4.8	7.49	56	4.4	5.98
26	4.8	7.46	57	4.3	5.92
27	4.7	7.37	58	4.3	5.84
28	4.7	7.22	59	4.3	5.76
29	4.7	7.07	60	4.3	5.65
30	4.6	7.08	61	4.3	5.40

thermo.

move ⇒ (beside row 26)

⇐ move (beside row 50)

WATER TEMPERATURE AND DISSOLVED OXYGEN LAKE PROFILE DATA FORM

Location: SABRINA 8/24/21

GARMIN = 66.5

DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)	DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)
62	4.3	4.45	91		
~~63~~ 62.2	4.3	4.23	92		
64			93		
65			94		
66			95		
67			96		
68			97		
69			98		
70			99		
71			100		
72			101		
73			102		
74			103		
75			104		
76			105		
77			106		
78			107		
79			108		
80			109		
81			110		
82			111		
83			112		
84			113		
85			114		
86			115		
87			116		
88			117		
89			118		
90			119		

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH 6 DATE: 8/25/21 TIME: 7:05am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS — WEATHER CONDITIONS

Water Temperature: 13.7 (ºF or ºC) Dissolved Oxygen: 8.89 (mg/L)

Conductivity: - (µmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: - (NTUs) Air Temperature 68 (ºF or ºC) Baro. Pressure 25.40 (in Hg)

Winds 1-2 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear x Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks: slight musty smell

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH6 DATE: 8/25/21 TIME: 7:15am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 13.6 (ºF or ºC) Dissolved Oxygen: 8.94 (mg/L)

Conductivity: 56 (µmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: 2.28 (NTUs) Air Temperature 68 (ºF or ºC) Baro. Pressure 25.40 (in Hg)

Winds 1-2 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-PH6 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH5 DATE: 8/25/21 TIME: 7:30 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 13.7 (ºF or ºC) Dissolved Oxygen: 8.54 (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: –

Turbidity: – (NTUs) Air Temperature 70 (ºF or ºC) Baro. Pressure 25.15 (in Hg)

Winds 0 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: _____meters Depth of Reappearance: _____meters

Secchi Depth: _____ meters

Visual Condition of Stream (check all that apply):
Clear ✓ Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH5 DATE: 8/25/21 TIME: 7:40 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 14.0 (ºF or ºC) Dissolved Oxygen: 8.65 (mg/L)

Conductivity: 54 (μmhos/cm@25 ºC) Stream or Lake gage reading: –

Turbidity: 2.86 (NTUs) Air Temperature 70 (ºF or ºC) Baro. Pressure 25.15 (in Hg)

Winds 0 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: _____ meters Depth of Reappearance: _____ meters

Secchi Depth: _____ meters

Visual Condition of Stream (check all that apply):

Clear ✓ Cloudy _____ Colored _____

Floating Material _____ Other: _____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-PH5 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH 4 DATE: 8/25/21 TIME: 8:00 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

Water Temperature: 13.6 (ºF or ºC)

Conductivity: – (μmhos/cm@25 ºC)

Turbidity: – (NTUs)

WEATHER CONDITIONS

Dissolved Oxygen: 8.69 (mg/L)

Stream or Lake gage reading: –

Air Temperature 66 (°F or °C) Baro. Pressure 24.80 (in Hg)

Winds 0-1 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ___ meters Depth of Reappearance: ___ meters

Secchi Depth: ___ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ___ Colored ___
Floating Material ___ Other: ___

Remarks: ___

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ___ Preservatives: ___

REMARKS

SIGNED BY: [signature] REVIEWED BY: ___

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH 4 DATE: 8/25/21 TIME: 8:15 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 13.5 (ºF or ºC) Dissolved Oxygen: 8.87 (mg/L)

Conductivity: 55 (μmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: 2.64 (NTUs) Air Temperature 67 (°F or °C) Baro. Pressure 24.80 (in Hg)

Winds 0 - 1 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-PH4 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH3 DATE: 8/25/21 TIME: 8:35am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 13.7 (ºF or ºC) Dissolved Oxygen: 8.46 (mg/L)

Conductivity: - (µmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: - (NTUs) Air Temperature 68 (ºF or ºC) Baro. Pressure 23.80 (in Hg)

Winds 1-2 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ___ meters Depth of Reappearance: ___ meters

Secchi Depth: ___ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ___ Colored ___
Floating Material ___ Other: ___

Remarks: ___

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ___ Preservatives: ___

REMARKS

SIGNED BY: [signature] REVIEWED BY: ___

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH3 DATE: 8/25/21 TIME: 8:50 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS — WEATHER CONDITIONS

Water Temperature: 13.5 (ºF or ºC) Dissolved Oxygen: 8.51 (mg/L)

Conductivity: 52 (µmhos/cm@25 ºC) Stream or Lake gage reading: 0.7 feet

Turbidity: 2.12 (NTUs) Air Temperature 68 (ºF or ºC) Baro. Pressure 23.85 (in Hg)

Winds 1-2 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-PH3 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH2 DATE: 8/25/21 TIME: 9:10 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS — WEATHER CONDITIONS

Water Temperature: 13.7 (ºF or ºC) Dissolved Oxygen: 8.22 (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: –

Turbidity: – (NTUs) Air Temperature 67 (ºF or ºC) Baro. Pressure 23.15 (in Hg)

Winds 1 - 3 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks: ____

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH 2 DATE: 8/25/21 TIME: 9:20 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 13.0 (ºF or ºC) Dissolved Oxygen: 8.47 (mg/L)

Conductivity: 50 (μmhos/cm@25 ºC) Stream or Lake gage reading: 1.75'

Turbidity: 3.11 (NTUs) Air Temperature 67 (ºF or ºC) Baro. Pressure ____ (in Hg)

Winds 0-1 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-PH2 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: North Fork DATE: 8/25/21 TIME: 10:20 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 13.8 (ºF or ºC) Dissolved Oxygen: 8.30 (mg/L)

Conductivity: 32 (μmhos/cm@25 ºC) Stream or Lake gage reading: 8.95 cfs

Turbidity: 2.78 (NTUs) Air Temperature 68 (ºF or ºC) Baro. Pressure 21.40 (in Hg)

Winds 1-2 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks: ______

Notes

Stream flow field measured at 8.95 cfs.

WATER QUALITY SAMPLE DATA

Sample No. BC-NF-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Middle Fork DATE: 8/25/21 TIME: 10:35am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS — WEATHER CONDITIONS

Water Temperature: 16.2 (ºF or ºC) Dissolved Oxygen: 7.22 (mg/L)

Conductivity: 23 (μmhos/cm@25 ºC) Stream or Lake gage reading: —

Turbidity: 2.94 (NTUs) Air Temperature 68 (ºF or ºC) Baro. Pressure 21.55 (in Hg)

Winds 5-15 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):
Clear ✓ Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks: ______

Notes

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-LS Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: South Fork DATE: 8/25/21 TIME: 11:05am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 15.6 (ºF or ºC) Dissolved Oxygen: 7.24 (mg/L)

Conductivity: 31 (μmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: 2.95 (NTUs) Air Temperature 65 (ºF or ºC) Baro. Pressure 21.25 (in Hg)

Winds 5-12 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ___ meters Depth of Reappearance: ___ meters

Secchi Depth: ___ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ___ Colored ___
Floating Material ___ Other: ___

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-SL Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH6 DATE: 9/9/21 TIME: 8:15 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS | WEATHER CONDITIONS

Water Temperature: 15.8 (ºF or ºC) Dissolved Oxygen: 8.53 (mg/L)

Conductivity: - (µmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: - (NTUs) Air Temperature 76 (ºF or ºC) Baro. Pressure 25.41 (in Hg)

Winds 1-2 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks: ____

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH6 DATE: 9/9/21 TIME: 8:25am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS

Water Temperature: 15.4 (ºF or ºC)

Conductivity: – (µmhos/cm@25 ºC)

Turbidity: – (NTUs)

WEATHER CONDITIONS

Dissolved Oxygen: 8.70 (mg/L)

Stream or Lake gage reading: –

Air Temperature 76 (ºF or ºC) Baro. Pressure 25.41 (in Hg)

Winds 1-2 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH5 DATE: 9/9/21 TIME: 8:45am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS WEATHER CONDITIONS

Water Temperature: 15.3 (ºF or ºC) Dissolved Oxygen: 8.61 (mg/L)

Conductivity: - (μmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: - (NTUs) Air Temperature 77 (ºF or ºC) Baro. Pressure 25.17 (in Hg)

Winds 2-3 (mph) Cloud cover 0 (%) Precipitation __Fog __Rain __Sleet __Hail __Snow

Secchi Disk: NA Depth of Disappear: ___ meters Depth of Reappearance: ___ meters

Secchi Depth: ___ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ___ Colored ___
Floating Material ___ Other: ___

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ___ Preservatives: ___

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH5 DATE: 9/9/21 TIME: 8:55am

DRAINAGE: Bishop Creek INVESTIGATORS: JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 15.6 (ºF or ºC) Dissolved Oxygen: 8.58 (mg/L)

Conductivity: - (μmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: - (NTUs) Air Temperature 77 (ºF or ºC) Baro. Pressure 25.17 (in Hg)

Winds 0-1 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: _____ meters Depth of Reappearance: _____ meters

Secchi Depth: _____ meters

Visual Condition of Stream (check all that apply):
Clear ✓ Cloudy _____ Colored _____
Floating Material _____ Other: _____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles _____ Preservatives: _____

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH 4 DATE: 9/9/21 TIME: 9:20 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS

Water Temperature: 15.0 (ºF or ºC)

Conductivity: - (µmhos/cm@25 ºC)

Turbidity: - (NTUs)

WEATHER CONDITIONS

Dissolved Oxygen: 8.48 (mg/L)

Stream or Lake gage reading: -

Air Temperature 80 (ºF or ºC) Baro. Pressure 24.80 (in Hg)

Winds 2-4 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH4 DATE: 9/9/21 TIME: 9:35am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 15.0 (ºF or ºC)

Dissolved Oxygen: 8.62 (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: –

Turbidity: – (NTUs) Air Temperature 80 (ºF or ºC) Baro. Pressure 24.82 (in Hg)

Winds 1-2 (mph) Cloud cover 0 (%) Precipitation ___ Fog ___ Rain ___ Sleet ___ Hail ___ Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ______ Colored ______

Floating Material ______ Other: ______

Remarks: ______

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ______ Preservatives: ______

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH3 DATE: 9/9/21 TIME: 10:00 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS | WEATHER CONDITIONS

Water Temperature: 14.9 (ºF or ºC) Dissolved Oxygen: 8.25 (mg/L)

Conductivity: — (µmhos/cm@25 ºC) Stream or Lake gage reading: —

Turbidity: — (NTUs) Air Temperature 80 (ºF or ºC) Baro. Pressure 23.84 (in Hg)

Winds 1-3 (mph) Cloud cover 10 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ________ meters Depth of Reappearance: ________ meters

Secchi Depth: ________ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ________ Colored ________
Floating Material ________ Other: ________

Remarks: ________

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ________ Preservatives: ________

REMARKS

SIGNED BY: [signature] REVIEWED BY: ________

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH3 DATE: 9/9/21 TIME: 10:20am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 15.2 (ºF or ºC) Dissolved Oxygen: 8.19 (mg/L)

Conductivity: – (μmhos/cm@25 ºC) Stream or Lake gage reading: 0.69'

Turbidity: – (NTUs) Air Temperature 80 (ºF or ºC) Baro. Pressure 23.88 (in Hg)

Winds 1-2 (mph) Cloud cover 10 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear:______meters Depth of Reappearance: ______meters

Secchi Depth: ______meters

Visual Condition of Stream (check all that apply):
Clear ✓ Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ______ Preservatives: ______

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH2 DATE: 9/9/21 TIME: 10:45am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS WEATHER CONDITIONS

Water Temperature: 15.3 (ºF or ºC) Dissolved Oxygen: 7.95 (mg/L)

Conductivity: - (µmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: - (NTUs) Air Temperature 80 (ºF or ºC) Baro. Pressure 23.15 (in Hg)

Winds 3-6 (mph) Cloud cover 15 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear:________meters Depth of Reappearance: ________meters

Secchi Depth: ________ meters

Visual Condition of Stream (check all that apply):
Clear ✓ Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks: PH2 reservoir about 2-3 lower than usual

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ________ Preservatives: ________

REMARKS

SIGNED BY: [signature] REVIEWED BY: ________

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH2 DATE: 9/9/21 TIME: 10:56 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 14.7 (ºF or ºC) Dissolved Oxygen: 8.10 (mg/L)

Conductivity: – (μmhos/cm@25 ºC) Stream or Lake gage reading: 1.62'

Turbidity: – (NTUs) Air Temperature 78.5 (ºF or ºC) Baro. Pressure 23.18 (in Hg)

Winds 1-2 (mph) Cloud cover 15 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear ✓ Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: North Fork DATE: 9/9/21 TIME: 11:30 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS WEATHER CONDITIONS

Water Temperature: 16.1 (ºF or ºC) Dissolved Oxygen: 8.17 (mg/L)

Conductivity: — (µmhos/cm@25 ºC) Stream or Lake gage reading: 6.4 cfs

Turbidity: — (NTUs) Air Temperature 78 (ºF or ºC) Baro. Pressure 21.47 (in Hg)

Winds 1-3 (mph) Cloud cover 20 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: _____ meters Depth of Reappearance: _____ meters

Secchi Depth: _____ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks:

Notes

Flow field measured at 6.4 cfs

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Middle Fork DATE: 9/9/21 TIME: 12:20pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 16.7 (ºF or ºC) Dissolved Oxygen: 7.25 (mg/L)

Conductivity: – (μmhos/cm@25 ºC) Stream or Lake gage reading: –

Turbidity: – (NTUs) Air Temperature 72 (ºF or ºC) Baro. Pressure 21.61 (in Hg)

Winds 3-9 (mph) Cloud cover 20 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: _____ meters Depth of Reappearance: _____ meters

Secchi Depth: _____ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: South Fork DATE: 9/9/21 TIME: 12:45 pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 15.2 (ºF or ºC) Dissolved Oxygen: 7.40 (mg/L)

Conductivity: — (µmhos/cm@25 ºC) Stream or Lake gage reading: —

Turbidity: — (NTUs) Air Temperature 71 (ºF or ºC) Baro. Pressure 21.19 (in Hg)

Winds 2-4 (mph) Cloud cover 20 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: _____ meters Depth of Reappearance: _____ meters

Secchi Depth: _____ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Lake Sabrina DATE: 9/20/21 TIME: 10:20am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: See profile (ºF or ºC) Dissolved Oxygen: see profile (mg/L)

Conductivity: 34 (µmhos/cm@25 ºC) Stream or Lake gage reading: 9096.74' msl

Turbidity: Secchi (NTUs) Air Temperature 52 (ºF or ºC) Baro. Pressure 21.55 (in Hg)

Winds 4-8 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: Y Depth of Disappear: 11 meters Depth of Reappearance: 9.5 meters

Secchi Depth: 10.25 meters

Visual Condition of Stream (check all that apply):

Clear ____ Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. LS-DP-8 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H2SO4 in one

REMARKS

SIGNED BY: REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Lake Sabrina DATE: 9/20/21 TIME: 10:45am

DRAINAGE: Bishop Creek INVESTIGATORS: TB, JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: See profile (ºF or ºC) Dissolved Oxygen: see profile (mg/L)

Conductivity: 30 (µmhos/cm@25 ºC) Stream or Lake gage reading: 9096.74' msl

Turbidity: Secchi (NTUs) Air Temperature 52 (ºF or ºC) Baro. Pressure 21.55 (in Hg)

Winds 4-8 (mph) Cloud cover 0 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: Y Depth of Disappear: 11 meters Depth of Reappearance: 9.5 meters

Secchi Depth: 10.25 meters

Visual Condition of Stream (check all that apply):
Clear ______ Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks: ______

Notes

WATER QUALITY SAMPLE DATA

Sample No. LS-DP-20 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: South Lake DATE: 9/21/21 TIME: 10:25 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS | WEATHER CONDITIONS

Water Temperature: See profile (ºF or ºC) Dissolved Oxygen: see profile (mg/L)

Conductivity: 30 (µmhos/cm@25 ºC) Stream or Lake gage reading: 9648.37' msl

Turbidity: Secchi (NTUs) Air Temperature 61 (ºF or ºC) Baro. Pressure 21.25 (in Hg)

Winds 1-3 (mph) Cloud cover 0 but smokey (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: Y Depth of Disappear: 7 meters Depth of Reappearance: 5.5 meters

Secchi Depth: 6.25 meters

Visual Condition of Stream (check all that apply):

Clear ____ Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks: smokey

Notes

WATER QUALITY SAMPLE DATA

Sample No. SL-DP-4 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: South Lake DATE: 9/21/21 TIME: 10:50am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: see profile (ºF or ºC) Dissolved Oxygen: see profile (mg/L)

Conductivity: 90 (µmhos/cm@25 ºC) Stream or Lake gage reading: 9648.37' msl

Turbidity: Secchi (NTUs) Air Temperature 61 (ºF or ºC) Baro. Pressure 21.25 (in Hg)

Winds 1-3 (mph) Cloud cover ∅ but smokey (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: Y Depth of Disappear: 7 meters Depth of Reappearance: 5.5 meters

Secchi Depth: 6.25 meters

Visual Condition of Stream (check all that apply):
Clear ______ Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks: smokey

Notes

WATER QUALITY SAMPLE DATA

Sample No. SL-DP-16 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH6 DATE: 9/22/21 TIME: 7:30 am

DRAINAGE: Bishop Creek INVESTIGATORS: JB TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 12.1 (ºF or ºC) Dissolved Oxygen: 9.07 (mg/L)

Conductivity: - (μmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: - (NTUs) Air Temperature 66 (°F or °C) Baro. Pressure 25.60 (in Hg)

Winds Ø (mph) Cloud cover Ø (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ___ meters Depth of Reappearance: ___ meters

Secchi Depth: ___ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ___ Colored ___
Floating Material ___ Other: ___

Remarks: ___

Notes

SMOKE FILLED AIR - HAZY

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ___ Preservatives: ___

REMARKS

SIGNED BY: [signature] REVIEWED BY: ___

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH6 DATE: 9/22/21 TIME: 7:45am

DRAINAGE: Bishop Creek INVESTIGATORS: JB TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 11.9 (ºF or ºC) Dissolved Oxygen: 9.36 (mg/L)

Conductivity: 60 (μmhos/cm@25 ºC) Stream or Lake gage reading: –

Turbidity: 2.61 (NTUs) Air Temperature 66.5 (ºF or ºC) Baro. Pressure 25.60 (in Hg)

Winds 0-1 (mph) Cloud cover Ø (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ___ meters Depth of Reappearance: ___ meters

Secchi Depth: ___ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ___ Colored ___
Floating Material ___ Other: ___

Remarks: ___

Notes

SMOKE FILLED AIR – HAZY

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-PH6 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ___

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH5 DATE: 9/22/21 TIME: 8:00 am

DRAINAGE: Bishop Creek INVESTIGATORS: JB TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 12.0 (ºF or ºC) Dissolved Oxygen: 8.88 (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: –

Turbidity: – (NTUs) Air Temperature 66.2 (ºF or ºC) Baro. Pressure 25.35 (in Hg)

Winds 0-1 (mph) Cloud cover Ø (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks: ____

Notes

SMOKE FILLED AIR

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH5 DATE: 9/22/21 TIME: 8:15 am

DRAINAGE: Bishop Creek INVESTIGATORS: JB TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 12.3 (ºF or ºC) Dissolved Oxygen: 9.11 (mg/L)

Conductivity: 62 (μmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: 3.15 (NTUs) Air Temperature 68.3 (ºF or ºC) Baro. Pressure 25.35 (in Hg)

Winds 0-1 (mph) Cloud cover ∅ (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks:

Notes

SMOKEY HAZY AIR

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-PH5 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 iron

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH 4 DATE: 9/22/21 TIME: 8:35 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS WEATHER CONDITIONS

Water Temperature: 11.7 (ºF or ºC) Dissolved Oxygen: 9.18 (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: –

Turbidity: – (NTUs) Air Temperature 66.7 (ºF or ºC) Baro. Pressure 24.95 (in Hg)

Winds Ø (mph) Cloud cover Ø (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear:_______meters Depth of Reappearance: _______meters

Secchi Depth: _______meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks: ______

Notes

SMOKEY HAZY

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ______ Preservatives: ______

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH 4 DATE: 9/22/21 TIME: 8:45 am

DRAINAGE: Bishop Creek INVESTIGATORS: JB TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 12.2 (ºF or ºC) Dissolved Oxygen: 9.27 (mg/L)

Conductivity: 62 (μmhos/cm@25 ºC) Stream or Lake gage reading: —

Turbidity: 2.69 (NTUs) Air Temperature 72.0 (ºF or ºC) Baro. Pressure 24.95 (in Hg)

Winds Ø (mph) Cloud cover Ø (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks:

Notes

SMOKEY AIR

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-PH4 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH3 DATE: 9/22/21 TIME: 9:10 am

DRAINAGE: Bishop Creek INVESTIGATORS: JB TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 13.0 (ºF or ºC) Dissolved Oxygen: 8.64 (mg/L)

Conductivity: - (µmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: - (NTUs) Air Temperature 70.5 (°F or °C) Baro. Pressure 23.95 (in Hg)

Winds 0 (mph) Cloud cover ϕ (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: _____ meters Depth of Reappearance: _____ meters

Secchi Depth: _____ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy _____ Colored _____

Floating Material _____ Other: _____

Remarks: FLUME #3

Notes

VERY SMOKEY

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles _____ Preservatives: _____

REMARKS

SIGNED BY: [signature] REVIEWED BY: _____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH3 DATE: 9/22/21 TIME: 9:30 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS | WEATHER CONDITIONS

Water Temperature: 12.4 (ºF or ºC) Dissolved Oxygen: 8.80 (mg/L)

Conductivity: 58 (μmhos/cm@25 ºC) Stream or Lake gage reading: 0.70'

Turbidity: 3.97 (NTUs) Air Temperature 69.7 (ºF or ºC) Baro. Pressure 23.95 (in Hg)

Winds 0-1 (mph) Cloud cover Ø (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ______ Colored ______

Floating Material ______ Other: ______

Remarks: SEE USGS READING ABOVE

Notes

VERY HEAVY SMOKE

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-PH3 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one.

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH 2 DATE: 9/22/21 TIME: 9:50 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 11.3 (ºF or ºC) Dissolved Oxygen: 8.72 (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: –

Turbidity: – (NTUs) Air Temperature 68.5 (ºF or ºC) Baro. Pressure 23.25 (in Hg)

Winds Ø (mph) Cloud cover Ø (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks: LOWER THAN "NORMAL" FLOW

Notes

HEAVY SMOKE FILLED AIR

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH2 DATE: 9/22/21 TIME: 10:00am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS | WEATHER CONDITIONS

Water Temperature: 11.5 (ºF or ºC) Dissolved Oxygen: 8.68 (mg/L)

Conductivity: 54 (μmhos/cm@25 ºC) Stream or Lake gage reading: 1.82'

Turbidity: 3.42 (NTUs) Air Temperature 69.1 (ºF or ºC) Baro. Pressure 23.30 (in Hg)

Winds Ø (mph) Cloud cover Ø (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks: SEE USGS READING ABOVE

Notes

VERY SMOKEY

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-PH2 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Middle Fork DATE: 9/22/21 TIME: 10:20 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS — WEATHER CONDITIONS

Water Temperature: 14.2 (ºF or ºC) Dissolved Oxygen: 7.60 (mg/L)

Conductivity: 27 (µmhos/cm@25 ºC) Stream or Lake gage reading: —

Turbidity: 3.09 (NTUs) Air Temperature 68 (ºF or ºC) Baro. Pressure 21.70 (in Hg)

Winds 4-6 (mph) Cloud cover Ø (%) Precipitation __Fog __Rain __Sleet __Hail __Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks: LOWER FLOW THAN "NORMAL"

Notes

THICK SMOKE

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-LS Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: North Fork DATE: 9/22/21 TIME: 10:55 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 12.4 (ºF or ºC) Dissolved Oxygen: 8.35 (mg/L)

Conductivity: 38 (μmhos/cm@25 ºC) Stream or Lake gage reading: 5.8 cfs

Turbidity: 2.23 (NTUs) Air Temperature 65 (ºF or ºC) Baro. Pressure 21.55 (in Hg)

Winds 0-1 (mph) Cloud cover Ø (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks: ______

Notes

SMOKEY
Flow field measured at ~5.8 cfs

WATER QUALITY SAMPLE DATA

Sample No. BC-NF-1 Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: South Fork DATE: 9/22/21 TIME: 11:45 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS WEATHER CONDITIONS

Water Temperature: 14.3 (ºF or ºC) Dissolved Oxygen: 7.51 (mg/L)

Conductivity: 40 (μmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: 4.68 (NTUs) Air Temperature 64.6 (ºF or ºC) Baro. Pressure 21.25 (in Hg)

Winds 4-8 (mph) Cloud cover Ø (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks: ALGAE ON ROCKS IN CREEK

Notes

THICK SMOKE VISABILITY < 1/4 mile

WATER QUALITY SAMPLE DATA

Sample No. BC-blw-SL Sample Method: Grab Preservatives: Ice

No. of Sample Bottles 4 Preservatives: H_2SO_4 in one

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

GPS
DEPTH = 66m
SURFACE T = 13.9 °C
DO = 8.15

WATER TEMPERATURE AND DISSOLVED OXYGEN
LAKE PROFILE DATA FORM

Location: Lake Sabrina 9/20/21

	DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)	DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)
	0.5	14.0	8.08	31	4.6	7.20
	1	14.0	8.05	32	4.6	7.30
	2	14.1	8.02	33	4.5	7.18
	3	14.1	8.00	34	4.5	7.19
	4	14.1	7.99	35	4.5	7.33
	5	14.1	7.98	36	4.5	7.02
	6	14.1	7.97	37	4.4	7.07
	7	14.1	7.96	38	4.4	7.14
Sample	8	14.1	7.96	39	4.4	7.19
	9	14.1	7.95	40	4.4	7.25
	10	14.1	7.95	41	4.4	7.02
T	11	13.3	8.44	42	4.4	6.83
	11.5	12.0	9.41			
Approx thermo.	12	10.0	10.18	43	4.3	6.85
	12.5	9.4	10.29			
	13	9.0	10.31	44	4.3	6.89
	14	8.3	10.26	45	4.4	6.63
	15	7.7	10.15	46	4.3	6.62
⊥	16	7.1	10.04	47	4.4	6.44
	17	6.7	9.80	48	4.4	6.30
	18	6.4	9.50	49	4.4	6.15
	19	6.0	9.16	50	4.3	6.07
sample	20	5.7	8.74	51	4.4	5.85
	21	5.5	8.38	52	4.3	5.50
	22	5.4	8.15	53	4.3	5.40
	23	5.2	7.95	54	4.3	5.02
	24	5.0	8.00	55	4.3	4.75
	25	5.0	7.53	56	4.3	4.45
	26	4.8	7.47	57	4.3	4.20
	27	4.8	7.35	58	4.3	3.50
	28	4.7	7.44	59	4.3	3.45
	29	4.7	7.37	60	4.3	3.37
	30	4.6	7.36	61	4.3	3.31

WATER TEMPERATURE AND DISSOLVED OXYGEN LAKE PROFILE DATA FORM

Location: LAKE SABRINA

BOT→

GPS 65.8m

DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)	DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)
62	4.3	2.89	91		
~~63~~ 62.9	4.4	2.17	92		
64			93		
65			94		
66			95		
67			96		
68			97		
69			98		
70			99		
71			100		
72			101		
73			102		
74			103		
75			104		
76			105		
77			106		
78			107		
79			108		
80			109		
81			110		
82			111		
83			112		
84			113		
85			114		
86			115		
87			116		
88			117		
89			118		
90			119		

SURFACE
GARMIN @37.4 m
TEMP @13.5 °C
DO @ 7.75

WATER TEMPERATURE AND DISSOLVED OXYGEN
LAKE PROFILE DATA FORM

Location: South Lake 9/21/21

DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)	DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)
0.5	13.3	7.70	31	7.4	0.03
1	13.3	7.69	32	7.5	0.01
2	13.3	7.67	33	7.6	0.00
3	13.2	7.67	34	7.7	0.01
4	13.2	7.67	35.1m	7.7	0.00
5	13.2	7.67	36		
6	13.2	7.66	37		
7	13.1	7.65	38		
8	12.3	7.83	39		
8.5 9	11.1 8.4	8.15 8.91	40		
9.5 10	6.9 5.9	8.82 8.84	41		
11	5.4	8.43	42		
12	5.1	8.10	43		
13	4.9	7.76	44		
14	4.8	7.40	45		
15	4.7	6.80	46		
16	4.6	5.66	47		
17	4.6	4.95	48		
18	4.6	4.02	49		
19	4.7	2.50	50		
20	4.8	0.23	51		
21	5.1	0.13	52		
22	5.5	0.08	53		
23	5.8	0.06	54		
24	5.9	0.05	55		
25	6.1	0.05	56		
26	6.3	0.04	57		
27	6.5	0.03	58		
28	6.7	0.02	59		
29	6.9	0.02	60		
30	7.2	0.02	61		

Sampl (4 m)

Approx. thermo (8 m – 11 m)

*8.75m
T = 9.6°C
DO = 8.71

9.25m
T = 7.4°C
DO = 8.94

Sampl (16 m)

BOTTOM (35.1 m)

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: North Fork DATE: 10/4/21 TIME: 11:20 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS WEATHER CONDITIONS

Water Temperature: 8.5 (ºF or ºC) Dissolved Oxygen: 8.70 (mg/L)

Conductivity: - (µmhos/cm@25 ºC) Stream or Lake gage reading: 5.8 cfs

Turbidity: - (NTUs) Air Temperature 46 (ºF or ºC) Baro. Pressure 21.43 (in Hg)

- clouds + smoke

Winds 0 (mph) Cloud cover 100 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: _____ meters Depth of Reappearance: _____ meters

Secchi Depth: _____ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks: Very smokey

Notes

Flow field measured at 5.8 cfs.

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Middle Fork DATE: 10/4/21 TIME: 12:15pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 11.5 (ºF or ºC) Dissolved Oxygen: 7.93 (mg/L)

Conductivity: - (μmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: - (NTUs) Air Temperature 46 (ºF or °C) Baro. Pressure 21.56 (in Hg)

clouds + smoke

Winds 0 (mph) Cloud cover 100 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks: Very smoky

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: South Fork DATE: 10/4/21 TIME: 12:50pm

DRAINAGE: Bishop Creek INVESTIGATORS: JB TB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 11.0 (ºF or ºC)

Dissolved Oxygen: 7.96 (mg/L)

Conductivity: – (µmhos/cm@25 ºC)

Stream or Lake gage reading: –

Turbidity: – (NTUs)

Air Temperature 52 (ºF or ºC)

Baro. Pressure 21.13 (in Hg)

Winds 1-2 (mph) Cloud cover 100 (%) clouds + smokey Precipitation ___ Fog ___ Rain ___ Sleet ___ Hail ___ Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks: Heavy smoke

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH2 DATE: 10/14/21 TIME: 1:30pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS | WEATHER CONDITIONS

Water Temperature: 9.1 (ºF or ºC) Dissolved Oxygen: 9.17 (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: –

Turbidity: – (NTUs) Air Temperature 61 (°F or °C) Baro. Pressure 23.11 (in Hg)

clouds & smoke

Winds 0-1 (mph) Cloud cover 100 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: _____ meters Depth of Reappearance: _____ meters

Secchi Depth: _____ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ____ Colored ____

Floating Material ____ Other: ____

Remarks: very smokey

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH2 DATE: 10/4/21 TIME: 1:45pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 9.1 (ºF or ºC) Dissolved Oxygen: 9.25 (mg/L)

Conductivity: – (μmhos/cm@25 ºC) Stream or Lake gage reading: 1.8'

Turbidity: – (NTUs) Air Temperature 61 (ºF or ºC) Baro. Pressure 23.15 (in Hg)

Winds 0 (mph) Cloud cover 100 (%) clouds & smoke Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: _____ meters Depth of Reappearance: _____ meters

Secchi Depth: _____ meters

Visual Condition of Stream (check all that apply):
Clear ✓ Cloudy _____ Colored _____
Floating Material _____ Other: _____

Remarks:

Notes

stream weir gage at 1.8 feet.

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles _____ Preservatives: _____

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH3 DATE: 10/4/21 TIME: 2:00pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 9.6 (ºF or ºC)

Dissolved Oxygen: 9.25 (mg/L)

Conductivity: – (μmhos/cm@25 ºC) Stream or Lake gage reading: –

Turbidity: – (NTUs) Air Temperature 65 (ºF or ºC) Baro. Pressure 23.80 (in Hg)

Winds 0-1 (mph) Cloud cover 100 clouds + smoke (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks: ______

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ______ Preservatives: ______

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH3 DATE: 10/4/21 TIME: 2:10 pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 9.7 (ºF or ºC) Dissolved Oxygen: 9.36 (mg/L)

Conductivity: — (μmhos/cm@25 ºC) Stream or Lake gage reading: 0.7'

Turbidity: — (NTUs) Air Temperature 65 (ºF or ºC) Baro. Pressure 23.84 (in Hg)

Winds 0-1 (mph) Cloud cover 100 clouds/smoke (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks: ____

Notes

stream weir gage at 0.7 feet.

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH4 DATE: 10/4/21 TIME: 2:30 pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 9.9 (ºF or ºC) Dissolved Oxygen: 9.57 (mg/L)

Conductivity: - (µmhos/cm@25 ºC) Stream or Lake gage reading: -

Turbidity: - (NTUs) Air Temperature 67 (ºF or ºC) Baro. Pressure 24.76 (in Hg)

Winds 0 (mph) Cloud cover 90 (%) clouds/smoke Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear ✓ Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks: ____

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH4 DATE: 10/4/21 TIME: 2:35pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 9.8 (ºF or ºC) Dissolved Oxygen: 9.69 (mg/L)

Conductivity: – (μmhos/cm@25 ºC) Stream or Lake gage reading: –

Turbidity: – (NTUs) Air Temperature 67 (ºF or ºC) Baro. Pressure 24.79 (in Hg)

clouds + smoke

Winds 0 (mph) Cloud cover 90 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear:______meters Depth of Reappearance: ______meters

Secchi Depth: ______meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ______ Colored ______

Floating Material ______ Other: ______

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ______ Preservatives: ______

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH5 DATE: 10/4/21 TIME: 2:45pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS — WEATHER CONDITIONS

Water Temperature: 10.0 (ºF or ºC) Dissolved Oxygen: 9.45 (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: –

Turbidity: – (NTUs) Air Temperature 71 (ºF or ºC) Baro. Pressure 25.14 (in Hg)

Winds 0-2 (mph) Cloud cover 90 (%) Clouds + smoke Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ______ Colored ______

Floating Material ______ Other: ______

Remarks: ______

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ______ Preservatives: ______

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH5 DATE: 10/4/21 TIME: 2:55pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 10.7 (ºF or ºC) Dissolved Oxygen: 9.55 (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: –

Turbidity: – (NTUs) Air Temperature 71 (ºF or ºC) Baro. Pressure 25.15 (in Hg)

Winds 0-1 (mph) Cloud cover 90 (%) clouds & smoke Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Tailwater PH6 DATE: 10/4/21 TIME: 3:05pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS — WEATHER CONDITIONS

Water Temperature: 10.4 (ºF or ºC) Dissolved Oxygen: 9.72 (mg/L)

Conductivity: — (µmhos/cm@25 ºC) Stream or Lake gage reading: —

Turbidity: — (NTUs) Air Temperature 71 (ºF or ºC) Baro. Pressure 25.37 (in Hg)

clouds + smoke

Winds 2-3 (mph) Cloud cover 80 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ____ meters Depth of Reappearance: ____ meters

Secchi Depth: ____ meters

Visual Condition of Stream (check all that apply):
Clear X Cloudy ____ Colored ____
Floating Material ____ Other: ____

Remarks: ____

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ____ Preservatives: ____

REMARKS

SIGNED BY: [signature] REVIEWED BY: ____

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: BC below PH6 DATE: 10/4/21 TIME: 3:15pm

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: 10.5 (ºF or ºC)

Dissolved Oxygen: 9.74 (mg/L)

Conductivity: – (µmhos/cm@25 ºC)

Stream or Lake gage reading: –

Turbidity: – (NTUs)

Air Temperature 71 (ºF or ºC)

Baro. Pressure 25.37 (in Hg)

clouds + smoke

Winds 1-3 (mph) Cloud cover 80 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ________ meters

Depth of Reappearance: ________ meters

Secchi Depth: ________ meters

Visual Condition of Stream (check all that apply):

Clear X Cloudy ________ Colored ________

Floating Material ________ Other: ________

Remarks:

Notes

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ________ Preservatives: ________

REMARKS

SIGNED BY: [signature] REVIEWED BY:

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: Lake Sabrina DATE: 10/5/21 TIME: 9:00 am

DRAINAGE: Bishop Creek INVESTIGATORS: TB JB DM

PHYSICAL WATER QUALITY PARAMETERS WEATHER CONDITIONS

Water Temperature: see profile (ºF or ºC) Dissolved Oxygen: see profile (mg/L)

Conductivity: – (µmhos/cm@25 ºC) Stream or Lake gage reading: 9095.09

Turbidity: – (NTUs) Air Temperature 49 (ºF or ºC) Baro. Pressure 21.45 (in Hg)

Winds Ø (mph) Cloud cover Ø (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear:_______meters Depth of Reappearance: _______meters

Secchi Depth: _______ meters

Visual Condition of Stream (check all that apply):

Clear ______ Cloudy ______ Colored ______

Floating Material X Other: ______

Remarks: ASH ON LAKE SURFACE

Notes

THICK HEAVY SMOKE VISABILTY
u < 1/4 mile
Lake level elev. @ 9095.09 ft msl

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ______ Preservatives: ______

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

BISHOP CREEK WATER QUALITY STUDY
FIELD FORM

SITE NAME: SOUTH LAKE DATE: 10/5/21 TIME: 11:45 am

DRAINAGE: Bishop Creek INVESTIGATORS: JB/TB/DM

PHYSICAL WATER QUALITY PARAMETERS

WEATHER CONDITIONS

Water Temperature: see prof. 6 (ºF or ºC) Dissolved Oxygen: see profil 6 (mg/L)

Conductivity: — (µmhos/cm@25 ºC) Stream or Lake gage reading: 9641.70'

Turbidity: — (NTUs) Air Temperature 55.5 (ºF or ºC) Baro. Pressure 21.00 (in Hg)

Winds 6-12 (mph) Cloud cover 50 (%) Precipitation ___Fog ___Rain ___Sleet ___Hail ___Snow

Secchi Disk: NA Depth of Disappear: ______ meters Depth of Reappearance: ______ meters

Secchi Depth: ______ meters

Visual Condition of Stream (check all that apply):
Clear ______ Cloudy ______ Colored ______
Floating Material ______ Other: ______

Remarks: HEAVY SMOKE POOR VISABILITY

Notes

Lake level Elev. @ 9641.70' msl

WATER QUALITY SAMPLE DATA

Sample No. NA Sample Method: Grab Preservatives: Ice

No. of Sample Bottles ______ Preservatives: ______

REMARKS

SIGNED BY: [signature] REVIEWED BY: ______

GARMIN
66.7 M
10.8 C

SURFACE
12.1°C
DO=8.1

WATER TEMPERATURE AND DISSOLVED OXYGEN
LAKE PROFILE DATA FORM

Location: LAKE SABRINA 10/5/21

DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)	DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)
0.5	12.1	8.09	31	4.6	7.35
1	12.2	8.09	32	4.5	7.37
2	12.2	8.08	33	4.5	7.35
3	12.2	8.08	34	4.5	7.40
4	12.2	8.08	35	4.5	7.40
5	12.2	8.07	36	4.4	7.41
6	12.2	8.07	37	4.4	7.41
7	12.2	8.07	38	4.3	7.41
8	12.2	8.07	39	4.3	7.40
9	12.2	8.07	40	4.3	7.39
10	12.2	8.07	41	4.3	7.40
11	12.1	8.09	42	4.3	6.90
12	11.9	8.28	43	4.3	6.89
12.5 13	11.3 10.0	8.75 9.62	44	4.3	6.70
13.5 14	8.6 8.3	10.06 10.14	45	4.3	6.72
15	7.6	10.08	46	4.3	6.55
16	7.1	9.87	47	4.3	6.52
17	6.6	9.71	48	4.3	6.46
18	6.3	9.54	49	4.3	6.23
19	6.0	9.27	50	4.3	6.06
20	5.7	8.84	51	4.3	5.80
21	5.5	8.20	52	4.3	5.58
22	5.2	7.90	53	4.4	5.26
23	5.1	7.70	54	4.4	4.70
24	5.0	7.32	55	4.4	4.44
25	4.9	7.30	56	4.4	4.19
26	4.7	7.50	57	4.4	3.54
27	4.7	7.47	58	4.4	3.25
28	4.6	7.45	59	4.4	2.95
29	4.6	7.42	60	4.4	2.37
30	4.6	7.38	61	4.4	1.90

WATER TEMPERATURE AND DISSOLVED OXYGEN LAKE PROFILE DATA FORM

Location: LAKE SABRINA 10/5/21

DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)	DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)
62	4.4	1.55	91		
63	4.4	Ø.25	92		
BOTTOM ~~64~~ 63.5	4.4	Ø.11	93		
65			94		
66			95		
67			96		
68			97		
69			98		
70			99		
71			100		
72			101		
73			102		
74			103		
75			104		
76			105		
77			106		
78			107		
79			108		
80			109		
81			110		
82			111		
83			112		
84			113		
85			114		
86			115		
87			116		
88			117		
89			118		
90			119		

SURFACE
10.6 °C
8.03

WATER TEMPERATURE AND DISSOLVED OXYGEN
LAKE PROFILE DATA FORM

Location: SOUTH ~~LAKE~~ 10/5/21

@ 8.25M →
8.3 °C
8.41 = DO

DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)	DEPTH FROM WATER SURFACE (meters)	WATER TEMPERATURE (°C)	DISSOLVED OXYGEN (mg/L)
0.5	10.7	8.03	31	7.6	Ø.06
1	10.7	8.02	32	7.7	Ø.05
2	10.6	8.02	~~33~~ 32.5	7.7	Ø.04 ← BOTTOM
3	10.5	8.02	34		
4	10.5	8.01	35		
5	10.5	8.01	36		
6	10.4	8.02	37		
7	10.2	8.01	38		
8	9.0	8.25	39		
8.5	7.3	8.49			
9	6.6	8.39	40		
9.5	3.9	8.51			
10	5.6	8.31	41		
11	5.2	7.92	42		
12	4.9	7.40	43		
13	4.8	6.80	44		
14	4.7	5.57	45		
15	4.7	4.70	46		
16	4.7	3.30	47		
17	4.7	2.10	48		
18	4.9	Ø.25	49		
19	5.1	Ø.19	50		
20	5.5	Ø.14	51		
21	5.7	Ø.11	52		
22	5.9	Ø.09	53		
23	6.0	Ø.08	54		
24	6.2	Ø.07	55		
25	6.5	Ø.06	56		
26	6.7	Ø.05	57		
MOVED * 27	6.9	Ø.15	58		
28	7.2	Ø.10	59		
29	7.3	Ø.09	60		
30	7.5	Ø.07	61		

APPENDIX B

2021 LABORATORY REPORTS

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders:	1F15018	**Report Date:**	6/29/2021
		Received Date:	6/15/2021
Project:	2KLE010102	**Turnaround Time:**	Normal
		Phones:	(714) 751-7373
		Fax:	(714) 545-8883
Attn:	Michael P. Donovan	**P.O. #:**	
Client:	Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Billing Code:**	

Dear Michael P. Donovan,

Enclosed are the results of analyses for samples received 6/15/21 with the Chain-of-Custody document. The samples were received in good condition, at 2.4 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Sample Results

Sample: BC-blw-LS
1F15018-01 (Water)

Sampled: 06/14/21 9:35 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] **Preparation:** [CALC]		**Prepared:** 06/21/21 15:38				**Analyst:** YMT
Nitrogen, Total	**0.16**	0.10	mg/l	1	06/23/21	
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1F0948 **Preparation:** _NONE (LC)		**Prepared:** 06/15/21 12:00				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	06/16/21 03:10	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1F1220 **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/21/21 15:38				**Analyst:** YMT
TKN	**0.16**	0.10	mg/l	1	06/23/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1F0910 **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/15/21 14:24				**Analyst:** sar
NO2+NO3 as N	ND	200	ug/l	1	06/15/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1F0912 **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/15/21 14:33				**Analyst:** ssi
o-Phosphate as P	ND	0.010	mg/l	1	06/15/21 15:23	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1F1005 **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/16/21 12:27				**Analyst:** ism
Total Dissolved Solids	**26**	10	mg/l	1	06/17/21	

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Sample Results

(Continued)

Sample: BC-NF-1 — Sampled: 06/14/21 10:40 by Jim Burton, Todd Bear

1F15018-02 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 06/21/21 15:38				**Analyst:** YMT
Nitrogen, Total	ND	0.10	mg/l	1	06/23/21	
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1F0948 — **Preparation:** _NONE (LC)		**Prepared:** 06/15/21 12:00				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	06/16/21 03:28	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1F1220 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/21/21 15:38				**Analyst:** YMT
TKN	ND	0.10	mg/l	1	06/23/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1F0910 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/15/21 14:24				**Analyst:** sar
NO2+NO3 as N	ND	200	ug/l	1	06/15/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1F0912 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/15/21 14:33				**Analyst:** ssi
o-Phosphate as P	ND	0.010	mg/l	1	06/15/21 15:23	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1F1005 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/16/21 12:27				**Analyst:** ism
Total Dissolved Solids	**32**	10	mg/l	1	06/17/21	

Sample: BC-blw-SL — Sampled: 06/14/21 11:25 by Jim Burton, Todd Bear

1F15018-03 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 06/21/21 15:38				**Analyst:** YMT
Nitrogen, Total	**0.15**	0.10	mg/l	1	06/23/21	
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1F0948 — **Preparation:** _NONE (LC)		**Prepared:** 06/15/21 12:00				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	06/16/21 04:22	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1F1220 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/21/21 15:38				**Analyst:** YMT
TKN	**0.15**	0.10	mg/l	1	06/23/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1F0910 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/15/21 14:24				**Analyst:** sar
NO2+NO3 as N	ND	200	ug/l	1	06/15/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1F0912 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/15/21 14:33				**Analyst:** ssi
o-Phosphate as P	ND	0.010	mg/l	1	06/15/21 15:24	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1F1005 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/16/21 12:27				**Analyst:** ism
Total Dissolved Solids	**37**	10	mg/l	1	06/17/21	

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Sample Results

(Continued)

Sample: BC-blw-PH2 — 1F15018-04 (Water) — Sampled: 06/14/21 12:05 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: [CALC] — **Instr:** [CALC]						
Batch ID: [CALC] — **Preparation:** [CALC] — **Prepared:** 06/21/21 15:38 — **Analyst:** YMT						
Nitrogen, Total	**0.19**	0.10	mg/l	1	06/23/21	
Method: EPA 300.0 — **Instr:** LC12						
Batch ID: W1F0948 — **Preparation:** _NONE (LC) — **Prepared:** 06/15/21 12:00 — **Analyst:** jan						
Nitrate as N	ND	110	ug/l	1	06/16/21 04:40	
Method: EPA 351.2 — **Instr:** AA06						
Batch ID: W1F1220 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 06/21/21 15:38 — **Analyst:** YMT						
TKN	**0.19**	0.10	mg/l	1	06/23/21	
Method: EPA 353.2 — **Instr:** AA01						
Batch ID: W1F0910 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 06/15/21 14:24 — **Analyst:** sar						
NO2+NO3 as N	ND	200	ug/l	1	06/15/21	
Method: EPA 365.3 — **Instr:** UVVIS04						
Batch ID: W1F0912 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 06/15/21 14:33 — **Analyst:** ssi						
o-Phosphate as P	ND	0.010	mg/l	1	06/15/21 15:24	
Method: SM 2540C — **Instr:** OVEN01						
Batch ID: W1F1005 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 06/16/21 12:27 — **Analyst:** ism						
Total Dissolved Solids	**34**	10	mg/l	1	06/17/21	

Sample: BC-blw-PH3 — 1F15018-05 (Water) — Sampled: 06/14/21 12:30 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: [CALC] — **Instr:** [CALC]						
Batch ID: [CALC] — **Preparation:** [CALC] — **Prepared:** 06/21/21 15:38 — **Analyst:** YMT						
Nitrogen, Total	**0.11**	0.10	mg/l	1	06/23/21	
Method: EPA 300.0 — **Instr:** LC12						
Batch ID: W1F0948 — **Preparation:** _NONE (LC) — **Prepared:** 06/15/21 12:00 — **Analyst:** jan						
Nitrate as N	ND	110	ug/l	1	06/16/21 04:58	
Method: EPA 351.2 — **Instr:** AA06						
Batch ID: W1F1220 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 06/21/21 15:38 — **Analyst:** YMT						
TKN	**0.11**	0.10	mg/l	1	06/23/21	
Method: EPA 353.2 — **Instr:** AA01						
Batch ID: W1F0910 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 06/15/21 14:24 — **Analyst:** sar						
NO2+NO3 as N	ND	200	ug/l	1	06/15/21	
Method: EPA 365.3 — **Instr:** UVVIS04						
Batch ID: W1F0912 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 06/15/21 14:33 — **Analyst:** ssi						
o-Phosphate as P	ND	0.010	mg/l	1	06/15/21 15:25	
Method: SM 2540C — **Instr:** OVEN01						
Batch ID: W1F1005 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 06/16/21 12:27 — **Analyst:** ism						
Total Dissolved Solids	**43**	10	mg/l	1	06/17/21	

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Quality Control Results

Anions by IC, EPA Method 300.0

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1F0948 - _NONE (LC)										
Blank (W1F0948-BLK1)				Prepared & Analyzed: 06/15/21						
Nitrate as N	ND	110	ug/l							
LCS (W1F0948-BS1)				Prepared & Analyzed: 06/15/21						
Nitrate as N	998	110	ug/l	1000		100	90-110			
Matrix Spike (W1F0948-MS1)	Source: 1F07013-01			Prepared: 06/15/21 Analyzed: 06/16/21						
Nitrate as N	17700	1100	ug/l	10000	*7790*	99	84-115			
Matrix Spike (W1F0948-MS2)	Source: 1F07013-03			Prepared: 06/15/21 Analyzed: 06/16/21						
Nitrate as N	11100	1100	ug/l	10000	*1160*	100	84-115			
Matrix Spike Dup (W1F0948-MSD1)	Source: 1F07013-01			Prepared: 06/15/21 Analyzed: 06/16/21						
Nitrate as N	17800	1100	ug/l	10000	*7790*	100	84-115	0.4	20	
Matrix Spike Dup (W1F0948-MSD2)	Source: 1F07013-03			Prepared: 06/15/21 Analyzed: 06/16/21						
Nitrate as N	11100	1100	ug/l	10000	*1160*	100	84-115	0.09	20	

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1F0910 - _NONE (WETCHEM)										
Blank (W1F0910-BLK1)				Prepared & Analyzed: 06/15/21						
NO2+NO3 as N	ND	200	ug/l							
LCS (W1F0910-BS1)				Prepared & Analyzed: 06/15/21						
NO2+NO3 as N	989	200	ug/l	1000		99	90-110			
Matrix Spike (W1F0910-MS1)	Source: 1F07004-07			Prepared & Analyzed: 06/15/21						
NO2+NO3 as N	7340	200	ug/l	2000	*5310*	102	90-110			
Matrix Spike (W1F0910-MS2)	Source: 1F07013-07			Prepared & Analyzed: 06/15/21						
NO2+NO3 as N	7510	200	ug/l	2000	*5310*	110	90-110			
Matrix Spike Dup (W1F0910-MSD1)	Source: 1F07004-07			Prepared & Analyzed: 06/15/21						
NO2+NO3 as N	7310	200	ug/l	2000	*5310*	100	90-110	0.4	20	
Matrix Spike Dup (W1F0910-MSD2)	Source: 1F07013-07			Prepared & Analyzed: 06/15/21						
NO2+NO3 as N	7470	200	ug/l	2000	*5310*	108	90-110	0.5	20	
Batch: W1F0912 - _NONE (WETCHEM)										
Blank (W1F0912-BLK1)				Prepared & Analyzed: 06/15/21						
o-Phosphate as P	ND	0.010	mg/l							
LCS (W1F0912-BS1)				Prepared & Analyzed: 06/15/21						
o-Phosphate as P	0.206	0.010	mg/l	0.200		103	88-111			
Matrix Spike (W1F0912-MS1)	Source: 1F15032-01			Prepared & Analyzed: 06/15/21						
o-Phosphate as P	0.305	0.010	mg/l	0.200	*0.110*	98	85-112			
Matrix Spike Dup (W1F0912-MSD1)	Source: 1F15032-01			Prepared & Analyzed: 06/15/21						
o-Phosphate as P	0.301	0.010	mg/l	0.200	*0.110*	96	85-112	1	20	
Batch: W1F1005 - _NONE (WETCHEM)										
Blank (W1F1005-BLK1)				Prepared: 06/16/21 Analyzed: 06/17/21						
Total Dissolved Solids	ND	10	mg/l							
LCS (W1F1005-BS1)				Prepared: 06/16/21 Analyzed: 06/17/21						
Total Dissolved Solids	810	10	mg/l	824		98	96-102			

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Quality Control Results

(Continued)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1F1005 - _NONE (WETCHEM) (Continued)										
Duplicate (W1F1005-DUP1)	**Source: 1E24085-01**			**Prepared: 06/16/21**	**Analyzed: 06/17/21**					
Total Dissolved Solids	893	10	mg/l		*892*			0.1	10	
Duplicate (W1F1005-DUP2)	**Source: 1F15037-01**			**Prepared: 06/16/21**	**Analyzed: 06/17/21**					
Total Dissolved Solids	975	10	mg/l		*959*			2	10	
Batch: W1F1220 - _NONE (WETCHEM)										
Blank (W1F1220-BLK1)				**Prepared: 06/21/21**	**Analyzed: 06/23/21**					
TKN	ND	0.10	mg/l							
Blank (W1F1220-BLK2)				**Prepared: 06/21/21**	**Analyzed: 06/23/21**					
TKN	ND	0.10	mg/l							
LCS (W1F1220-BS1)				**Prepared: 06/21/21**	**Analyzed: 06/23/21**					
TKN	0.955	0.10	mg/l	1.00		95	90-110			
LCS (W1F1220-BS2)				**Prepared: 06/21/21**	**Analyzed: 06/23/21**					
TKN	0.950	0.10	mg/l	1.00		95	90-110			
Matrix Spike (W1F1220-MS1)	**Source: 1F10020-07**			**Prepared: 06/21/21**	**Analyzed: 06/23/21**					
TKN	1.22	0.10	mg/l	1.00	*0.285*	94	90-110			
Matrix Spike (W1F1220-MS2)	**Source: 1F15018-04**			**Prepared: 06/21/21**	**Analyzed: 06/23/21**					
TKN	1.08	0.10	mg/l	1.00	*0.185*	90	90-110			
Matrix Spike Dup (W1F1220-MSD1)	**Source: 1F10020-07**			**Prepared: 06/21/21**	**Analyzed: 06/23/21**					
TKN	1.24	0.10	mg/l	1.00	*0.285*	96	90-110	1	10	
Matrix Spike Dup (W1F1220-MSD2)	**Source: 1F15018-04**			**Prepared: 06/21/21**	**Analyzed: 06/23/21**					
TKN	1.09	0.10	mg/l	1.00	*0.185*	91	90-110	0.6	10	

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Notes and Definitions

Item	Definition
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

Reviewed by:

Chris Samatmanakit
Project Manager

DoD-ELAP ANAB #L2457 • DoD-ISO ANAB # • ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH # • ISO17025 ANAB #L2457.01 • LACSD #10143 • NELAP-OR #4047 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

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(626) 336-2139

CHAIN OF CUSTODY FORM

1F15018

Client Name/Address:	Project/PO Number:
PSOMAS 3 HUTTON CENTRE DRIVE, SUITE 200 SANTA ANA, CA 92707	2KLE010102
Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)	Phone Number: (714) 328-5234
Sampler: Jim Burton, Todd Bear	Fax Number: 714.545.8883

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Nitrate-N EPA Method 300.0	Orthophosphae-OPO4 EPA Method 365.3	Total Dissolved Solids SM2540C	Total Kjeldahl Nitrogenby EPA Method 351.2	NO2+NO3 as N - EPA Method 353.2	Total Nitrogen by calculation						Special Instructions
BC-blw-LS	water	60 ml Poly	1	6/14/21	9:35am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
BC-NF-1	water	60 ml Poly	1	6/14/21	10:40am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
BC-blw-SL	water	60 ml Poly	1	6/14/21	11:25am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
BC-blw-PH2	water	60 ml Poly	1	6/14/21	12:05pm	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
BC-blw-PH3	water	60 ml Poly	1	6/14/21	12:30pm	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						

Relinquished By:	Date /Time:	Received by:	Date /Time:
[signature]	6/14/21 1:30pm		
Relinquished By: FedEx	Date /Time: 6/15/21	Received by: [signature]	Date /Time: 10:25
Relinquished By:	Date /Time:	Received in Lab by:	Date /Time:

Turnaround Time: (Check)
Same Day ____ 72 Hours ____
24 Hours ____ 5 Days ____
48 Hours ____ Normal X

Sample Integrity: (Check)
Intact ____ On Ice X 2.4°C

RD54

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FINAL REPORT

Work Orders:	1F16006	**Report Date:**	7/01/2021
		Received Date:	6/16/2021
Project:	2KLE010102	**Turnaround Time:**	Normal
		Phones:	(714) 751-7373
		Fax:	(714) 545-8883
Attn:	Michael P. Donovan	**P.O. #:**	
Client:	Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Billing Code:**	

Dear Michael P. Donovan,

Enclosed are the results of analyses for samples received 6/16/21 with the Chain-of-Custody document. The samples were received in good condition, at 3.4 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Sample Results

Sample: BC-blw-PH4 — 1F16006-01 (Water) — Sampled: 06/15/21 8:05 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: [CALC] — **Instr:** [CALC]						
Batch ID: [CALC] — **Preparation:** [CALC] — **Prepared:** 06/25/21 17:30 — **Analyst:** YMT						
Nitrogen, Total	ND	0.10	mg/l	1	06/29/21	
Method: EPA 300.0 — **Instr:** LC12						
Batch ID: W1F0976 — **Preparation:** _NONE (LC) — **Prepared:** 06/16/21 10:53 — **Analyst:** jan						
Nitrate as N	ND	110	ug/l	1	06/16/21 22:18	
Method: EPA 351.2 — **Instr:** AA06						
Batch ID: W1F1512 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 06/25/21 17:30 — **Analyst:** YMT						
TKN	ND	0.10	mg/l	1	06/29/21	
Method: EPA 353.2 — **Instr:** AA01						
Batch ID: W1F1059 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 06/17/21 10:22 — **Analyst:** sar						
NO2+NO3 as N	ND	200	ug/l	1	06/17/21	
Method: EPA 365.3 — **Instr:** UVVIS04						
Batch ID: W1F1019 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 06/16/21 17:02 — **Analyst:** ssi						
o-Phosphate as P	ND	0.010	mg/l	1	06/16/21 17:44	
Method: SM 2540C — **Instr:** OVEN01						
Batch ID: W1F1005 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 06/16/21 12:27 — **Analyst:** ism						
Total Dissolved Solids	**41**	10	mg/l	1	06/17/21	

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Sample Results

(Continued)

Sample: BC-blw-PH5 Sampled: 06/15/21 8:35 by Jim Burton, Todd Bear

1F16006-02 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] **Preparation:** [CALC]		**Prepared:** 06/25/21 17:30				**Analyst:** YMT
Nitrogen, Total	**0.13**	0.10	mg/l	1	06/29/21	
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1F0976 **Preparation:** _NONE (LC)		**Prepared:** 06/16/21 10:53				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	06/16/21 22:36	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1F1512 **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/25/21 17:30				**Analyst:** YMT
TKN	**0.13**	0.10	mg/l	1	06/29/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1F1059 **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/17/21 10:22				**Analyst:** sar
NO2+NO3 as N	ND	200	ug/l	1	06/17/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1F1019 **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/16/21 17:02				**Analyst:** ssi
o-Phosphate as P	ND	0.010	mg/l	1	06/16/21 17:44	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1F1005 **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/16/21 12:27				**Analyst:** ism
Total Dissolved Solids	**33**	10	mg/l	1	06/17/21	

Sample: BC-blw-PH6 Sampled: 06/15/21 9:05 by Jim Burton, Todd Bear

1F16006-03 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] **Preparation:** [CALC]		**Prepared:** 06/25/21 17:30				**Analyst:** YMT
Nitrogen, Total	ND	0.10	mg/l	1	06/29/21	
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1F0976 **Preparation:** _NONE (LC)		**Prepared:** 06/16/21 10:53				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	06/16/21 22:54	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1F1512 **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/25/21 17:30				**Analyst:** YMT
TKN	ND	0.10	mg/l	1	06/29/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1F1059 **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/17/21 10:22				**Analyst:** sar
NO2+NO3 as N	ND	200	ug/l	1	06/17/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1F1019 **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/16/21 17:02				**Analyst:** ssi
o-Phosphate as P	ND	0.010	mg/l	1	06/16/21 17:45	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1F1005 **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/16/21 12:27				**Analyst:** ism
Total Dissolved Solids	**38**	10	mg/l	1	06/17/21	

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Quality Control Results

Anions by IC, EPA Method 300.0

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1F0976 - _NONE (LC)										
Blank (W1F0976-BLK1)				**Prepared & Analyzed: 06/16/21**						
Nitrate as N	ND	110	ug/l							
LCS (W1F0976-BS1)				**Prepared & Analyzed: 06/16/21**						
Nitrate as N	1000	110	ug/l	1000		100	90-110			
Matrix Spike (W1F0976-MS1)	**Source: 1F14042-04**			**Prepared & Analyzed: 06/16/21**						
Nitrate as N	10700	1100	ug/l	10000	*450*	102	84-115			
Matrix Spike (W1F0976-MS2)	**Source: 1F15033-04**			**Prepared: 06/16/21 Analyzed: 06/17/21**						
Nitrate as N	10600	1100	ug/l	10000	*440*	102	84-115			
Matrix Spike Dup (W1F0976-MSD1)	**Source: 1F14042-04**			**Prepared & Analyzed: 06/16/21**						
Nitrate as N	10700	1100	ug/l	10000	*450*	102	84-115	0.2	20	
Matrix Spike Dup (W1F0976-MSD2)	**Source: 1F15033-04**			**Prepared: 06/16/21 Analyzed: 06/17/21**						
Nitrate as N	10600	1100	ug/l	10000	*440*	101	84-115	0.2	20	

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1F1005 - _NONE (WETCHEM)										
Blank (W1F1005-BLK1)				**Prepared: 06/16/21 Analyzed: 06/17/21**						
Total Dissolved Solids	ND	10	mg/l							
LCS (W1F1005-BS1)				**Prepared: 06/16/21 Analyzed: 06/17/21**						
Total Dissolved Solids	810	10	mg/l	824		98	96-102			
Duplicate (W1F1005-DUP1)	**Source: 1E24085-01**			**Prepared: 06/16/21 Analyzed: 06/17/21**						
Total Dissolved Solids	893	10	mg/l		*892*			0.1	10	
Duplicate (W1F1005-DUP2)	**Source: 1F15037-01**			**Prepared: 06/16/21 Analyzed: 06/17/21**						
Total Dissolved Solids	975	10	mg/l		*959*			2	10	
Batch: W1F1019 - _NONE (WETCHEM)										
Blank (W1F1019-BLK1)				**Prepared & Analyzed: 06/16/21**						
o-Phosphate as P	ND	0.010	mg/l							
LCS (W1F1019-BS1)				**Prepared & Analyzed: 06/16/21**						
o-Phosphate as P	0.202	0.010	mg/l	0.200		101	88-111			
Matrix Spike (W1F1019-MS1)	**Source: 1D04002-01**			**Prepared & Analyzed: 06/16/21**						
o-Phosphate as P	0.365	0.010	mg/l	0.200	*0.170*	98	85-112			
Matrix Spike Dup (W1F1019-MSD1)	**Source: 1D04002-01**			**Prepared & Analyzed: 06/16/21**						
o-Phosphate as P	0.369	0.010	mg/l	0.200	*0.170*	99	85-112	1	20	
Batch: W1F1059 - _NONE (WETCHEM)										
Blank (W1F1059-BLK1)				**Prepared & Analyzed: 06/17/21**						
NO2+NO3 as N	ND	200	ug/l							
LCS (W1F1059-BS1)				**Prepared & Analyzed: 06/17/21**						
NO2+NO3 as N	1030	200	ug/l	1000		103	90-110			
Duplicate (W1F1059-DUP1)	**Source: 1F17005-01**			**Prepared & Analyzed: 06/17/21**						
NO2+NO3 as N	304	200	ug/l		*298*			2	20	
Matrix Spike (W1F1059-MS1)	**Source: 1F17005-01**			**Prepared & Analyzed: 06/17/21**						
NO2+NO3 as N	2390	200	ug/l	2000	*298*	105	90-110			

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Quality Control Results

(Continued)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1F1059 - _NONE (WETCHEM) (Continued)										
Matrix Spike (W1F1059-MS2)	**Source: 1F16005-01**			**Prepared & Analyzed: 06/17/21**						
NO2+NO3 as N	7210	200	ug/l	2000	*5210*	100	90-110			
Matrix Spike Dup (W1F1059-MSD1)	**Source: 1F17005-01**			**Prepared & Analyzed: 06/17/21**						
NO2+NO3 as N	2400	200	ug/l	2000	*298*	105	90-110	0.4	20	
Matrix Spike Dup (W1F1059-MSD2)	**Source: 1F16005-01**			**Prepared & Analyzed: 06/17/21**						
NO2+NO3 as N	7190	200	ug/l	2000	*5210*	99	90-110	0.3	20	
Batch: W1F1512 - _NONE (WETCHEM)										
Blank (W1F1512-BLK1)				**Prepared: 06/25/21 Analyzed: 06/29/21**						
TKN	ND	0.10	mg/l							
Blank (W1F1512-BLK2)				**Prepared: 06/25/21 Analyzed: 06/29/21**						
TKN	ND	0.10	mg/l							
LCS (W1F1512-BS1)				**Prepared: 06/25/21 Analyzed: 06/29/21**						
TKN	1.02	0.10	mg/l	1.00		102	90-110			
LCS (W1F1512-BS2)				**Prepared: 06/25/21 Analyzed: 06/29/21**						
TKN	1.01	0.10	mg/l	1.00		101	90-110			
Matrix Spike (W1F1512-MS1)	**Source: 1F15051-09**			**Prepared: 06/25/21 Analyzed: 06/29/21**						
TKN	1.15	0.10	mg/l	1.00	*0.123*	103	90-110			
Matrix Spike (W1F1512-MS2)	**Source: 1F15096-03**			**Prepared: 06/25/21 Analyzed: 06/29/21**						
TKN	1.36	0.10	mg/l	1.00	*0.488*	88	90-110			MS-01
Matrix Spike Dup (W1F1512-MSD1)	**Source: 1F15051-09**			**Prepared: 06/25/21 Analyzed: 06/29/21**						
TKN	1.09	0.10	mg/l	1.00	*0.123*	97	90-110	5	10	
Matrix Spike Dup (W1F1512-MSD2)	**Source: 1F15096-03**			**Prepared: 06/25/21 Analyzed: 06/29/21**						
TKN	1.50	0.10	mg/l	1.00	*0.488*	101	90-110	10	10	

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Notes and Definitions

Item	Definition
MS-01	The spike recovery for this QC sample is outside of established control limits possibly due to sample matrix interference.
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

Reviewed by:

Chris Samatmanakit
Project Manager

DoD-ELAP ANAB #L2457 • DoD-ISO ANAB # • ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH # • ISO17025 ANAB #L2457.01 • LACSD #10143 • NELAP-OR #4047 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

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1F16006

CHAIN OF CUSTODY FORM

Client Name/Address:	Project/PO Number:
PSOMAS 3 HUTTON CENTRE DRIVE, SUITE 200 SANTA ANA, CA 92707	2KLE010102
Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)	Phone Number: (714) 328-5234
Sampler: Jim Burton, Todd Bear	Fax Number: 714.545.8883

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Nitrate-N EPA Method 300.0	Orthophosphae-OPO4 EPA Method 365.3	Total Dissolved Solids SM2540C	Total Kjeldahl Nitrogenby EPA Method 351.2	NO2+NO3 as N - EPA Method 353.2	Total Nitrogen by calculation	Special Instructions
BC-blw-PH4	water	60 ml Poly	1	6/15/21	8:05am	None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
BC-blw-PH5	water	60 ml Poly	1	6/15/21	8:35am	None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
BC-blw-PH6	water	60 ml Poly	1	6/15/21	9:05am	None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
	water	60 ml Poly	1			None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
	water	60 ml Poly	1			None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	

Relinquished By:	Date /Time:	Received by:	Date /Time:
[signature]	6/15/21 11:30am	FedEx	
FedEx	6/16/21 928	[signature]	
		Received in Lab by:	

Turnaround Time: (Check)
Same Day ______ 72 Hours ______
24 Hours ______ 5 Days ______
48 Hours ______ Normal X

Sample Integrity: (Check)
Intact ______ On Ice ✓

3.4c T-0234

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Certificate of Analysis

FINAL REPORT

Work Orders:	1F17034	**Report Date:**	7/01/2021
		Received Date:	6/17/2021
Project:	2KLE010102	**Turnaround Time:**	Normal
		Phones:	(714) 751-7373
		Fax:	(714) 545-8883
Attn:	Michael P. Donovan	**P.O. #:**	
Client:	Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Billing Code:**	

Dear Michael P. Donovan,

Enclosed are the results of analyses for samples received 6/17/21 with the Chain-of-Custody document. The samples were received in good condition, at 1.8 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Sample Results

Sample: SL-DP-7 — Sampled: 06/16/21 10:30 by Jim Burton, Todd Bear

1F17034-01 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 06/25/21 17:30				**Analyst:** YMT
Nitrogen, Total	ND	0.10	mg/l	1	06/29/21	
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1F1046 — **Preparation:** _NONE (LC)		**Prepared:** 06/17/21 09:19				**Analyst:** jan
Nitrate as N	ND	230	ug/l	2	06/17/21 15:19	A-01
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1F1512 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/25/21 17:30				**Analyst:** YMT
TKN	ND	0.10	mg/l	1	06/29/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1F1075 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/18/21 08:01				**Analyst:** sar
NO2+NO3 as N	ND	200	ug/l	1	06/18/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1F1087 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/17/21 17:10				**Analyst:** ssi
o-Phosphate as P	ND	0.010	mg/l	1	06/17/21 17:48	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1F1235 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/21/21 17:32				**Analyst:** blg
Total Dissolved Solids	**40**	10	mg/l	1	06/22/21	

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Sample Results

(Continued)

Sample: SL-DP-40 Sampled: 06/16/21 11:00 by Jim Burton, Todd Bear

1F17034-02 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] **Preparation:** [CALC]		**Prepared:** 06/25/21 17:30				**Analyst:** YMT
Nitrogen, Total	**5.5**	0.20	mg/l	1	06/29/21	
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1F1046 **Preparation:** _NONE (LC)		**Prepared:** 06/17/21 09:19				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	06/17/21 15:37	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1F1512 **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/25/21 17:30				**Analyst:** YMT
TKN	**5.5**	2.0	mg/l	1	06/29/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1F1075 **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/18/21 08:01				**Analyst:** sar
NO2+NO3 as N	ND	200	ug/l	1	06/18/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1F1087 **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/17/21 17:10				**Analyst:** ssi
o-Phosphate as P	**0.12**	0.010	mg/l	1	06/17/21 17:49	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1F1235 **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/21/21 17:32				**Analyst:** blg
Total Dissolved Solids	**1300**	10	mg/l	1	06/22/21	

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Quality Control Results

Anions by IC, EPA Method 300.0

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1F1046 - _NONE (LC)										
Blank (W1F1046-BLK1)				**Prepared & Analyzed: 06/17/21**						
Nitrate as N	ND	110	ug/l							
LCS (W1F1046-BS1)				**Prepared & Analyzed: 06/17/21**						
Nitrate as N	980	110	ug/l	1000		98	90-110			
Matrix Spike (W1F1046-MS1)	**Source: 1F16080-03**			**Prepared & Analyzed: 06/17/21**						
Nitrate as N	15700	1100	ug/l	10000	*5660*	100	84-115			
Matrix Spike (W1F1046-MS2)	**Source: 1F16080-04**			**Prepared & Analyzed: 06/17/21**						
Nitrate as N	15300	1100	ug/l	10000	*5670*	97	84-115			
Matrix Spike Dup (W1F1046-MSD1)	**Source: 1F16080-03**			**Prepared & Analyzed: 06/17/21**						
Nitrate as N	15600	1100	ug/l	10000	*5660*	100	84-115	0.3	20	
Matrix Spike Dup (W1F1046-MSD2)	**Source: 1F16080-04**			**Prepared & Analyzed: 06/17/21**						
Nitrate as N	15300	1100	ug/l	10000	*5670*	96	84-115	0.4	20	

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1F1075 - _NONE (WETCHEM)										
Blank (W1F1075-BLK1)				**Prepared: 06/17/21 Analyzed: 06/18/21**						
NO2+NO3 as N	ND	200	ug/l							
LCS (W1F1075-BS1)				**Prepared: 06/17/21 Analyzed: 06/18/21**						
NO2+NO3 as N	1030	200	ug/l	1000		103	90-110			
Matrix Spike (W1F1075-MS1)	**Source: 1C02003-02**			**Prepared: 06/17/21 Analyzed: 06/18/21**						
NO2+NO3 as N	8250	200	ug/l	2000	*6240*	100	90-110			
Matrix Spike (W1F1075-MS2)	**Source: 1F11086-01**			**Prepared: 06/17/21 Analyzed: 06/18/21**						
NO2+NO3 as N	26000	800	ug/l	8000	*17300*	109	90-110			
Matrix Spike Dup (W1F1075-MSD1)	**Source: 1C02003-02**			**Prepared: 06/17/21 Analyzed: 06/18/21**						
NO2+NO3 as N	8240	200	ug/l	2000	*6240*	100	90-110	0.1	20	
Matrix Spike Dup (W1F1075-MSD2)	**Source: 1F11086-01**			**Prepared: 06/17/21 Analyzed: 06/18/21**						
NO2+NO3 as N	26000	800	ug/l	8000	*17300*	109	90-110	0	20	
Batch: W1F1087 - _NONE (WETCHEM)										
Blank (W1F1087-BLK1)				**Prepared & Analyzed: 06/17/21**						
o-Phosphate as P	ND	0.010	mg/l							
LCS (W1F1087-BS1)				**Prepared & Analyzed: 06/17/21**						
o-Phosphate as P	0.202	0.010	mg/l	0.200		101	88-111			
Matrix Spike (W1F1087-MS1)	**Source: 1F17034-01**			**Prepared & Analyzed: 06/17/21**						
o-Phosphate as P	0.199	0.010	mg/l	0.200	*ND*	100	85-112			
Matrix Spike Dup (W1F1087-MSD1)	**Source: 1F17034-01**			**Prepared & Analyzed: 06/17/21**						
o-Phosphate as P	0.192	0.010	mg/l	0.200	*ND*	96	85-112	4	20	
Batch: W1F1235 - _NONE (WETCHEM)										
Blank (W1F1235-BLK1)				**Prepared: 06/21/21 Analyzed: 06/22/21**						
Total Dissolved Solids	ND	10	mg/l							
LCS (W1F1235-BS1)				**Prepared: 06/21/21 Analyzed: 06/22/21**						
Total Dissolved Solids	834	10	mg/l	824		101	96-102			

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Quality Control Results

(Continued)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1F1235 - _NONE (WETCHEM) (Continued)										
Duplicate (W1F1235-DUP1)	**Source: 1C02003-02**			**Prepared: 06/21/21**	**Analyzed: 06/22/21**					
Total Dissolved Solids	2010	10	mg/l		*1980*			2	10	
Duplicate (W1F1235-DUP2)	**Source: 1C02003-03**			**Prepared: 06/21/21**	**Analyzed: 06/22/21**					
Total Dissolved Solids	2210	10	mg/l		*2260*			2	10	
Batch: W1F1512 - _NONE (WETCHEM)										
Blank (W1F1512-BLK1)				**Prepared: 06/25/21**	**Analyzed: 06/29/21**					
TKN	ND	0.10	mg/l							
Blank (W1F1512-BLK2)				**Prepared: 06/25/21**	**Analyzed: 06/29/21**					
TKN	ND	0.10	mg/l							
LCS (W1F1512-BS1)				**Prepared: 06/25/21**	**Analyzed: 06/29/21**					
TKN	1.02	0.10	mg/l	1.00		102	90-110			
LCS (W1F1512-BS2)				**Prepared: 06/25/21**	**Analyzed: 06/29/21**					
TKN	1.01	0.10	mg/l	1.00		101	90-110			
Matrix Spike (W1F1512-MS1)	**Source: 1F15051-09**			**Prepared: 06/25/21**	**Analyzed: 06/29/21**					
TKN	1.15	0.10	mg/l	1.00	*0.123*	103	90-110			
Matrix Spike (W1F1512-MS2)	**Source: 1F15096-03**			**Prepared: 06/25/21**	**Analyzed: 06/29/21**					
TKN	1.36	0.10	mg/l	1.00	*0.488*	88	90-110			MS-01
Matrix Spike Dup (W1F1512-MSD1)	**Source: 1F15051-09**			**Prepared: 06/25/21**	**Analyzed: 06/29/21**					
TKN	1.09	0.10	mg/l	1.00	*0.123*	97	90-110	5	10	
Matrix Spike Dup (W1F1512-MSD2)	**Source: 1F15096-03**			**Prepared: 06/25/21**	**Analyzed: 06/29/21**					
TKN	1.50	0.10	mg/l	1.00	*0.488*	101	90-110	10	10	

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Notes and Definitions

Item	Definition
A-01	Sample ran at 2x dilution by mistake. The MDL and MRL were raised due to such error.
MS-01	The spike recovery for this QC sample is outside of established control limits possibly due to sample matrix interference.
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

Reviewed by:

Chris Samatmanakit
Project Manager

DoD-ELAP ANAB #L2457 • DoD-ISO ANAB # • ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH # • ISO17025 ANAB #L2457.01 • LACSD #10143 • NELAP-OR #4047 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

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14859 Clark Avenue
City of Industry, CA 91745
(626) 336-2139

1F17034

CHAIN OF CUSTODY FORM

Client Name/Address:	Project/PO Number:
PSOMAS 3 HUTTON CENTRE DRIVE, SUITE 200 SANTA ANA, CA 92707	2KLE010102
Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)	Phone Number: (714) 328-5234
Sampler: Jim Burton, Todd Bear	Fax Number: 714.545.8883

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Nitrate-N EPA Method 300.0	Orthophosphae-OPO4 EPA Method 365.3	Total Dissolved Solids SM2540C	Total Kjeldahl Nitrogenby EPA Method 351.2	NO2+NO3 as N - EPA Method 353.2	Total Nitrogen by calculation	Special Instructions
SL-DP-7	water	60 ml Poly	1	6/16/21	10:30am	None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
SL-DP-40	water	60 ml Poly	1	6/16/21	11:00am	None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
	water	60 ml Poly	1			None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
	water	60 ml Poly	1			None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
	water	60 ml Poly	1			None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	

Relinquished By:	Date /Time:	Received by:	Date /Time:
[signature]	6/16/21 1:45pm	FedEx	
FedEx		[signature]	06/17/21 1022
		Received in Lab by:	

Turnaround Time: (Check)
Same Day ______ 72 Hours ______
24 Hours ______ 5 Days ______
48 Hours ______ Normal X

Sample Integrity: (Check)
Intact ______ On Ice ______

1.8°c T0254

Certificate of Analysis

FINAL REPORT

WECK LABORATORIES, INC.

Work Orders:	1F18035	**Report Date:**	7/09/2021
		Received Date:	6/18/2021
Project:	2KLE010102	**Turnaround Time:**	Normal
		Phones:	(714) 751-7373
		Fax:	(714) 545-8883
Attn:	Michael P. Donovan	**P.O. #:**	
Client:	Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Billing Code:**	

DoD-ELAP ANAB #ADE-2882 ● DoD-ISO ANAB # ● ELAP-CA #1132 ● EPA-UCMR #CA00211 ● Guam-EPA #17-008R ● HW-DOH #4047 ● ISO17025 ANAB #L2457.01 ● LACSD #10143 ● NELAP-OR #4047 ● NJ-DEP #CA015 ● NV-DEP #NAC 445A ● SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Michael P. Donovan,

Enclosed are the results of analyses for samples received 6/18/21 with the Chain-of-Custody document. The samples were received in good condition, at 3.8 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

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Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 07/09/2021 12:12

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
LS-DP-5	Jim Burton, Todd Bear	1F18035-01	Water	06/17/21 09:30	
LS-DP-20	Jim Burton, Todd Bear	1F18035-02	Water	06/17/21 10:00	

Certificate of Analysis

FINAL REPORT

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 07/09/2021 12:12

Sample Results

Sample: LS-DP-5 Sampled: 06/17/21 9:30 by Jim Burton, Todd Bear

1F18035-01 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1F1116 **Preparation:** _NONE (LC)		**Prepared:** 06/18/21 11:51				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	06/18/21 16:32	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] **Preparation:** [CALC]		**Prepared:** 06/28/21 18:34				**Analyst:** ymt
Nitrogen, Total	ND	0.10	mg/l	1	07/08/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1F1616 **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/28/21 18:34				**Analyst:** ymt
TKN	ND	0.10	mg/l	1	07/08/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1F1119 **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/18/21 12:27				**Analyst:** SAR
NO2+NO3 as N	ND	200	ug/l	1	06/18/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1F1121 **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/18/21 13:19				**Analyst:** ssi
o-Phosphate as P	ND	0.010	mg/l	1	06/18/21 13:38	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1F1235 **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/21/21 17:32				**Analyst:** blg
Total Dissolved Solids	**19**	10	mg/l	1	06/22/21	

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Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Project Number:** 2KLE010102 **Project Manager:** Michael P. Donovan	**Reported:** 07/09/2021 12:12

Sample Results

(Continued)

Sample: LS-DP-20 — Sampled: 06/17/21 10:00 by Jim Burton, Todd Bear

1F18035-02 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1F1116 — **Preparation:** _NONE (LC)		**Prepared:** 06/18/21 11:51				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	06/18/21 16:50	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 06/28/21 18:34				**Analyst:** ymt
Nitrogen, Total	**0.11**	0.10	mg/l	1	07/08/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1F1616 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/28/21 18:34				**Analyst:** ymt
TKN	**0.11**	0.10	mg/l	1	07/08/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1F1119 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/18/21 12:27				**Analyst:** SAR
NO2+NO3 as N	ND	200	ug/l	1	06/18/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1F1121 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/18/21 13:19				**Analyst:** ssi
o-Phosphate as P	ND	0.010	mg/l	1	06/18/21 13:39	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1F1235 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 06/21/21 17:32				**Analyst:** blg
Total Dissolved Solids	**24**	10	mg/l	1	06/22/21	

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Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 07/09/2021 12:12

Quality Control Results

Anions by IC, EPA Method 300.0

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1F1116 - EPA 300.0										
Blank (W1F1116-BLK1)				**Prepared & Analyzed: 06/18/21**						
Nitrate as N	ND	110	ug/l							
Blank (W1F1116-BLK2)				**Prepared: 06/18/21 Analyzed: 06/21/21**						
Nitrate as N	ND	110	ug/l							QC-2
LCS (W1F1116-BS1)				**Prepared & Analyzed: 06/18/21**						
Nitrate as N	985	110	ug/l	1000		98	90-110			
LCS (W1F1116-BS2)				**Prepared: 06/18/21 Analyzed: 06/21/21**						
Nitrate as N	903	110	ug/l	1000		90	90-110			QC-2
Matrix Spike (W1F1116-MS1)	**Source: 1F16050-02**			**Prepared: 06/18/21 Analyzed: 06/21/21**						
Nitrate as N	19100	1100	ug/l	10000	10300	88	84-115			
Matrix Spike Dup (W1F1116-MSD1)	**Source: 1F16050-02**			**Prepared: 06/18/21 Analyzed: 06/21/21**						
Nitrate as N	18800	1100	ug/l	10000	10300	85	84-115	2	20	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1F1119 - EPA 353.2										
Blank (W1F1119-BLK1)				**Prepared & Analyzed: 06/18/21**						
NO2+NO3 as N	ND	200	ug/l							
LCS (W1F1119-BS1)				**Prepared & Analyzed: 06/18/21**						
NO2+NO3 as N	1000	200	ug/l	1000		100	90-110			
Duplicate (W1F1119-DUP1)	**Source: 1F18033-01**			**Prepared & Analyzed: 06/18/21**						
NO2+NO3 as N	4890	200	ug/l		4840			1	20	
Matrix Spike (W1F1119-MS1)	**Source: 1F18033-01**			**Prepared & Analyzed: 06/18/21**						
NO2+NO3 as N	6910	200	ug/l	2000	4840	104	90-110			
Matrix Spike Dup (W1F1119-MSD1)	**Source: 1F18033-01**			**Prepared & Analyzed: 06/18/21**						
NO2+NO3 as N	6880	200	ug/l	2000	4840	102	90-110	0.4	20	
Batch: W1F1121 - EPA 365.3										
Blank (W1F1121-BLK1)				**Prepared & Analyzed: 06/18/21**						
o-Phosphate as P	ND	0.010	mg/l							
LCS (W1F1121-BS1)				**Prepared & Analyzed: 06/18/21**						
o-Phosphate as P	0.206	0.010	mg/l	0.200		103	88-111			
Matrix Spike (W1F1121-MS1)	**Source: 1F18035-01**			**Prepared & Analyzed: 06/18/21**						
o-Phosphate as P	0.202	0.010	mg/l	0.200	ND	101	85-112			
Matrix Spike Dup (W1F1121-MSD1)	**Source: 1F18035-01**			**Prepared & Analyzed: 06/18/21**						
o-Phosphate as P	0.201	0.010	mg/l	0.200	ND	100	85-112	0.5	20	
Batch: W1F1235 - SM 2540C										
Blank (W1F1235-BLK1)				**Prepared: 06/21/21 Analyzed: 06/22/21**						

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Certificate of Analysis

FINAL REPORT

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 07/09/2021 12:12

Quality Control Results

(Continued)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1F1235 - SM 2540C (Continued)										
Blank (W1F1235-BLK1)				**Prepared: 06/21/21**	**Analyzed: 06/22/21**					
Total Dissolved Solids	ND	10	mg/l							
LCS (W1F1235-BS1)				**Prepared: 06/21/21**	**Analyzed: 06/22/21**					
Total Dissolved Solids	834	10	mg/l	824		101	96-102			
Duplicate (W1F1235-DUP1)	**Source: 1C02003-02**			**Prepared: 06/21/21**	**Analyzed: 06/22/21**					
Total Dissolved Solids	2010	10	mg/l		1980			2	10	
Duplicate (W1F1235-DUP2)	**Source: 1C02003-03**			**Prepared: 06/21/21**	**Analyzed: 06/22/21**					
Total Dissolved Solids	2210	10	mg/l		2260			2	10	
Batch: W1F1616 - EPA 351.2										
Blank (W1F1616-BLK1)				**Prepared: 06/28/21**	**Analyzed: 07/08/21**					
TKN	ND	0.10	mg/l							
Blank (W1F1616-BLK2)				**Prepared: 06/28/21**	**Analyzed: 07/08/21**					
TKN	ND	0.10	mg/l							
LCS (W1F1616-BS1)				**Prepared: 06/28/21**	**Analyzed: 07/08/21**					
TKN	1.06	0.10	mg/l	1.00		106	90-110			
LCS (W1F1616-BS2)				**Prepared: 06/28/21**	**Analyzed: 07/08/21**					
TKN	1.08	0.10	mg/l	1.00		108	90-110			
Matrix Spike (W1F1616-MS1)	**Source: 1F16025-01**			**Prepared: 06/28/21**	**Analyzed: 07/08/21**					
TKN	1.37	0.10	mg/l	1.00	0.566	81	90-110			MS-01
Matrix Spike (W1F1616-MS2)	**Source: 1F23032-04**			**Prepared: 06/28/21**	**Analyzed: 07/08/21**					
TKN	1.53	0.10	mg/l	1.00	0.355	118	90-110			MS-01
Matrix Spike Dup (W1F1616-MSD1)	**Source: 1F16025-01**			**Prepared: 06/28/21**	**Analyzed: 07/08/21**					
TKN	0.857	0.10	mg/l	1.00	0.566	29	90-110	46	10	MS-01
Matrix Spike Dup (W1F1616-MSD2)	**Source: 1F23032-04**			**Prepared: 06/28/21**	**Analyzed: 07/08/21**					
TKN	1.56	0.10	mg/l	1.00	0.355	121	90-110	2	10	MS-01

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Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 07/09/2021 12:12

Notes and Definitions

Item	Definition
MS-01	The spike recovery for this QC sample is outside of established control limits possibly due to sample matrix interference.
QC-2	This QC sample was reanalyzed to complement samples that require re-analysis on different date. See analysis date.
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

Weck Laboratories
14859 Clark Avenue
City of Industry, CA 91745
(626) 336-2139

CHAIN OF CUSTODY FORM

1F18035

Page 1 of 1

Client Name/Address:	Project/PO Number:
PSOMAS 3 HUTTON CENTRE DRIVE, SUITE 200 SANTA ANA, CA 92707	2KLE010102
Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)	Phone Number: (714) 328-5234
Sampler: Jim Burton, Todd Bear	Fax Number: 714.545.8883

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Nitrate-N EPA Method 300.0	Orthophosphae-OPO4 EPA Method 365.3	Total Dissolved Solids SM2540C	Total Kjeldahl Nitrogenby EPA Method 351.2	NO2+NO3 as N - EPA Method 353.2	Total Nitrogen by calculation	Special Instructions
LS-DP-5	water	60 ml Poly	1	6/17/21	9:30am	None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
LS-DP-20	water	60 ml Poly	1	6/17/21	10:00am	None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
	water	60 ml Poly	1			None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
	water	60 ml Poly	1			None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
	water	60 ml Poly	1			None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	

Relinquished By:	Date /Time:	Received by:	Date /Time:
[signature]	6/17/21 11:15am		
FedEx	6/18/21	[signature]	10:15
		Received in Lab by:	

Turnaround Time: (Check)
Same Day ____ 72 Hours ____
24 Hours ____ 5 Days ____
48 Hours ____ Normal X

Sample Integrity: (Check)
Intact ____ On Ice 3.8°

T023Y

Certificate of Analysis

FINAL REPORT

WECK LABORATORIES, INC.

Work Orders:	1G14015	**Report Date:**	7/22/2021
		Received Date:	7/14/2021
Project:	2KLE010102	**Turnaround Time:**	Normal
		Phones:	(714) 751-7373
		Fax:	(714) 545-8883
Attn:	Michael P. Donovan	**P.O. #:**	
Client:	Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Billing Code:**	

Dear Michael P. Donovan :

Enclosed are the results of analyses for samples received 7/14/2021 with the Chain-of-Custody document. The samples were received in good condition, at 4.7 °C and on ice. All analysis met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Sample Results

Sample: SL-BR-1 — 1G14015-01 (Water) — Sampled: 07/12/21 11:15 by Client

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: SM 9223B		**Instr:** INC12				
Batch ID: W1G0973	**Preparation:** _NONE (MICROBIOLOGY)	**Prepared:** 07/14/21 18:20				**Analyst:** slh
E. coli	ND	1.0	MPN/100ml	1	07/15/21	O-09

Sample: LS-BR-1 — 1G14015-02 (Water) — Sampled: 07/12/21 11:45 by Client

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: SM 9223B		**Instr:** INC12				
Batch ID: W1G0973	**Preparation:** _NONE (MICROBIOLOGY)	**Prepared:** 07/14/21 18:20				**Analyst:** slh
E. coli	ND	1.0	MPN/100ml	1	07/15/21	O-09

Sample: INT-RES-1 — 1G14015-03 (Water) — Sampled: 07/12/21 12:05 by Client

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: SM 9223B		**Instr:** INC12				
Batch ID: W1G0973	**Preparation:** _NONE (MICROBIOLOGY)	**Prepared:** 07/14/21 18:20				**Analyst:** slh
E. coli	**28**	1.0	MPN/100ml	1	07/15/21	O-09

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Notes and Definitions

Item	Definition
O-09	This sample was received with the EPA recommended holding time expired.
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

Analyses Accreditation Summary

Analyte	CAS #	Not By NELAP	ANAB ISO 17025
SM 9223B in Water			
E. coli		✓	

Reviewed by:

Chris Samatmanakit
Project Manager

DoD-ELAP ANAB #ADE-2882 • DoD-ISO ANAB # • ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH #4047 • ISO17025 ANAB #L2457.01 • LACSD #10143 • NELAP-OR #4047 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

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CHAIN OF CUSTODY FORM

1G14015

Page 1 of 1

Client Name/Address:	Project/PO Number:
PSOMAS 3 HUTTON CENTRE DRIVE, SUITE 200 SANTA ANA, CA 92707	2KLE010102
Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)	Phone Number: (714) 328-5234
Sampler: Jim Burton, Todd Bear	Fax Number: 714.545.8883

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Escherichia coli (E. coli) by SM 9223B											Special Instructions
SL-BR-1	water	125 ml poly	1	7/12/21	11:15a	Sterile- None	X											24-Hour Hold time*
LS-BR-1	water	125 ml poly	1	7/12/21	11:45a	Sterile- None	X											24-Hour Hold time*
INT-RES-1	water	125 ml poly	1	7/12/21	12:05p	Sterile- None	X											24-Hour Hold time*

Relinquished By:	Date /Time:	Received by:	Date /Time:	
[signature]	7/12/21 12:45pm			Turnaround Time: (Check) Same Day ____ 72 Hours ____
Relinquished By: Fedex	Date /Time: 7/14/21	Received by: [signature]	Date /Time: 10:30	24 Hours ____ 5 Days ____ 48 Hours ____ Normal X
Relinquished By:	Date /Time:	Received in Lab by:	Date /Time:	Sample Integrity: (Check) Intact ____ On Ice ____

* Per Lohantan Surface Water Ambient Monitoring Program (SWAMP) for ambient water

T0234 4.7°C

Certificate of Analysis

FINAL REPORT

WECK LABORATORIES, INC.

Work Orders:	1G16026	**Report Date:**	7/22/2021
		Received Date:	7/16/2021
Project:	2KLE010102	**Turnaround Time:**	Normal
		Phones:	(714) 751-7373
		Fax:	(714) 545-8883
Attn:	Michael P. Donovan	**P.O. #:**	
Client:	Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Billing Code:**	

Dear Michael P. Donovan :

Enclosed are the results of analyses for samples received 7/16/2021 with the Chain-of-Custody document. The samples were received in good condition, at 3.8 °C and on ice. All analysis met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Sample Results

Sample: SL-BR-1 — Sampled: 07/15/21 12:05 by Client

1G16026-01 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: SM 9223B		**Instr:** INC12				
Batch ID: W1G0973	**Preparation:** _NONE (MICROBIOLOGY)	**Prepared:** 07/16/21 11:58				**Analyst:** atd
E. coli	ND	1.0	MPN/100ml	1	07/17/21	

Sample: LS-BR-1 — Sampled: 07/15/21 12:30 by Client

1G16026-02 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: SM 9223B		**Instr:** INC12				
Batch ID: W1G0973	**Preparation:** _NONE (MICROBIOLOGY)	**Prepared:** 07/16/21 11:58				**Analyst:** atd
E. coli	ND	1.0	MPN/100ml	1	07/17/21	

Sample: INT2-RES-1 — Sampled: 07/15/21 12:50 by Client

1G16026-03 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: SM 9223B		**Instr:** INC12				
Batch ID: W1G0973	**Preparation:** _NONE (MICROBIOLOGY)	**Prepared:** 07/16/21 11:58				**Analyst:** atd
E. coli	**8.6**	1.0	MPN/100ml	1	07/17/21	

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Notes and Definitions

Item	Definition
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

Analyses Accreditation Summary

Analyte	CAS #	Not By NELAP	ANAB ISO 17025
SM 9223B in Water			
E. coli		✓	

Reviewed by:

Chris Samatmanakit
Project Manager

DoD-ELAP ANAB #ADE-2882 • DoD-ISO ANAB # • ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH #4047 • ISO17025 ANAB #L2457.01 • LACSD #10143 • NELAP-OR #4047 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

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CHAIN OF CUSTODY FORM 1G16026 Page 1 of 1

Client Name/Address: PSOMAS 3 HUTTON CENTRE DRIVE, SUITE 200 SANTA ANA, CA 92707	Project/PO Number: 2KLE010102
Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)	Phone Number: (714) 328-5234
Sampler: Jim Burton, Todd Bear	Fax Number: 714.545.8883

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Escherichia coli (E. coli) by SM 9223B	Special Instructions
SL-BR-1	water	125 ml poly	1	7/15/21	12:05p	Sterile- None	X	24-Hour Hold time*
LS-BR-1	water	125 ml poly	1	7/15/21	12:30p	Sterile- None	X	24-Hour Hold time*
INT2-RES-1	water	125 ml poly	1	7/15/21	12:50p	Sterile- None	X	24-Hour Hold time*

Relinquished By:	Date /Time:	Received by:	Date /Time:
[signature]	7/15/21 1:30pm	FedEx	
FedEx		[signature]	07/16/21 10:30
		Received in Lab by:	

Turnaround Time: (Check)
Same Day ______ 72 Hours ______
24 Hours ______ 5 Days ______
48 Hours ______ Normal X

Sample Integrity: (Check)
Intact ______ On Ice ______

* Per Lohantan Surface Water Ambient Monitoring Program (SWAMP) for ambient water

3.8°C T0254

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders:	1G27020	**Report Date:**	8/10/2021
		Received Date:	7/27/2021
Project:	2KLE010102	**Turnaround Time:**	Normal
		Phones:	(714) 751-7373
		Fax:	(714) 545-8883
Attn:	Michael P. Donovan	**P.O. #:**	
Client:	Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Billing Code:**	

Dear Michael P. Donovan :

Enclosed are the results of analyses for samples received 7/27/2021 with the Chain-of-Custody document. The samples were received in good condition, at 2.0 °C and on ice. All analysis met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Sample Results

Sample: SL-BR-1 — 1G27020-01 (Water) — Sampled: 07/26/21 12:00 by Client

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: SM 9223B		**Instr:** INC12				
Batch ID: W1H0520	**Preparation:** _NONE (MICROBIOLOGY)	**Prepared:** 07/27/21 11:54				**Analyst:** rea
E. coli	ND	1.0	MPN/100ml	1	07/28/21	

Sample: LS-BR-1 — 1G27020-02 (Water) — Sampled: 07/26/21 12:40 by Client

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: SM 9223B		**Instr:** INC12				
Batch ID: W1H0520	**Preparation:** _NONE (MICROBIOLOGY)	**Prepared:** 07/27/21 11:54				**Analyst:** rea
E. coli	**310**	1.0	MPN/100ml	1	07/28/21	

Sample: INT2-RES-1 — 1G27020-03 (Water) — Sampled: 07/26/21 13:00 by Client

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: SM 9223B		**Instr:** INC12				
Batch ID: W1H0520	**Preparation:** _NONE (MICROBIOLOGY)	**Prepared:** 07/27/21 11:54				**Analyst:** rea
E. coli	**2.0**	1.0	MPN/100ml	1	07/28/21	

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Notes and Definitions

Item	Definition
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

Analyses Accreditation Summary

Analyte	CAS #	Not By NELAP	ANAB ISO 17025
SM 9223B in Water			
E. coli		✓	

Reviewed by:

Chris Samatmanakit
Project Manager

DoD-ELAP ANAB #ADE-2882 • DoD-ISO ANAB # • ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH #4047 • ISO17025 ANAB #L2457.01 • LACSD #10143 • NELAP-OR #4047 • NJ-DEP #CA015 • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

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CHAIN OF CUSTODY FORM

1G27020 Page 1 of 1

Client Name/Address:	Project/PO Number:
PSOMAS 3 HUTTON CENTRE DRIVE, SUITE 200 SANTA ANA, CA 92707	2KLE010102
Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)	Phone Number: (714) 328-5234
Sampler: Jim Burton, Todd Bear	Fax Number: 714.545.8883

* Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Escherichia coli (E. coli) by SM 9223B	Special Instructions
SL-BR-1	water	125 ml poly	1	7/26/21	12:00p	Sterile- None	X	24-Hour Hold time*
LS-BR-1	water	125 ml poly	1	|	12:40p	Sterile- None	X	24-Hour Hold time*
INT2-RES-1	water	125 ml poly	1	|	1:00p	Sterile- None	X	24-Hour Hold time*

Relinquished By:	Date /Time:	Received by:	Date /Time:
[signature]	7/26/21 1:45pm		
Relinquished By: [signature]	Date /Time: 7/27/21	Received by: [signature]	Date /Time: 10:05
Relinquished By:	Date /Time:	Received in Lab by:	Date /Time:

Turnaround Time: (Check)
Same Day ______ 72 Hours ______
24 Hours ______ 5 Days ______
48 Hours ______ Normal X

Sample Integrity: (Check)
Intact ______ On Ice ______

* Per Lohantan Surface Water Ambient Monitoring Program (SWAMP) for ambient water

T0230 2°

Certificate of Analysis
FINAL REPORT

WECK LABORATORIES, INC.

Work Orders:	1G27021	**Report Date:**	8/17/2021
		Received Date:	7/27/2021
Project:	2KLE010102	**Turnaround Time:**	Normal
		Phones:	(714) 751-7373
		Fax:	(714) 545-8883
Attn:	Michael P. Donovan	**P.O. #:**	
Client:	Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Billing Code:**	

DoD-ELAP ANAB #ADE-2882 • DoD-ISO ANAB # • ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH #4047 • ISO17025 ANAB #L2457.01 • LACSD #10143 • NELAP-OR #4047 • NJ-DEP #CA015 • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Michael P. Donovan,

Enclosed are the results of analyses for samples received 7/27/21 with the Chain-of-Custody document. The samples were received in good condition, at 2.0 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

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FINAL REPORT

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 08/17/2021 11:48

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
BC-NF-1	Jim Burton, Todd Bear	1G27021-01	Water	07/26/21 08:30	
BC-blw-LS	Jim Burton, Todd Bear	1G27021-02	Water	07/26/21 09:15	
BC-blw-SL	Jim Burton, Todd Bear	1G27021-03	Water	07/26/21 10:00	

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 08/17/2021 11:48

Sample Results

Sample: BC-NF-1 Sampled: 07/26/21 8:30 by Jim Burton, Todd Bear

1G27021-01 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1G1369 **Preparation:** _NONE (LC)		**Prepared:** 07/27/21 11:23				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	07/28/21 00:43	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] **Preparation:** [CALC]		**Prepared:** 08/06/21 17:42				**Analyst:** YMT
Nitrogen, Total	**0.13**	0.10	mg/l	1	08/10/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1H0454 **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/06/21 17:42				**Analyst:** YMT
TKN	**0.13**	0.10	mg/l	1	08/10/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1G1532 **Preparation:** _NONE (WETCHEM)		**Prepared:** 07/28/21 17:44				**Analyst:** ISM
NO2+NO3 as N	ND	200	ug/l	1	07/29/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1G1443 **Preparation:** _NONE (WETCHEM)		**Prepared:** 07/27/21 16:28				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	07/27/21 17:06	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1G1670 **Preparation:** _NONE (WETCHEM)		**Prepared:** 07/30/21 17:30				**Analyst:** blg
Total Dissolved Solids	**29**	10	mg/l	1	08/02/21	

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FINAL REPORT

WECK LABORATORIES, INC.

Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Project Number:** 2KLE010102 **Project Manager:** Michael P. Donovan	**Reported:** 08/17/2021 11:48

Sample Results

(Continued)

Sample: BC-blw-LS — Sampled: 07/26/21 9:15 by Jim Burton, Todd Bear

1G27021-02 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1G1369 — **Preparation:** _NONE (LC)		**Prepared:** 07/27/21 11:23				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	07/28/21 01:01	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 08/09/21 19:20				**Analyst:** YMT
Nitrogen, Total	**0.12**	0.10	mg/l	1	08/11/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1H0569 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/09/21 19:20				**Analyst:** YMT
TKN	**0.12**	0.10	mg/l	1	08/11/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1G1532 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 07/28/21 17:44				**Analyst:** ISM
NO2+NO3 as N	ND	200	ug/l	1	07/29/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1G1443 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 07/27/21 16:28				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	07/27/21 17:08	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1G1670 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 07/30/21 17:30				**Analyst:** blg
Total Dissolved Solids	**28**	10	mg/l	1	08/02/21	

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Certificate of Analysis

FINAL REPORT

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 08/17/2021 11:48

Sample Results

(Continued)

Sample: BC-blw-SL
1G27021-03 (Water)

Sampled: 07/26/21 10:00 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1G1369 **Preparation:** _NONE (LC)		**Prepared:** 07/27/21 11:23				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	07/28/21 01:19	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] **Preparation:** [CALC]		**Prepared:** 08/09/21 19:20				**Analyst:** YMT
Nitrogen, Total	**0.12**	0.10	mg/l	1	08/11/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1H0569 **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/09/21 19:20				**Analyst:** YMT
TKN	**0.12**	0.10	mg/l	1	08/11/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1G1532 **Preparation:** _NONE (WETCHEM)		**Prepared:** 07/28/21 17:44				**Analyst:** ISM
NO2+NO3 as N	ND	200	ug/l	1	07/29/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1G1443 **Preparation:** _NONE (WETCHEM)		**Prepared:** 07/27/21 16:28				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	07/27/21 17:09	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1G1670 **Preparation:** _NONE (WETCHEM)		**Prepared:** 07/30/21 17:30				**Analyst:** blg
Total Dissolved Solids	**24**	10	mg/l	1	08/02/21	

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Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 08/17/2021 11:48

Quality Control Results

Anions by IC, EPA Method 300.0

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1G1369 - EPA 300.0										
Blank (W1G1369-BLK1)				**Prepared & Analyzed: 07/27/21**						
Nitrate as N	ND	110	ug/l							
LCS (W1G1369-BS1)				**Prepared & Analyzed: 07/27/21**						
Nitrate as N	1040	110	ug/l	1000		104	90-110			
Matrix Spike (W1G1369-MS1)	**Source: 1G21005-01**			**Prepared: 07/27/21 Analyzed: 07/28/21**						
Nitrate as N	12800	1100	ug/l	10000	3090	97	84-115			
Matrix Spike Dup (W1G1369-MSD1)	**Source: 1G21005-01**			**Prepared: 07/27/21 Analyzed: 07/28/21**						
Nitrate as N	12700	1100	ug/l	10000	3090	96	84-115	0.7	20	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1G1443 - EPA 365.3										
Blank (W1G1443-BLK1)				**Prepared & Analyzed: 07/27/21**						
o-Phosphate as P	ND	0.010	mg/l							
LCS (W1G1443-BS1)				**Prepared & Analyzed: 07/27/21**						
o-Phosphate as P	0.200	0.010	mg/l	0.200		100	88-111			
Matrix Spike (W1G1443-MS1)	**Source: 1G27021-01**			**Prepared & Analyzed: 07/27/21**						
o-Phosphate as P	0.198	0.010	mg/l	0.200	ND	99	85-112			
Matrix Spike Dup (W1G1443-MSD1)	**Source: 1G27021-01**			**Prepared & Analyzed: 07/27/21**						
o-Phosphate as P	0.200	0.010	mg/l	0.200	ND	100	85-112	1	20	
Batch: W1G1532 - EPA 353.2										
Blank (W1G1532-BLK1)				**Prepared: 07/28/21 Analyzed: 07/29/21**						
NO2+NO3 as N	ND	200	ug/l							
LCS (W1G1532-BS1)				**Prepared: 07/28/21 Analyzed: 07/29/21**						
NO2+NO3 as N	1010	200	ug/l	1000		101	90-110			
Matrix Spike (W1G1532-MS1)	**Source: 1G27003-06**			**Prepared: 07/28/21 Analyzed: 07/29/21**						
NO2+NO3 as N	2900	200	ug/l	2000	1010	94	90-110			
Matrix Spike (W1G1532-MS2)	**Source: 1G28064-04**			**Prepared: 07/28/21 Analyzed: 07/29/21**						
NO2+NO3 as N	2230	200	ug/l	2000	219	101	90-110			
Matrix Spike Dup (W1G1532-MSD1)	**Source: 1G27003-06**			**Prepared: 07/28/21 Analyzed: 07/29/21**						
NO2+NO3 as N	2910	200	ug/l	2000	1010	95	90-110	0.3	20	
Matrix Spike Dup (W1G1532-MSD2)	**Source: 1G28064-04**			**Prepared: 07/28/21 Analyzed: 07/29/21**						
NO2+NO3 as N	2190	200	ug/l	2000	219	99	90-110	2	20	
Batch: W1G1670 - SM 2540C										
Blank (W1G1670-BLK1)				**Prepared: 07/30/21 Analyzed: 08/02/21**						
Total Dissolved Solids	ND	10	mg/l							
Blank (W1G1670-BLK2)				**Prepared: 07/30/21 Analyzed: 08/02/21**						

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Quality Control Results

(Continued)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1G1670 - SM 2540C (Continued)										
Blank (W1G1670-BLK2)				**Prepared: 07/30/21**	**Analyzed: 08/02/21**					
Total Dissolved Solids	ND	10	mg/l							
LCS (W1G1670-BS1)				**Prepared: 07/30/21**	**Analyzed: 08/02/21**					
Total Dissolved Solids	823	10	mg/l				96-102			
LCS (W1G1670-BS2)				**Prepared: 07/30/21**	**Analyzed: 08/02/21**					
Total Dissolved Solids	807	10	mg/l	824		98	96-102			
Duplicate (W1G1670-DUP1)	**Source: 1G27053-01**			**Prepared: 07/30/21**	**Analyzed: 08/02/21**					
Total Dissolved Solids	983	10	mg/l		957			3	10	
Duplicate (W1G1670-DUP2)	**Source: 1G27064-01**			**Prepared: 07/30/21**	**Analyzed: 08/02/21**					
Total Dissolved Solids	572	10	mg/l		593			4	10	
Duplicate (W1G1670-DUP3)	**Source: 1G26047-08RE1**			**Prepared: 07/30/21**	**Analyzed: 08/02/21**					
Total Dissolved Solids	6160	10	mg/l		6210			0.8	10	
Batch: W1H0454 - EPA 351.2										
Blank (W1H0454-BLK1)				**Prepared: 08/06/21**	**Analyzed: 08/10/21**					
TKN	ND	0.10	mg/l							
LCS (W1H0454-BS1)				**Prepared: 08/06/21**	**Analyzed: 08/10/21**					
TKN	1.01	0.10	mg/l	1.00		101	90-110			
Matrix Spike (W1H0454-MS1)	**Source: 1G27017-05**			**Prepared: 08/06/21**	**Analyzed: 08/10/21**					
TKN	1.34	0.10	mg/l	1.00	0.344	100	90-110			
Matrix Spike Dup (W1H0454-MSD1)	**Source: 1G27017-05**			**Prepared: 08/06/21**	**Analyzed: 08/10/21**					
TKN	1.36	0.10	mg/l	1.00	0.344	102	90-110	2	10	
Batch: W1H0569 - EPA 351.2										
Blank (W1H0569-BLK1)				**Prepared: 08/09/21**	**Analyzed: 08/11/21**					
TKN	ND	0.10	mg/l							
LCS (W1H0569-BS1)				**Prepared: 08/09/21**	**Analyzed: 08/11/21**					
TKN	0.969	0.10	mg/l	1.00		97	90-110			
Matrix Spike (W1H0569-MS1)	**Source: 1G27017-02**			**Prepared: 08/09/21**	**Analyzed: 08/11/21**					
TKN	1.23	0.10	mg/l	1.00	0.238	99	90-110			
Matrix Spike Dup (W1H0569-MSD1)	**Source: 1G27017-02**			**Prepared: 08/09/21**	**Analyzed: 08/11/21**					
TKN	1.25	0.10	mg/l	1.00	0.238	101	90-110	1	10	

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported:
08/17/2021 11:48

Notes and Definitions

Item	Definition
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

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CHAIN OF CUSTODY FORM 1G27021

Page 1 of 1

Client Name/Address:	Project/PO Number:
PSOMAS 3 HUTTON CENTRE DRIVE, SUITE 200 SANTA ANA, CA 92707	2KLE010102
Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)	Phone Number: (714) 328-5234
Sampler: Jim Burton, Todd Bear	Fax Number: 714.545.8883

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Nitrate-N EPA Method 300.0	Orthophosphae-OPO4 EPA Method 365.3	Total Dissolved Solids SM2540C	Total Kjeldahl Nitrogenby EPA Method 351.2	NO2+NO3 as N - EPA Method 353.2	Total Nitrogen by calculation						Special Instructions
BC-NF-1	water	60 ml Poly	1	7/26/21	8:30am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
BC-b\w-LS	water	60 ml Poly	1	7/26/21	9:15a	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
BC-b\w-SL	water	60 ml Poly	1	7/26/21	10:00am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
	water	60 ml Poly	1			None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
	water	60 ml Poly	1			None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						

Relinquished By:	Date /Time:	Received by:	Date /Time:
[signature] 7/26/21	1:40pm		
Relinquished By: Fedex	Date /Time: 7/27/21	Received by: [signature]	Date /Time: 10:05
Relinquished By:	Date /Time:	Received in Lab by:	Date /Time:

Turnaround Time: (Check)
Same Day ____ 72 Hours ____
24 Hours ____ 5 Days ____
48 Hours ____ Normal X

Sample Integrity: (Check)
Intact ____ On Ice ____

TR30 2°

Certificate of Analysis

FINAL REPORT

WECK LABORATORIES, INC.

Work Orders:	1G28049	**Report Date:**	8/24/2021
		Received Date:	7/28/2021
Project:	2KLE010102	**Turnaround Time:**	Normal
		Phones:	(714) 751-7373
		Fax:	(714) 545-8883
Attn:	Michael P. Donovan	**P.O. #:**	
Client:	Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Billing Code:**	

DoD-ELAP ANAB #ADE-2882 • DoD-ISO ANAB # • ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH #4047 • ISO17025 ANAB #L2457.01 • LACSD #10143 • NELAP-OR #4047 • NJ-DEP #CA015 • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Michael P. Donovan,

Enclosed are the results of analyses for samples received 7/28/21 with the Chain-of-Custody document. The samples were received in good condition, at 3.4 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

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Psomas - Santa Ana, CA
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Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 08/24/2021 17:03

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
SL-DP-10	Jim Burton, Todd Bear	1G28049-01	Water	07/27/21 09:45	
SL-DP-24	Jim Burton, Todd Bear	1G28049-02	Water	07/27/21 10:15	

Certificate of Analysis

FINAL REPORT

WECK LABORATORIES, INC.

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 08/24/2021 17:03

Sample Results

Sample: SL-DP-10 — Sampled: 07/27/21 9:45 by Jim Burton, Todd Bear

1G28049-01 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1G1476 — **Preparation:** _NONE (LC)		**Prepared:** 07/28/21 09:33				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	07/28/21 19:27	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 08/11/21 13:32				**Analyst:** ymt
Nitrogen, Total	**0.17**	0.10	mg/l	1	08/17/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1H0763 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/11/21 13:32				**Analyst:** ymt
TKN	**0.17**	0.10	mg/l	1	08/17/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1G1532 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 07/28/21 17:44				**Analyst:** ISM
NO2+NO3 as N	ND	200	ug/l	1	07/29/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1G1529 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 07/28/21 16:53				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	07/28/21 18:16	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1H0056 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/02/21 17:06				**Analyst:** blg
Total Dissolved Solids	**23**	10	mg/l	1	08/03/21	

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Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 08/24/2021 17:03

Sample Results

(Continued)

Sample: SL-DP-24 — Sampled: 07/27/21 10:15 by Jim Burton, Todd Bear

1G28049-02 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1G1476 — **Preparation:** _NONE (LC)		**Prepared:** 07/28/21 09:33				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	07/28/21 19:45	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 08/11/21 13:32				**Analyst:** YMT
Nitrogen, Total	**0.15**	0.10	mg/l	1	08/13/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1H0763 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/11/21 13:32				**Analyst:** YMT
TKN	**0.15**	0.10	mg/l	1	08/13/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1G1532 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 07/28/21 17:44				**Analyst:** ISM
NO2+NO3 as N	ND	200	ug/l	1	07/29/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1G1529 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 07/28/21 16:53				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	07/28/21 18:19	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1H0056 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/02/21 17:06				**Analyst:** blg
Total Dissolved Solids	**36**	10	mg/l	1	08/03/21	

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Project Number: 2KLE010102
Project Manager: Michael P. Donovan
Reported: 08/24/2021 17:03

Quality Control Results

Anions by IC, EPA Method 300.0

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1G1476 - EPA 300.0										
Blank (W1G1476-BLK1)				**Prepared & Analyzed: 07/28/21**						
Nitrate as N	ND	110	ug/l							
LCS (W1G1476-BS1)				**Prepared & Analyzed: 07/28/21**						
Nitrate as N	1070	110	ug/l	1000		107	90-110			
Matrix Spike (W1G1476-MS1)	**Source: 1G19015-01**			**Prepared & Analyzed: 07/28/21**						
Nitrate as N	19000	1100	ug/l	10000	8810	102	84-115			
Matrix Spike (W1G1476-MS2)	**Source: 1G19015-03**			**Prepared & Analyzed: 07/28/21**						
Nitrate as N	15100	1100	ug/l	10000	5890	92	84-115			
Matrix Spike Dup (W1G1476-MSD1)	**Source: 1G19015-01**			**Prepared & Analyzed: 07/28/21**						
Nitrate as N	18900	1100	ug/l	10000	8810	101	84-115	0.4	20	
Matrix Spike Dup (W1G1476-MSD2)	**Source: 1G19015-03**			**Prepared & Analyzed: 07/28/21**						
Nitrate as N	15100	1100	ug/l	10000	5890	92	84-115	0.1	20	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1G1529 - EPA 365.3										
Blank (W1G1529-BLK1)				**Prepared & Analyzed: 07/28/21**						
o-Phosphate as P	ND	0.010	mg/l							
LCS (W1G1529-BS1)				**Prepared & Analyzed: 07/28/21**						
o-Phosphate as P	0.202	0.010	mg/l	0.200		101	88-111			
Matrix Spike (W1G1529-MS1)	**Source: 1G28049-01**			**Prepared & Analyzed: 07/28/21**						
o-Phosphate as P	0.207	0.010	mg/l	0.200	ND	104	85-112			
Matrix Spike Dup (W1G1529-MSD1)	**Source: 1G28049-01**			**Prepared & Analyzed: 07/28/21**						
o-Phosphate as P	0.206	0.010	mg/l	0.200	ND	103	85-112	0.5	20	
Batch: W1G1532 - EPA 353.2										
Blank (W1G1532-BLK1)				**Prepared: 07/28/21 Analyzed: 07/29/21**						
NO2+NO3 as N	ND	200	ug/l							
LCS (W1G1532-BS1)				**Prepared: 07/28/21 Analyzed: 07/29/21**						
NO2+NO3 as N	1010	200	ug/l	1000		101	90-110			
Matrix Spike (W1G1532-MS1)	**Source: 1G27003-06**			**Prepared: 07/28/21 Analyzed: 07/29/21**						
NO2+NO3 as N	2900	200	ug/l	2000	1010	94	90-110			
Matrix Spike (W1G1532-MS2)	**Source: 1G28064-04**			**Prepared: 07/28/21 Analyzed: 07/29/21**						
NO2+NO3 as N	2230	200	ug/l	2000	219	101	90-110			
Matrix Spike Dup (W1G1532-MSD1)	**Source: 1G27003-06**			**Prepared: 07/28/21 Analyzed: 07/29/21**						
NO2+NO3 as N	2910	200	ug/l	2000	1010	95	90-110	0.3	20	
Matrix Spike Dup (W1G1532-MSD2)	**Source: 1G28064-04**			**Prepared: 07/28/21 Analyzed: 07/29/21**						
NO2+NO3 as N	2190	200	ug/l	2000	219	99	90-110	2	20	

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Santa Ana, CA 92707

Project Number: 2KLE010102
Project Manager: Michael P. Donovan

Reported:
08/24/2021 17:03

Quality Control Results

(Continued)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1H0056 - SM 2540C										
Blank (W1H0056-BLK1)				**Prepared: 08/02/21**	**Analyzed: 08/03/21**					
Total Dissolved Solids	ND	10	mg/l							
LCS (W1H0056-BS1)				**Prepared: 08/02/21**	**Analyzed: 08/03/21**					
Total Dissolved Solids	797	10	mg/l	824		97	96-102			
Duplicate (W1H0056-DUP1)	**Source: 1G28049-02**			**Prepared: 08/02/21**	**Analyzed: 08/03/21**					
Total Dissolved Solids	37.0	10	mg/l		36.0			3	10	
Batch: W1H0763 - EPA 351.2										
Blank (W1H0763-BLK1)				**Prepared: 08/11/21**	**Analyzed: 08/13/21**					
TKN	ND	0.10	mg/l							
Blank (W1H0763-BLK2)				**Prepared: 08/11/21**	**Analyzed: 08/17/21**					
TKN	ND	0.10	mg/l							
LCS (W1H0763-BS1)				**Prepared: 08/11/21**	**Analyzed: 08/13/21**					
TKN	0.988	0.10	mg/l	1.00		99	90-110			
LCS (W1H0763-BS2)				**Prepared: 08/11/21**	**Analyzed: 08/17/21**					
TKN	1.04	0.10	mg/l	1.00		104	90-110			
Matrix Spike (W1H0763-MS1)	**Source: 1G28049-01**			**Prepared: 08/11/21**	**Analyzed: 08/13/21**					
TKN	1.21	0.10	mg/l	1.00	0.166	105	90-110			
Matrix Spike (W1H0763-MS2)	**Source: 1G28049-01**			**Prepared: 08/11/21**	**Analyzed: 08/17/21**					
TKN	1.20	0.10	mg/l	1.00	0.166	103	90-110			
Matrix Spike Dup (W1H0763-MSD1)	**Source: 1G28049-01**			**Prepared: 08/11/21**	**Analyzed: 08/13/21**					
TKN	1.24	0.10	mg/l	1.00	0.166	107	90-110	2	10	
Matrix Spike Dup (W1H0763-MSD2)	**Source: 1G28049-01**			**Prepared: 08/11/21**	**Analyzed: 08/17/21**					
TKN	1.22	0.10	mg/l	1.00	0.166	105	90-110	1	10	

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Psomas - Santa Ana, CA
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Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 08/24/2021 17:03

Notes and Definitions

Item	Definition
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

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CHAIN OF CUSTODY FORM

1G28049 Page 1 of 1

Client Name/Address:
PSOMAS
3 HUTTON CENTRE DRIVE, SUITE 200
SANTA ANA, CA 92707

Project/PO Number: 2KLE010102

Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)

Phone Number: (714) 328-5234

Sampler: Jim Burton, Todd Bear

Fax Number: 714.545.8883

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Nitrate-N EPA Method 300.0	Orthophosphae-OPO4 EPA Method 365.3	Total Dissolved Solids SM2540C	Total Kjeldahl Nitrogenby EPA Method 351.2	NO2+NO3 as N - EPA Method 353.2	Total Nitrogen by calculation						Special Instructions
SL-DP-10	water	60 ml Poly	1	7/27/21	9:45am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
SL-DP-24	water	60 ml Poly	1	7/27/21	10:15am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
	water	60 ml Poly	1			None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
	water	60 ml Poly	1			None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
	water	60 ml Poly	1			None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						

Relinquished By:	Date /Time:	Received by:	Date /Time:
[signature] 7/27/21	1:35pm		
Relinquished By: [signature]	Date /Time: 7/28/21	Received by: [signature]	Date /Time: 10:30
Relinquished By:	Date /Time:	Received in Lab by:	Date /Time:

Turnaround Time: (Check)
Same Day ______ 72 Hours ______
24 Hours ______ 5 Days ______
48 Hours ______ Normal X

Sample Integrity: (Check)
Intact X On Ice X

TD270 3.4°

Certificate of Analysis

FINAL REPORT

WECK LABORATORIES, INC.

Work Orders:	1G29036	**Report Date:**	8/27/2021
		Received Date:	7/29/2021
Project:	2KLE010102	**Turnaround Time:**	Normal
		Phones:	(714) 751-7373
		Fax:	(714) 545-8883
Attn:	Michael P. Donovan	**P.O. #:**	
Client:	Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Billing Code:**	

DoD-ELAP ANAB #ADE-2882 ● DoD-ISO ANAB # ● ELAP-CA #1132 ● EPA-UCMR #CA00211 ● Guam-EPA #17-008R ● HW-DOH #4047 ● ISO17025 ANAB #L2457.01 ● LACSD #10143 ● NELAP-OR #4047 ● NJ-DEP #CA015 ● SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Michael P. Donovan,

Enclosed are the results of analyses for samples received 7/29/21 with the Chain-of-Custody document. The samples were received in good condition, at 5.0 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

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Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 08/27/2021 14:57

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
LS-DP-5	Jim Burton, Todd Bear	1G29036-01	Water	07/28/21 09:45	
LS-DP-22	Jim Burton, Todd Bear	1G29036-02	Water	07/28/21 10:05	

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FINAL REPORT

WECK LABORATORIES, INC.

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported:
08/27/2021 14:57

Sample Results

Sample: LS-DP-5 — Sampled: 07/28/21 9:45 by Jim Burton, Todd Bear

1G29036-01 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1G1554 **Preparation:** _NONE (LC)		**Prepared:** 07/29/21 10:40				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	07/29/21 19:20	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] **Preparation:** [CALC]		**Prepared:** 08/13/21 14:30				**Analyst:** YMT
Nitrogen, Total	**0.11**	0.10	mg/l	1	08/17/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1H0962 **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/13/21 14:30				**Analyst:** YMT
TKN	**0.11**	0.10	mg/l	1	08/17/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1H0312 **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/04/21 21:09				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	08/05/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1G1594 **Preparation:** _NONE (WETCHEM)		**Prepared:** 07/29/21 17:15				**Analyst:** UVVIS04
o-Phosphate as P	ND	0.010	mg/l	1	07/30/21 09:02	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1H0190 **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/03/21 18:30				**Analyst:** blg
Total Dissolved Solids	**12**	10	mg/l	1	08/04/21	

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Certificate of Analysis

FINAL REPORT

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 08/27/2021 14:57

Sample Results

(Continued)

Sample: LS-DP-22 Sampled: 07/28/21 10:05 by Jim Burton, Todd Bear

1G29036-02 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1G1554 **Preparation:** _NONE (LC)		**Prepared:** 07/29/21 10:40				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	07/29/21 20:14	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] **Preparation:** [CALC]		**Prepared:** 08/13/21 14:30				**Analyst:** YMT
Nitrogen, Total	**0.15**	0.10	mg/l	1	08/17/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1H0962 **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/13/21 14:30				**Analyst:** YMT
TKN	**0.15**	0.10	mg/l	1	08/17/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1H0312 **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/04/21 21:09				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	08/05/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1G1594 **Preparation:** _NONE (WETCHEM)		**Prepared:** 07/29/21 17:15				**Analyst:** UVVIS04
o-Phosphate as P	ND	0.010	mg/l	1	07/30/21 09:04	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1H0190 **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/03/21 18:30				**Analyst:** blg
Total Dissolved Solids	**20**	10	mg/l	1	08/04/21	

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Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 08/27/2021 14:57

Quality Control Results

Anions by IC, EPA Method 300.0

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1G1554 - EPA 300.0										
Blank (W1G1554-BLK1)				**Prepared & Analyzed: 07/29/21**						
Nitrate as N	ND	110	ug/l							
LCS (W1G1554-BS1)				**Prepared & Analyzed: 07/29/21**						
Nitrate as N	1020	110	ug/l	1000		102	90-110			
Matrix Spike (W1G1554-MS1)	**Source: 1G09009-05**			**Prepared & Analyzed: 07/29/21**						
Nitrate as N	9580	1100	ug/l	10000	ND	96	84-115			
Matrix Spike (W1G1554-MS2)	**Source: 1G09009-06**			**Prepared & Analyzed: 07/29/21**						
Nitrate as N	9500	1100	ug/l	10000	ND	95	84-115			
Matrix Spike Dup (W1G1554-MSD1)	**Source: 1G09009-05**			**Prepared & Analyzed: 07/29/21**						
Nitrate as N	9550	1100	ug/l	10000	ND	96	84-115	0.3	20	
Matrix Spike Dup (W1G1554-MSD2)	**Source: 1G09009-06**			**Prepared & Analyzed: 07/29/21**						
Nitrate as N	9510	1100	ug/l	10000	ND	95	84-115	0.1	20	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1G1594 - EPA 365.3										
Blank (W1G1594-BLK1)				**Prepared: 07/29/21**	**Analyzed: 07/30/21**					
o-Phosphate as P	ND	0.010	mg/l							
LCS (W1G1594-BS1)				**Prepared: 07/29/21**	**Analyzed: 07/30/21**					
o-Phosphate as P	0.202	0.010	mg/l	0.200		101	88-111			
Matrix Spike (W1G1594-MS1)	**Source: 1G29036-01**			**Prepared: 07/29/21**	**Analyzed: 07/30/21**					
o-Phosphate as P	0.201	0.010	mg/l	0.200	ND	100	85-112			
Matrix Spike Dup (W1G1594-MSD1)	**Source: 1G29036-01**			**Prepared: 07/29/21**	**Analyzed: 07/30/21**					
o-Phosphate as P	0.201	0.010	mg/l	0.200	ND	100	85-112	0	20	
Batch: W1H0190 - SM 2540C										
Blank (W1H0190-BLK1)				**Prepared: 08/03/21**	**Analyzed: 08/04/21**					
Total Dissolved Solids	ND	10	mg/l							
LCS (W1H0190-BS1)				**Prepared: 08/03/21**	**Analyzed: 08/04/21**					
Total Dissolved Solids	816	10	mg/l	824		99	96-102			
Duplicate (W1H0190-DUP1)	**Source: 1G29055-01**			**Prepared: 08/03/21**	**Analyzed: 08/04/21**					
Total Dissolved Solids	2280	10	mg/l		2290			0.4	10	
Duplicate (W1H0190-DUP2)	**Source: 1G29055-02**			**Prepared: 08/03/21**	**Analyzed: 08/04/21**					
Total Dissolved Solids	4390	10	mg/l		4410			0.5	10	
Batch: W1H0312 - EPA 353.2										
Blank (W1H0312-BLK1)				**Prepared: 08/04/21**	**Analyzed: 08/05/21**					
NO2+NO3 as N	ND	200	ug/l							
LCS (W1H0312-BS1)				**Prepared: 08/04/21**	**Analyzed: 08/05/21**					

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Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 08/27/2021 14:57

Quality Control Results

(Continued)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1H0312 - EPA 353.2 (Continued)										
LCS (W1H0312-BS1)				**Prepared: 08/04/21**	**Analyzed: 08/05/21**					
NO2+NO3 as N	1020	200	ug/l	1000		102	90-110			
Matrix Spike (W1H0312-MS1)	**Source: 1H04067-03**			**Prepared: 08/04/21**	**Analyzed: 08/05/21**					
NO2+NO3 as N	29600	1000	ug/l	10000		296	90-110			
Matrix Spike (W1H0312-MS2)	**Source: 1H04068-01**			**Prepared: 08/04/21**	**Analyzed: 08/05/21**					
NO2+NO3 as N	6640	200	ug/l	2000	4650	100	90-110			
Matrix Spike Dup (W1H0312-MSD1)	**Source: 1H04067-03**			**Prepared: 08/04/21**	**Analyzed: 08/05/21**					
NO2+NO3 as N	29600	1000	ug/l	10000		296	90-110	0	20	
Matrix Spike Dup (W1H0312-MSD2)	**Source: 1H04068-01**			**Prepared: 08/04/21**	**Analyzed: 08/05/21**					
NO2+NO3 as N	6610	200	ug/l	2000	4650	98	90-110	0.5	20	
Batch: W1H0962 - EPA 351.2										
Blank (W1H0962-BLK1)				**Prepared: 08/13/21**	**Analyzed: 08/17/21**					
TKN	ND	0.10	mg/l							
LCS (W1H0962-BS1)				**Prepared: 08/13/21**	**Analyzed: 08/17/21**					
TKN	1.04	0.10	mg/l	1.00		104	90-110			
Matrix Spike (W1H0962-MS1)	**Source: 1G30092-01**			**Prepared: 08/13/21**	**Analyzed: 08/17/21**					
TKN	1.01	0.10	mg/l	1.00	ND	101	90-110			
Matrix Spike Dup (W1H0962-MSD1)	**Source: 1G30092-01**			**Prepared: 08/13/21**	**Analyzed: 08/17/21**					
TKN	0.991	0.10	mg/l	1.00	ND	99	90-110	2	10	

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Notes and Definitions

Item	Definition
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

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Weck Laboratories
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City of Industry, CA 91745
(626) 336-2139

1G29036

CHAIN OF CUSTODY FORM ~~1G280~~ UKA

Page 1 of 1

Client Name/Address:	Project/PO Number:
PSOMAS 3 HUTTON CENTRE DRIVE, SUITE 200 SANTA ANA, CA 92707	2KLE010102
Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)	Phone Number: (714) 328-5234
Sampler: Jim Burton, Todd Bear	Fax Number: 714.545.8883

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Nitrate-N EPA Method 300.0	Orthophosphae-OPO4 EPA Method 365.3	Total Dissolved Solids SM2540C	Total Kjeldahl Nitrogenby EPA Method 351.2	NO2+NO3 as N - EPA Method 353.2	Total Nitrogen by calculation						Special Instructions
LS-DP-5	water	60 ml Poly	1	7/28/21	9:45a	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
LS-DP-22	water	60 ml Poly	1	7/28/21	10:05a	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
	water	60 ml Poly	1			None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
	water	60 ml Poly	1			None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
	water	60 ml Poly	1			None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						

Relinquished By: [signature]	Date /Time: 7/28/21 1:25pm	Received by:	Date /Time:
Relinquished By: FedEx	Date /Time: 7/29/21	Received by: [signature] 5° T0234	Date /Time: 10:30
Relinquished By:	Date /Time:	Received in Lab by:	Date /Time:

Turnaround Time: (Check)
Same Day ______ 72 Hours ______
24 Hours ______ 5 Days ______
48 Hours ______ Normal X

Sample Integrity: (Check)
Intact ______ On Ice ______

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders:	1G29038	**Report Date:**	8/10/2021
		Received Date:	7/29/2021
Project:	2KLE010102	**Turnaround Time:**	Normal
		Phones:	(714) 751-7373
		Fax:	(714) 545-8883
Attn:	Michael P. Donovan	**P.O. #:**	
Client:	Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Billing Code:**	

Dear Michael P. Donovan :

Enclosed are the results of analyses for samples received 7/29/2021 with the Chain-of-Custody document. The samples were received in good condition, at 5.0 °C and on ice. All analysis met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Sample Results

Sample: LS-BR-1 — 1G29038-01 (Water) — Sampled: 07/28/21 12:05 by Client

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: SM 9223B		**Instr:** INC12				
Batch ID: W1H0520 — **Preparation:** _NONE (MICROBIOLOGY)		**Prepared:** 07/29/21 12:03				**Analyst:** slh
E. coli	**6.3**	1.0	MPN/100ml	1	07/30/21	

Sample: SL-BR-1 — 1G29038-02 (Water) — Sampled: 07/28/21 12:40 by Client

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: SM 9223B		**Instr:** INC12				
Batch ID: W1H0520 — **Preparation:** _NONE (MICROBIOLOGY)		**Prepared:** 07/29/21 12:03				**Analyst:** slh
E. coli	ND	1.0	MPN/100ml	1	07/30/21	

Sample: INT2-RES-1 — 1G29038-03 (Water) — Sampled: 07/28/21 12:15 by Client

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: SM 9223B		**Instr:** INC12				
Batch ID: W1H0520 — **Preparation:** _NONE (MICROBIOLOGY)		**Prepared:** 07/29/21 12:03				**Analyst:** slh
E. coli	**4.1**	1.0	MPN/100ml	1	07/30/21	

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Notes and Definitions

Item	Definition
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

Analyses Accreditation Summary

Analyte	CAS #	Not By NELAP	ANAB ISO 17025
SM 9223B in Water			
E. coli		✓	

Reviewed by:

Chris Samatmanakit
Project Manager

DoD-ELAP ANAB #ADE-2882 • DoD-ISO ANAB # • ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH #4047 • ISO17025 ANAB #L2457.01 • LACSD #10143 • NELAP-OR #4047 • NJ-DEP #CA015 • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

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(626) 336-2139

CHAIN OF CUSTODY FORM 1G29038

Client Name/Address:	Project/PO Number:
PSOMAS 3 HUTTON CENTRE DRIVE, SUITE 200 SANTA ANA, CA 92707	2KLE010102
Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)	Phone Number: (714) 328-5234
Sampler: Jim Burton, Todd Bear	Fax Number: 714.545.8883

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Escherichia coli (E. coli) by SM 9223B	Special Instructions
LS-BR-1	water	125 ml poly	1	7/28/21	12:05p	Sterile- None	X	24-Hour Hold time*
SL-BR-1	water	125 ml poly	1	7/28/21	12:40p	Sterile- None	X	24-Hour Hold time*
INT2-RES-1	water	125 ml poly	1	7/28/21	12:15p	Sterile- None	X	24-Hour Hold time*

Relinquished By:	Date /Time:	Received by:	Date /Time:
[signature]	7/28/21 1:25pm		
Relinquished By: Fedex	Date /Time: 7/29/21	Received by: [signature] 5°C T0234	Date /Time: 10:30
Relinquished By:	Date /Time:	Received in Lab by:	Date /Time:

Turnaround Time: (Check)
Same Day ______ 72 Hours ______
24 Hours ______ 5 Days ______
48 Hours ______ Normal X

Sample Integrity: (Check)
Intact ______ On Ice ______

* Per Lohantan Surface Water Ambient Monitoring Program (SWAMP) for ambient water

Certificate of Analysis

FINAL REPORT

WECK LABORATORIES, INC.

Work Orders:	1G30022	**Report Date:**	8/27/2021
		Received Date:	7/30/2021
Project:	2KLE010102	**Turnaround Time:**	Normal
		Phones:	(714) 751-7373
		Fax:	(714) 545-8883
Attn:	Michael P. Donovan	**P.O. #:**	
Client:	Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Billing Code:**	

DoD-ELAP ANAB #ADE-2882 • DoD-ISO ANAB # • ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH #4047 • ISO17025 ANAB #L2457.01 • LACSD #10143 • NELAP-OR #4047 • NJ-DEP #CA015 • SCAQMD #93LA1006

Dear Michael P. Donovan,

Enclosed are the results of analyses for samples received 7/30/21 with the Chain-of-Custody document. The samples were received in good condition, at 2.8 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

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WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported:
08/27/2021 14:59

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
BC-BLW-PH6	Jim Burton, Todd Bear	1G30022-01	Water	07/29/21 08:05	
BC-BLW-PH5	Jim Burton, Todd Bear	1G30022-02	Water	07/29/21 08:35	
BC-BLW-PH4	Jim Burton, Todd Bear	1G30022-03	Water	07/29/21 09:10	
BC-BLW-PH3	Jim Burton, Todd Bear	1G30022-04	Water	07/29/21 09:45	
BC-BLW-PH2	Jim Burton, Todd Bear	1G30022-05	Water	07/29/21 10:25	

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Sample Results

Sample: BC-BLW-PH6
1G30022-01 (Water)

Sampled: 07/29/21 8:05 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1G1628 **Preparation:** _NONE (LC)		**Prepared:** 07/30/21 10:53				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	07/30/21 18:17	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] **Preparation:** [CALC]		**Prepared:** 08/13/21 14:30				**Analyst:** YMT
Nitrogen, Total	**0.12**	0.10	mg/l	1	08/17/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1H0962 **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/13/21 14:30				**Analyst:** YMT
TKN	**0.12**	0.10	mg/l	1	08/17/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1H0865 **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/12/21 14:31				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	08/13/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1G1655 **Preparation:** _NONE (WETCHEM)		**Prepared:** 07/30/21 15:22				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	07/30/21 15:49	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1H0280 **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/04/21 15:28				**Analyst:** blg
Total Dissolved Solids	**44**	10	mg/l	1	08/05/21	

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Certificate of Analysis

FINAL REPORT

Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Project Number:** 2KLE010102 **Project Manager:** Michael P. Donovan	**Reported:** 08/27/2021 14:59

Sample Results

(Continued)

Sample: BC-BLW-PH5 — Sampled: 07/29/21 8:35 by Jim Burton, Todd Bear

1G30022-02 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1G1628 **Preparation:** _NONE (LC)		**Prepared:** 07/30/21 10:53				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	07/30/21 18:34	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] **Preparation:** [CALC]		**Prepared:** 08/13/21 14:30				**Analyst:** YMT
Nitrogen, Total	**0.12**	0.10	mg/l	1	08/17/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1H0962 **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/13/21 14:30				**Analyst:** YMT
TKN	**0.12**	0.10	mg/l	1	08/17/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1H0865 **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/12/21 14:31				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	08/13/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1G1655 **Preparation:** _NONE (WETCHEM)		**Prepared:** 07/30/21 15:22				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	07/30/21 15:51	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1H0280 **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/04/21 15:28				**Analyst:** blg
Total Dissolved Solids	**44**	10	mg/l	1	08/05/21	

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Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 08/27/2021 14:59

Sample Results

(Continued)

Sample: BC-BLW-PH4 — 1G30022-03 (Water)

Sampled: 07/29/21 9:10 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1G1628 — **Preparation:** _NONE (LC)		**Prepared:** 07/30/21 10:53				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	07/30/21 18:52	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 08/13/21 14:30				**Analyst:** YMT
Nitrogen, Total	**0.13**	0.10	mg/l	1	08/17/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1H0962 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/13/21 14:30				**Analyst:** YMT
TKN	**0.13**	0.10	mg/l	1	08/17/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1H0865 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/12/21 14:31				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	08/13/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1G1655 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 07/30/21 15:22				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	07/30/21 15:52	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1H0280 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/04/21 15:28				**Analyst:** blg
Total Dissolved Solids	**43**	10	mg/l	1	08/05/21	

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Psomas - Santa Ana, CA
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Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 08/27/2021 14:59

Sample Results

(Continued)

Sample: BC-BLW-PH3 — 1G30022-04 (Water)

Sampled: 07/29/21 9:45 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1G1628 — **Preparation:** _NONE (LC)		**Prepared:** 07/30/21 10:53				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	07/30/21 19:10	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 08/13/21 14:30				**Analyst:** YMT
Nitrogen, Total	**0.19**	0.10	mg/l	1	08/17/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1H0962 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/13/21 14:30				**Analyst:** YMT
TKN	**0.19**	0.10	mg/l	1	08/17/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1H0865 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/12/21 14:31				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	08/13/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1G1655 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 07/30/21 15:22				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	07/30/21 15:52	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1H0280 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/04/21 15:28				**Analyst:** blg
Total Dissolved Solids	**40**	10	mg/l	1	08/05/21	

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 08/27/2021 14:59

Sample Results

(Continued)

Sample: BC-BLW-PH2 — 1G30022-05 (Water)

Sampled: 07/29/21 10:25 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0 — **Instr:** LC12						
Batch ID: W1G1628 — **Preparation:** _NONE (LC) — **Prepared:** 07/30/21 10:53 — **Analyst:** jan						
Nitrate as N	ND	110	ug/l	1	07/30/21 19:28	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC] — **Instr:** [CALC]						
Batch ID: [CALC] — **Preparation:** [CALC] — **Prepared:** 08/13/21 14:30 — **Analyst:** YMT						
Nitrogen, Total	ND	0.10	mg/l	1	08/17/21	
Method: EPA 351.2 — **Instr:** AA06						
Batch ID: W1H0962 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 08/13/21 14:30 — **Analyst:** YMT						
TKN	ND	0.10	mg/l	1	08/17/21	
Method: EPA 353.2 — **Instr:** AA01						
Batch ID: W1H0865 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 08/12/21 14:31 — **Analyst:** ism						
NO2+NO3 as N	ND	200	ug/l	1	08/13/21	
Method: EPA 365.3 — **Instr:** UVVIS04						
Batch ID: W1G1655 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 07/30/21 15:22 — **Analyst:** sbn						
o-Phosphate as P	**0.018**	0.010	mg/l	1	07/30/21 15:53	
Method: SM 2540C — **Instr:** OVEN01						
Batch ID: W1H0280 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 08/04/21 15:28 — **Analyst:** blg						
Total Dissolved Solids	**45**	10	mg/l	1	08/05/21	

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Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 08/27/2021 14:59

Quality Control Results

Anions by IC, EPA Method 300.0

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1G1628 - EPA 300.0										
Blank (W1G1628-BLK1)				**Prepared & Analyzed: 07/30/21**						
Nitrate as N	ND	110	ug/l							
LCS (W1G1628-BS1)				**Prepared & Analyzed: 07/30/21**						
Nitrate as N	1030	110	ug/l	1000		103	90-110			
Matrix Spike (W1G1628-MS1)	**Source: 1G29050-01**			**Prepared & Analyzed: 07/30/21**						
Nitrate as N	14800	1100	ug/l	10000	5460	93	84-115			
Matrix Spike (W1G1628-MS2)	**Source: 1G29050-02**			**Prepared & Analyzed: 07/30/21**						
Nitrate as N	14500	1100	ug/l	10000	5040	94	84-115			
Matrix Spike Dup (W1G1628-MSD1)	**Source: 1G29050-01**			**Prepared & Analyzed: 07/30/21**						
Nitrate as N	14900	1100	ug/l	10000	5460	95	84-115	1	20	
Matrix Spike Dup (W1G1628-MSD2)	**Source: 1G29050-02**			**Prepared & Analyzed: 07/30/21**						
Nitrate as N	14500	1100	ug/l	10000	5040	95	84-115	0.5	20	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1G1655 - EPA 365.3										
Blank (W1G1655-BLK1)				**Prepared & Analyzed: 07/30/21**						
o-Phosphate as P	ND	0.010	mg/l							
LCS (W1G1655-BS1)				**Prepared & Analyzed: 07/30/21**						
o-Phosphate as P	0.206	0.010	mg/l	0.200		103	88-111			
Matrix Spike (W1G1655-MS1)	**Source: 1G30022-01**			**Prepared & Analyzed: 07/30/21**						
o-Phosphate as P	0.206	0.010	mg/l	0.200	0.00300	102	85-112			
Matrix Spike Dup (W1G1655-MSD1)	**Source: 1G30022-01**			**Prepared & Analyzed: 07/30/21**						
o-Phosphate as P	0.206	0.010	mg/l	0.200	0.00300	102	85-112	0	20	
Batch: W1H0280 - SM 2540C										
Blank (W1H0280-BLK1)				**Prepared: 08/04/21 Analyzed: 08/05/21**						
Total Dissolved Solids	ND	10	mg/l							
LCS (W1H0280-BS1)				**Prepared: 08/04/21 Analyzed: 08/05/21**						
Total Dissolved Solids	822	10	mg/l	824		100	96-102			
Duplicate (W1H0280-DUP1)	**Source: 1H02101-03**			**Prepared: 08/04/21 Analyzed: 08/05/21**						
Total Dissolved Solids	38500	10	mg/l		38400			0.3	10	
Duplicate (W1H0280-DUP2)	**Source: 1H02101-04**			**Prepared: 08/04/21 Analyzed: 08/05/21**						
Total Dissolved Solids	2890	10	mg/l		2890			0.1	10	
Batch: W1H0865 - EPA 353.2										
Blank (W1H0865-BLK1)				**Prepared: 08/12/21 Analyzed: 08/13/21**						
NO2+NO3 as N	ND	200	ug/l							
LCS (W1H0865-BS1)				**Prepared: 08/12/21 Analyzed: 08/13/21**						

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Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 08/27/2021 14:59

Quality Control Results

(Continued)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1H0865 - EPA 353.2 (Continued)										
LCS (W1H0865-BS1)				**Prepared: 08/12/21**	**Analyzed: 08/13/21**					
NO2+NO3 as N	1010	200	ug/l	1000		101	90-110			
Matrix Spike (W1H0865-MS1)	**Source: 1G29055-01**			**Prepared: 08/12/21**	**Analyzed: 08/13/21**					
NO2+NO3 as N	2210	200	ug/l	2000	202	100	90-110			
Matrix Spike (W1H0865-MS2)	**Source: 1G29055-02**			**Prepared: 08/12/21**	**Analyzed: 08/13/21**					
NO2+NO3 as N	2050	200	ug/l	2000	54.5	100	90-110			
Matrix Spike Dup (W1H0865-MSD1)	**Source: 1G29055-01**			**Prepared: 08/12/21**	**Analyzed: 08/13/21**					
NO2+NO3 as N	2230	200	ug/l	2000	202	101	90-110	0.9	20	
Matrix Spike Dup (W1H0865-MSD2)	**Source: 1G29055-02**			**Prepared: 08/12/21**	**Analyzed: 08/13/21**					
NO2+NO3 as N	2060	200	ug/l	2000	54.5	100	90-110	0.5	20	
Batch: W1H0962 - EPA 351.2										
Blank (W1H0962-BLK1)				**Prepared: 08/13/21**	**Analyzed: 08/17/21**					
TKN	ND	0.10	mg/l							
LCS (W1H0962-BS1)				**Prepared: 08/13/21**	**Analyzed: 08/17/21**					
TKN	1.04	0.10	mg/l	1.00		104	90-110			
Matrix Spike (W1H0962-MS1)	**Source: 1G30092-01**			**Prepared: 08/13/21**	**Analyzed: 08/17/21**					
TKN	1.01	0.10	mg/l	1.00	ND	101	90-110			
Matrix Spike Dup (W1H0962-MSD1)	**Source: 1G30092-01**			**Prepared: 08/13/21**	**Analyzed: 08/17/21**					
TKN	0.991	0.10	mg/l	1.00	ND	99	90-110	2	10	

Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Project Number:** 2KLE010102 **Project Manager:** Michael P. Donovan	**Reported:** 08/27/2021 14:59

Notes and Definitions

Item	Definition
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

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1G30022

CHAIN OF CUSTODY FORM

Page 1 of 1

Client Name/Address:	Project/PO Number:
PSOMAS 3 HUTTON CENTRE DRIVE, SUITE 200 SANTA ANA, CA 92707	2KLE010102
Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)	Phone Number: (714) 328-5234
Sampler: Jim Burton, Todd Bear	Fax Number: 714.545.8883

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Nitrate-N EPA Method 300.0	Orthophosphae-OPO4 EPA Method 365.3	Total Dissolved Solids SM2540C	Total Kjeldahl Nitrogenby EPA Method 351.2	NO2+NO3 as N - EPA Method 353.2	Total Nitrogen by calculation						Special Instructions
BC-blw-PH6	water	60 ml Poly	1	7/29/21	8:05 am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
BC-blw-PH5	water	60 ml Poly	1	7/29/21	8:35 am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
BC-blw-PH4	water	60 ml Poly	1	7/29/21	9:10a	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
BC-blw-PH3	water	60 ml Poly	1	7/29/21	9:45am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
BC-blw-PH2	water	60 ml Poly	1	7/29/21	10:25am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						

Relinquished By:	Date /Time:	Received by:	Date /Time:
[signature] 7/29/21	1:40 pm	FedEx	
FedEx		Jonathan	07/30/21 10:10
		Received in Lab by:	

Turnaround Time: (Check)
Same Day ____ 72 Hours ____
24 Hours ____ 5 Days ____
48 Hours ____ Normal X

Sample Integrity: (Check)
Intact ____ On Ice ____

2.9°C J0234

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders:	1G30023	**Report Date:**	8/10/2021
		Received Date:	7/30/2021
Project:	2KLE010102	**Turnaround Time:**	Normal
		Phones:	(714) 751-7373
		Fax:	(714) 545-8883
Attn:	Michael P. Donovan	**P.O. #:**	
Client:	Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Billing Code:**	

Dear Michael P. Donovan :

Enclosed are the results of analyses for samples received 7/30/2021 with the Chain-of-Custody document. The samples were received in good condition, at 2.8 °C and on ice. All analysis met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Sample Results

Sample: LS-BR-1 — 1G30023-01 (Water) — Sampled: 07/29/21 11:45 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: SM 9223B		**Instr:** INC12				
Batch ID: W1H0520 — **Preparation:** _NONE (MICROBIOLOGY)		**Prepared:** 07/30/21 11:17				**Analyst:** slh
E. coli	**180**	1.0	MPN/100ml	1	07/31/21	

Sample: SL-BR-1 — 1G30023-02 (Water) — Sampled: 07/29/21 12:10 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: SM 9223B		**Instr:** INC12				
Batch ID: W1H0520 — **Preparation:** _NONE (MICROBIOLOGY)		**Prepared:** 07/30/21 11:17				**Analyst:** slh
E. coli	ND	1.0	MPN/100ml	1	07/31/21	

Sample: INT2-RES-1 — 1G30023-03 (Water) — Sampled: 07/29/21 12:20 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Method: SM 9223B		**Instr:** INC12				
Batch ID: W1H0520 — **Preparation:** _NONE (MICROBIOLOGY)		**Prepared:** 07/30/21 11:17				**Analyst:** slh
E. coli	**210**	1.0	MPN/100ml	1	07/31/21	

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Notes and Definitions

Item	Definition
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

Analyses Accreditation Summary

Analyte	CAS #	Not By NELAP	ANAB ISO 17025
SM 9223B in Water			
E. coli		✓	

Reviewed by:

Chris Samatmanakit
Project Manager

DoD-ELAP ANAB #ADE-2882 • DoD-ISO ANAB # • ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH #4047 • ISO17025 ANAB #L2457.01 • LACSD #10143 • NELAP-OR #4047 • NJ-DEP #CA015 • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

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1630023

CHAIN OF CUSTODY FORM

Page 1 of 1

Client Name/Address:			Project/PO Number:				Analysis Required	
PSOMAS 3 HUTTON CENTRE DRIVE, SUITE 200 SANTA ANA, CA 92707			2KLE010102					
Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)			Phone Number: (714) 328-5234					
Sampler: Jim Burton, Todd Bear			Fax Number: 714.545.8883					

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Escherichia coli (E. coli) by SM 9223B	Special Instructions
SL-BR-1	water	125 ml poly	1	7/29/21	11:45a	Sterile- None	X	24-Hour Hold time*
LS-BR-1	water	125 ml poly	1	7/29/21	12:10p	Sterile- None	X	24-Hour Hold time*
INT2-RES-1	water	125 ml poly	1	7/29/21	12:20p	Sterile- None	X	24-Hour Hold time*

Relinquished By:	Date /Time:	Received by:	Date /Time:
[signature] 7/29/21	1:20 pm	FedEx	
FedEx		[signature]	07/30/21 10:10
		Received in Lab by:	

Turnaround Time: (Check)
Same Day ______ 72 Hours ______
24 Hours ______ 5 Days ______
48 Hours ______ Normal X

Sample Integrity: (Check)
Intact ______ On Ice ______

2.8°C TO234

* Per Lohantan Surface Water Ambient Monitoring Program (SWAMP) for ambient water

Certificate of Analysis

FINAL REPORT

WECK LABORATORIES, INC.

Work Orders:	1H03039	**Report Date:**	8/18/2021
		Received Date:	8/3/2021
Project:	2KLE010102	**Turnaround Time:**	Normal
		Phones:	(714) 751-7373
		Fax:	(714) 545-8883
Attn:	Michael P. Donovan	**P.O. #:**	
Client:	Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Billing Code:**	

Dear Michael P. Donovan :

Enclosed are the results of analyses for samples received 8/3/2021 with the Chain-of-Custody document. The samples were received in good condition, at 3.1 °C and on ice. All analysis met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Sample Results

Sample: SL-BR-1 — Sampled: 08/02/21 11:50 by Jim Burton, Todd Bear

1H03039-01 (Water)

Method: SM 9223B — **Instr:** INC12

Batch ID: W1H0289 — **Preparation:** _NONE (MICROBIOLOGY) — **Prepared:** 08/03/21 11:48 — **Analyst:** slh

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
E. coli	ND	1.0	MPN/100ml	1	08/04/21	

Sample: LS-BR-1 — Sampled: 08/02/21 12:15 by Jim Burton, Todd Bear

1H03039-02 (Water)

Method: SM 9223B — **Instr:** INC12

Batch ID: W1H0289 — **Preparation:** _NONE (MICROBIOLOGY) — **Prepared:** 08/03/21 11:48 — **Analyst:** slh

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
E. coli	**17**	1.0	MPN/100ml	1	08/04/21	

Sample: INT2-RES-1 — Sampled: 08/02/21 12:30 by Jim Burton, Todd Bear

1H03039-03 (Water)

Method: SM 9223B — **Instr:** INC12

Batch ID: W1H0289 — **Preparation:** _NONE (MICROBIOLOGY) — **Prepared:** 08/03/21 11:48 — **Analyst:** slh

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
E. coli	**6.3**	1.0	MPN/100ml	1	08/04/21	

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Certificate of Analysis

FINAL REPORT

Notes and Definitions

Item	Definition
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

Analyses Accreditation Summary

Analyte	CAS #	Not By NELAP	ANAB ISO 17025
SM 9223B in Water			
E. coli		✓	

Reviewed by:

Chris Samatmanakit
Project Manager

DoD-ELAP ANAB #ADE-2882 • DoD-ISO ANAB # • ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH #4047 • ISO17025 ANAB #L2457.01 • LACSD #10143 • NELAP-OR #4047 • NJ-DEP #CA015 • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

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CHAIN OF CUSTODY FORM 1H03039

Page 1 of 1

Client Name/Address:	Project/PO Number:
PSOMAS 3 HUTTON CENTRE DRIVE, SUITE 200 SANTA ANA, CA 92707	2KLE010102
Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)	Phone Number: (714) 328-5234
Sampler: Jim Burton, Todd Bear	Fax Number: 714.545.8883

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Escherichia coli (E. coli) by SM 9223B											Special Instructions
SL-BR-1	water	125 ml poly	1	8/2/21	11:50a	Sterile- None	X											24-Hour Hold time*
LS-BR-1	water	125 ml poly	1		12:15p	Sterile- None	X											24-Hour Hold time*
DNT2-RES-1	water	125 ml poly	1		12:30p	Sterile- None	X											24-Hour Hold time*

Relinquished By:	Date /Time:	Received by:	Date /Time:
8/2/21	1:25 pm		
Relinquished By: FedEx	Date /Time: 8/3/21	Received by:	Date /Time: 9:50
Relinquished By:	Date /Time:	Received in Lab by:	Date /Time:

Turnaround Time: (Check)
Same Day ____ 72 Hours ____
24 Hours ____ 5 Days ____
48 Hours ____ Normal X

Sample Integrity: (Check)
Intact ____ On Ice ____

* Per Lohantan Surface Water Ambient Monitoring Program (SWAMP) for ambient water

3.1° T0254

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders:	1H06031	**Report Date:**	8/19/2021
		Received Date:	8/6/2021
Project:	2KLE010102	**Turnaround Time:**	Normal
		Phones:	(714) 751-7373
		Fax:	(714) 545-8883
Attn:	Michael P. Donovan	**P.O. #:**	
Client:	Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Billing Code:**	

Dear Michael P. Donovan :

Enclosed are the results of analyses for samples received 8/6/2021 with the Chain-of-Custody document. The samples were received in good condition, at 4.0 °C and on ice. All analysis met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Sample Results

Sample: LS-BR-1 — 1H06031-01 (Water) — Sampled: 08/05/21 11:40 by Client

Method: SM 9223B — **Instr:** INC12

Batch ID: W1H0947 — **Preparation:** _NONE (MICROBIOLOGY) — **Prepared:** 08/06/21 11:55 — **Analyst:** atd

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
E. coli	**3.1**	1.0	MPN/100ml	1	08/07/21	O-15

Sample: INT2-RES-1 — 1H06031-02 (Water) — Sampled: 08/05/21 12:10 by Client

Method: SM 9223B — **Instr:** INC12

Batch ID: W1H0947 — **Preparation:** _NONE (MICROBIOLOGY) — **Prepared:** 08/06/21 11:55 — **Analyst:** atd

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
E. coli	**5.2**	1.0	MPN/100ml	1	08/07/21	

Sample: SL-BR-1 — 1H06031-03 (Water) — Sampled: 08/05/21 12:35 by Client

Method: SM 9223B — **Instr:** INC12

Batch ID: W1H0947 — **Preparation:** _NONE (MICROBIOLOGY) — **Prepared:** 08/06/21 11:55 — **Analyst:** atd

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
E. coli	ND	1.0	MPN/100ml	1	08/07/21	

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Certificate of Analysis

FINAL REPORT

Notes and Definitions

Item	Definition
O-15	The sample was received with the recommended holding time nearly expired. It was analyzed as soon as possible but the maximum holding time was slightly exceeded.
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

Analyses Accreditation Summary

Analyte	CAS #	Not By NELAP	ANAB ISO 17025
SM 9223B in Water			
E. coli		✓	

Reviewed by:

Chris Samatmanakit
Project Manager

DoD-ELAP ANAB #ADE-2882 • DoD-ISO ANAB # • ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH #4047 • ISO17025 ANAB #L2457.01 • LACSD #10143 • NELAP-OR #4047 • NJ-DEP #CA015 • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

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1H06031

CHAIN OF CUSTODY FORM

Page 1 of 1

Client Name/Address: PSOMAS 3 HUTTON CENTRE DRIVE, SUITE 200 SANTA ANA, CA 92707	Project/PO Number: 2KLE010102
Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)	Phone Number: (714) 328-5234
Sampler: ~~Jim Burton,~~ Todd Bear KD	Fax Number: 714.545.8883

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Escherichia coli (E. coli) by SM 9223B	Special Instructions
LS-BR-1	water	125 ml poly	1	8/5/21	11:40AM	Sterile- None	X	24-Hour Hold time*
INT2-RES-1	water	125 ml poly	1	8/5/21	12:10PM	Sterile- None	X	24-Hour Hold time*
SL-BR-1	water	125 ml poly	1	8/5/21	12:35PM	Sterile- None	X	24-Hour Hold time*

Relinquished By: Kimberly Delatos	Date /Time: 8/5/21 / 1:45PM	Received by:	Date /Time: 8/6/21 1034
Relinquished By:	Date /Time:	Received by:	Date /Time:
Relinquished By:	Date /Time:	Received in Lab by:	Date /Time:

Turnaround Time: (Check)
Same Day ______ 72 Hours ______
24 Hours ______ 5 Days ______
48 Hours ______ Normal X

Sample Integrity: (Check)
Intact ______ On Ice ______

* Per Lohantan Surface Water Ambient Monitoring Program (SWAMP) for ambient water

4.0°C T-0230

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders:	1H24033	**Report Date:**	9/20/2021
		Received Date:	8/24/2021
Project:	2KLE010102	**Turnaround Time:**	Normal
		Phones:	(714) 751-7373
		Fax:	(714) 545-8883
Attn:	Michael P. Donovan	**P.O. #:**	
Client:	Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Billing Code:**	

DoD-ELAP ANAB #ADE-2882 • DoD-ISO ANAB # • ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH #4047 • ISO17025 ANAB #L2457.01 • LACSD #10143 • NELAP-OR #4047 • NJ-DEP #CA015 • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Michael P. Donovan,

Enclosed are the results of analyses for samples received 8/24/21 with the Chain-of-Custody document. The samples were received in good condition, at 2.9 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

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Certificate of Analysis

FINAL REPORT

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported:
09/20/2021 16:13

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
SL-DP-8	Jim Burton, Todd Bear	1H24033-01	Water	08/23/21 10:30	
SL-DP-20	Jim Burton, Todd Bear	1H24033-02	Water	08/23/21 11:05	

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FINAL REPORT

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 09/20/2021 16:13

Sample Results

Sample: SL-DP-8 — Sampled: 08/23/21 10:30 by Jim Burton, Todd Bear

1H24033-01 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1H1589 — **Preparation:** _NONE (LC)		**Prepared:** 08/24/21 09:14				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	08/24/21 17:52	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 09/16/21 15:57				**Analyst:** YMT
Nitrogen, Total	**0.16**	0.10	mg/l	1	09/16/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1H1638 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/24/21 12:44				**Analyst:** YMT
TKN	**0.16**	0.10	mg/l	1	08/26/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1I1086 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/16/21 15:57				**Analyst:** ISM
NO2+NO3 as N	ND	200	ug/l	1	09/16/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1H1663 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/24/21 13:59				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	08/24/21 15:46	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1H1862 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/26/21 13:03				**Analyst:** blg
Total Dissolved Solids	**18**	10	mg/l	1	08/26/21	

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Project Number: 2KLE010102
Project Manager: Michael P. Donovan

Reported: 09/20/2021 16:13

Sample Results

(Continued)

Sample: SL-DP-20 — Sampled: 08/23/21 11:05 by Jim Burton, Todd Bear

1H24033-02 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1H1589 — **Preparation:** _NONE (LC)		**Prepared:** 08/24/21 09:14				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	08/24/21 18:46	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 09/16/21 15:57				**Analyst:** YMT
Nitrogen, Total	ND	0.10	mg/l	1	09/16/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1H1638 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/24/21 12:44				**Analyst:** YMT
TKN	ND	0.10	mg/l	1	08/26/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1I1086 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/16/21 15:57				**Analyst:** ISM
NO2+NO3 as N	ND	200	ug/l	1	09/16/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1H1663 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/24/21 13:59				**Analyst:** sbn
o-Phosphate as P	**0.029**	0.010	mg/l	1	08/24/21 15:48	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1H1862 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/26/21 13:03				**Analyst:** blg
Total Dissolved Solids	**46**	10	mg/l	1	08/26/21	

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Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 09/20/2021 16:13

Quality Control Results

Anions by IC, EPA Method 300.0

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1H1589 - EPA 300.0										
Blank (W1H1589-BLK1)				**Prepared & Analyzed: 08/24/21**						
Nitrate as N	ND	110	ug/l							
LCS (W1H1589-BS1)				**Prepared & Analyzed: 08/24/21**						
Nitrate as N	2150	110	ug/l	2000		107	90-110			
Matrix Spike (W1H1589-MS1)	**Source: 1H23045-07**			**Prepared & Analyzed: 08/24/21**						
Nitrate as N	26700	1100	ug/l	20000	5330	107	84-115			
Matrix Spike (W1H1589-MS2)	**Source: 1H23045-08**			**Prepared & Analyzed: 08/24/21**						
Nitrate as N	26700	1100	ug/l	20000	5300	107	84-115			
Matrix Spike Dup (W1H1589-MSD1)	**Source: 1H23045-07**			**Prepared & Analyzed: 08/24/21**						
Nitrate as N	26600	1100	ug/l	20000	5330	106	84-115	0.2	20	
Matrix Spike Dup (W1H1589-MSD2)	**Source: 1H23045-08**			**Prepared & Analyzed: 08/24/21**						
Nitrate as N	26700	1100	ug/l	20000	5300	107	84-115	0.1	20	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1H1638 - EPA 351.2										
Blank (W1H1638-BLK1)				**Prepared: 08/24/21 Analyzed: 08/26/21**						
TKN	ND	0.10	mg/l							
LCS (W1H1638-BS1)				**Prepared: 08/24/21 Analyzed: 08/26/21**						
TKN	1.01	0.10	mg/l	1.00		101	90-110			
Matrix Spike (W1H1638-MS1)	**Source: 1H24046-02**			**Prepared: 08/24/21 Analyzed: 08/26/21**						
TKN	1.28	0.10	mg/l	1.00	0.230	105	90-110			
Matrix Spike Dup (W1H1638-MSD1)	**Source: 1H24046-02**			**Prepared: 08/24/21 Analyzed: 08/26/21**						
TKN	1.27	0.10	mg/l	1.00	0.230	104	90-110	0.3	10	
Batch: W1H1663 - EPA 365.3										
Blank (W1H1663-BLK1)				**Prepared & Analyzed: 08/24/21**						
o-Phosphate as P	ND	0.010	mg/l							
LCS (W1H1663-BS1)				**Prepared & Analyzed: 08/24/21**						
o-Phosphate as P	0.206	0.010	mg/l	0.200		103	88-111			
Matrix Spike (W1H1663-MS1)	**Source: 1H24033-01**			**Prepared & Analyzed: 08/24/21**						
o-Phosphate as P	0.215	0.010	mg/l	0.200	0.00300	106	85-112			
Matrix Spike Dup (W1H1663-MSD1)	**Source: 1H24033-01**			**Prepared & Analyzed: 08/24/21**						
o-Phosphate as P	0.214	0.010	mg/l	0.200	0.00300	106	85-112	0.5	20	
Batch: W1H1862 - SM 2540C										
Blank (W1H1862-BLK1)				**Prepared & Analyzed: 08/26/21**						
Total Dissolved Solids	ND	10	mg/l							
LCS (W1H1862-BS1)				**Prepared & Analyzed: 08/26/21**						

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Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 09/20/2021 16:13

Quality Control Results

(Continued)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1H1862 - SM 2540C (Continued)										
LCS (W1H1862-BS1)				**Prepared & Analyzed: 08/26/21**						
Total Dissolved Solids	831	10	mg/l	824		101	96-102			
Duplicate (W1H1862-DUP1)	**Source: 1H25001-01**			**Prepared & Analyzed: 08/26/21**						
Total Dissolved Solids	84000	10	mg/l		83700			0.4	10	
Duplicate (W1H1862-DUP2)	**Source: 1H25092-01**			**Prepared & Analyzed: 08/26/21**						
Total Dissolved Solids	9950	10	mg/l		10100			1	10	
Batch: W1I1086 - EPA 353.2										
Blank (W1I1086-BLK1)				**Prepared & Analyzed: 09/16/21**						
NO2+NO3 as N	ND	200	ug/l							
LCS (W1I1086-BS1)				**Prepared & Analyzed: 09/16/21**						
NO2+NO3 as N	991	200	ug/l	1000		99	90-110			
Matrix Spike (W1I1086-MS1)	**Source: 1I07039-03**			**Prepared & Analyzed: 09/16/21**						
NO2+NO3 as N	2400	200	ug/l	2000	320	104	90-110			
Matrix Spike (W1I1086-MS2)	**Source: 1I07039-05**			**Prepared & Analyzed: 09/16/21**						
NO2+NO3 as N	2460	200	ug/l	2000	426	102	90-110			
Matrix Spike Dup (W1I1086-MSD1)	**Source: 1I07039-03**			**Prepared & Analyzed: 09/16/21**						
NO2+NO3 as N	2360	200	ug/l	2000	320	102	90-110	2	20	
Matrix Spike Dup (W1I1086-MSD2)	**Source: 1I07039-05**			**Prepared & Analyzed: 09/16/21**						
NO2+NO3 as N	2470	200	ug/l	2000	426	102	90-110	0.4	20	

Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Project Number:** 2KLE010102 **Project Manager:** Michael P. Donovan	**Reported:** 09/20/2021 16:13

Notes and Definitions

Item	Definition
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

Weck Laboratories
14859 Clark Avenue
City of Industry, CA 91745
(626) 336-2139

CHAIN OF CUSTODY FORM

1H24033

Page 1 of 1

Client Name/Address:	Project/PO Number:
PSOMAS 3 HUTTON CENTRE DRIVE, SUITE 200 SANTA ANA, CA 92707	2KLE010102
Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)	Phone Number: (714) 328-5234
Sampler: Jim Burton, Todd Bear	Fax Number: 714.545.8883

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Nitrate-N EPA Method 300.0	Orthophosphae-OPO4 EPA Method 365.3	Total Dissolved Solids SM2540C	Total Kjeldahl Nitrogenby EPA Method 351.2	NO2+NO3 as N - EPA Method 353.2	Total Nitrogen by calculation						Special Instructions
SL-DP-8	water	60 ml Poly	1	8/23/21	10:30am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
SL-DP-20	water	60 ml Poly	1	8/23/21	11:05am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
	water	60 ml Poly	1			None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
	water	60 ml Poly	1			None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
	water	60 ml Poly	1			None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						

Relinquished By:	Date /Time:	Received by:	Date /Time:
[signature]	8/23/21 1:25pm		
Relinquished By: FedEx	Date /Time: 8/24/21	Received by: [signature]	Date /Time: 10:10
Relinquished By:	Date /Time:	Received in Lab by:	Date /Time:

Turnaround Time: (Check)
Same Day ______ 72 Hours ______
24 Hours ______ 5 Days ______
48 Hours ______ Normal X

Sample Integrity: (Check)
Intact ______ On Ice ______

TR230 2.9°c

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders:	1H25027	**Report Date:**	9/22/2021
		Received Date:	8/25/2021
Project:	2KLE010102	**Turnaround Time:**	Normal
		Phones:	(714) 751-7373
		Fax:	(714) 545-8883
Attn:	Michael P. Donovan	**P.O. #:**	
Client:	Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Billing Code:**	

ELAP-CA #1132 ● EPA-UCMR #CA00211 ● Guam-EPA #17-008R ● HW-DOH #4047 ● LACSD #10143 ● NELAP-OR #4047 ● NJ-DEP #CA015 ● SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Michael P. Donovan,

Enclosed are the results of analyses for samples received 8/25/21 with the Chain-of-Custody document. The samples were received in good condition, at 1.2 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

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Certificate of Analysis

FINAL REPORT

WECK LABORATORIES, INC.

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported:
09/22/2021 11:05

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
LS-DP-5	Jim Burton, Todd Bear	1H25027-01	Water	08/24/21 10:15	
LS-DP-25	Jim Burton, Todd Bear	1H25027-02	Water	08/24/21 10:40	

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FINAL REPORT

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 09/22/2021 11:05

Sample Results

Sample: LS-DP-5 — Sampled: 08/24/21 10:15 by Jim Burton, Todd Bear

1H25027-01 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1H1719 **Preparation:** _NONE (LC)		**Prepared:** 08/25/21 09:34				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	08/25/21 17:14	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] **Preparation:** [CALC]		**Prepared:** 09/16/21 15:57				**Analyst:** YMT
Nitrogen, Total	ND	0.10	mg/l	1	09/16/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1H2152 **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/31/21 13:18				**Analyst:** YMT
TKN	ND	0.10	mg/l	1	09/02/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1I1086 **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/16/21 15:57				**Analyst:** ISM
NO2+NO3 as N	ND	200	ug/l	1	09/16/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1H1762 **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/25/21 14:01				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	08/25/21 15:49	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1H1970 **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/27/21 16:53				**Analyst:** blg
Total Dissolved Solids	**15**	10	mg/l	1	08/30/21	

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Santa Ana, CA 92707

Project Number: 2KLE010102
Project Manager: Michael P. Donovan

Reported: 09/22/2021 11:05

Sample Results

(Continued)

Sample: LS-DP-25 — 1H25027-02 (Water)
Sampled: 08/24/21 10:40 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1H1719 **Preparation:** _NONE (LC)		**Prepared:** 08/25/21 09:34				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	08/25/21 17:32	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] **Preparation:** [CALC]		**Prepared:** 09/16/21 15:57				**Analyst:** YMT
Nitrogen, Total	ND	0.10	mg/l	1	09/16/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1H2152 **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/31/21 13:18				**Analyst:** YMT
TKN	ND	0.10	mg/l	1	09/02/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1I1086 **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/16/21 15:57				**Analyst:** ISM
NO2+NO3 as N	ND	200	ug/l	1	09/16/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1H1762 **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/25/21 14:01				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	08/25/21 15:53	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1H1970 **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/27/21 16:53				**Analyst:** blg
Total Dissolved Solids	**14**	10	mg/l	1	08/30/21	

Psomas - Santa Ana, CA
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Santa Ana, CA 92707

Project Number: 2KLE010102
Project Manager: Michael P. Donovan

Reported: 09/22/2021 11:05

Quality Control Results

Anions by IC, EPA Method 300.0

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1H1719 - EPA 300.0										
Blank (W1H1719-BLK1)				**Prepared & Analyzed: 08/25/21**						
Nitrate as N	ND	110	ug/l							
LCS (W1H1719-BS1)				**Prepared & Analyzed: 08/25/21**						
Nitrate as N	2130	110	ug/l	2000		107	90-110			
Matrix Spike (W1H1719-MS1)	**Source: 1H18003-03**			**Prepared & Analyzed: 08/25/21**						
Nitrate as N	23300	1100	ug/l	20000	1320	110	84-115			
Matrix Spike (W1H1719-MS2)	**Source: 1H18003-05**			**Prepared & Analyzed: 08/25/21**						
Nitrate as N	27900	1100	ug/l	20000	6240	108	84-115			
Matrix Spike Dup (W1H1719-MSD1)	**Source: 1H18003-03**			**Prepared & Analyzed: 08/25/21**						
Nitrate as N	23300	1100	ug/l	20000	1320	110	84-115	0.04	20	
Matrix Spike Dup (W1H1719-MSD2)	**Source: 1H18003-05**			**Prepared & Analyzed: 08/25/21**						
Nitrate as N	27800	1100	ug/l	20000	6240	108	84-115	0.2	20	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1H1762 - EPA 365.3										
Blank (W1H1762-BLK1)				**Prepared & Analyzed: 08/25/21**						
o-Phosphate as P	ND	0.010	mg/l							
LCS (W1H1762-BS1)				**Prepared & Analyzed: 08/25/21**						
o-Phosphate as P	0.200	0.010	mg/l	0.200		100	88-111			
Matrix Spike (W1H1762-MS1)	**Source: 1H25027-01**			**Prepared & Analyzed: 08/25/21**						
o-Phosphate as P	0.195	0.010	mg/l	0.200	ND	97	85-112			
Matrix Spike Dup (W1H1762-MSD1)	**Source: 1H25027-01**			**Prepared & Analyzed: 08/25/21**						
o-Phosphate as P	0.196	0.010	mg/l	0.200	ND	98	85-112	0.5	20	
Batch: W1H1970 - SM 2540C										
Blank (W1H1970-BLK1)				**Prepared: 08/27/21 Analyzed: 08/30/21**						
Total Dissolved Solids	ND	10	mg/l							
LCS (W1H1970-BS1)				**Prepared: 08/27/21 Analyzed: 08/30/21**						
Total Dissolved Solids	804	10	mg/l	824		98	96-102			
Duplicate (W1H1970-DUP1)	**Source: 1H06002-12**			**Prepared: 08/27/21 Analyzed: 08/30/21**						
Total Dissolved Solids	584	10	mg/l		608			4	10	
Duplicate (W1H1970-DUP2)	**Source: 1H11007-01**			**Prepared: 08/27/21 Analyzed: 08/30/21**						
Total Dissolved Solids	1450	10	mg/l		1400			4	10	
Batch: W1H2152 - EPA 351.2										
Blank (W1H2152-BLK1)				**Prepared: 08/31/21 Analyzed: 09/02/21**						
TKN	ND	0.10	mg/l							
Blank (W1H2152-BLK2)				**Prepared: 08/31/21 Analyzed: 09/02/21**						

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Project Number: 2KLE010102
Project Manager: Michael P. Donovan

Reported: 09/22/2021 11:05

Quality Control Results

(Continued)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1H2152 - EPA 351.2 (Continued)										
Blank (W1H2152-BLK2)				**Prepared: 08/31/21 Analyzed: 09/02/21**						
TKN	ND	0.10	mg/l							
LCS (W1H2152-BS1)				**Prepared: 08/31/21 Analyzed: 09/02/21**						
TKN	0.986	0.10	mg/l	1.00		99	90-110			
LCS (W1H2152-BS2)				**Prepared: 08/31/21 Analyzed: 09/02/21**						
TKN	0.968	0.10	mg/l	1.00		97	90-110			
Matrix Spike (W1H2152-MS1)	**Source: 1H25027-01**			**Prepared: 08/31/21 Analyzed: 09/02/21**						
TKN	1.07	0.10	mg/l	1.00	ND	107	90-110			
Matrix Spike (W1H2152-MS2)	**Source: 1H25102-01**			**Prepared: 08/31/21 Analyzed: 09/02/21**						
TKN	1.03	0.10	mg/l	1.00	ND	103	90-110			
Matrix Spike Dup (W1H2152-MSD1)	**Source: 1H25027-01**			**Prepared: 08/31/21 Analyzed: 09/02/21**						
TKN	1.06	0.10	mg/l	1.00	ND	106	90-110	0.3	10	
Matrix Spike Dup (W1H2152-MSD2)	**Source: 1H25102-01**			**Prepared: 08/31/21 Analyzed: 09/02/21**						
TKN	1.03	0.10	mg/l	1.00	ND	103	90-110	0.8	10	
Batch: W1I1086 - EPA 353.2										
Blank (W1I1086-BLK1)				**Prepared & Analyzed: 09/16/21**						
NO2+NO3 as N	ND	200	ug/l							
LCS (W1I1086-BS1)				**Prepared & Analyzed: 09/16/21**						
NO2+NO3 as N	991	200	ug/l	1000		99	90-110			
Matrix Spike (W1I1086-MS1)	**Source: 1I07039-03**			**Prepared & Analyzed: 09/16/21**						
NO2+NO3 as N	2400	200	ug/l	2000	320	104	90-110			
Matrix Spike (W1I1086-MS2)	**Source: 1I07039-05**			**Prepared & Analyzed: 09/16/21**						
NO2+NO3 as N	2460	200	ug/l	2000	426	102	90-110			
Matrix Spike Dup (W1I1086-MSD1)	**Source: 1I07039-03**			**Prepared & Analyzed: 09/16/21**						
NO2+NO3 as N	2360	200	ug/l	2000	320	102	90-110	2	20	
Matrix Spike Dup (W1I1086-MSD2)	**Source: 1I07039-05**			**Prepared & Analyzed: 09/16/21**						
NO2+NO3 as N	2470	200	ug/l	2000	426	102	90-110	0.4	20	

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 09/22/2021 11:05

Notes and Definitions

Item	Definition
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

Weck Laboratories
14859 Clark Avenue
City of Industry, CA 91745
(626) 336-2139

CHAIN OF CUSTODY FORM 1H25027

Page 1 of 1

Client Name/Address:	Project/PO Number:
PSOMAS 3 HUTTON CENTRE DRIVE, SUITE 200 SANTA ANA, CA 92707	2KLE010102
Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)	Phone Number: (714) 328-5234
Sampler: Jim Burton, Todd Bear	Fax Number: 714.545.8883

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Nitrate-N EPA Method 300.0	Orthophosphae-OPO4 EPA Method 365.3	Total Dissolved Solids SM2540C	Total Kjeldahl Nitrogenby EPA Method 351.2	NO2+NO3 as N - EPA Method 353.2	Total Nitrogen by calculation	Special Instructions
LS-DP-5	water	60 ml Poly	1	8/24/21	10:15am	None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
LS-DP-25	water	60 ml Poly	1	8/24/21	10:40am	None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
	water	60 ml Poly	1			None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
	water	60 ml Poly	1			None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
	water	60 ml Poly	1			None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	

Relinquished By:	Date /Time:	Received by:	Date /Time:
[signature]	8/24/21 12:15pm		
FedEx	8/25/21	[signature]	10:25
		Received in Lab by:	

Turnaround Time: (Check)
Same Day ______ 72 Hours ______
24 Hours ______ 5 Days ______
48 Hours ______ Normal X

Sample Integrity: (Check)
Intact ______ On Ice ______

1.2° TO28

Certificate of Analysis

FINAL REPORT

Work Orders:	1H26021	**Report Date:**	9/20/2021
		Received Date:	8/26/2021
Project:	2KLE010102	**Turnaround Time:**	Normal
		Phones:	(714) 751-7373
		Fax:	(714) 545-8883
Attn:	Michael P. Donovan	**P.O. #:**	
Client:	Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Billing Code:**	

DoD-ELAP ANAB #ADE-2882 • DoD-ISO ANAB # • ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH #4047 • ISO17025 ANAB #L2457.01 • LACSD #10143 • NELAP-OR #4047 • NJ-DEP #CA015 • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Michael P. Donovan,

Enclosed are the results of analyses for samples received 8/26/21 with the Chain-of-Custody document. The samples were received in good condition, at 1.4 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

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Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported:
09/20/2021 16:15

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
BC-blw-PH6	Jim Burton, Todd Bear	1H26021-01	Water	08/25/21 07:15	
BC-blw-PH5	Jim Burton, Todd Bear	1H26021-02	Water	08/25/21 07:40	
BC-blw-PH4	Jim Burton, Todd Bear	1H26021-03	Water	08/25/21 08:15	
BC-blw-PH3	Jim Burton, Todd Bear	1H26021-04	Water	08/25/21 08:50	
BC-blw-PH2	Jim Burton, Todd Bear	1H26021-05	Water	08/25/21 09:20	
BC-NF-1	Jim Burton, Todd Bear	1H26021-06	Water	08/25/21 10:20	
BC-blw-LS	Jim Burton, Todd Bear	1H26021-07	Water	08/25/21 10:35	
BC-blw-SL	Jim Burton, Todd Bear	1H26021-08	Water	08/25/21 11:05	

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 09/20/2021 16:15

Sample Results

Sample: BC-blw-PH6 — Sampled: 08/25/21 7:15 by Jim Burton, Todd Bear

1H26021-01 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1H1830 — **Preparation:** _NONE (LC)		**Prepared:** 08/26/21 09:23				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	08/26/21 16:41	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 09/14/21 19:49				**Analyst:** SBN
Nitrogen, Total	**0.10**	0.10	mg/l	1	09/17/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1I0024 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/01/21 09:50				**Analyst:** SBN
TKN	**0.10**	0.10	mg/l	1	09/03/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1I0903 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/14/21 19:49				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	09/17/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1H1864 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/26/21 13:06				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	08/26/21 14:07	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1H1971 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/27/21 16:56				**Analyst:** blg
Total Dissolved Solids	**26**	10	mg/l	1	08/31/21	

Sample Results

(Continued)

Sample: BC-blw-PH5 — Sampled: 08/25/21 7:40 by Jim Burton, Todd Bear

1H26021-02 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1H1830 — **Preparation:** _NONE (LC)		**Prepared:** 08/26/21 09:23				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	08/26/21 16:59	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 09/14/21 19:49				**Analyst:** SBN
Nitrogen, Total	ND	0.10	mg/l	1	09/17/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1I0024 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/01/21 09:50				**Analyst:** SBN
TKN	ND	0.10	mg/l	1	09/03/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1I0903 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/14/21 19:49				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	09/17/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1H1864 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/26/21 13:06				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	08/26/21 14:08	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1H1971 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/27/21 16:56				**Analyst:** blg
Total Dissolved Solids	**35**	10	mg/l	1	08/31/21	

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Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 09/20/2021 16:15

Sample Results

(Continued)

Sample: BC-blw-PH4 — 1H26021-03 (Water) — Sampled: 08/25/21 8:15 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1H1830 — **Preparation:** _NONE (LC)		**Prepared:** 08/26/21 09:23				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	08/26/21 17:17	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 09/14/21 19:49				**Analyst:** SBN
Nitrogen, Total	**0.11**	0.10	mg/l	1	09/17/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1I0024 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/01/21 09:50				**Analyst:** SBN
TKN	**0.11**	0.10	mg/l	1	09/03/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1I0903 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/14/21 19:49				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	09/17/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1H1864 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/26/21 13:06				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	08/26/21 14:09	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1H1971 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/27/21 16:56				**Analyst:** blg
Total Dissolved Solids	**46**	10	mg/l	1	08/31/21	

Sample Results

(Continued)

Sample: BC-blw-PH3 — Sampled: 08/25/21 8:50 by Jim Burton, Todd Bear

1H26021-04 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1H1830 — **Preparation:** _NONE (LC)		**Prepared:** 08/26/21 09:23				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	08/26/21 17:34	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 09/14/21 19:49				**Analyst:** SBN
Nitrogen, Total	**0.19**	0.10	mg/l	1	09/17/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1I0024 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/01/21 09:50				**Analyst:** SBN
TKN	**0.19**	0.10	mg/l	1	09/03/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1I0903 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/14/21 19:49				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	09/17/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1H1864 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/26/21 13:06				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	08/26/21 14:09	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1H1971 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/27/21 16:56				**Analyst:** blg
Total Dissolved Solids	**23**	10	mg/l	1	08/31/21	

Sample Results

(Continued)

Sample: BC-blw-PH2 — Sampled: 08/25/21 9:20 by Jim Burton, Todd Bear

1H26021-05 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1H1830 — **Preparation:** _NONE (LC)		**Prepared:** 08/26/21 09:23				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	08/26/21 17:52	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 09/14/21 19:49				**Analyst:** SBN
Nitrogen, Total	**0.12**	0.10	mg/l	1	09/17/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1I0024 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/01/21 09:50				**Analyst:** SBN
TKN	**0.12**	0.10	mg/l	1	09/03/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1I0903 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/14/21 19:49				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	09/17/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1H1864 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/26/21 13:06				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	08/26/21 14:10	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1H1971 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/27/21 16:56				**Analyst:** blg
Total Dissolved Solids	**27**	10	mg/l	1	08/31/21	

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Sample Results

(Continued)

Sample: BC-NF-1 — 1H26021-06 (Water) — Sampled: 08/25/21 10:20 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1H1830 — **Preparation:** _NONE (LC)		**Prepared:** 08/26/21 09:23				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	08/26/21 18:10	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 09/14/21 19:49				**Analyst:** SBN
Nitrogen, Total	**0.12**	0.10	mg/l	1	09/17/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1I0024 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/01/21 09:50				**Analyst:** SBN
TKN	**0.12**	0.10	mg/l	1	09/03/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1I0903 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/14/21 19:49				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	09/17/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1H1864 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/26/21 13:06				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	08/26/21 14:10	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1H1971 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/27/21 16:56				**Analyst:** blg
Total Dissolved Solids	**25**	10	mg/l	1	08/31/21	

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Certificate of Analysis

FINAL REPORT

Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Project Number:** 2KLE010102 **Project Manager:** Michael P. Donovan	**Reported:** 09/20/2021 16:15

Sample Results

(Continued)

Sample: BC-blw-LS — Sampled: 08/25/21 10:35 by Jim Burton, Todd Bear

1H26021-07 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1H1830 — **Preparation:** _NONE (LC)		**Prepared:** 08/26/21 09:23				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	08/26/21 18:28	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 09/14/21 19:49				**Analyst:** SBN
Nitrogen, Total	**0.12**	0.10	mg/l	1	09/17/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1I0024 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/01/21 09:50				**Analyst:** SBN
TKN	**0.12**	0.10	mg/l	1	09/03/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1I0903 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/14/21 19:49				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	09/17/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1H1866 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/26/21 13:08				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	08/26/21 14:18	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1H1971 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/27/21 16:56				**Analyst:** blg
Total Dissolved Solids	**14**	10	mg/l	1	08/31/21	

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Sample Results

(Continued)

Sample: BC-blw-SL — 1H26021-08 (Water)

Sampled: 08/25/21 11:05 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1H1830 **Preparation:** _NONE (LC)		**Prepared:** 08/26/21 09:23				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	08/26/21 19:22	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: [CALC]		**Instr:** [CALC]				
Batch ID: [CALC] **Preparation:** [CALC]		**Prepared:** 09/14/21 19:49				**Analyst:** SBN
Nitrogen, Total	**0.11**	0.10	mg/l	1	09/17/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1I0024 **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/01/21 09:50				**Analyst:** SBN
TKN	**0.11**	0.10	mg/l	1	09/03/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1I0903 **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/14/21 19:49				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	09/17/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1H1866 **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/26/21 13:08				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	08/26/21 14:19	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1H1971 **Preparation:** _NONE (WETCHEM)		**Prepared:** 08/27/21 16:56				**Analyst:** blg
Total Dissolved Solids	**14**	10	mg/l	1	08/31/21	

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Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 09/20/2021 16:15

Quality Control Results

Anions by IC, EPA Method 300.0

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1H1830 - EPA 300.0										
Blank (W1H1830-BLK1)				**Prepared & Analyzed: 08/26/21**						
Nitrate as N	ND	110	ug/l							
LCS (W1H1830-BS1)				**Prepared & Analyzed: 08/26/21**						
Nitrate as N	2200	110	ug/l	2000		110	90-110			
Matrix Spike (W1H1830-MS1)	**Source: 1H16015-01**			**Prepared & Analyzed: 08/26/21**						
Nitrate as N	21200	1100	ug/l	20000	ND	106	84-115			
Matrix Spike (W1H1830-MS2)	**Source: 1H16015-02**			**Prepared & Analyzed: 08/26/21**						
Nitrate as N	20900	1100	ug/l	20000	ND	104	84-115			
Matrix Spike Dup (W1H1830-MSD1)	**Source: 1H16015-01**			**Prepared & Analyzed: 08/26/21**						
Nitrate as N	21200	1100	ug/l	20000	ND	106	84-115	0.3	20	
Matrix Spike Dup (W1H1830-MSD2)	**Source: 1H16015-02**			**Prepared & Analyzed: 08/26/21**						
Nitrate as N	20800	1100	ug/l	20000	ND	104	84-115	0.2	20	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1H1864 - EPA 365.3										
Blank (W1H1864-BLK1)				**Prepared & Analyzed: 08/26/21**						
o-Phosphate as P	ND	0.010	mg/l							
LCS (W1H1864-BS1)				**Prepared & Analyzed: 08/26/21**						
o-Phosphate as P	0.207	0.010	mg/l	0.200		104	88-111			
Matrix Spike (W1H1864-MS1)	**Source: 1H25072-01**			**Prepared & Analyzed: 08/26/21**						
o-Phosphate as P	0.230	0.010	mg/l	0.200	0.0210	104	85-112			
Matrix Spike Dup (W1H1864-MSD1)	**Source: 1H25072-01**			**Prepared & Analyzed: 08/26/21**						
o-Phosphate as P	0.230	0.010	mg/l	0.200	0.0210	104	85-112	0	20	
Batch: W1H1866 - EPA 365.3										
Blank (W1H1866-BLK1)				**Prepared & Analyzed: 08/26/21**						
o-Phosphate as P	ND	0.010	mg/l							
LCS (W1H1866-BS1)				**Prepared & Analyzed: 08/26/21**						
o-Phosphate as P	0.212	0.010	mg/l	0.200		106	88-111			
Matrix Spike (W1H1866-MS1)	**Source: 1H26021-07**			**Prepared & Analyzed: 08/26/21**						
o-Phosphate as P	0.212	0.010	mg/l	0.200	0.00900	102	85-112			
Matrix Spike Dup (W1H1866-MSD1)	**Source: 1H26021-07**			**Prepared & Analyzed: 08/26/21**						
o-Phosphate as P	0.210	0.010	mg/l	0.200	0.00900	100	85-112	0.9	20	
Batch: W1H1971 - SM 2540C										
Blank (W1H1971-BLK1)				**Prepared: 08/27/21 Analyzed: 08/31/21**						
Total Dissolved Solids	ND	10	mg/l							
LCS (W1H1971-BS1)				**Prepared: 08/27/21 Analyzed: 08/31/21**						

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Quality Control Results

(Continued)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1H1971 - SM 2540C (Continued)										
LCS (W1H1971-BS1)				**Prepared: 08/27/21**	**Analyzed: 08/31/21**					
Total Dissolved Solids	838	10	mg/l	824		102	96-102			
Duplicate (W1H1971-DUP1)	**Source: 1H16018-01**			**Prepared: 08/27/21**	**Analyzed: 08/31/21**					
Total Dissolved Solids	4510	10	mg/l		4390			3	10	
Duplicate (W1H1971-DUP2)	**Source: 1H16018-02**			**Prepared: 08/27/21**	**Analyzed: 08/31/21**					
Total Dissolved Solids	1680	10	mg/l		1630			3	10	
Batch: W1I0024 - EPA 351.2										
Blank (W1I0024-BLK1)				**Prepared: 09/01/21**	**Analyzed: 09/03/21**					
TKN	ND	0.10	mg/l							
Blank (W1I0024-BLK2)				**Prepared: 09/01/21**	**Analyzed: 09/03/21**					
TKN	ND	0.10	mg/l							
LCS (W1I0024-BS1)				**Prepared: 09/01/21**	**Analyzed: 09/03/21**					
TKN	1.04	0.10	mg/l	1.00		104	90-110			
LCS (W1I0024-BS2)				**Prepared: 09/01/21**	**Analyzed: 09/03/21**					
TKN	1.03	0.10	mg/l	1.00		103	90-110			
Matrix Spike (W1I0024-MS1)	**Source: 1H26021-01**			**Prepared: 09/01/21**	**Analyzed: 09/03/21**					
TKN	1.14	0.10	mg/l	1.00	0.102	103	90-110			
Matrix Spike (W1I0024-MS2)	**Source: 1H26021-05**			**Prepared: 09/01/21**	**Analyzed: 09/03/21**					
TKN	1.13	0.10	mg/l	1.00	0.119	101	90-110			
Matrix Spike Dup (W1I0024-MSD1)	**Source: 1H26021-01**			**Prepared: 09/01/21**	**Analyzed: 09/03/21**					
TKN	1.11	0.10	mg/l	1.00	0.102	101	90-110	2	10	
Matrix Spike Dup (W1I0024-MSD2)	**Source: 1H26021-05**			**Prepared: 09/01/21**	**Analyzed: 09/03/21**					
TKN	1.14	0.10	mg/l	1.00	0.119	102	90-110	0.9	10	
Batch: W1I0903 - EPA 353.2										
Blank (W1I0903-BLK1)				**Prepared: 09/14/21**	**Analyzed: 09/17/21**					
NO2+NO3 as N	ND	200	ug/l							
LCS (W1I0903-BS1)				**Prepared: 09/14/21**	**Analyzed: 09/17/21**					
NO2+NO3 as N	1010	200	ug/l	1000		101	90-110			
Matrix Spike (W1I0903-MS1)	**Source: 1I01057-01**			**Prepared: 09/14/21**	**Analyzed: 09/17/21**					
NO2+NO3 as N	17900	800	ug/l	8000	9680	102	90-110			
Matrix Spike (W1I0903-MS2)	**Source: 1I08061-01**			**Prepared: 09/14/21**	**Analyzed: 09/17/21**					
NO2+NO3 as N	7350	200	ug/l	2000	5280	104	90-110			
Matrix Spike Dup (W1I0903-MSD1)	**Source: 1I01057-01**			**Prepared: 09/14/21**	**Analyzed: 09/17/21**					
NO2+NO3 as N	17900	800	ug/l	8000	9680	102	90-110	0	20	
Matrix Spike Dup (W1I0903-MSD2)	**Source: 1I08061-01**			**Prepared: 09/14/21**	**Analyzed: 09/17/21**					
NO2+NO3 as N	7340	200	ug/l	2000	5280	103	90-110	0.1	20	

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Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 09/20/2021 16:15

Notes and Definitions

Item	Definition
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

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CHAIN OF CUSTODY FORM 1H26021

Page 1 of 2

Client Name/Address:	Project/PO Number:
PSOMAS 3 HUTTON CENTRE DRIVE, SUITE 200 SANTA ANA, CA 92707	2KLE010102
Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)	Phone Number: (714) 328-5234
Sampler: Jim Burton, Todd Bear	Fax Number: 714.545.8883

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Nitrate-N EPA Method 300.0	Orthophosphae-OPO4 EPA Method 365.3	Total Dissolved Solids SM2540C	Total Kjeldahl Nitrogenby EPA Method 351.2	NO2+NO3 as N - EPA Method 353.2	Total Nitrogen by calculation						Special Instructions
BC-blw-PH6	water	60 ml Poly	1	8/25/21	7:15am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
BC-blw-PH5	water	60 ml Poly	1	8/25/21	7:40am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
BC-blw-PH4	water	60 ml Poly	1	8/25/21	8:15am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
BC-blw-PH3	water	60 ml Poly	1	8/25/21	8:50am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
BC-blw-PH2	water	60 ml Poly	1	8/25/21	9:20am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						

Relinquished By:	Date /Time:	Received by:	Date /Time:
[signature]	8/25/21 12:30pm		
Relinquished By: Fed ex	Date /Time: 8/26/21	Received by: [signature]	Date /Time: 10:30
Relinquished By:	Date /Time:	Received in Lab by:	Date /Time:

Turnaround Time: (Check)
Same Day ______ 72 Hours ______
24 Hours ______ 5 Days ______
48 Hours ______ Normal X

Sample Integrity: (Check)
Intact ✓ On Ice ✓

1.4°C 702821

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CHAIN OF CUSTODY FORM 1H26021

Page 2 of 2

Client Name/Address:	Project/PO Number:
PSOMAS 3 HUTTON CENTRE DRIVE, SUITE 200 SANTA ANA, CA 92707	2KLE010102
Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)	Phone Number: (714) 328-5234
Sampler: Jim Burton, Todd Bear	Fax Number: 714.545.8883

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Nitrate-N EPA Method 300.0	Orthophosphae-OPO4 EPA Method 365.3	Total Dissolved Solids SM2540C	Total Kjeldahl Nitrogenby EPA Method 351.2	NO2+NO3 as N - EPA Method 353.2	Total Nitrogen by calculation	Special Instructions
BC-NF-1	water	60 ml Poly	1	8/25/21	10:20am	None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
BC-blw-LS	water	60 ml Poly	1	8/25/21	10:35am	None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
BC-blw-SL	water	60 ml Poly	1	8/25/21	11:05am	None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
	water	60 ml Poly	1			None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
	water	60 ml Poly	1			None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	

Relinquished By:	Date /Time:	Received by:	Date /Time:
[signature]	8/25/21 12:30pm		
Fedex	8/26/21	[signature]	10:30
		Received in Lab by:	

Turnaround Time: (Check)
Same Day ______ 72 Hours ______
24 Hours ______ 5 Days ______
48 Hours ______ Normal X
Sample Integrity: (Check)
Intact ______ On Ice ✓

1.4°c JU2824

Certificate of Analysis

FINAL REPORT

WECK LABORATORIES, INC.

Work Orders:	1I21015	**Report Date:**	10/08/2021
		Received Date:	9/21/2021
Project:	2KLE010102	**Turnaround Time:**	Normal
		Phones:	(714) 751-7373
		Fax:	(714) 545-8883
Attn:	Michael P. Donovan	**P.O. #:**	
Client:	Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Billing Code:**	

ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH #4047 • LACSD #10143 • NELAP-OR #4047 • NJ-DEP #CA015 • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Michael P. Donovan,

Enclosed are the results of analyses for samples received 9/21/21 with the Chain-of-Custody document. The samples were received in good condition, at 2.7 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

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WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported:
10/08/2021 16:13

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
LS-DP-8	Jim Burton, Todd Bear	1I21015-01	Water	09/20/21 10:20	
LS-DP-20	Jim Burton, Todd Bear	1I21015-02	Water	09/20/21 10:45	

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Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 10/08/2021 16:13

Sample Results

Sample: LS-DP-8 | Sampled: 09/20/21 10:20 by Jim Burton, Todd Bear

1I21015-01 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1I1329 **Preparation:** _NONE (LC)		**Prepared:** 09/21/21 10:07				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	09/21/21 19:34	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: *** DEFAULT SPECIFIC METHOD ***		**Instr:** [CALC]				
Batch ID: [CALC] **Preparation:** [CALC]		**Prepared:** 09/23/21 13:21				**Analyst:** YMT
Nitrogen, Total	ND	0.10	mg/l	1	09/23/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1I1348 **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/22/21 18:00				**Analyst:** YMT
TKN	ND	0.10	mg/l	1	09/23/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1I1560 **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/23/21 13:21				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	09/23/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1I1371 **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/21/21 15:17				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	09/21/21 17:38	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1I1726 **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/27/21 12:11				**Analyst:** blg
Total Dissolved Solids	**16**	10	mg/l	1	09/27/21	

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Psomas - Santa Ana, CA
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Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 10/08/2021 16:13

Sample Results

(Continued)

Sample: LS-DP-20 — Sampled: 09/20/21 10:45 by Jim Burton, Todd Bear

1I21015-02 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1I1329 — **Preparation:** _NONE (LC)		**Prepared:** 09/21/21 10:07				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	09/21/21 20:46	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: *** DEFAULT SPECIFIC METHOD ***		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 09/23/21 13:21				**Analyst:** YMT
Nitrogen, Total	ND	0.10	mg/l	1	09/23/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1I1348 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/22/21 18:00				**Analyst:** YMT
TKN	ND	0.10	mg/l	1	09/23/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1I1560 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/23/21 13:21				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	09/23/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1I1371 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/21/21 15:17				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	09/21/21 17:39	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1I1726 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/27/21 12:11				**Analyst:** blg
Total Dissolved Solids	**20**	10	mg/l	1	09/27/21	

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 10/08/2021 16:13

Quality Control Results

Anions by IC, EPA Method 300.0

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1I1329 - EPA 300.0										
Blank (W1I1329-BLK1)				**Prepared & Analyzed: 09/21/21**						
Nitrate as N	ND	110	ug/l							
LCS (W1I1329-BS1)				**Prepared & Analyzed: 09/21/21**						
Nitrate as N	2020	110	ug/l	2000		101	90-110			
Matrix Spike (W1I1329-MS1)	**Source: 1I02003-01**			**Prepared & Analyzed: 09/21/21**						
Nitrate as N	19400	1100	ug/l	20000	ND	97	84-115			
Matrix Spike (W1I1329-MS2)	**Source: 1I02003-02**			**Prepared & Analyzed: 09/21/21**						
Nitrate as N	19600	1100	ug/l	20000	ND	98	84-115			
Matrix Spike Dup (W1I1329-MSD1)	**Source: 1I02003-01**			**Prepared & Analyzed: 09/21/21**						
Nitrate as N	19200	1100	ug/l	20000	ND	96	84-115	0.7	20	
Matrix Spike Dup (W1I1329-MSD2)	**Source: 1I02003-02**			**Prepared & Analyzed: 09/21/21**						
Nitrate as N	19700	1100	ug/l	20000	ND	98	84-115	0.3	20	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1I1348 - EPA 351.2										
Blank (W1I1348-BLK1)				**Prepared: 09/22/21 Analyzed: 09/23/21**						
TKN	ND	0.10	mg/l							
Blank (W1I1348-BLK2)				**Prepared: 09/22/21 Analyzed: 09/23/21**						
TKN	ND	0.10	mg/l							
LCS (W1I1348-BS1)				**Prepared: 09/22/21 Analyzed: 09/23/21**						
TKN	0.981	0.10	mg/l	1.00		98	90-110			
LCS (W1I1348-BS2)				**Prepared: 09/22/21 Analyzed: 09/23/21**						
TKN	0.934	0.10	mg/l	1.00		93	90-110			
Matrix Spike (W1I1348-MS1)	**Source: 1I21027-01**			**Prepared: 09/22/21 Analyzed: 09/23/21**						
TKN	1.23	0.10	mg/l	1.00	0.246	99	90-110			
Matrix Spike (W1I1348-MS2)	**Source: 1I21027-02**			**Prepared: 09/22/21 Analyzed: 09/23/21**						
TKN	1.10	0.10	mg/l	1.00	0.152	95	90-110			
Matrix Spike Dup (W1I1348-MSD1)	**Source: 1I21027-01**			**Prepared: 09/22/21 Analyzed: 09/23/21**						
TKN	1.19	0.10	mg/l	1.00	0.246	94	90-110	4	10	
Matrix Spike Dup (W1I1348-MSD2)	**Source: 1I21027-02**			**Prepared: 09/22/21 Analyzed: 09/23/21**						
TKN	1.11	0.10	mg/l	1.00	0.152	96	90-110	0.6	10	
Batch: W1I1371 - EPA 365.3										
Blank (W1I1371-BLK1)				**Prepared & Analyzed: 09/21/21**						
o-Phosphate as P	ND	0.010	mg/l							
LCS (W1I1371-BS1)				**Prepared & Analyzed: 09/21/21**						
o-Phosphate as P	0.197	0.010	mg/l	0.200		98	88-111			

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Quality Control Results

(Continued)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1I1371 - EPA 365.3 (Continued)										
Matrix Spike (W1I1371-MS1)	**Source: 1I21015-01**			**Prepared & Analyzed: 09/21/21**						
o-Phosphate as P	0.197	0.010	mg/l	0.200	0.00600	96	85-112			
Matrix Spike Dup (W1I1371-MSD1)	**Source: 1I21015-01**			**Prepared & Analyzed: 09/21/21**						
o-Phosphate as P	0.205	0.010	mg/l	0.200	0.00600	100	85-112	4	20	
Batch: W1I1560 - EPA 353.2										
Blank (W1I1560-BLK1)				**Prepared & Analyzed: 09/23/21**						
NO2+NO3 as N	ND	200	ug/l							
LCS (W1I1560-BS1)				**Prepared & Analyzed: 09/23/21**						
NO2+NO3 as N	1010	200	ug/l	1000		101	90-110			
Matrix Spike (W1I1560-MS1)	**Source: 1I22055-01**			**Prepared & Analyzed: 09/23/21**						
NO2+NO3 as N	4940	200	ug/l	2000	3020	96	90-110			
Matrix Spike (W1I1560-MS2)	**Source: 1I23023-01**			**Prepared & Analyzed: 09/23/21**						
NO2+NO3 as N	2100	200	ug/l	2000	ND	105	90-110			
Matrix Spike Dup (W1I1560-MSD1)	**Source: 1I22055-01**			**Prepared & Analyzed: 09/23/21**						
NO2+NO3 as N	4950	200	ug/l	2000	3020	96	90-110	0.2	20	
Matrix Spike Dup (W1I1560-MSD2)	**Source: 1I23023-01**			**Prepared & Analyzed: 09/23/21**						
NO2+NO3 as N	2120	200	ug/l	2000	ND	106	90-110	0.9	20	
Batch: W1I1726 - SM 2540C										
Blank (W1I1726-BLK1)				**Prepared & Analyzed: 09/27/21**						
Total Dissolved Solids	ND	10	mg/l							
LCS (W1I1726-BS1)				**Prepared & Analyzed: 09/27/21**						
Total Dissolved Solids	810	10	mg/l	824		98	96-102			
Duplicate (W1I1726-DUP1)	**Source: 1F08004-02**			**Prepared & Analyzed: 09/27/21**						
Total Dissolved Solids	2200	10	mg/l		2150			3	10	
Duplicate (W1I1726-DUP2)	**Source: 1F08004-03**			**Prepared & Analyzed: 09/27/21**						
Total Dissolved Solids	1760	10	mg/l		1720			2	10	

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Notes and Definitions

Item	Definition
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

Weck Laboratories
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1I21015

CHAIN OF CUSTODY FORM

Page 1 of 1

Client Name/Address: PSOMAS 3 HUTTON CENTRE DRIVE, SUITE 200 SANTA ANA, CA 92707	Project/PO Number: 2KLE010102
Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)	Phone Number: (714) 328-5234
Sampler: Jim Burton, Todd Bear	Fax Number: 714.545.8883

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Nitrate-N EPA Method 300.0	Orthophosphae-OPO4 EPA Method 365.3	Total Dissolved Solids SM2540C	Total Kjeldahl Nitrogenby EPA Method 351.2	NO2+NO3 as N - EPA Method 353.2	Total Nitrogen by calculation	Special Instructions
LS-DP-8	water	60 ml Poly	1	9/20/21	10:20am	None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
LS-DP-20	water	60 ml Poly	1	9/20/21	10:45am	None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
	water	60 ml Poly	1			None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
	water	60 ml Poly	1			None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
	water	60 ml Poly	1			None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	

Relinquished By:	Date /Time:	Received by:	Date /Time:
[signature] 1:15pm	9/20/21		
FedEx	9/21/21 918	[signature]	
		Received in Lab by:	

Turnaround Time: (Check)
Same Day ______ 72 Hours ______
24 Hours ______ 5 Days ______
48 Hours ______ Normal X

Sample Integrity: (Check)
Intact ______ On Ice ______

2.7°C T-0270

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders:	1I22034	**Report Date:**	10/08/2021
		Received Date:	9/22/2021
Project:	2KLE010102	**Turnaround Time:**	Normal
		Phones:	(714) 751-7373
		Fax:	(714) 545-8883
Attn:	Michael P. Donovan	**P.O. #:**	
Client:	Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Billing Code:**	

ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH #4047 • LACSD #10143 • NELAP-OR #4047 • NJ-DEP #CA015 • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Michael P. Donovan,

Enclosed are the results of analyses for samples received 9/22/21 with the Chain-of-Custody document. The samples were received in good condition, at 2.1 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

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WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 10/08/2021 16:14

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
SL-DP-4	Jim Burton, Todd Bear	1I22034-01	Water	09/21/21 10:25	
SL-DP-16	Jim Burton, Todd Bear	1I22034-02	Water	09/21/21 10:50	

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Certificate of Analysis

FINAL REPORT

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 10/08/2021 16:14

Sample Results

Sample: SL-DP-4 — 1I22034-01 (Water)

Sampled: 09/21/21 10:25 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1I1452 — **Preparation:** _NONE (LC)		**Prepared:** 09/22/21 10:39				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	09/23/21 03:34	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: *** DEFAULT SPECIFIC METHOD ***		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 09/23/21 13:21				**Analyst:** YMT
Nitrogen, Total	ND	0.10	mg/l	1	09/23/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1I1348 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/22/21 18:00				**Analyst:** YMT
TKN	ND	0.10	mg/l	1	09/23/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1I1560 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/23/21 13:21				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	09/23/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1I1482 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/22/21 15:17				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	09/22/21 16:00	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1I1768 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/27/21 16:27				**Analyst:** blg
Total Dissolved Solids	ND	10	mg/l	1	09/28/21	

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Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Project Number:** 2KLE010102 **Project Manager:** Michael P. Donovan	**Reported:** 10/08/2021 16:14

Sample Results

(Continued)

Sample: SL-DP-16 — 1I22034-02 (Water) — Sampled: 09/21/21 10:50 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0 — **Instr:** LC12						
Batch ID: W1I1452 — **Preparation:** _NONE (LC) — **Prepared:** 09/22/21 10:39 — **Analyst:** jan						
Nitrate as N	ND	110	ug/l	1	09/23/21 04:28	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: *** DEFAULT SPECIFIC METHOD *** — **Instr:** [CALC]						
Batch ID: [CALC] — **Preparation:** [CALC] — **Prepared:** 09/23/21 13:21 — **Analyst:** YMT						
Nitrogen, Total	ND	0.10	mg/l	1	09/23/21	
Method: EPA 351.2 — **Instr:** AA06						
Batch ID: W1I1348 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 09/22/21 18:00 — **Analyst:** YMT						
TKN	ND	0.10	mg/l	1	09/23/21	
Method: EPA 353.2 — **Instr:** AA01						
Batch ID: W1I1560 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 09/23/21 13:21 — **Analyst:** ism						
NO2+NO3 as N	ND	200	ug/l	1	09/23/21	
Method: EPA 365.3 — **Instr:** UVVIS04						
Batch ID: W1I1482 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 09/22/21 15:17 — **Analyst:** sbn						
o-Phosphate as P	ND	0.010	mg/l	1	09/22/21 16:03	
Method: SM 2540C — **Instr:** OVEN01						
Batch ID: W1I1768 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 09/27/21 16:27 — **Analyst:** blg						
Total Dissolved Solids	**42**	10	mg/l	1	09/28/21	

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Certificate of Analysis

FINAL REPORT

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 10/08/2021 16:14

Quality Control Results

Anions by IC, EPA Method 300.0

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1I1452 - EPA 300.0										
Blank (W1I1452-BLK1)				**Prepared & Analyzed: 09/22/21**						
Nitrate as N	ND	110	ug/l							
LCS (W1I1452-BS1)				**Prepared & Analyzed: 09/22/21**						
Nitrate as N	2040	110	ug/l	2000		102	90-110			
Matrix Spike (W1I1452-MS1)	**Source: 1I10015-01**			**Prepared: 09/22/21**	**Analyzed: 09/23/21**					
Nitrate as N	22800	1100	ug/l	20000	2570	101	84-115			
Matrix Spike (W1I1452-MS2)	**Source: 1I20080-01**			**Prepared: 09/22/21**	**Analyzed: 09/23/21**					
Nitrate as N	26000	1100	ug/l	20000	5940	100	84-115			
Matrix Spike Dup (W1I1452-MSD1)	**Source: 1I10015-01**			**Prepared: 09/22/21**	**Analyzed: 09/23/21**					
Nitrate as N	22900	1100	ug/l	20000	2570	102	84-115	0.5	20	
Matrix Spike Dup (W1I1452-MSD2)	**Source: 1I20080-01**			**Prepared: 09/22/21**	**Analyzed: 09/23/21**					
Nitrate as N	25900	1100	ug/l	20000	5940	100	84-115	0.3	20	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1I1348 - EPA 351.2										
Blank (W1I1348-BLK1)				**Prepared: 09/22/21**	**Analyzed: 09/23/21**					
TKN	ND	0.10	mg/l							
Blank (W1I1348-BLK2)				**Prepared: 09/22/21**	**Analyzed: 09/23/21**					
TKN	ND	0.10	mg/l							
LCS (W1I1348-BS1)				**Prepared: 09/22/21**	**Analyzed: 09/23/21**					
TKN	0.981	0.10	mg/l	1.00		98	90-110			
LCS (W1I1348-BS2)				**Prepared: 09/22/21**	**Analyzed: 09/23/21**					
TKN	0.934	0.10	mg/l	1.00		93	90-110			
Matrix Spike (W1I1348-MS1)	**Source: 1I21027-01**			**Prepared: 09/22/21**	**Analyzed: 09/23/21**					
TKN	1.23	0.10	mg/l	1.00	0.246	99	90-110			
Matrix Spike (W1I1348-MS2)	**Source: 1I21027-02**			**Prepared: 09/22/21**	**Analyzed: 09/23/21**					
TKN	1.10	0.10	mg/l	1.00	0.152	95	90-110			
Matrix Spike Dup (W1I1348-MSD1)	**Source: 1I21027-01**			**Prepared: 09/22/21**	**Analyzed: 09/23/21**					
TKN	1.19	0.10	mg/l	1.00	0.246	94	90-110	4	10	
Matrix Spike Dup (W1I1348-MSD2)	**Source: 1I21027-02**			**Prepared: 09/22/21**	**Analyzed: 09/23/21**					
TKN	1.11	0.10	mg/l	1.00	0.152	96	90-110	0.6	10	
Batch: W1I1482 - EPA 365.3										
Blank (W1I1482-BLK1)				**Prepared & Analyzed: 09/22/21**						
o-Phosphate as P	ND	0.010	mg/l							
LCS (W1I1482-BS1)				**Prepared & Analyzed: 09/22/21**						
o-Phosphate as P	0.199	0.010	mg/l	0.200		100	88-111			

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Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 10/08/2021 16:14

Quality Control Results

(Continued)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1I1482 - EPA 365.3 (Continued)										
Matrix Spike (W1I1482-MS1)	**Source: 1I22034-01**			**Prepared & Analyzed: 09/22/21**						
o-Phosphate as P	0.196	0.010	mg/l	0.200	ND	98	85-112			
Matrix Spike Dup (W1I1482-MSD1)	**Source: 1I22034-01**			**Prepared & Analyzed: 09/22/21**						
o-Phosphate as P	0.199	0.010	mg/l	0.200	ND	100	85-112	2	20	
Batch: W1I1560 - EPA 353.2										
Blank (W1I1560-BLK1)				**Prepared & Analyzed: 09/23/21**						
NO2+NO3 as N	ND	200	ug/l							
LCS (W1I1560-BS1)				**Prepared & Analyzed: 09/23/21**						
NO2+NO3 as N	1010	200	ug/l	1000		101	90-110			
Matrix Spike (W1I1560-MS1)	**Source: 1I22055-01**			**Prepared & Analyzed: 09/23/21**						
NO2+NO3 as N	4940	200	ug/l	2000	3020	96	90-110			
Matrix Spike (W1I1560-MS2)	**Source: 1I23023-01**			**Prepared & Analyzed: 09/23/21**						
NO2+NO3 as N	2100	200	ug/l	2000	ND	105	90-110			
Matrix Spike Dup (W1I1560-MSD1)	**Source: 1I22055-01**			**Prepared & Analyzed: 09/23/21**						
NO2+NO3 as N	4950	200	ug/l	2000	3020	96	90-110	0.2	20	
Matrix Spike Dup (W1I1560-MSD2)	**Source: 1I23023-01**			**Prepared & Analyzed: 09/23/21**						
NO2+NO3 as N	2120	200	ug/l	2000	ND	106	90-110	0.9	20	
Batch: W1I1768 - SM 2540C										
Blank (W1I1768-BLK1)				**Prepared: 09/27/21 Analyzed: 09/28/21**						
Total Dissolved Solids	ND	10	mg/l							
LCS (W1I1768-BS1)				**Prepared: 09/27/21 Analyzed: 09/28/21**						
Total Dissolved Solids	814	10	mg/l	824		99	96-102			
Duplicate (W1I1768-DUP1)	**Source: 1I21059-01**			**Prepared: 09/27/21 Analyzed: 09/28/21**						
Total Dissolved Solids	890	10	mg/l		916			3	10	
Duplicate (W1I1768-DUP2)	**Source: 1I21094-01**			**Prepared: 09/27/21 Analyzed: 09/28/21**						
Total Dissolved Solids	1880	10	mg/l		1880			0.1	10	

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Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 10/08/2021 16:14

Notes and Definitions

Item	Definition
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

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CHAIN OF CUSTODY FORM

1I22034

Page 1 of 1

Client Name/Address:	Project/PO Number:
PSOMAS 3 HUTTON CENTRE DRIVE, SUITE 200 SANTA ANA, CA 92707	2KLE010102
Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)	Phone Number: (714) 328-5234
Sampler: Jim Burton, Todd Bear	Fax Number: 714.545.8883

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Nitrate-N EPA Method 300.0	Orthophosphae-OPO4 EPA Method 365.3	Total Dissolved Solids SM2540C	Total Kjeldahl Nitrogenby EPA Method 351.2	NO2+NO3 as N - EPA Method 353.2	Total Nitrogen by calculation	Special Instructions
DP-4	water	60 ml Poly	1	9/21/21	10:25am	None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
SL-DP-16	water	60 ml Poly	1	9/21/21	10:50am	None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
	water	60 ml Poly	1			None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
	water	60 ml Poly	1			None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	
	water	60 ml Poly	1			None	X						
	water	250 ml Poly	1			None		X					Filtered with 0.45µ
	water	500 ml Poly	1			None			X				
	water	250 ml Poly	1			H2SO4				X	X	X	

Relinquished By:	Date /Time:	Received by:	Date /Time:
[signature]	9/21/21 1:30 pm		
Fedex	9/22/21	[signature]	11:04
		Received in Lab by:	

Turnaround Time: (Check)
Same Day ____ 72 Hours ____
24 Hours ____ 5 Days ____
48 Hours ____ Normal X

Sample Integrity: (Check)
Intact ____ On ice ____

2.1° T0254

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders:	1I23020	**Report Date:**	10/08/2021
		Received Date:	9/23/2021
Project:	2KLE010102	**Turnaround Time:**	Normal
		Phones:	(714) 751-7373
		Fax:	(714) 545-8883
Attn:	Michael P. Donovan	**P.O. #:**	
Client:	Psomas - Santa Ana, CA 3 Hutton Centre Dr., Ste. 200 Santa Ana, CA 92707	**Billing Code:**	

ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH #4047 • LACSD #10143 • NELAP-OR #4047 • NJ-DEP #CA015 • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Michael P. Donovan,

Enclosed are the results of analyses for samples received 9/23/21 with the Chain-of-Custody document. The samples were received in good condition, at 4.3 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

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FINAL REPORT

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 10/08/2021 16:16

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
BC-BLW-PH6	Jim Burton, Todd Bear	1I23020-01	Water	09/22/21 07:45	
BC-BLW-PH5	Jim Burton, Todd Bear	1I23020-02	Water	09/22/21 08:15	
BC-BLW-PH4	Jim Burton, Todd Bear	1I23020-03	Water	09/22/21 08:45	
BC-BLW-PH3	Jim Burton, Todd Bear	1I23020-04	Water	09/22/21 09:30	
BC-BLW-PH2	Jim Burton, Todd Bear	1I23020-05	Water	09/22/21 10:00	
BC-BLW-LS	Jim Burton, Todd Bear	1I23020-06	Water	09/22/21 10:20	
BC-NF-1	Jim Burton, Todd Bear	1I23020-07	Water	09/22/21 10:55	
BC-BLW-SL	Jim Burton, Todd Bear	1I23020-08	Water	09/22/21 11:45	

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FINAL REPORT

WECK LABORATORIES, INC.

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 10/08/2021 16:16

Sample Results

Sample: BC-BLW-PH6 — Sampled: 09/22/21 7:45 by Jim Burton, Todd Bear

1I23020-01 (Water)

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1I1524 — **Preparation:** _NONE (LC)		**Prepared:** 09/23/21 09:42				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	09/23/21 17:02	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: *** DEFAULT SPECIFIC METHOD ***		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 09/23/21 16:31				**Analyst:** SBN
Nitrogen, Total	ND	0.10	mg/l	1	09/29/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1I1543 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/23/21 11:44				**Analyst:** SBN
TKN	ND	0.10	mg/l	1	09/29/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1I1581 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/23/21 16:31				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	09/23/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1I1578 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/23/21 16:13				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	09/23/21 17:38	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1I1835 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/28/21 10:46				**Analyst:** blg
Total Dissolved Solids	**35**	10	mg/l	1	09/29/21	

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Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 10/08/2021 16:16

Sample Results

(Continued)

Sample: BC-BLW-PH5 — 1I23020-02 (Water) — Sampled: 09/22/21 8:15 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0 — **Instr:** LC12						
Batch ID: W1I1524 — **Preparation:** _NONE (LC) — **Prepared:** 09/23/21 09:42 — **Analyst:** jan						
Nitrate as N	ND	110	ug/l	1	09/23/21 17:20	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: *** DEFAULT SPECIFIC METHOD *** — **Instr:** [CALC]						
Batch ID: [CALC] — **Preparation:** [CALC] — **Prepared:** 09/23/21 16:31 — **Analyst:** SBN						
Nitrogen, Total	ND	0.10	mg/l	1	09/29/21	
Method: EPA 351.2 — **Instr:** AA06						
Batch ID: W1I1543 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 09/23/21 11:44 — **Analyst:** SBN						
TKN	ND	0.10	mg/l	1	09/29/21	
Method: EPA 353.2 — **Instr:** AA01						
Batch ID: W1I1581 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 09/23/21 16:31 — **Analyst:** ism						
NO2+NO3 as N	ND	200	ug/l	1	09/23/21	
Method: EPA 365.3 — **Instr:** UVVIS04						
Batch ID: W1I1578 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 09/23/21 16:13 — **Analyst:** sbn						
o-Phosphate as P	ND	0.010	mg/l	1	09/23/21 17:39	
Method: SM 2540C — **Instr:** OVEN01						
Batch ID: W1I1835 — **Preparation:** _NONE (WETCHEM) — **Prepared:** 09/28/21 10:46 — **Analyst:** blg						
Total Dissolved Solids	**19**	10	mg/l	1	09/29/21	

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Project Number: 2KLE010102
Project Manager: Michael P. Donovan

Reported: 10/08/2021 16:16

Sample Results

(Continued)

Sample: BC-BLW-PH4
1I23020-03 (Water)

Sampled: 09/22/21 8:45 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1I1524 **Preparation:** _NONE (LC)		**Prepared:** 09/23/21 09:42				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	09/23/21 17:38	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: *** DEFAULT SPECIFIC METHOD ***		**Instr:** [CALC]				
Batch ID: [CALC] **Preparation:** [CALC]		**Prepared:** 09/23/21 16:31				**Analyst:** SBN
Nitrogen, Total	ND	0.10	mg/l	1	09/29/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1I1543 **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/23/21 11:44				**Analyst:** SBN
TKN	ND	0.10	mg/l	1	09/29/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1I1581 **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/23/21 16:31				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	09/23/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1I1578 **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/23/21 16:13				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	09/23/21 17:39	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1I1835 **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/28/21 10:46				**Analyst:** blg
Total Dissolved Solids	**35**	10	mg/l	1	09/29/21	

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Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 10/08/2021 16:16

Sample Results

(Continued)

Sample: BC-BLW-PH3 — 1I23020-04 (Water)

Sampled: 09/22/21 9:30 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1I1524 — **Preparation:** _NONE (LC)		**Prepared:** 09/23/21 09:42				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	09/23/21 17:56	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: *** DEFAULT SPECIFIC METHOD ***		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 09/28/21 18:30				**Analyst:** YMT
Nitrogen, Total	ND	0.10	mg/l	1	09/30/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1I1732 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/28/21 18:30				**Analyst:** YMT
TKN	ND	0.10	mg/l	1	09/30/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1I1581 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/23/21 16:31				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	09/23/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1I1578 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/23/21 16:13				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	09/23/21 17:40	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1I1835 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/28/21 10:46				**Analyst:** blg
Total Dissolved Solids	**40**	10	mg/l	1	09/29/21	

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Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 10/08/2021 16:16

Sample Results

(Continued)

Sample: BC-BLW-PH2
1I23020-05 (Water)

Sampled: 09/22/21 10:00 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1I1524 **Preparation:** _NONE (LC)		**Prepared:** 09/23/21 09:42				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	09/23/21 18:14	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: *** DEFAULT SPECIFIC METHOD ***		**Instr:** [CALC]				
Batch ID: [CALC] **Preparation:** [CALC]		**Prepared:** 09/28/21 18:30				**Analyst:** YMT
Nitrogen, Total	ND	0.10	mg/l	1	09/30/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1I1732 **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/28/21 18:30				**Analyst:** YMT
TKN	ND	0.10	mg/l	1	09/30/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1I1581 **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/23/21 16:31				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	09/23/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1I1578 **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/23/21 16:13				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	09/23/21 17:41	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1I1835 **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/28/21 10:46				**Analyst:** blg
Total Dissolved Solids	**31**	10	mg/l	1	09/29/21	

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 10/08/2021 16:16

Sample Results

(Continued)

Sample: BC-BLW-LS — 1I23020-06 (Water) — Sampled: 09/22/21 10:20 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1I1524 — **Preparation:** _NONE (LC)		**Prepared:** 09/23/21 09:42				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	09/23/21 18:32	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: *** DEFAULT SPECIFIC METHOD ***		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 09/28/21 18:30				**Analyst:** YMT
Nitrogen, Total	**0.11**	0.10	mg/l	1	09/30/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1I1732 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/28/21 18:30				**Analyst:** YMT
TKN	**0.11**	0.10	mg/l	1	09/30/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1I1581 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/23/21 16:31				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	09/23/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1I1578 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/23/21 16:13				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	09/23/21 17:42	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1I1835 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/28/21 10:46				**Analyst:** blg
Total Dissolved Solids	**23**	10	mg/l	1	09/29/21	

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Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 10/08/2021 16:16

Sample Results

(Continued)

Sample: BC-NF-1 — 1I23020-07 (Water)

Sampled: 09/22/21 10:55 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1I1524 — **Preparation:** _NONE (LC)		**Prepared:** 09/23/21 09:42				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	09/23/21 18:50	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: *** DEFAULT SPECIFIC METHOD ***		**Instr:** [CALC]				
Batch ID: [CALC] — **Preparation:** [CALC]		**Prepared:** 09/28/21 18:30				**Analyst:** YMT
Nitrogen, Total	**0.17**	0.10	mg/l	1	09/30/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1I1732 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/28/21 18:30				**Analyst:** YMT
TKN	**0.17**	0.10	mg/l	1	09/30/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1I1581 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/23/21 16:31				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	09/23/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1I1578 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/23/21 16:13				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	09/23/21 17:43	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1I1835 — **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/28/21 10:46				**Analyst:** blg
Total Dissolved Solids	**28**	10	mg/l	1	09/29/21	

Certificate of Analysis

FINAL REPORT

WECK LABORATORIES, INC.

Psomas - Santa Ana, CA
3 Hutton Centre Dr., Ste. 200
Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported:
10/08/2021 16:16

Sample Results

(Continued)

Sample: BC-BLW-SL — 1I23020-08 (Water)

Sampled: 09/22/21 11:45 by Jim Burton, Todd Bear

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Anions by IC, EPA Method 300.0						
Method: EPA 300.0		**Instr:** LC12				
Batch ID: W1I1524 **Preparation:** _NONE (LC)		**Prepared:** 09/23/21 09:42				**Analyst:** jan
Nitrate as N	ND	110	ug/l	1	09/23/21 19:44	
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods						
Method: *** DEFAULT SPECIFIC METHOD ***		**Instr:** [CALC]				
Batch ID: [CALC] **Preparation:** [CALC]		**Prepared:** 09/28/21 18:30				**Analyst:** YMT
Nitrogen, Total	**0.37**	0.10	mg/l	1	09/30/21	
Method: EPA 351.2		**Instr:** AA06				
Batch ID: W1I1732 **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/28/21 18:30				**Analyst:** YMT
TKN	**0.37**	0.10	mg/l	1	09/30/21	
Method: EPA 353.2		**Instr:** AA01				
Batch ID: W1I1581 **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/23/21 16:31				**Analyst:** ism
NO2+NO3 as N	ND	200	ug/l	1	09/23/21	
Method: EPA 365.3		**Instr:** UVVIS04				
Batch ID: W1I1578 **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/23/21 16:13				**Analyst:** sbn
o-Phosphate as P	ND	0.010	mg/l	1	09/23/21 17:43	
Method: SM 2540C		**Instr:** OVEN01				
Batch ID: W1I1835 **Preparation:** _NONE (WETCHEM)		**Prepared:** 09/28/21 10:46				**Analyst:** blg
Total Dissolved Solids	**29**	10	mg/l	1	09/29/21	

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Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 10/08/2021 16:16

Quality Control Results

Anions by IC, EPA Method 300.0

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1I1524 - EPA 300.0										
Blank (W1I1524-BLK1)				**Prepared & Analyzed: 09/23/21**						
Nitrate as N	ND	110	ug/l							
LCS (W1I1524-BS1)				**Prepared & Analyzed: 09/23/21**						
Nitrate as N	2020	110	ug/l	2000		101	90-110			
Matrix Spike (W1I1524-MS1)	**Source: 1I17004-02**			**Prepared & Analyzed: 09/23/21**						
Nitrate as N	29200	1100	ug/l	20000	8630	103	84-115			
Matrix Spike (W1I1524-MS2)	**Source: 1I20070-01**			**Prepared & Analyzed: 09/23/21**						
Nitrate as N	20300	1100	ug/l	20000	406	100	84-115			
Matrix Spike Dup (W1I1524-MSD1)	**Source: 1I17004-02**			**Prepared & Analyzed: 09/23/21**						
Nitrate as N	29100	1100	ug/l	20000	8630	103	84-115	0.3	20	
Matrix Spike Dup (W1I1524-MSD2)	**Source: 1I20070-01**			**Prepared & Analyzed: 09/23/21**						
Nitrate as N	20200	1100	ug/l	20000	406	99	84-115	0.4	20	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1I1543 - EPA 351.2										
Blank (W1I1543-BLK1)				**Prepared: 09/23/21 Analyzed: 09/29/21**						
TKN	ND	0.10	mg/l							
Blank (W1I1543-BLK2)				**Prepared: 09/23/21 Analyzed: 09/29/21**						
TKN	ND	0.10	mg/l							
Blank (W1I1543-BLK3)				**Prepared: 09/23/21 Analyzed: 10/06/21**						
TKN	ND	0.10	mg/l							
LCS (W1I1543-BS1)				**Prepared: 09/23/21 Analyzed: 09/29/21**						
TKN	1.10	0.10	mg/l	1.00		110	90-110			
LCS (W1I1543-BS2)				**Prepared: 09/23/21 Analyzed: 09/29/21**						
TKN	1.10	0.10	mg/l	1.00		110	90-110			
LCS (W1I1543-BS3)				**Prepared: 09/23/21 Analyzed: 10/06/21**						
TKN	1.03	0.10	mg/l	1.00		103	90-110			
Matrix Spike (W1I1543-MS1)	**Source: 1I22090-16**			**Prepared: 09/23/21 Analyzed: 09/29/21**						
TKN	1.02	0.10	mg/l	1.00	ND	102	90-110			
Matrix Spike (W1I1543-MS2)	**Source: 1I23020-02**			**Prepared: 09/23/21 Analyzed: 09/29/21**						
TKN	1.17	0.10	mg/l	1.00	ND	117	90-110			MS-01
Matrix Spike (W1I1543-MS3)	**Source: 1I23020-02RE1**			**Prepared: 09/23/21 Analyzed: 10/06/21**						
TKN	1.06	0.10	mg/l	1.00	0.0654	99	90-110			
Matrix Spike Dup (W1I1543-MSD1)	**Source: 1I22090-16**			**Prepared: 09/23/21 Analyzed: 09/29/21**						
TKN	1.01	0.10	mg/l	1.00	ND	101	90-110	0.8	10	
Matrix Spike Dup (W1I1543-MSD2)	**Source: 1I23020-02**			**Prepared: 09/23/21 Analyzed: 09/29/21**						

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Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 10/08/2021 16:16

Quality Control Results

(Continued)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1I1543 - EPA 351.2 (Continued)										
Matrix Spike Dup (W1I1543-MSD2)	**Source: 1I23020-02**			**Prepared: 09/23/21**	**Analyzed: 09/29/21**					
TKN	1.14	0.10	mg/l	1.00	ND	114	90-110	3	10	MS-01
Matrix Spike Dup (W1I1543-MSD3)	**Source: 1I23020-02RE1**			**Prepared: 09/23/21**	**Analyzed: 10/06/21**					
TKN	1.17	0.10	mg/l	1.00	0.0654	110	90-110	10	10	
Batch: W1I1578 - EPA 365.3										
Blank (W1I1578-BLK1)				**Prepared & Analyzed: 09/23/21**						
o-Phosphate as P	ND	0.010	mg/l							
LCS (W1I1578-BS1)				**Prepared & Analyzed: 09/23/21**						
o-Phosphate as P	0.210	0.010	mg/l	0.200		105	88-111			
Matrix Spike (W1I1578-MS1)	**Source: 1I22090-01**			**Prepared & Analyzed: 09/23/21**						
o-Phosphate as P	0.233	0.010	mg/l	0.200	0.0310	101	85-112			
Matrix Spike Dup (W1I1578-MSD1)	**Source: 1I22090-01**			**Prepared & Analyzed: 09/23/21**						
o-Phosphate as P	0.232	0.010	mg/l	0.200	0.0310	100	85-112	0.4	20	
Batch: W1I1581 - EPA 353.2										
Blank (W1I1581-BLK1)				**Prepared & Analyzed: 09/23/21**						
NO2+NO3 as N	ND	200	ug/l							
LCS (W1I1581-BS1)				**Prepared & Analyzed: 09/23/21**						
NO2+NO3 as N	1020	200	ug/l	1000		102	90-110			
Matrix Spike (W1I1581-MS1)	**Source: 1I01005-01**			**Prepared & Analyzed: 09/23/21**						
NO2+NO3 as N	4950	200	ug/l	2000	2910	102	90-110			
Matrix Spike Dup (W1I1581-MSD1)	**Source: 1I01005-01**			**Prepared & Analyzed: 09/23/21**						
NO2+NO3 as N	4980	200	ug/l	2000	2910	104	90-110	0.6	20	
Batch: W1I1732 - EPA 351.2										
Blank (W1I1732-BLK1)				**Prepared: 09/28/21**	**Analyzed: 09/30/21**					
TKN	ND	0.10	mg/l							
Blank (W1I1732-BLK2)				**Prepared: 09/28/21**	**Analyzed: 09/30/21**					
TKN	ND	0.10	mg/l							
LCS (W1I1732-BS1)				**Prepared: 09/28/21**	**Analyzed: 09/30/21**					
TKN	1.05	0.10	mg/l	1.00		105	90-110			
LCS (W1I1732-BS2)				**Prepared: 09/28/21**	**Analyzed: 09/30/21**					
TKN	1.02	0.10	mg/l	1.00		102	90-110			
Matrix Spike (W1I1732-MS1)	**Source: 1I23020-04**			**Prepared: 09/28/21**	**Analyzed: 09/30/21**					
TKN	1.07	0.10	mg/l	1.00	0.0765	99	90-110			
Matrix Spike (W1I1732-MS2)	**Source: 1I23020-05**			**Prepared: 09/28/21**	**Analyzed: 09/30/21**					
TKN	1.04	0.10	mg/l	1.00	0.0897	95	90-110			
Matrix Spike Dup (W1I1732-MSD1)	**Source: 1I23020-04**			**Prepared: 09/28/21**	**Analyzed: 09/30/21**					
TKN	1.07	0.10	mg/l	1.00	0.0765	99	90-110	0.1	10	
Matrix Spike Dup (W1I1732-MSD2)	**Source: 1I23020-05**			**Prepared: 09/28/21**	**Analyzed: 09/30/21**					

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Project Number: 2KLE010102

Project Manager: Michael P. Donovan

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Quality Control Results

(Continued)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods (Continued)

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W1I1732 - EPA 351.2 (Continued)										
Matrix Spike Dup (W1I1732-MSD2)	**Source: 1I23020-05**			**Prepared: 09/28/21**	**Analyzed: 09/30/21**					
TKN	1.07	0.10	mg/l	1.00	0.0897	98	90-110	3	10	
Batch: W1I1835 - SM 2540C										
Blank (W1I1835-BLK1)				**Prepared: 09/28/21**	**Analyzed: 09/29/21**					
Total Dissolved Solids	ND	10	mg/l							
LCS (W1I1835-BS1)				**Prepared: 09/28/21**	**Analyzed: 09/29/21**					
Total Dissolved Solids	829	10	mg/l	824		101	96-102			
Duplicate (W1I1835-DUP1)	**Source: 1I22043-01**			**Prepared: 09/28/21**	**Analyzed: 09/29/21**					
Total Dissolved Solids	2760	10	mg/l		2880			4	10	
Duplicate (W1I1835-DUP2)	**Source: 1I22095-01**			**Prepared: 09/28/21**	**Analyzed: 09/29/21**					
Total Dissolved Solids	1060	10	mg/l		1040			2	10	

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Santa Ana, CA 92707

Project Number: 2KLE010102

Project Manager: Michael P. Donovan

Reported: 10/08/2021 16:16

Notes and Definitions

Item	Definition
MS-01	The spike recovery for this QC sample is outside of established control limits possibly due to sample matrix interference.
%REC	Percent Recovery
Dil	Dilution
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

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1I23020

CHAIN OF CUSTODY FORM

Client Name/Address: PSOMAS, 3 HUTTON CENTRE DRIVE, SUITE 200, SANTA ANA, CA 92707

Project/PO Number: 2KLE010102

Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)

Phone Number: (714) 328-5234

Sampler: Jim Burton, Todd Bear

Fax Number: 714.545.8883

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Nitrate-N EPA Method 300.0	Orthophosphae-OPO4 EPA Method 365.3	Total Dissolved Solids SM2540C	Total Kjeldahl Nitrogenby EPA Method 351.2	NO2+NO3 as N - EPA Method 353.2	Total Nitrogen by calculation						Special Instructions
BC-b\w-PH6	water	60 ml Poly	1	9/22/21	7:45am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
BC-b\w-PH5	water	60 ml Poly	1	9/22/21	8:15am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
BC-b\w-PH4	water	60 ml Poly	1	9/22/21	8:45am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
BC-b\w-PH3	water	60 ml Poly	1	9/22/21	9:30am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
BC-b\w-PH2	water	60 ml Poly	1	9/22/21	10:00am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						

Relinquished By:	Date /Time:	Received by:	Date /Time:
	9/22/21 13:30		
FedEx	9/23/21 1015		
		Received in Lab by:	

Turnaround Time: (Check)
Same Day ____ 72 Hours ____
24 Hours ____ 5 Days ____
48 Hours ____ Normal X

Sample Integrity: (Check)
Intact ____ On Ice 4.3°
T-0354

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1I23020

CHAIN OF CUSTODY FORM

Client Name/Address:	Project/PO Number:
PSOMAS 3 HUTTON CENTRE DRIVE, SUITE 200 SANTA ANA, CA 92707	2KLE010102
Project Manager: MICHAEL P. DONOVAN (mpdonovn@cox.net)	Phone Number: (714) 328-5234
Sampler: Jim Burton, Todd Bear	Fax Number: 714.545.8883

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Time	Preservation	Nitrate-N EPA Method 300.0	Orthophosphae-OPO4 EPA Method 365.3	Total Dissolved Solids SM2540C	Total Kjeldahl Nitrogenby EPA Method 351.2	NO2+NO3 as N - EPA Method 353.2	Total Nitrogen by calculation						Special Instructions
BC-blw-LS	water	60 ml Poly	1	9/22/21	10:20	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
BC-NF-1	water	60 ml Poly	1	9/22/21	10:55am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
BC-blw-SL	water	60 ml Poly	1	9/22/21	11:45am	None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
	water	60 ml Poly	1			None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						
	water	60 ml Poly	1			None	X											
	water	250 ml Poly	1			None		X										Filtered with 0.45µ
	water	500 ml Poly	1			None			X									
	water	250 ml Poly	1			H2SO4				X	X	X						

Relinquished By:	Date /Time:	Received by:	Date /Time:	
	9/22/21 13:30			Turnaround Time: (Check) Same Day ____ 72 Hours ____ 24 Hours ____ 5 Days ____
FedEx	9/23/21 1015			48 Hours ____ Normal X
		Received in Lab by:		Sample Integrity: (Check) Intact ____ On Ice 4.3°c

T-0254

LUMINULTRA

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ilac-MRA

A2LA ACCREDITED CERT # 4126.01

Fecal Host

Fecal Host Quantification ID Test Results Report

Detection and quantification of the fecal host associated gene biomarker by quantitative Polymerase Chain Reaction (qPCR) DNA analytical technology

ND: Not Det DNQ: Detected, Not Quantifiable ROQ: Detected, Quantifiable

Submitter: Psomas
Report Generated: December 22, 2021

SM #	Sample ID	Date Collected	Time Collected	Analysis Requested	Ct, Rep1	Ct, Rep2	Marker Quantified	Results Qualifier	LOD (Limit of detection)	LOQ (Limit of Quantification)	Result Unit
SM21L13019	LS-BR-1	7/26/2021	12:40 PM	Human_HF183	ND	ND	0.00E+00	ND	1.50E+02	5.00E+02	copies per 100ml
SM21L13020	LS-BR-1	7/29/2021	12:10 PM	Human_HF183	ND	ND	0.00E+00	ND	1.50E+02	5.00E+02	copies per 100ml
SM21L13021	INT2-RES-1	7/29/2021	12:20 PM	Human_HF183	ND	ND	0.00E+00	ND	1.50E+02	5.00E+02	copies per 100ml

Reported Results Authorized By: Anda Quintero, Quality Manager

Results reported herein apply only to the sample matrices as received.
Results reported herein relate to the genetic material extracted from the sample matrix processed and included in the analysis.

Revision 2.2
Effective Date: 11/11/2021

LUMINULTRA

15280 NW 79th Court, Suite 107 Miami Lakes, Florida 33016

ilac-MRA a2LA ACCREDITED CERT# 4126.01

Fecal Host Quantification ID Test Results Report

Sample Processing and Analysis Information

Submitter: Psomas
Report Generated: December 22, 2021

SM #	Sample ID	Analysis Requested	Sample Type	Processed Date	Extraction Date	Analysis Date	Amount Processed	Amount Processed Unit	Extracted DNA/RNA Volume (ul)	PCR Input Volume (ul)	PCR Plate ID	Sample Comments
SM21L13019	LS-BR-1	Human_HF183	Water	7/28/2021	12/20/2021	12/20/2021	100	ml	100	2	20211220_q01	
SM21L13020	LS-BR-1	Human_HF183	Water	8/2/2021	12/20/2021	12/20/2021	100	ml	100	2	20211220_q01	
SM21L13021	INT2-RES-1	Human_HF183	Water	8/2/2021	12/20/2021	12/20/2021	100	ml	100	2	20211220_q01	

Reported Results Authorized By: Anda Quintero, Quality Manager

Results reported herein apply only to the sample matrices as received.
Results reported herein relate to the genetic material extracted from the sample matrix processed and included in the analysis.

15280 NW 79th Court, Suite 107 Miami Lakes, Florida 33016

Fecal Host Quantification ID Test Results Report

qPCR Analysis QAQC information

Submitter: Psomas
Report Generated: December 22, 2021

Analysis Requested	PCR Plate ID	Y-intercept	Slope	R^2	Efficiency %	NTC1 (no template control)	NTC2 (no template control)	NTC3 (no template control)	Positive control Ct (if applicable)	Comments
Human_HF183	20211220_q01	36.285	-3.361	1	98.395	ND	ND	ND		

Reported Results Authorized By: Anda Quintero, Quality Manager

Results reported herein apply only to the sample matrices as received.
Results reported herein relate to the genetic material extracted from the sample matrix processed and included in the analysis.

Revision 2.2
Effective Date: 11/11/2021

Laboratory Comments

Submitter: Psomas
Report Generated: December 22, 2021

Non-Detect (ND) Results
In sample(s) classified as non-detect, the host-associated fecal gene biomarker(s) was either not detected in test replicates, one replicate was detected at a cycle threshold greater than 35 and the other was not, or one replicate was detected at a cycle threshold less than 35 and the other was not after repeated analysis.

Detected Not Quantified (DNQ) Results
In sample(s) classified as Detected Not Quantified (DNQ), the host-associated fecal biomarker was detected in both test replicates but in quantities below the limit of quantification (LOQ, see below). This result indicates that fecal indicators associated with the respective host was present in the sample(s) but in low concentrations, and the confidence of such quantification will be lower than that declared by the definition of LOQ.

Quantifiable Results (ROQ)
Sample results are within the range of quantification of calibration curves (standard curves) of a validation qPCR method. For most qPCR assays, the range is 1E1 to 1E5 copies/reaction. Copy number measurements reported are relative, not absolute, quantification.

LOD (Limit of Detection, lower)
A general consensus was reached around the definition of the LOD as the lowest amount of analyte, which can be detected with more than a stated percentage of confidence (95%), but, not necessarily quantified as an exact value. It must be noted that LOD is not a limiting value and therefore, that Ct vlaues below the LOD cannot automatically be considered as negative. From the definition of LOD, it is evident that values below LOD are absolutely valid in terms of microornanism prescence. However, the probabality of their repeated detection is lower than 95%.

LOQ (Limit of Quantification, lower)
The LOQ was defined as the smallest amount of analyte, which can be measured and quantified with defined precision and accuracy under the experimental conditions by the method under validation. Numerically, the LOQ is defined as the lowest concentration of analyte, which gives a predefined variability (coeffecient of variation, CV) of under 25%.

Inhibition check
A 1:10 dilution of the original sample is analyzed togther each time with the undiluted sample to evaluate the effect of PCR inhibition. If the sample is inhibited, where 1:10 dilution produces a high signal than undiluted sample, the 1:10 dilution results will be used for quantification. The use of 1:10 dilution sample results will be reflected in Analytical Volume(ul). For example, if the analytical volume for undiluted sample is 2ul, the analytical volume for 1:10 dilution will be 0.2ul.

Fecal Reference Samples
The client is encouraged to submit fecal samples from suspected sources in the surrounding area in order to gain a better understanding of the concentration of the host-associated biomarker with the regional population. A more precise interpretation would be available to the client with the submittal of such baseline samples.

Result Interpretations
The presence of the biomarker does not signify the presence or absence of that form of fecal pollution conclusively. The most reliable way to accurately test for contamination is to combine genetic testing with scientifically sound and adequate study design appropriate for the environmental quality questions to be answered or issues to be resolved.

Additional Testing
A portion of all samples has been frozen and will be archived for 3 months. The client is encouraged to perform additional tests on the sample(s) for other hosts suspected of contributing to the fecal contamination.

Qualitification Assay Results (Detected/Non-Detected only)
Such results are only reported as Detected or Non-Detected without quantification. Non-Detected results are defined as stated above, and Detected results are defined as detected Ct in both replicate qPCR reactions.

DNA Analytical Method Explanation
Water Samples: Each submitted water sample is filtered through 0.45 micron membrane filter(s). Each filter is placed in a separate, sterile 2ml disposable tube containing a unique mix of beads and lysis buffer. The sample is homogenized for and the DNA extracted per kit manufacturer's protocol. Devitations to these procedures may occur at the client's request.

Non-Water Samples: Each non-water sample submitted by the client is processed as per internal laboratory extraction procedures. An extracted DNA sample is proceed directly to PCR analysis. Details available upon request.

Amplifications to detect the target gene biomarker were run in a final reaction volume of 20ul sample extract, forward primer, reverse primer, probe and an optimized buffer. All assays are run in duplicate. Quantification is achieved by extrapolating target gene copy numbers from a standard curve generated from serial dilutions of known gene copy numbers.

For quality control purposes, a positive control and a negative control, were run alongside the sample(s) to ensure a properly functioning reaction and reveal any false negatives or false positives.

APPENDIX C

2021 LAKE VERTICAL PROFILE DATA SHEETS

TABLE C-1

SOUTH LAKE DISSOLVED OXYGEN AND WATER TEMPERATURE PROFILE

Date of Profile: 6/16/2021
Lake Surface Elevation: 9693.20
Outlet Pipe Elevation (ft/msl): 9621

Estimated Barometric Pressure (in Hg) 21.20

Water Surface Elevation (ft msl)	Depth of Measurement: Feet	Depth of Measurement: Meters	Water Temperature (deg C)	Change in Water Temperature (deg C)	Dissolved Oxygen (mg/L)	% O_2 Saturation*	
9693.2	0.0	0	---	---	---	---	
9691.6	1.6	0.5	11.9	---	8.13	115.8%	
9689.9	3.3	1	11.9	0.0	8.10	115.4%	
9686.6	6.6	2	11.8	0.1	8.11	115.5%	
9683.4	9.8	3	11.7	0.1	8.13	115.8%	
9680.1	13.1	4	11.6	0.1	8.14	116.0%	
9676.8	16.4	5	11.6	0.0	8.14	116.0%	
9673.5	19.7	6	11.6	0.0	8.15	116.1%	
9670.2	23.0	7	11.5	0.1	8.16	116.3%	
9667.0	26.2	8	11.4	0.1	8.20	116.8%	
9663.7	29.5	9	11.3	0.1	8.24	117.4%	
9660.4	32.8	10	11.1	0.2	8.27	117.8%	
9657.1	36.1	11	11.0	0.1	8.24	117.4%	
9653.8	39.4	12	10.7	0.3	8.35	105.7%	
9650.5	42.7	13	10.4	0.3	8.40	106.3%	
9647.3	45.9	14	9.7	0.7	8.83	109.1%	
9644.0	49.2	15	9.0	0.7	9.12	112.7%	
9640.7	52.5	16	8.7	0.3	9.40	113.4%	
9637.4	55.8	17	8.0	0.7	9.46	114.1%	
9634.1	59.1	18	7.5	0.5	9.53	112.2%	
9630.9	62.3	19	6.9	0.6	9.52	109.3%	
9627.6	65.6	20	6.3	0.6	9.35	107.3%	
9624.3	68.9	21	5.5	0.8	9.18	102.7%	
9621.0	72.2	22	4.9	0.6	8.91	97.1%	<<Outlet
9617.7	75.5	23	4.6	0.3	8.73	95.2%	
9614.5	78.7	24	4.4	0.2	8.48	92.4%	
9611.2	82.0	25	4.3	0.1	8.30	90.5%	
9607.9	85.3	26	4.2	0.1	8.05	87.7%	
9604.6	88.6	27	4.2	0.0	7.73	84.3%	
9601.3	91.9	28	4.2	0.0	7.40	80.7%	
9598.1	95.1	29	4.2	0.0	7.12	77.6%	
9594.8	98.4	30	4.2	0.0	6.60	71.9%	
9591.5	101.7	31	4.2	0.0	5.72	62.3%	
9588.2	105.0	32	4.3	-0.1	4.54	49.5%	
9584.9	108.3	33	4.3	0.0	3.53	38.5%	
9581.7	111.5	34	4.4	-0.1	2.82	30.7%	
9578.4	114.8	35	4.7	-0.3	0.28	3.1%	
9575.1	118.1	36	5.4	-0.7	0.15	1.7%	

TABLE C-1

SOUTH LAKE DISSOLVED OXYGEN AND WATER TEMPERATURE PROFILE

Date of Profile: 6/16/2021

Lake Surface Elevation: 9693.20

Outlet Pipe Elevation (ft/msl): 9621

Estimated Barometric Pressure (in Hg) 21.20

Water Surface Elevation (ft msl)	Depth of Measurement Feet	Meters	Water Temperature (deg C)	Change in Water Temperature (deg C)	Dissolved Oxygen (mg/L)	% O_2 Saturation*
9571.8	121.4	37	5.6	-0.2	0.04	0.4%
9568.5	124.7	38	5.9	-0.3	0.03	0.3%
9565.2	128.0	39	6.1	-0.2	0.03	0.3%
9562.0	131.2	40	6.1	0.0	0.00	0.0%
9558.7	134.5	41	6.3	-0.2	0.00	0.0%
9555.4	137.8	42	6.6	-0.3	0.00	0.0%
9552.1	141.1	43	6.7	-0.1	0.00	0.0%
9548.8	144.4	44	7.0	-0.3	0.00	0.0%
9545.6	147.6	45	7.1	-0.1	-0.01	-0.1%
9542.3	150.9	46	7.4	-0.3	-0.01	-0.1%
9539.0	154.2	47	7.6	-0.2	-0.02	-0.2%
9535.7	157.5	48	7.7	-0.1	-0.02	-0.2%
9534.1	159.1	48.5	7.7	0.0	-0.03	-0.4%
		Maximum	**11.9**	**---**	**9.53**	**117.8%**
		Minimum	**4.2**	**---**	**-0.03**	**-0.4%**

* - Saturation based on calculated DO saturation at reported water temperature and ambient barometric pressure.

TABLE C-2

SOUTH LAKE DISSOLVED OXYGEN AND WATER TEMPERATURE PROFILE

Date of Profile: 7/27/2021
Lake Surface Elevation: 9676.00
Outlet Pipe Elevation (ft/msl): 9621

Barometric Pressure (in Hg) 21.18

Water Surface Elevation (ft msl)	Depth of Measurement Feet	Depth of Measurement Meters	Water Temperature (deg C)	Change in Water Temperature (deg C)*	Dissolved Oxygen (mg/L)	% O_2 Saturation **	
9676	---	---	---	---	---	---	
9674.4	1.6	0.5	17.4	---	7.31	108.0%	
9672.7	3.3	1	17.4	0.0	7.33	108.3%	
9669.4	6.6	2	17.4	0.0	7.34	108.5%	
9666.2	9.8	3	17.4	0.0	7.34	108.5%	
9662.9	13.1	4	17.3	0.1	7.35	108.6%	
9659.6	16.4	5	17.1	0.2	7.44	110.0%	
9656.3	19.7	6	16.9	0.2	7.48	108.3%	
9653.0	23.0	7	16.8	0.1	7.60	110.0%	
9649.8	26.2	8	16.5	0.3	7.53	109.0%	
9646.5	29.5	9	16.4	0.1	7.57	109.6%	
9643.2	32.8	10	16.1	0.3	7.68	111.2%	
9639.9	36.1	11	16.0	0.1	7.85	113.6%	
9636.6	39.4	12	15.4	0.6	8.13	115.2%	
9633.3	42.7	13	14.8	0.6	8.27	114.6%	
9630.1	45.9	14	14.2	0.6	8.26	114.5%	
9626.8	49.2	15	13.5	0.7	8.16	110.6%	
9625.1	50.9	15.5	11.6	---	8.08	115.1%	
9623.5	52.5	16	10.6	**2.9**	8.27	104.7%	
9621.9	54.1	16.5	8.4	**3.2**	8.64	104.2%	
9620.2	55.8	17	7.1	**3.5**	8.80	103.6%	<<Outlet
9616.9	59.1	18	5.8	**1.3**	8.80	98.4%	
9613.7	62.3	19	5.1	0.7	8.65	96.8%	
9610.4	65.6	20	4.8	0.3	8.40	91.6%	
9607.1	68.9	21	4.7	0.1	8.15	88.8%	
9603.8	72.2	22	4.5	0.2	7.80	85.0%	
9600.5	75.5	23	4.4	0.1	7.42	80.9%	
9597.3	78.7	24	4.4	0.0	6.91	75.3%	
9594.0	82.0	25	4.4	0.0	6.29	68.6%	
9590.7	85.3	26	4.4	0.0	5.32	58.0%	
9587.4	88.6	27	4.4	0.0	4.46	48.6%	
9584.1	91.9	28	4.5	-0.1	2.55	27.8%	
9580.9	95.1	29	4.6	-0.1	1.03	11.2%	
9577.6	98.4	30	4.8	-0.2	0.13	1.4%	
9574.3	101.7	31	5.4	-0.6	0.03	0.3%	
9571.0	105.0	32	5.7	-0.3	0.01	0.1%	

TABLE C-2

SOUTH LAKE DISSOLVED OXYGEN AND WATER TEMPERATURE PROFILE

Date of Profile: 7/27/2021
Lake Surface Elevation: 9676.00
Outlet Pipe Elevation (ft/msl): 9621

Barometric Pressure (in Hg) 21.18

Water Surface Elevation (ft msl)	Depth of Measurement Feet	Depth of Measurement Meters	Water Temperature (deg C)	Change in Water Temperature (deg C)*	Dissolved Oxygen (mg/L)	% O_2 Saturation **
9567.7	108.3	33	5.9	-0.2	0.00	0.0%
9564.5	111.5	34	6.1	-0.2	0.09	1.0%
9561.2	114.8	35	6.3	-0.2	0.06	0.7%
9557.9	118.1	36	6.5	-0.2	0.03	0.3%
9554.6	121.4	37	6.7	-0.2	0.02	0.2%
9551.3	124.7	38	6.9	-0.2	0.01	0.1%
9548.0	128.0	39	7.1	-0.2	-0.01	-0.1%
9544.8	131.2	40	7.3	-0.2	-0.01	-0.1%
9541.5	134.5	41	7.5	-0.2	-0.02	-0.2%
9538.2	137.8	42	7.6	-0.1	-0.02	-0.2%
9534.9	141.1	43	7.7	-0.1	-0.03	-0.4%
9531.6	144.4	44	7.7	0.0	-0.04	-0.5%
9529.0	147.0	44.8	7.8	-0.1	-0.04	-0.5%
		Maximum	**17.4**	---	**8.80**	**115.2%**
		Minimum	**4.4**	---	**-0.04**	**-0.5%**

* - **Bold** values indicate thermocline (1 deg change in one meter).

** - Saturation based on calculated DO saturation at reported water temperature and ambient barometric pressure.

TABLE C-3

SOUTH LAKE DISSOLVED OXYGEN AND WATER TEMPERATURE PROFILE

Date of Profile: 8/23/2021
Lake Surface Elevation: 9664.61
Outlet Pipe Elevation (ft/msl): 9621

Barometric Pressure (in Hg) 20.95

Water Surface Elevation (ft msl)	Depth of Measurement Feet	Depth of Measurement Meters	Water Temperature (deg C)	Change in Water Temperature (deg C)*	Dissolved Oxygen (mg/L)	% O_2 Saturation **	
9664.61	0.0	0	16.1	---	7.47	108.1%	
9663.0	1.6	0.5	16.1	---	7.43	107.5%	
9661.3	3.3	1	16.0	0.1	7.41	107.3%	
9658.0	6.6	2	16.0	0.0	7.40	107.1%	
9654.8	9.8	3	16.0	0.0	7.40	107.1%	
9651.5	13.1	4	16.0	0.0	7.39	107.0%	
9648.2	16.4	5	16.0	0.0	7.39	107.0%	
9644.9	19.7	6	16.0	0.0	7.38	106.8%	
9641.6	23.0	7	16.0	0.0	7.38	106.8%	
9638.4	26.2	8	16.0	0.0	7.38	106.8%	
9635.1	29.5	9	16.0	0.0	7.37	106.7%	
9631.8	32.8	10	15.7	0.3	7.38	104.6%	
9628.5	36.1	11	15.6	0.1	7.36	104.3%	
9625.2	39.4	12	14.2	**1.4**	7.30	101.2%	
9623.6	41.0	12.5	11.8	**2.4**	7.56	107.7%	
9622.0	42.7	13	9.3	**2.5**	8.30	102.6%	
9620.3	44.3	13.5	7.1	**2.2**	8.61	101.3%	<<Outlet
9618.7	45.9	14	6.1	**1.0**	8.57	98.4%	
9617.0	47.6	14.5	5.5	0.6	8.46	94.6%	
9615.4	49.2	15	5.3	0.2	8.31	93.0%	
9612.1	52.5	16	4.8	0.5	8.06	87.8%	
9608.8	55.8	17	4.6	0.2	7.88	85.9%	
9605.6	59.1	18	4.5	0.1	7.55	82.3%	
9602.3	62.3	19	4.5	0.0	7.26	79.1%	
9599.0	65.6	20	4.5	0.0	6.95	75.8%	
9595.7	68.9	21	4.5	0.0	6.30	68.7%	
9592.4	72.2	22	4.5	0.0	5.50	59.9%	
9589.2	75.5	23	4.4	0.1	4.87	53.1%	
9585.9	78.7	24	4.5	-0.1	3.27	35.6%	
9582.6	82.0	25	4.6	-0.1	1.40	15.3%	
9579.3	85.3	26	5.0	-0.4	0.15	1.7%	
9576.0	88.6	27	5.4	-0.4	0.06	0.7%	
9572.7	91.9	28	5.7	-0.3	0.05	0.6%	
9569.5	95.1	29	5.9	-0.2	0.03	0.3%	
9566.2	98.4	30	6.0	-0.1	0.02	0.2%	
9562.9	101.7	31	6.2	-0.2	0.01	0.1%	
9559.6	105.0	32	6.3	-0.1	0.01	0.1%	
9556.3	108.3	33	6.6	-0.3	0.00	0.0%	

TABLE C-3

SOUTH LAKE DISSOLVED OXYGEN AND WATER TEMPERATURE PROFILE

Date of Profile: 8/23/2021
Lake Surface Elevation: 9664.61
Outlet Pipe Elevation (ft/msl): 9621

Barometric Pressure (in Hg) **20.95**

Water Surface Elevation (ft msl)	Depth of Measurement Feet	Meters	Water Temperature (deg C)	Change in Water Temperature (deg C)*	Dissolved Oxygen (mg/L)	% O_2 Saturation **
9553.1	111.5	34	6.9	-0.3	0.00	0.0%
9549.8	114.8	35	7.1	-0.2	0.00	0.0%
9546.5	118.1	36	7.3	-0.2	0.00	0.0%
9543.2	121.4	37	7.5	-0.2	0.00	0.0%
9539.9	124.7	38	7.6	-0.1	0.00	0.0%
9536.7	128.0	39	7.7	-0.1	0.00	0.0%
9534.0	130.6	39.8	7.7	0.0	-0.01	-0.1%
		Maximum	**16.1**	---	**8.61**	**107.7%**
		Minimum	**4.4**	---	**-0.01**	**-0.1%**

* - **Bold** values indicate thermocline (1 deg change in one meter).

** - Saturation based on calculated DO saturation at reported water temperature and ambient barometric pressure.

TABLE C-4

SOUTH LAKE DISSOLVED OXYGEN AND WATER TEMPERATURE PROFILE

Date of Profile: 9/21/2021
Lake Surface Elevation: 9648.37
Outlet Pipe Elevation (ft/msl): 9621

Barometric Pressure (in Hg) 21.25

Water Surface Elevation (ft msl)	Depth of Measurement Feet	Depth of Measurement Meters	Water Temperature (deg C)	Change in Water Temperature (deg C)*	Dissolved Oxygen (mg/L)	% O_2 Saturation **	
9648.37	0.0	0	13.5	---	7.75	---	
9646.7	1.6	0.5	13.3	---	7.70	104.4%	
9645.1	3.3	1	13.3	0.0	7.69	104.3%	
9641.8	6.6	2	13.3	0.0	7.67	104.0%	
9638.5	9.8	3	13.2	0.1	7.67	104.0%	
9635.2	13.1	4	13.2	0.0	7.67	104.0%	
9632.0	16.4	5	13.2	0.0	7.67	104.0%	
9628.7	19.7	6	13.2	0.0	7.66	103.9%	
9625.4	23.0	7	13.1	0.1	7.65	103.7%	
9622.1	26.2	8	12.3	0.8	7.83	103.8%	
9620.5	27.9	8.5	11.1	---	8.15	116.1%	<<Outlet
9619.7	28.7	8.75	9.6	---	8.71	107.6%	
9618.8	29.5	9	8.4	**3.9**	8.91	107.5%	
9618.0	30.3	9.25	7.4	---	8.94	105.2%	
9617.2	31.2	9.5	6.9	**4.2**	8.82	101.2%	
9615.6	32.8	10	5.9	**2.5**	8.84	98.9%	
9612.3	36.1	11	5.4	0.5	8.43	94.3%	
9609.0	39.4	12	5.1	0.3	8.10	90.6%	
9605.7	42.7	13	4.9	0.2	7.76	84.6%	
9602.4	45.9	14	4.8	0.1	7.40	80.7%	
9599.2	49.2	15	4.7	0.1	6.80	74.1%	
9595.9	52.5	16	4.6	0.1	5.66	61.7%	
9592.6	55.8	17	4.6	0.0	4.95	54.0%	
9589.3	59.1	18	4.6	0.0	4.02	43.8%	
9586.0	62.3	19	4.7	-0.1	2.50	27.2%	
9582.8	65.6	20	4.8	-0.1	0.23	2.5%	
9579.5	68.9	21	5.1	-0.3	0.13	1.5%	
9576.2	72.2	22	5.5	-0.4	0.08	0.9%	
9572.9	75.5	23	5.8	-0.3	0.06	0.7%	
9569.6	78.7	24	5.9	-0.1	0.05	0.6%	
9566.3	82.0	25	6.1	-0.2	0.05	0.6%	
9563.1	85.3	26	6.3	-0.2	0.04	0.5%	
9559.8	88.6	27	6.5	-0.2	0.03	0.3%	
9556.5	91.9	28	6.7	-0.2	0.02	0.2%	
9553.2	95.1	29	6.9	-0.2	0.02	0.2%	
9549.9	98.4	30	7.2	-0.3	0.02	0.2%	
9546.7	101.7	31	7.4	-0.2	0.03	0.4%	
9543.4	105.0	32	7.5	-0.1	0.01	0.1%	
9540.1	108.3	33	7.6	-0.1	0.00	0.0%	

TABLE C-4

SOUTH LAKE DISSOLVED OXYGEN AND WATER TEMPERATURE PROFILE

Date of Profile: 9/21/2021
Lake Surface Elevation: 9648.37
Outlet Pipe Elevation (ft/msl): 9621

Barometric Pressure (in Hg) 21.25

Water Surface Elevation (ft msl)	Depth of Measurement		Water Temperature (deg C)	Change in Water Temperature (deg C)*	Dissolved Oxygen (mg/L)	% O_2 Saturation **
	Feet	Meters				
9536.8	111.5	34	7.7	-0.1	0.01	0.1%
9533.2	115.2	35.1	7.7	0.0	0.00	0.0%
		Maximum	**13.5**	---	**8.94**	**116.1%**
		Minimum	**4.6**	---	**0.00**	**0.0%**

* - **Bold** values indicate thermocline (1 deg change in one meter).

** - Saturation based on calculated DO saturation at reported water temperature and ambient barometric pressure.

TABLE C-5

SOUTH LAKE DISSOLVED OXYGEN AND WATER TEMPERATURE PROFILE

Date of Profile: 10/5/2021
Lake Surface Elevation: 9641.70
Outlet Pipe Elevation (ft/msl): 9621

Barometric Pressure (in Hg) 21.00

Water Surface Elevation (ft msl)	Depth of Measurement Feet	Depth of Measurement Meters	Water Temperature (deg C)	Change in Water Temperature (deg C)*	Dissolved Oxygen (mg/L)	% O_2 Saturation **	
9641.7	0.0	0	10.6	---	8.03	---	
9640.1	1.6	0.5	10.7	---	8.03	101.6%	
9638.4	3.3	1	10.7	0.0	8.02	101.5%	
9635.1	6.6	2	10.6	0.1	8.02	101.5%	
9631.9	9.8	3	10.5	0.1	8.02	101.5%	
9628.6	13.1	4	10.5	0.0	8.01	101.4%	
9625.3	16.4	5	10.5	0.0	8.01	101.4%	
9622.0	19.7	6	10.4	0.1	8.02	101.5%	<<Outlet
9618.7	23.0	7	10.2	0.2	8.01	101.4%	
9615.5	26.2	8	9.0	**1.2**	8.25	102.0%	
9614.6	27.1	8.25	8.3	**---**	8.41	101.4%	
9613.8	27.9	8.5	7.3	**---**	8.49	99.9%	
9612.2	29.5	9	6.6	**2.4**	8.39	96.3%	
9610.5	31.2	9.5	5.9	**---**	8.51	95.2%	
9608.9	32.8	10	5.6	**1.0**	8.31	93.0%	
9605.6	36.1	11	5.2	0.4	7.92	88.6%	
9602.3	39.4	12	4.9	0.3	7.40	80.7%	
9599.0	42.7	13	4.8	0.1	6.80	74.1%	
9595.8	45.9	14	4.7	0.1	5.57	60.7%	
9592.5	49.2	15	4.7	0.0	4.70	51.2%	
9589.2	52.5	16	4.7	0.0	3.30	36.0%	
9585.9	55.8	17	4.7	0.0	2.10	22.9%	
9582.6	59.1	18	4.9	-0.2	0.25	2.7%	
9579.4	62.3	19	5.1	-0.2	0.19	2.1%	
9576.1	65.6	20	5.5	-0.4	0.14	1.6%	
9572.8	68.9	21	5.7	-0.2	0.11	1.2%	
9569.5	72.2	22	5.9	-0.2	0.09	1.0%	
9566.2	75.5	23	6.0	-0.1	0.08	0.9%	
9563.0	78.7	24	6.2	-0.2	0.07	0.8%	
9559.7	82.0	25	6.5	-0.3	0.06	0.7%	
9556.4	85.3	26	6.7	-0.2	0.05	0.6%	
9553.1	88.6	27	6.9	-0.2	0.15	1.7%	
9549.8	91.9	28	7.2	-0.3	0.10	1.2%	
9546.6	95.1	29	7.3	-0.1	0.09	1.1%	
9543.3	98.4	30	7.5	-0.2	0.07	0.8%	
9540.0	101.7	31	7.6	-0.1	0.06	0.7%	

TABLE C-5

SOUTH LAKE DISSOLVED OXYGEN AND WATER TEMPERATURE PROFILE

Date of Profile: 10/5/2021

Lake Surface Elevation: 9641.70

Outlet Pipe Elevation (ft/msl): 9621

Barometric Pressure (in Hg) 21.00

Water Surface Elevation (ft msl)	Depth of Measurement Feet	Depth of Measurement Meters	Water Temperature (deg C)	Change in Water Temperature (deg C)*	Dissolved Oxygen (mg/L)	% O_2 Saturation **
9536.7	105.0	32	7.7	-0.1	0.05	0.6%
9535.1	106.6	32.5	7.7	0.0	0.04	0.5%
		Maximum	**10.7**	**---**	**8.51**	**102.0%**
		Minimum	**4.7**	**---**	**0.04**	**0.5%**

* - **Bold** values indicate thermocline (1 deg change in one meter).

** - Saturation based on calculated DO saturation at reported water temperature and ambient barometric pressure.

TABLE C-6

LAKE SABRINA DISSOLVED OXYGEN AND WATER TEMPERATURE PROFILE

Date of Profile: 6/17/2021
Lake Surface Elevation: 9099.50
Outlet Pipe Elevation (ft/msl): 9068

Estimated Barometric Pressure (in Hg) 21.60

Water Surface Elevation (ft msl)	Depth of Measurement Feet	Meters	Water Temperature (deg C)	Change in Water Temperature (deg C)*	Dissolved Oxygen (mg/L)	% O_2 Saturation **	
9099.5	0.0	0	---	---	---	---	
9097.9	1.6	0.5	13.4	---	8.21	108.2%	
9096.2	3.3	1	13.4	0.0	8.23	108.5%	
9092.9	6.6	2	13.3	0.1	8.23	108.5%	
9089.7	9.8	3	13.3	0.0	8.24	108.6%	
9086.4	13.1	4	13.3	0.0	8.24	108.6%	
9083.1	16.4	5	13.2	0.1	8.25	108.7%	
9079.8	19.7	6	12.8	0.4	8.43	108.6%	
9076.5	23.0	7	12.6	0.2	8.50	109.5%	
9073.3	26.2	8	11.9	0.7	8.77	121.5%	
9070.0	29.5	9	10.6	**1.3**	9.39	115.5%	
9066.7	32.8	10	9.6	**1.0**	9.78	117.5%	<<Outlet
9063.4	36.1	11	8.7	0.9	10.01	117.4%	
9060.1	39.4	12	8.3	0.4	10.02	117.5%	
9056.8	42.7	13	7.7	0.6	10.09	115.4%	
9053.6	45.9	14	7.1	0.6	10.16	116.2%	
9050.3	49.2	15	6.6	0.5	10.16	113.4%	
9047.0	52.5	16	6.3	0.3	10.05	112.1%	
9043.7	55.8	17	6.0	0.3	9.83	109.7%	
9040.4	59.1	18	5.6	0.4	9.50	103.3%	
9037.2	62.3	19	5.5	0.1	9.35	101.7%	
9033.9	65.6	20	5.2	0.3	9.10	99.0%	
9030.6	68.9	21	5.1	0.1	8.84	96.1%	
9027.3	72.2	22	5.0	0.1	8.53	92.8%	
9024.0	75.5	23	4.9	0.1	8.44	89.4%	
9020.8	78.7	24	4.8	0.1	8.35	88.5%	
9017.5	82.0	25	4.7	0.1	8.30	88.0%	
9014.2	85.3	26	4.6	0.1	8.26	87.5%	
9010.9	88.6	27	4.6	0.0	8.25	87.4%	
9007.6	91.9	28	4.6	0.0	8.20	86.9%	
9004.4	95.1	29	4.6	0.0	8.20	86.9%	
9001.1	98.4	30	4.5	0.1	8.21	87.0%	
8997.8	101.7	31	4.5	0.0	8.21	87.0%	
8994.5	105.0	32	4.5	0.0	8.19	86.8%	
8991.2	108.3	33	4.5	0.0	8.17	86.6%	
8988.0	111.5	34	4.5	0.0	8.16	86.5%	
8984.7	114.8	35	4.4	0.1	8.15	86.4%	
8981.4	118.1	36	4.4	0.0	8.12	86.0%	

TABLE C-6

LAKE SABRINA DISSOLVED OXYGEN AND WATER TEMPERATURE PROFILE

Date of Profile: 6/17/2021

Lake Surface Elevation: 9099.50

Outlet Pipe Elevation (ft/msl): 9068

Estimated Barometric Pressure (in Hg) 21.60

Water Surface Elevation (ft msl)	Depth of Measurement Feet	Meters	Water Temperature (deg C)	Change in Water Temperature (deg C)*	Dissolved Oxygen (mg/L)	% O_2 Saturation **
8978.1	121.4	37	4.4	0.0	8.05	85.3%
8974.8	124.7	38	4.4	0.0	7.98	84.6%
8971.5	128.0	39	4.4	0.0	8.00	84.8%
8968.3	131.2	40	4.3	0.1	8.01	84.9%
8965.0	134.5	41	4.3	0.0	8.01	84.9%
8961.7	137.8	42	4.3	0.0	8.02	85.0%
8958.4	141.1	43	4.3	0.0	8.02	85.0%
8955.1	144.4	44	4.3	0.0	8.01	84.9%
8951.9	147.6	45	4.3	0.0	7.97	84.5%
8948.6	150.9	46	4.3	0.0	7.95	84.2%
8945.3	154.2	47	4.3	0.0	7.80	82.7%
8942.0	157.5	48	4.2	0.1	7.82	82.9%
8938.7	160.8	49	4.2	0.0	7.86	83.3%
8935.5	164.0	50	4.2	0.0	7.86	83.3%
8932.2	167.3	51	4.2	0.0	7.75	82.1%
8928.9	170.6	52	4.2	0.0	7.70	81.6%
8925.6	173.9	53	4.2	0.0	7.64	81.0%
8922.3	177.2	54	4.3	-0.1	7.51	79.6%
8919.1	180.4	55	4.3	0.0	7.42	78.6%
8915.8	183.7	56	4.3	0.0	7.36	78.0%
8912.5	187.0	57	4.3	0.0	7.23	76.6%
8909.2	190.3	58	4.2	0.1	7.15	75.8%
8905.9	193.6	59	4.2	0.0	7.02	74.4%
8902.7	196.8	60	4.2	0.0	6.76	71.6%
8899.4	200.1	61	4.2	0.0	6.63	70.3%
8896.1	203.4	62	4.2	0.0	6.54	69.3%
8892.8	206.7	63	4.2	0.0	6.06	64.2%
8889.5	210.0	64	4.2	0.0	5.59	59.2%
8886.2	213.3	65	4.2	0.0	5.05	53.5%
8885.3	214.2	65.3	4.2	0.0	4.70	49.8%
		Maximum	**13.4**	**---**	**10.16**	**121.5%**
		Minimum	**4.2**	**---**	**4.70**	**49.8%**

* - **Bold** values indicate thermocline (1 deg change in one meter).

** - Saturation based on calculated DO saturation at reported water temperature and ambient barometric pressure.

TABLE C-7

LAKE SABRINA DISSOLVED OXYGEN AND WATER TEMPERATURE PROFILE

Date of Profile: 7/28/2021
Lake Surface Elevation: 9098.58
Outlet Pipe Elevation (ft/msl): 9068

Barometric Pressure (in Hg) 21.70

Water Surface Elevation (ft msl)	Depth of Measurement		Water Temperature (deg C)	Change in Water Temperature (deg C)*	Dissolved Oxygen (mg/L)	% O_2 Saturation **	
	Feet	Meters					
9098.58	0.0	0	---	---	---	---	
9096.9	1.6	0.5	18.1	---	7.08	103.9%	
9095.3	3.3	1	18.1	0.0	7.06	103.6%	
9092.0	6.6	2	18.1	0.0	7.05	103.4%	
9088.7	9.8	3	18.1	0.0	7.04	103.3%	
9085.5	13.1	4	18.1	0.0	7.04	103.3%	
9082.2	16.4	5	18.0	0.1	7.14	104.7%	
9078.9	19.7	6	17.4	0.6	7.32	105.2%	
9075.6	23.0	7	16.8	0.6	7.58	106.7%	
9074.0	24.6	7.5	15.5	---	8.45	116.4%	
9072.3	26.2	8	14.5	**2.3**	8.75	117.9%	
9070.7	27.9	8.5	13.4	**2.1**	9.00	118.6%	
9069.1	29.5	9	12.5	**2.0**	9.20	118.6%	<<Outlet
9065.8	32.8	10	11.2	**1.3**	9.42	130.5%	
9062.5	36.1	11	10.2	**1.0**	9.62	118.4%	
9059.2	39.4	12	9.3	0.9	9.70	116.6%	
9055.9	42.7	13	8.5	0.8	9.77	114.6%	
9052.6	45.9	14	7.9	0.6	9.76	111.7%	
9049.4	49.2	15	7.3	0.6	9.75	111.6%	
9046.1	52.5	16	6.7	0.6	9.56	106.7%	
9042.8	55.8	17	6.3	0.4	9.30	103.8%	
9039.5	59.1	18	6.0	0.3	9.13	101.9%	
9036.2	62.3	19	5.8	0.2	8.95	97.3%	
9033.0	65.6	20	5.5	0.3	8.61	93.6%	
9029.7	68.9	21	5.3	0.2	8.38	91.1%	
9026.4	72.2	22	5.2	0.1	8.10	88.1%	
9023.1	75.5	23	5.1	0.1	7.85	85.4%	
9019.8	78.7	24	4.9	0.2	7.83	83.0%	
9016.6	82.0	25	4.8	0.1	7.77	82.3%	
9013.3	85.3	26	4.8	0.0	7.71	81.7%	
9010.0	88.6	27	4.7	0.1	7.62	80.7%	
9006.7	91.9	28	4.6	0.1	7.61	80.6%	
9003.4	95.1	29	4.6	0.0	7.57	80.2%	
9000.2	98.4	30	4.6	0.0	7.56	80.1%	
8996.9	101.7	31	4.5	0.1	7.54	79.9%	
8993.6	105.0	32	4.5	0.0	7.53	79.8%	
8990.3	108.3	33	4.5	0.0	7.52	79.7%	
8987.0	111.5	34	4.5	0.0	7.51	79.6%	
8983.8	114.8	35	4.4	0.1	7.49	79.4%	
8980.5	118.1	36	4.4	0.0	7.48	79.3%	
8977.2	121.4	37	4.4	0.0	7.44	78.8%	

TABLE C-7

LAKE SABRINA DISSOLVED OXYGEN AND WATER TEMPERATURE PROFILE

Date of Profile: 7/28/2021
Lake Surface Elevation: 9098.58
Outlet Pipe Elevation (ft/msl): 9068

Barometric Pressure (in Hg) **21.70**

Water Surface Elevation (ft msl)	Depth of Measurement Feet	Depth of Measurement Meters	Water Temperature (deg C)	Change in Water Temperature (deg C)*	Dissolved Oxygen (mg/L)	% O_2 Saturation **
8973.9	124.7	38	4.4	0.0	7.43	78.7%
8970.6	128.0	39	4.3	0.1	7.40	78.4%
8967.3	131.2	40	4.3	0.0	7.38	78.2%
8964.1	134.5	41	4.3	0.0	7.38	78.2%
8960.8	137.8	42	4.3	0.0	7.38	78.2%
8957.5	141.1	43	4.3	0.0	7.38	78.2%
8954.2	144.4	44	4.3	0.0	7.34	77.8%
8950.9	147.6	45	4.2	0.1	7.32	77.6%
8947.7	150.9	46	4.3	-0.1	7.20	76.3%
8944.4	154.2	47	4.3	0.0	7.10	75.2%
8941.1	157.5	48	4.3	0.0	6.95	73.6%
8937.8	160.8	49	4.3	0.0	6.85	72.6%
8934.5	164.0	50	4.3	0.0	6.74	71.4%
8931.3	167.3	51	4.3	0.0	6.60	69.9%
8928.0	170.6	52	4.3	0.0	6.40	67.8%
8924.7	173.9	53	4.3	0.0	6.32	67.0%
8921.4	177.2	54	4.3	0.0	6.29	66.7%
8918.1	180.4	55	4.3	0.0	6.28	66.5%
8914.9	183.7	56	4.3	0.0	5.99	63.5%
8911.6	187.0	57	4.3	0.0	5.91	62.6%
8908.3	190.3	58	4.3	0.0	5.75	60.9%
8905.0	193.6	59	4.3	0.0	5.25	55.6%
8901.7	196.8	60	4.3	0.0	5.02	53.2%
8898.4	200.1	61	4.3	0.0	4.67	49.5%
8895.2	203.4	62	4.3	0.0	4.43	46.9%
8891.9	206.7	63	4.3	0.0	4.33	45.9%
		Maximum	**18.1**	---	**9.77**	**130.5%**
		Minimum	**4.2**	---	**4.33**	**45.9%**

* - **Bold** values indicate thermocline (1 deg change in one meter).

** - Saturation based on calculated DO saturation at reported water temperature and ambient barometric pressure.

TABLE C-8

LAKE SABRINA DISSOLVED OXYGEN AND WATER TEMPERATURE PROFILE

Date of Profile: 8/24/2021
Lake Surface Elevation: 9099.31
Outlet Pipe Elevation (ft msl): 9068

Barometric Pressure (in Hg) 21.50

Water Surface Elevation (ft msl)	Depth of Measurement Feet	Depth of Measurement Meters	Water Temperature (deg C)	Change in Water Temperature (deg C)*	Dissolved Oxygen (mg/L)	% O_2 Saturation **	
9099.31	0.0	0	16.3	---	7.63	108.9%	
9097.7	1.6	0.5	16.4	---	7.62	108.7%	
9096.0	3.3	1	16.4	0.0	7.61	108.6%	
9092.7	6.6	2	16.4	0.0	7.61	108.6%	
9089.5	9.8	3	16.4	0.0	7.60	108.5%	
9086.2	13.1	4	16.4	0.0	7.59	108.3%	
9082.9	16.4	5	16.4	0.0	7.59	108.3%	
9079.6	19.7	6	16.4	0.0	7.58	108.2%	
9076.3	23.0	7	16.4	0.0	7.61	108.6%	
9073.1	26.2	8	16.4	0.0	7.63	108.9%	
9069.8	29.5	9	15.5	0.9	8.76	122.4%	
9068.1	31.2	9.5	14.6	---	9.65	131.9%	<<Outlet
9066.5	32.8	10	13.4	**2.1**	10.29	137.5%	
9064.9	34.4	10.5	11.9	**2.7**	10.39	145.9%	
9063.2	36.1	11	11.0	**2.4**	10.39	145.9%	
9059.9	39.4	12	10.1	0.9	10.41	129.9%	
9056.7	42.7	13	9.3	0.8	10.38	126.5%	
9053.4	45.9	14	8.5	0.8	10.38	123.4%	
9050.1	49.2	15	7.6	0.9	10.26	119.0%	
9046.8	52.5	16	7.1	0.5	10.01	116.1%	
9043.5	55.8	17	6.5	0.6	9.63	109.0%	
9040.3	59.1	18	6.1	0.4	9.40	106.4%	
9037.0	62.3	19	5.8	0.3	8.95	98.7%	
9033.7	65.6	20	5.7	0.1	8.65	95.4%	
9030.4	68.9	21	5.3	0.4	8.10	89.3%	
9027.1	72.2	22	5.2	0.1	7.93	87.5%	
9023.9	75.5	23	5.1	0.1	7.75	85.5%	
9020.6	78.7	24	5.0	0.1	7.59	83.7%	
9017.3	82.0	25	4.8	0.2	7.49	80.5%	
9014.0	85.3	26	4.8	0.0	7.46	80.2%	
9010.7	88.6	27	4.7	0.1	7.37	79.2%	
9007.4	91.9	28	4.7	0.0	7.22	77.6%	
9004.2	95.1	29	4.7	0.0	7.07	76.0%	
9000.9	98.4	30	4.6	0.1	7.08	76.1%	
8997.6	101.7	31	4.6	0.0	7.09	76.2%	
8994.3	105.0	32	4.6	0.0	7.08	76.1%	
8991.0	108.3	33	4.6	0.0	6.98	75.0%	
8987.8	111.5	34	4.5	0.1	6.95	74.7%	
8984.5	114.8	35	4.5	0.0	6.97	74.9%	
8981.2	118.1	36	4.5	0.0	6.96	74.8%	

TABLE C-8

LAKE SABRINA DISSOLVED OXYGEN AND WATER TEMPERATURE PROFILE

Date of Profile: 8/24/2021
Lake Surface Elevation: 9099.31
Outlet Pipe Elevation (ft msl): 9068

Barometric Pressure (in Hg): 21.50

Water Surface Elevation (ft msl)	Depth of Measurement Feet	Depth of Measurement Meters	Water Temperature (deg C)	Change in Water Temperature (deg C)*	Dissolved Oxygen (mg/L)	% O_2 Saturation **
8977.9	121.4	37	4.5	0.0	6.93	74.5%
8974.6	124.7	38	4.5	0.0	6.93	74.5%
8971.4	128.0	39	4.4	0.1	6.97	74.9%
8968.1	131.2	40	4.4	0.0	6.98	75.0%
8964.8	134.5	41	4.4	0.0	7.10	76.3%
8961.5	137.8	42	4.4	0.0	6.90	74.1%
8958.2	141.1	43	4.4	0.0	6.88	73.9%
8955.0	144.4	44	4.3	0.1	6.83	73.4%
8951.7	147.6	45	4.3	0.0	6.72	72.2%
8948.4	150.9	46	4.3	0.0	6.69	71.9%
8945.1	154.2	47	4.3	0.0	6.45	69.3%
8941.8	157.5	48	4.3	0.0	6.28	67.5%
8938.5	160.8	49	4.3	0.0	6.26	67.3%
8935.3	164.0	50	4.5	-0.2	6.46	69.4%
8932.0	167.3	51	4.4	0.1	6.46	69.4%
8928.7	170.6	52	4.4	0.0	6.38	68.6%
8925.4	173.9	53	4.4	0.0	6.23	66.9%
8922.1	177.2	54	4.4	0.0	6.16	66.2%
8918.9	180.4	55	4.4	0.0	6.00	64.5%
8915.6	183.7	56	4.4	0.0	5.98	64.3%
8912.3	187.0	57	4.3	0.1	5.92	63.6%
8909.0	190.3	58	4.3	0.0	5.84	62.8%
8905.7	193.6	59	4.3	0.0	5.76	61.9%
8902.5	196.8	60	4.3	0.0	5.65	60.7%
8899.2	200.1	61	4.3	0.0	5.40	58.0%
8895.9	203.4	62	4.3	0.0	4.45	47.8%
8895.2	204.1	62.2	4.3	0.0	4.23	45.5%
		Maximum	**16.4**	**---**	**10.41**	**145.9%**
		Minimum	**4.3**	**---**	**4.23**	**45.5%**

* - **Bold** values indicate thermocline (1 deg change in one meter).

** - Saturation based on calculated DO saturation at reported water temperature and ambient barometric pressure.

TABLE C-9

LAKE SABRINA DISSOLVED OXYGEN AND WATER TEMPERATURE PROFILE

Date of Profile: 9/20/2021

Lake Surface Elevation: 9096.74

Outlet Pipe Elevation (ft msl): 9068

Barometric Pressure (in Hg) 21.55

Water Surface Elevation (ft msl)	Depth of Measurement Feet	Meters	Water Temperature (deg C)	Change in Water Temperature (deg C)*	Dissolved Oxygen (mg/L)	% O_2 Saturation **	
9096.74	0.0	0	13.9	---	8.15	---	
9095.1	1.6	0.5	14.0	---	8.08	108.9%	
9093.5	3.3	1	14.0	0.0	8.05	108.5%	
9090.2	6.6	2	14.1	-0.1	8.02	108.1%	
9086.9	9.8	3	14.1	0.0	8.00	107.8%	
9083.6	13.1	4	14.1	0.0	7.99	107.7%	
9080.3	16.4	5	14.1	0.0	7.98	107.5%	
9077.1	19.7	6	14.1	0.0	7.97	107.4%	
9073.8	23.0	7	14.1	0.0	7.96	107.3%	
9070.5	26.2	8	14.1	0.0	7.96	107.3%	
9067.2	29.5	9	14.1	0.0	7.95	107.1%	<<Outlet
9063.9	32.8	10	14.1	0.0	7.95	107.1%	
9060.7	36.1	11	13.3	0.8	8.44	111.2%	
9059.0	37.7	11.5	12.0	---	9.41	121.3%	
9057.4	39.4	12	10.0	**3.3**	10.18	125.3%	
9055.7	41.0	12.5	9.4	**2.6**	10.29	123.6%	
9054.1	42.7	13	9.0	**1.0**	10.31	123.9%	
9050.8	45.9	14	8.3	0.7	10.26	120.3%	
9047.5	49.2	15	7.7	0.6	10.15	116.1%	
9044.2	52.5	16	7.1	0.6	10.04	114.9%	
9041.0	55.8	17	6.7	0.4	9.80	109.4%	
9037.7	59.1	18	6.4	0.3	9.50	106.0%	
9034.4	62.3	19	6.0	0.4	9.16	102.2%	
9031.1	65.6	20	5.7	0.3	8.74	95.1%	
9027.8	68.9	21	5.5	0.2	8.38	91.1%	
9024.6	72.2	22	5.4	0.1	8.15	88.6%	
9021.3	75.5	23	5.2	0.2	7.95	86.5%	
9018.0	78.7	24	5.0	0.2	8.00	87.0%	
9014.7	82.0	25	5.0	0.0	7.53	81.9%	
9011.4	85.3	26	4.8	0.2	7.47	79.2%	
9008.2	88.6	27	4.8	0.0	7.35	77.9%	
9004.9	91.9	28	4.7	0.1	7.44	78.8%	
9001.6	95.1	29	4.7	0.0	7.37	78.1%	
8998.3	98.4	30	4.6	0.1	7.36	78.0%	
8995.0	101.7	31	4.6	0.0	7.20	76.3%	
8991.8	105.0	32	4.6	0.0	7.30	77.4%	
8988.5	108.3	33	4.5	0.1	7.18	76.1%	
8985.2	111.5	34	4.5	0.0	7.19	76.2%	
8981.9	114.8	35	4.5	0.0	7.33	77.7%	
8978.6	118.1	36	4.5	0.0	7.02	74.4%	
8975.3	121.4	37	4.4	0.1	7.07	74.9%	

TABLE C-9

LAKE SABRINA DISSOLVED OXYGEN AND WATER TEMPERATURE PROFILE

Date of Profile: 9/20/2021
Lake Surface Elevation: 9096.74
Outlet Pipe Elevation (ft msl): 9068

Barometric Pressure (in Hg) 21.55

Water Surface Elevation (ft msl)	Depth of Measurement Feet	Meters	Water Temperature (deg C)	Change in Water Temperature (deg C)*	Dissolved Oxygen (mg/L)	% O_2 Saturation **
8972.1	124.7	38	4.4	0.0	7.14	75.7%
8968.8	128.0	39	4.4	0.0	7.19	76.2%
8965.5	131.2	40	4.4	0.0	7.25	76.8%
8962.2	134.5	41	4.4	0.0	7.02	74.4%
8958.9	137.8	42	4.4	0.0	6.83	72.4%
8955.7	141.1	43	4.3	0.1	6.85	72.6%
8952.4	144.4	44	4.3	0.0	6.89	73.0%
8949.1	147.6	45	4.4	-0.1	6.63	70.3%
8945.8	150.9	46	4.3	0.1	6.62	70.1%
8942.5	154.2	47	4.4	-0.1	6.44	68.2%
8939.3	157.5	48	4.4	0.0	6.30	66.8%
8936.0	160.8	49	4.4	0.0	6.15	65.2%
8932.7	164.0	50	4.3	0.1	6.07	64.3%
8929.4	167.3	51	4.4	-0.1	5.85	62.0%
8926.1	170.6	52	4.3	0.1	5.50	58.3%
8922.9	173.9	53	4.3	0.0	5.40	57.2%
8919.6	177.2	54	4.3	0.0	5.02	53.2%
8916.3	180.4	55	4.3	0.0	4.75	50.3%
8913.0	183.7	56	4.3	0.0	4.45	47.2%
8909.7	187.0	57	4.3	0.0	4.20	44.5%
8906.5	190.3	58	4.3	0.0	3.50	37.1%
8903.2	193.6	59	4.3	0.0	3.45	36.6%
8899.9	196.8	60	4.3	0.0	3.37	35.7%
8896.6	200.1	61	4.3	0.0	3.31	35.1%
8893.3	203.4	62	4.3	0.0	2.89	30.6%
8890.4	206.4	62.9	4.4	-0.1	2.17	23.0%
		Maximum	**14.1**	---	**10.31**	**125.3%**
		Minimum	**4.3**	---	**2.17**	**23.0%**

* - **Bold** values indicate thermocline (1 deg change in one meter).

** - Saturation based on calculated DO saturation at reported water temperature and ambient barometric pressure.

TABLE C-10

LAKE SABRINA DISSOLVED OXYGEN AND WATER TEMPERATURE PROFILE

Date of Profile: 10/5/2021
Lake Surface Elevation: 9095.09
Outlet Pipe Elevation (ft/msl): 9068

Barometric Pressure (in Hg) 21.45

Water Surface Elevation (ft msl)	Depth of Measurement		Water Temperature (deg C)	Change in Water Temperature (deg C)*	Dissolved Oxygen (mg/L)	% O_2 Saturation **	
	Feet	Meters					
9095.09	0.0	0	12.1	---	8.09	---	
9093.4	1.6	0.5	12.1	---	8.09	105.7%	
9091.8	3.3	1	12.2	-0.1	8.08	105.6%	
9088.5	6.6	2	12.2	0.0	8.08	105.6%	
9085.2	9.8	3	12.2	0.0	8.08	105.6%	
9082.0	13.1	4	12.2	0.0	8.08	105.6%	
9078.7	16.4	5	12.2	0.0	8.07	105.5%	
9075.4	19.7	6	12.2	0.0	8.07	105.5%	
9072.1	23.0	7	12.2	0.0	8.07	105.5%	
9068.8	26.2	8	12.2	0.0	8.07	105.5%	<<Outlet
9065.6	29.5	9	12.2	0.0	8.07	105.5%	
9062.3	32.8	10	12.2	0.0	8.07	105.5%	
9059.0	36.1	11	12.1	0.1	8.09	105.7%	
9055.7	39.4	12	11.9	0.2	8.28	116.3%	
9054.1	41.0	12.5	11.3	---	8.75	122.9%	
9052.4	42.7	13	10.0	**1.9**	9.62	120.0%	
9050.8	44.3	13.5	8.6	**2.7**	10.06	119.6%	
9049.2	45.9	14	8.3	**1.7**	10.14	120.6%	
9045.9	49.2	15	7.6	0.7	10.08	117.0%	
9042.6	52.5	16	7.1	0.5	9.87	114.5%	
9039.3	55.8	17	6.6	0.5	9.71	109.9%	
9036.0	59.1	18	6.3	0.3	9.54	108.0%	
9032.8	62.3	19	6.0	0.3	9.27	104.9%	
9029.5	65.6	20	5.7	0.3	8.84	97.5%	
9026.2	68.9	21	5.5	0.2	8.20	90.4%	
9022.9	72.2	22	5.2	0.3	7.90	87.1%	
9019.6	75.5	23	5.1	0.1	7.70	84.9%	
9016.4	78.7	24	5.0	0.1	7.32	80.7%	
9013.1	82.0	25	4.9	0.1	7.30	78.4%	
9009.8	85.3	26	4.7	0.2	7.50	80.6%	
9006.5	88.6	27	4.7	0.0	7.47	80.3%	
9003.2	91.9	28	4.6	0.1	7.45	80.1%	
8999.9	95.1	29	4.6	0.0	7.42	79.7%	
8996.7	98.4	30	4.6	0.0	7.38	79.3%	
8993.4	101.7	31	4.6	0.0	7.35	79.0%	
8990.1	105.0	32	4.5	0.1	7.37	79.2%	
8986.8	108.3	33	4.5	0.0	7.35	79.0%	
8983.5	111.5	34	4.5	0.0	7.40	79.5%	
8980.3	114.8	35	4.5	0.0	7.40	79.5%	
8977.0	118.1	36	4.4	0.1	7.41	79.6%	
8973.7	121.4	37	4.4	0.0	7.41	79.6%	

TABLE C-10

LAKE SABRINA DISSOLVED OXYGEN AND WATER TEMPERATURE PROFILE

Date of Profile: 10/5/2021
Lake Surface Elevation: 9095.09
Outlet Pipe Elevation (ft/msl): 9068

Barometric Pressure (in Hg) 21.45

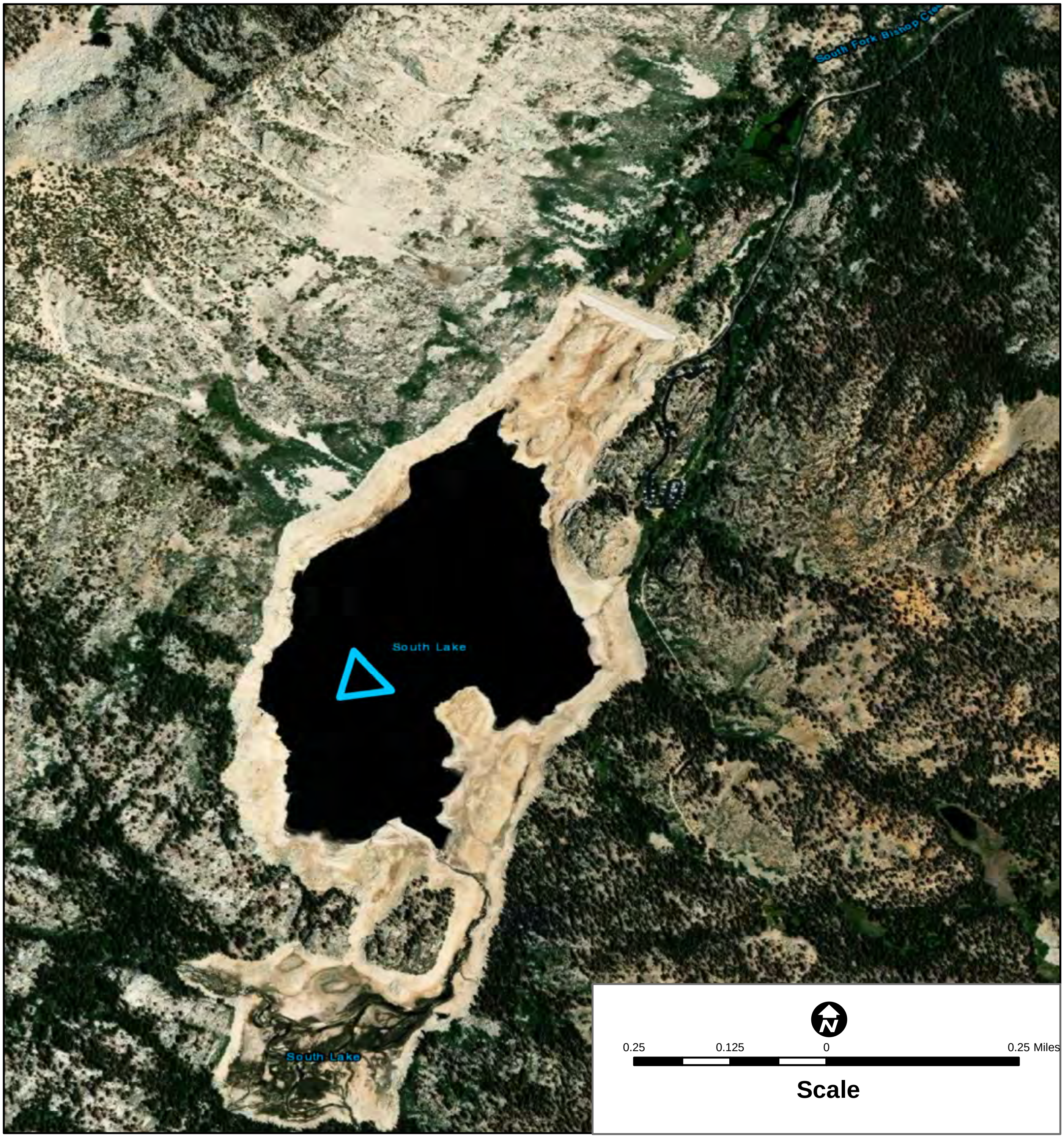
Water Surface Elevation (ft msl)	Depth of Measurement		Water Temperature (deg C)	Change in Water Temperature (deg C)*	Dissolved Oxygen (mg/L)	% O_2 Saturation **
	Feet	Meters				
8970.4	124.7	38	4.3	0.1	7.41	79.6%
8967.1	128.0	39	4.3	0.0	7.40	79.5%
8963.9	131.2	40	4.3	0.0	7.39	79.4%
8960.6	134.5	41	4.3	0.0	7.40	79.5%
8957.3	137.8	42	4.3	0.0	6.90	74.1%
8954.0	141.1	43	4.3	0.0	6.89	74.0%
8950.7	144.4	44	4.3	0.0	6.70	72.0%
8947.5	147.6	45	4.3	0.0	6.72	72.2%
8944.2	150.9	46	4.3	0.0	6.55	70.4%
8940.9	154.2	47	4.3	0.0	6.52	70.1%
8937.6	157.5	48	4.3	0.0	6.46	69.4%
8934.3	160.8	49	4.3	0.0	6.23	66.9%
8931.0	164.0	50	4.3	0.0	6.06	65.1%
8927.8	167.3	51	4.3	0.0	5.80	62.3%
8924.5	170.6	52	4.3	0.0	5.58	60.0%
8921.2	173.9	53	4.4	-0.1	5.26	56.5%
8917.9	177.2	54	4.4	0.0	4.70	50.5%
8914.6	180.4	55	4.4	0.0	4.44	47.7%
8911.4	183.7	56	4.4	0.0	4.19	45.0%
8908.1	187.0	57	4.4	0.0	3.54	38.0%
8904.8	190.3	58	4.4	0.0	3.25	34.9%
8901.5	193.6	59	4.4	0.0	2.95	31.7%
8898.2	196.8	60	4.4	0.0	2.37	25.5%
8895.0	200.1	61	4.4	0.0	1.90	20.4%
8891.7	203.4	62	4.4	0.0	1.55	16.7%
8888.4	206.7	63	4.4	0.0	0.25	2.7%
8886.8	208.3	63.5	4.4	0.0	0.11	1.2%
		Maximum	**12.2**	**---**	**10.14**	**122.9%**
		Minimum	**4.3**	**---**	**0.11**	**1.2%**

* - **Bold** values indicate thermocline (1 deg change in one meter).

** - Saturation based on calculated DO saturation at reported water temperature and ambient barometric pressure.

APPENDIX D

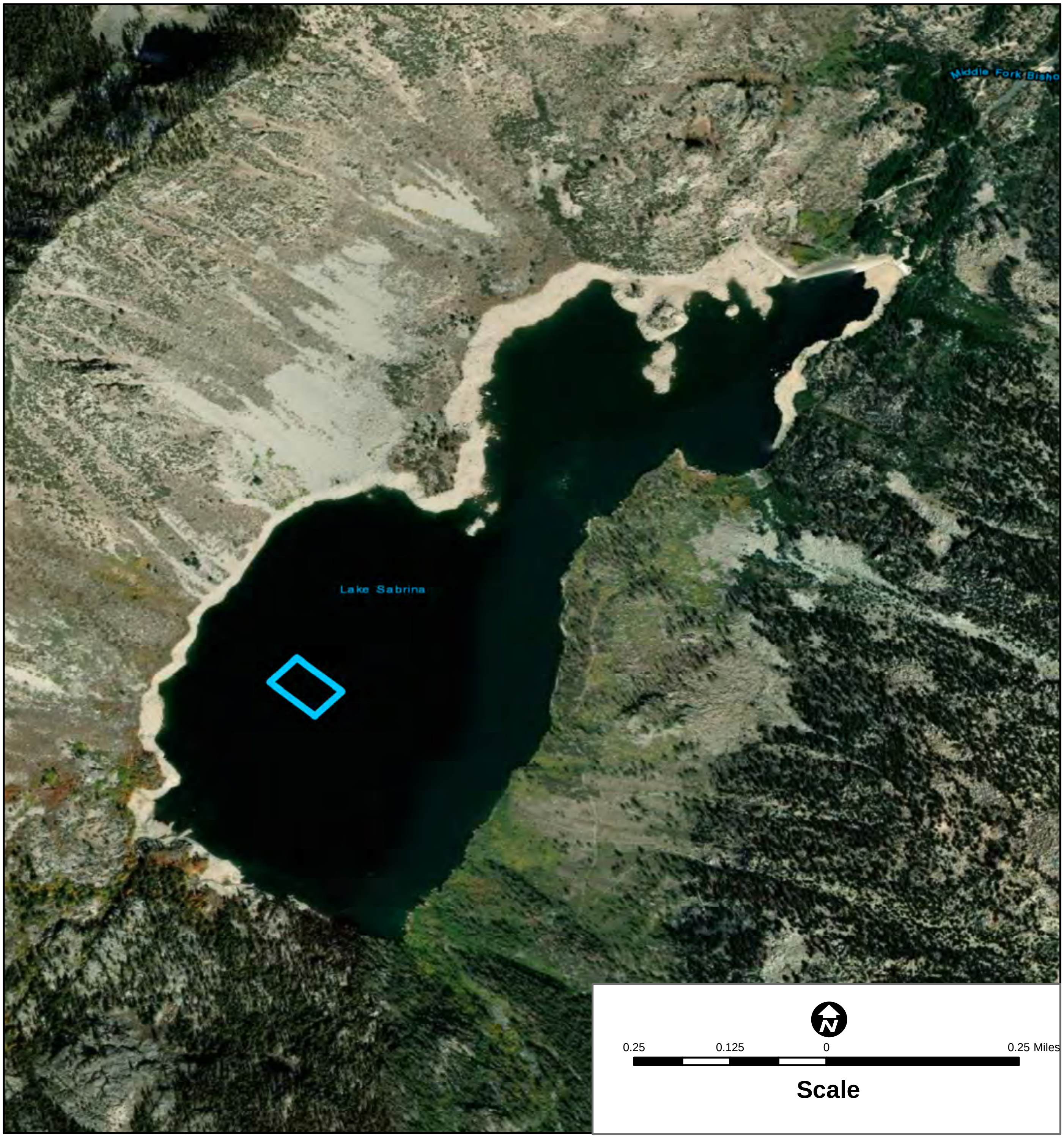
LAKE VERTICAL PROFILE LOCATIONS AND BATHYMETRY



Legend

South Lake Vertical Profile Area

Figure D-1 South Lake Vertical Profile Area



Legend

Lake Sabrina Vertical Profile Area

Figure D-2 Lake Sabrina Vertical Profile Area

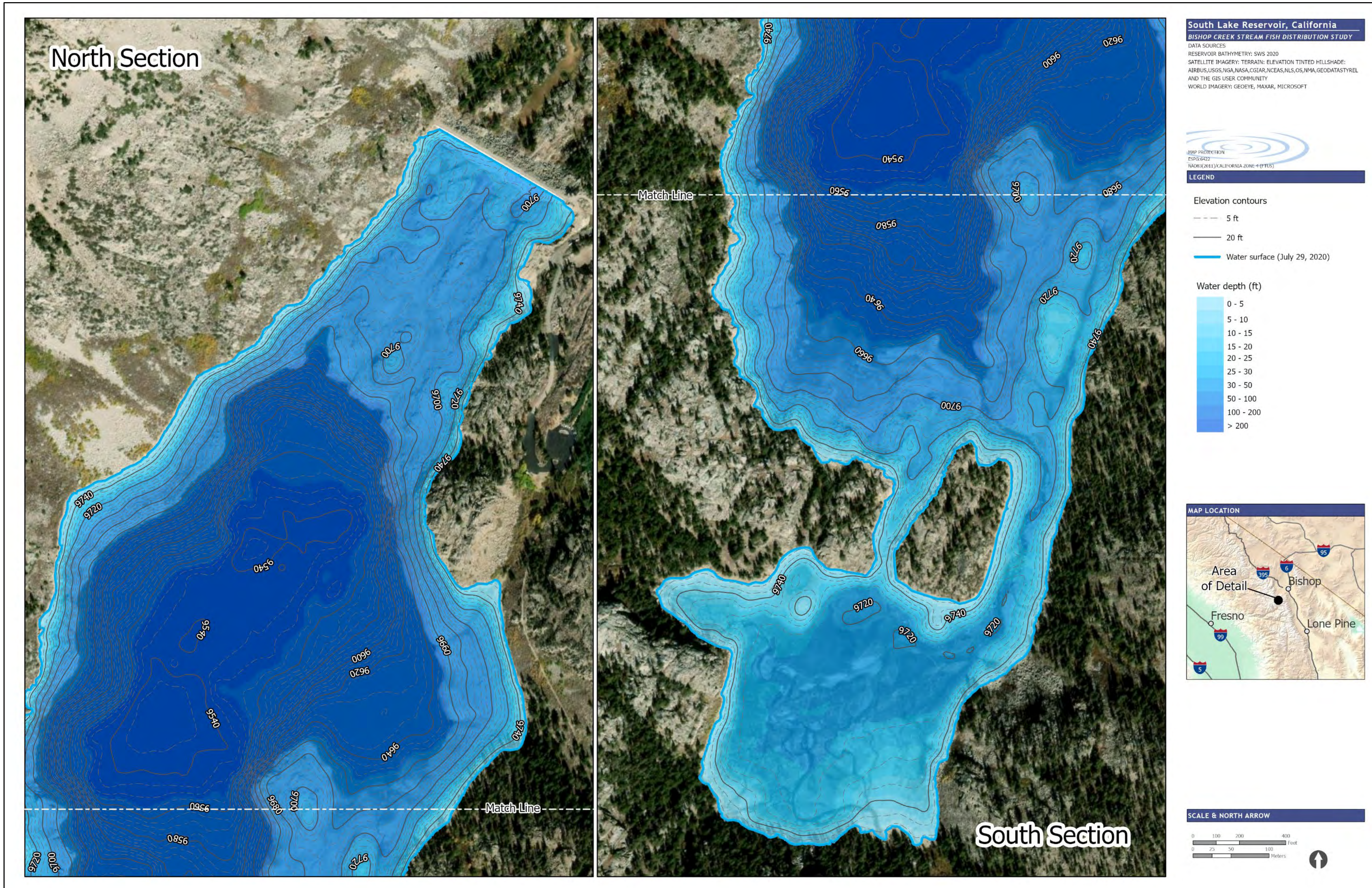


Figure 7.5-1 Bathymetry Map for South Lake

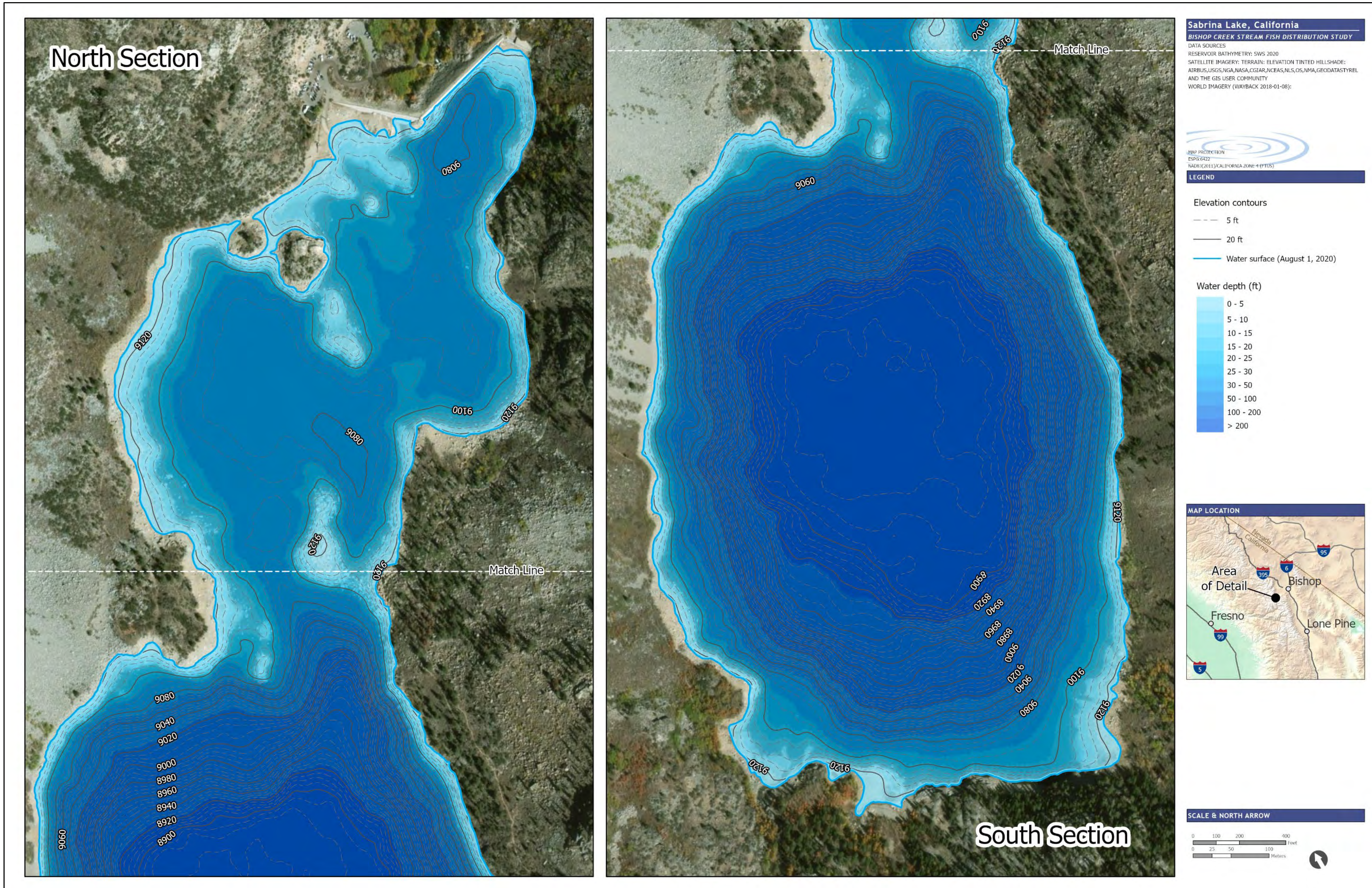


Figure 7.5-2 Bathymetry Map for Lake Sabrina

SOUTHERN CALIFORNIA EDISON

Bishop Creek Hydroelectric Project

(FERC Project No. 1394)

BISHOP CREEK SEDIMENT AND GEOMORPHOLOGY FINAL TECHNICAL REPORT (AQ 6)

SOUTHERN CALIFORNIA EDISON

An EDISON INTERNATIONAL® Company

June 2022

SOUTHERN CALIFORNIA EDISON

Bishop Creek Hydroelectric Project

(FERC Project No. 1394)

FINAL TECHNICAL REPORT (AQ 6) BISHOP CREEK SEDIMENT AND GEOMORPHOLOGY

Southern California Edison
1515 Walnut Grove Ave
Rosemead, CA 91770

June 2022

Support from:

Stillwater Sciences

and

Kleinschmidt

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ACRONYMS

Bishop Creek Project	Bishop Creek Hydroelectric Project
BKF	bankfull elevation
CDFW	California Department of Fish and Game
cfs	cubic feet per second
cm	centimeters
CY	cubic yards
FERC	Federal Energy Regulatory Commission
FLD	an approximate elevation of twice the bankfull depth
FLPMA	Federal Land Policy and Management Act
GPS	global positioning system
ISR	Initial Study Report
LADWP	Los Angeles Department of Water and Power
LWM	large woody material
mm	millimeters
NGS OPUS	National Geodetic Survey Online Positioning User Service
O&M	operations and maintenance
PIT	passive integrated transponder
Project	Bishop Creek Hydroelectric Project
RIP	riparian within floodplain
RTK GNSS	Real-Time Kinematic Global navigation satellite system
RTS	Real Time Service
SCE	Southern California Edison
SLA	Simons, Li, & Associates
SWRCB	State Water Resources Control Board

TWG	Technical Working Group
USFS	U.S. Forestry Service
USGS	U.S. Geological Survey
WET	Wetted Channel

1.0 INTRODUCTION

During the Technical Working Group (TWG) meetings, stakeholders identified the need to understand the sediment dynamics in Bishop Creek, including understanding what flows mobilize sediment and what Bishop Creek Hydroelectric Project (Bishop Creek Project, or Project) operations could be modified to mobilize sediments (assumed to be gravels suitable for spawning/rearing habitat) and large woody material (LWM) from forebays above the diversion dams into reaches that have a low sediment supply. This study focused on the reaches between Powerhouse No. 2 and 6, to provide additional information pertaining to riparian and fisheries habitat assessments, and to report the development of operations and maintenance (O&M) plans that have the potential to reduce maintenance needs of the Bishop Creek Project by limiting the accumulation of sediment in the forebays.

This Sediment and Geomorphology Report summarizes the objectives, methods, results, and discussion of findings of the study.

2.0 REVIEW OF EXISTING INFORMATION

The analysis for this study relied on existing data gathered as part of the existing Bishop Creek Project license, and additional data gathered to support the understanding of flow and sediment dynamics in the study reach. Therefore, this section reviews sources of existing data and discusses limitations on stream flow management at the Bishop Creek Project.

2.1 GEOMORPHOLOGICAL DATA

As part of the study investigating stream geomorphology and riparian vegetation, the Simons, Li, & Associates (SLA) Report (Simons 1990) evaluated stream channel processes in the Bishop Creek Project area. This report included a review of the Bishop Creek Project geomorphology, hydrology, hydraulics, and incipient motion of particles at six locations from the confluence of the South Fork and the Middle Fork of Bishop Creek to Powerhouse No. 6. The reader is referenced to the SLA Report (Simons 1990) for a summary of geology and hydrology near the Bishop Creek Project. This Sediment and Geomorphology Report covers the following:

- Overview of site geology
- Baseline geomorphic survey from 1989 field work
- Eight cross-sections and a longitudinal profile at each of six monitoring sites
- Bed particle size, bar particle size, and incipient motion analyses
- Pre-instream flow hydrology summary

Following completion of the SLA Report, riparian vegetation monitoring (Read 2015; Read and Sada 2013; Psomas 2005) and aquatic habitat monitoring (Read and Sada 2013; Psomas 2005) have occurred approximately every 5 years at the Bishop Creek Project as part of the current license. These reports, described in Sections 2.1.1 and 2.1.2 below, provide good historical data spanning an approximate 30-year period.

2.1.1 RIPARIAN MONITORING

- Baseline (1991 to 1993) and repeat surveys (field surveys in 2004, 2009, 2014, and 2019)
- Re-surveyed cross-sections that can be used to indicate channel stability
- Riparian tree sizing, age, and mortality
- Presence of LWM in the riparian zone
- Geomorphic parameter summary by site

2.1.2 Aquatic Habitat Monitoring

- Baseline (1991 to 1993) and repeat surveys (field surveys in 2005 and 2009)
- Characterization of channel width, depth, and velocity during three seasons in a monitoring year
- Substrate size distributions for each study reach
- Substrate embeddedness

After the SLA Report, Sites 3, 4, 5, and 6 were located and served as the basis for the study reaches in this report. The subsequent riparian vegetation and aquatic habitat monitoring surveys generally aligned with the initial geomorphic study sites, but over time, some sites were abandoned due to vandalism and site disturbance. While the post-1993 (after the start of minimum instream flows) study sites may not align directly with the proposed study reaches for this Study Plan, the information will be useful for calibrating a hydraulic model and understanding channel geomorphology.

Subsequent to the SLA Report, Sada and Hawkins (1997) performed an evaluation of the impacts of released impoundment sediment (fines, sands, and gravel) on sediment depth in pools, substrate type in pools, and pool bottom elevations. This report evaluated conditions immediately downstream of Intake 3 and Intake 4 twice prior to sediment release, immediately after a sediment release, and after a 200 cubic feet per second (cfs), 24-hour flushing flow for these areas. Sada and Hawkins (1997) determined that the released sediment, while equally deposited in riffles and pools (filling some to depths of more than 50 centimeters [cm] immediately after the release), generally was transported to the next intake impoundment by the flushing flow. The study determined that the substrate in the pools was substantially different when comparing the pre-sediment release and post-flushing flow conditions in any of the pools below Intake 3 and in 12 of 15 pools below Intake 4. The study determined there were no differences in pool substrate coverage by sediment in either reach when comparing pre-sediment releases and post-flushing flow conditions, regardless of the transport of the sediment 1300 meters and 2500 meters downstream of Intakes 3 and 4, respectively. The substrate in the pools post sediment release and prior to flushing flows was generally smaller than 1.5-inches gravel and larger than medium sand 0.012 inch, with sand being most frequently encountered. Additional information contained in this report includes:

- Turbidity monitoring during background conditions, the sediment release, and flushing flows
- Pool characteristics and substrate elevations for 15 pools in each reach
- Sediment depth, coverage, and composition for each study reach
- Summary of fish rescue and mortality during the study

To manage sediment in the impoundments, Southern California Edison (SCE) periodically removed sediment from the intake impoundments to maintain storage capacity and minimize the potential for sediment to be pulled through the powerhouses. The largest removal effort in the past 40 years occurred in response to historic flooding from Tropical Storm Olivia in 1982 that resulted in the failure of the North Lake Reservoir dam (peak flows estimated at 1,720 cfs in Bishop Creek (Sierra Hydrotech 1983). Shortly after this flood, sediment was removed from Intakes 3, 4, 5 and 6 to restore storage capacity (Simon 1990). Sediment was removed from Intake 2 in the late 1980s or early 1990s; Intake 2 had adequate capacity up until that time. The Intake 2 sediment removal effort resulted in the excavation of approximately 50,000 cubic yards (CY) of sediment from the impoundment (sediment that was primarily generated from the dam failure; Charles Partridge, SCE Project Staff, personal communication)). Since these removal efforts, periodic drawdowns of the intake impoundments have occurred, primarily for maintenance of necessary structures. However there has been no regular sediment removal, sediment sluicing, or drawdown program. More recently, in 2009, 2010, and 2011, SCE removed sediment from Intakes 6, 4 and 5, generating approximately 1,200 CY, 1,500 CY and 2,000 CY of material, respectively (Charles Partridge, SCE Project Staff, personal communication). Assuming approximately 25 years between sediment removals and excavation to similar extents during both excavations, the estimated sediment loading (bed load) at Intakes 6, 4, and 5 may average approximately of 50 to 80 CY per year. According to Bishop Creek Project staff, there is minimal LWM that drops into the sediment of the impoundments (based on the recently excavated sediment). Bishop Creek Project staff indicated that while some LWM may sink, most washes over the spillway and there were no issues with large LWM flows clogging the intake structures. SCE staff did state that a larger LWM and sediment load could occur if a higher runoff year follows a few years of lower flows; and/or when the upstream beaver dams were blown out and the accumulated sediment and beaver dam materials were released.

Just downstream of the Bishop Creek Project Powerhouse No. 6 outlet, the Los Angeles Department of Water and Power (LADWP) operates a small diversion structure to supply the Main Indian ditch diversion with water. This impoundment is 3-feet to 5-feet-deep and has sediment removed more frequently than the Bishop Creek Project impoundments (Charles Partridge, SCE Project Staff, personal communication).

2.2 PROJECT HYDROLOGY AND FLOW MANAGEMENT

The Bishop Creek Project’s relatively extensive Bishop Creek daily stream discharge (i.e., flow) dataset was utilized to evaluate channel geomorphology and sediment transport in this reach. The Operations Model Study Report (completed as part of this relicensing effort) can be used in parallel with this study to evaluate potential flow releases to mobilize sediment throughout the Bishop Creek Project. In addition, annual hydrographs and peak annual flows for the study reaches, developed by SCE, were used to evaluate sediment transport in the study reach.

As described in the Operations Model Study Report, flow at the site varies, depending on the amount of runoff and the SCE release schedule, which is dictated by snowpack, snow melt, spring rain events, drought, power demand, and irrigation. In Bishop Creek above

Powerhouse No. 6 (U.S. Geological Survey [USGS] Gauge 10271200), calculated daily mean flows (water years 1994 to 2020) range from 0.1 cfs to 453 cfs, with peak runoff generally occurring from June to August, as the snow melts in the higher mountain elevations. Over a recent 27 year period (1994-2020), annual peak daily runoff values ranged from 15 cfs to 453 cfs in Bishop Creek (Table 2.2-1) most of which have more than 20 years of data available. These gauges were utilized where necessary to evaluate flow conditions in the study reaches, including peak annual flows, average flows, and estimations of bankfull based on flow-event return period. These peak flows may be the channel-forming flow in Bishop Creek and thereby an important flow to evaluate as part of this study.

The Bishop Creek Project utilizes water from Bishop Creek to generate electricity, but there are minimum pass-by flows between the diversion dams. These pass-by flows and downstream minimum flows are documented in Section 2.3. Other sources of water input between the junction of the South Fork and Middle Fork to Powerhouse No. 6 include three tributaries, of which the largest is Coyote Creek, which enters Bishop Creek upstream of Powerhouse No. 4. SCE has stream gauges installed at many locations in the watershed (Figure 2.2-1) most of which have more than 20 years of data available. These gauges were utilized where necessary to evaluate flow conditions in the study reaches, including peak annual flows, average flows, and estimations of bankfull based on flow-event return period.

Table 2.2-1 Annual Peak Stream Flows in Bishop Creek above Powerhouse No. 6 since the Occurrence of Bypass Flows

Water Year	Date	Daily Mean Stream-Flow (cfs)
1994	September 29, 1994	71
1995	July 31, 1995	421
1996	July 29, 1996	197
1997	January 3, 1997	250
1998	July 23, 1998	453
1999	November 4, 1998	189
2000	November 4, 1999	163
2001	July 8, 2001	367
2002	November 6, 2001	194
2003	October 1, 2002	86
2004	June 8, 2004	180
2005	July 19, 2005	283
2006	July 24, 2006	310
2007	June 20, 2007	83
2008	May 22, 2008	138
2009	July 03, 2009	77
2010	July 17, 2010	362
2011	April 8, 2011	236
2012	August 16, 2012	41
2013	July 24, 2013	113
2014	March 19, 2014	15
2015	November 20, 2014	55
2016	June 30, 2016	116
2017	July 15, 2017	421
2018	July 24, 2018	334
2019	June 16, 2019	230
2020	November 21, 2019	74
27-year Annual Peak Stream Flow Average:		**202**

Source: USGS 2022

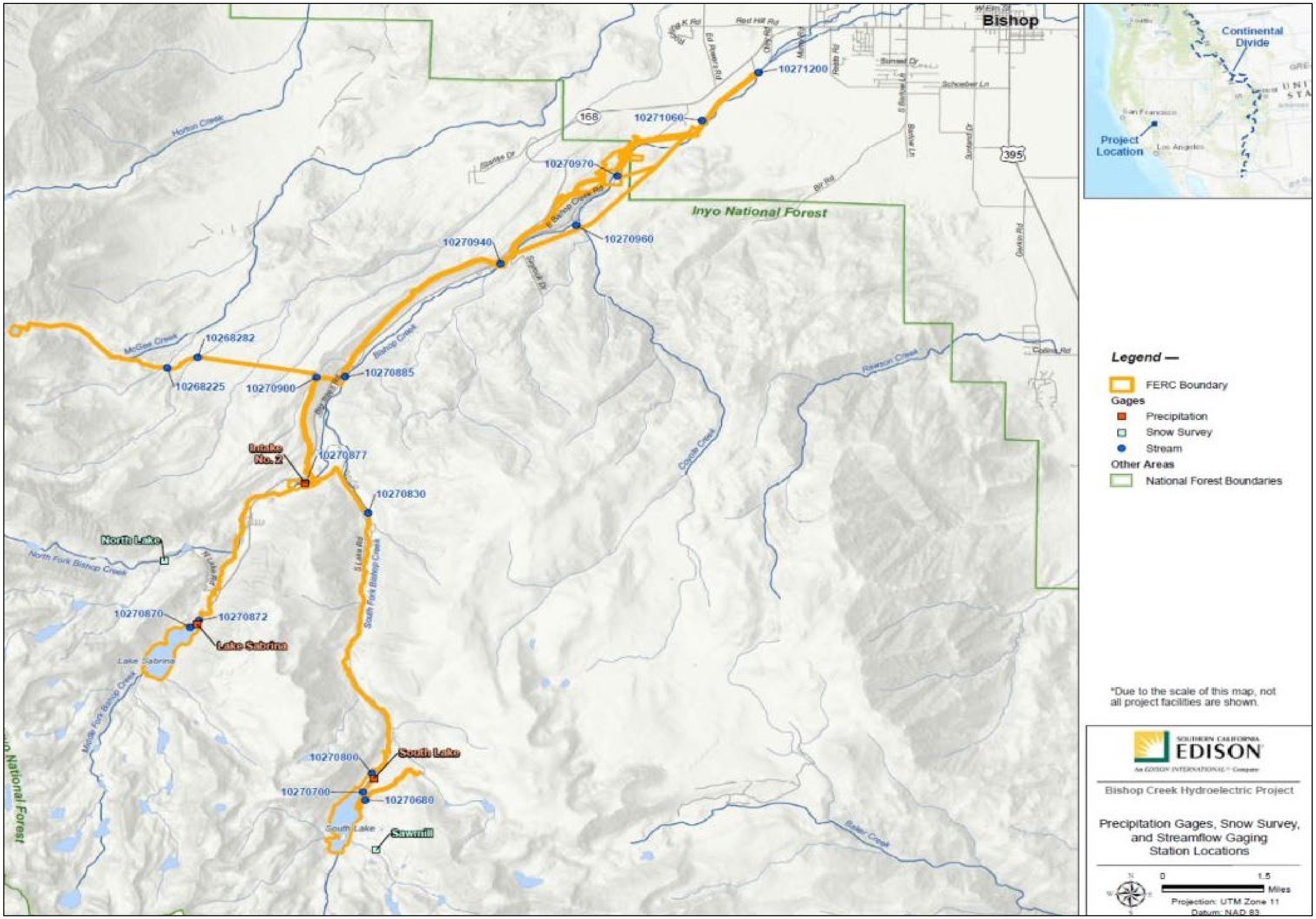


Figure 2.2-1 Stream Flow Gauging Stations along Bishop Creek.

2.3 REGULATORY AND LEGAL CONSTRAINTS

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

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

The Chandler Decree and State Water Resources Control Board (SWRCB) water rights licenses determine how flows are allocated and used, as follows:

- Seasonal diversion and accumulation limit not to exceed historically measured use (i.e., not to exceed current Bishop Creek Project capacity), including an annual limit of 1,400-acre feet from Green Creek
- Instantaneous diversion limit at all locations not to exceed historically measured use (i.e., not to exceed current Bishop Creek Project capacity), including a daily average limit of one cfs for domestic use
- Minimum Bishop Creek Project flow-through (downstream delivery) requirements, for senior downstream water rights holders, are measured below Powerhouse No. 6, as required by the Chandler Decree (Table 2.3-1)
- Minimum instream flow requirement of 0.25 cfs at the Birch Creek diversion, for senior downstream water rights holders, as stipulated by the Chandler Decree
- Minimum instream flow requirement of 1.6 cfs during the irrigation season, and 0.4 cfs at other times, through the Abelour Ditch, for senior downstream water rights holders in the Rocking K Subdivision

Table 2.3-1 Daily Average Flow Requirements for Flow below Powerhouse No. 6

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

Source: Chandler Decree, 1929

In addition, there are required minimum instream flow requirements within the Bishop Creek Project that are mandated by Article 105 of the FERC license, as follows:

- Lake Sabrina to Intake 2: no less than 13 cfs or natural flows, whichever is less, year-round
- South Lake to South Fork Diversion: no less than 13 cfs or natural flows, whichever is less, year- round
- Intake 2 to Powerhouse No. 2: no less than 10 cfs from Friday of the last weekend in April thru October 31; no less than 7 cfs for the remainder of the year; or no less than 5 cfs in all months of dry years
- Southfork Diversion: no less than 10 cfs from Friday of the last weekend in April thru October 31; no less than 7 cfs for the remainder of the year
- Powerhouse No. 2 to Powerhouse No. 3: no less than 13 cfs year-round
- Powerhouse No. 3 to Powerhouse No. 4: no less than 5 cfs year-round
- Powerhouse No. 4 to Powerhouse No. 5: no less than 18 cfs year-round (Article 105)[1]
- Release from Powerhouse No. 6: per Chandler Decree (Table 2.3-1)

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

3.0 STUDY OBJECTIVES

This Sediment and Geomorphology Study seeks to develop an understanding of sediment dynamics in Bishop Creek by analyzing relationships between sediment and flow dynamics in Bishop Creek. This study will assist SCE and stakeholders in understanding how Bishop Creek Project operations interact with sediment transport in Bishop Creek. To meet this goal, this study has the following objectives:

- Determine flow conditions that mobilize sediment and LWM in the stream channel and from forebays
- Characterize the particle size distribution of mobile sediment
- Evaluate how flow operations (flow release timing, magnitude, and duration) affect sediment transport
- Better understand how sediment flushing flows could impact reaches below Powerhouse No. 6

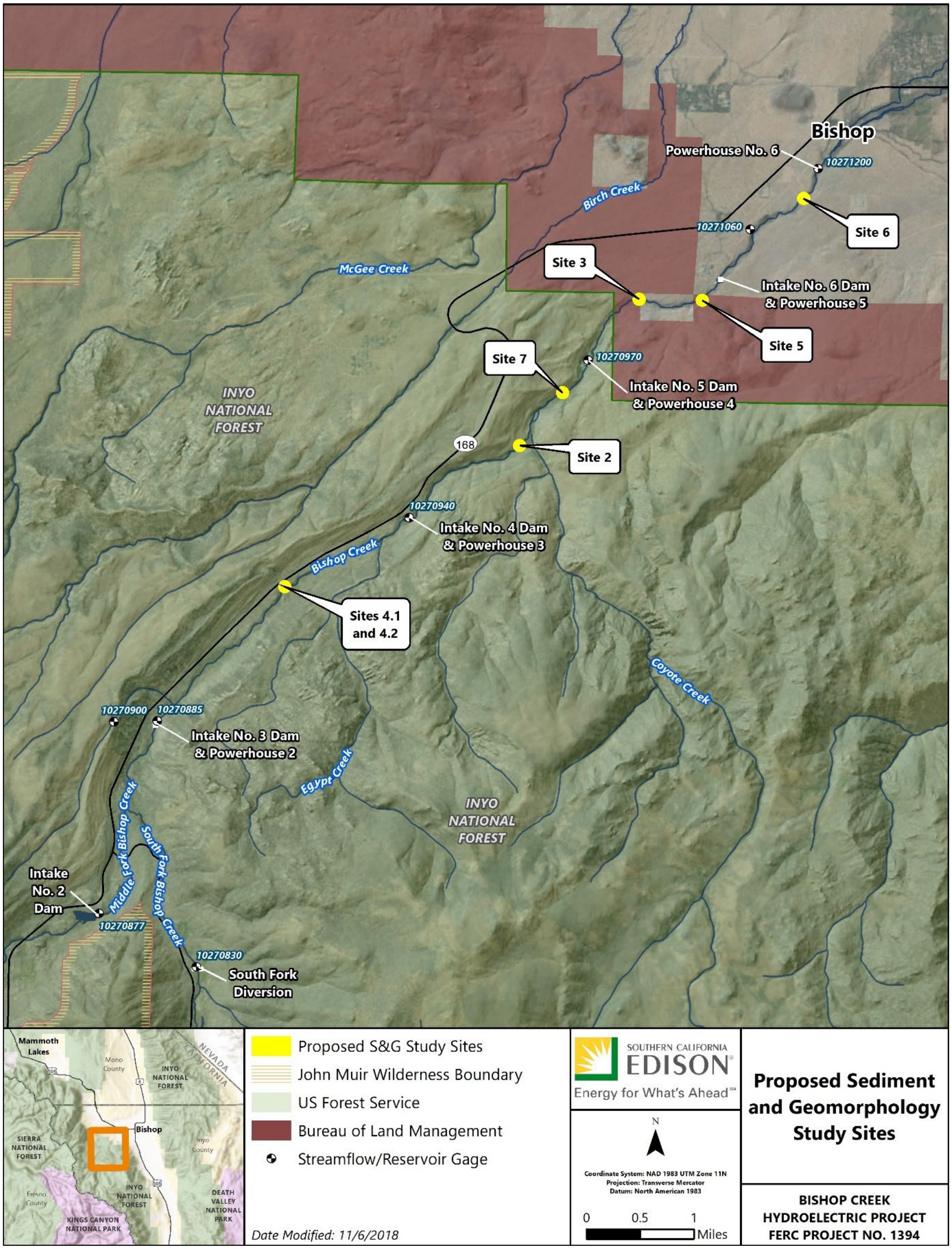
3.1 STUDY AREA

Figure 3.1-1 presents the study area for the Bishop Creek Sediment and Geomorphology Study. The study area focused on the areas of Bishop Creek that could potentially be modified by changes in Bishop Creek Project operation; Lake Sabrina, South Lake, and sections of Bishop Creek down to the Intake for Powerhouse No. 3 were not included in this study. The study area focused on the six of the seven[2] proposed monitoring sites identified in Figure 3.1-1. This included five monitoring sites (monitoring Sites 3 through 6, including a split site at Site 4.1 and Site 4.2) that align with the monitoring sites established by SLA (1990), as well as one new monitoring site (Site 7) to characterize channel substrates and dimensions downstream of the junction with Coyote Creek.

Monitoring Sites 3 through 6 were selected because of their inclusion in earlier stream monitoring studies (Read 2015; Simons 1990). These sites were located at the lower end of each reach between powerhouses, which should be in more equilibrium with the stream channel relative to any site just downstream of the diversion dam where there would likely be less sediment. Monitoring Site 1 referenced in the SLA Report was omitted from the proposed study area because it had a high frequency of disturbance (due to the nearby campground), as noted in previous studies in this area. Monitoring Site 7 is a new site established for this study. It should be noted that the numbers assigned to the Bishop Creek sites correspond to the chronological order in which the sites were established prior to 1991, not their relative location along the stream. In order from upstream to downstream on Bishop Creek, the monitoring sites were numbered, Sites 4.2, 4.1, 7, 3, 5, and 6. Of these, Site 3 was originally selected because it represents one of the two

[2] Seven sites were originally proposed, but Site 2 was excluded based on site conditions, as described in Section 5 of this report.

major physiographic valley types present along Bishop Creek; Sites 4 through 6 were selected because they were considered to be sensitive to changes in streamflow or to have vegetation (or wildlife) of special interest (Read 2015; Sada 2010). In 1991, Site 4 was divided into two monitoring sites due to the change in slope and channel characteristics in this stream section; this aligns with the riparian vegetation monitoring sites. This numbering scheme was retained to maintain continuity between monitoring activities. It should be noted that Sites 4.2, 4.1, 2, and 7 were in the study reach that was evaluated for sediment flushing flow as part of the Sada and Hawkins study (1997).



Note: Site 2 was excluded based on field conditions; refer to Section 5

Figure 3.1-1 Sediment and Geomorphology Study Sites.

4.0 METHODS

The Bishop Creek Sediment and Geomorphology Study, as outlined in the Revised Study Plan approved by the TWG, included five primary, intertwined tasks:

1. Field surveys;
2. An assessment of LWM;
3. An estimate of annual sediment loading;
4. An evaluation of substrate mobility, and
5. An evaluation of flushing flows on sediment mobility and LWM dynamics.

These tasks serve to clarify the objectives of this study by increasing SCE's understanding of sediment and LWM dynamics in Bishop Creek. The general sequence of steps to complete these tasks, with additional detail, is provided below:

1. Perform preliminary field reconnaissance to confirm SLA Report sites (Sites 2 through 6), recover cross-sections, and select a location for monitoring Site 7. Confirm "typical" sediment size by sampling bulk piles of sediment previously excavated from impoundments throughout the Bishop Creek Project (to identify the typical sizing of sediment found in the impoundments)
2. Compile and review data from the in-stream flow period (1994 to 2018) for peak annual flows and flow duration curves for the gauge nearest each site
3. Perform cross-section survey, substrate characterization, bankfull flow evaluation, and LWM assessment at each monitoring site
4. Perform bedload sediment transport measurements during estimated bankfull flows at the most upstream (monitoring Site 4.2) and most downstream (monitoring Site 6) sites
5. Utilize the FlowSed sediment transport model to estimate annual sediment loads at monitoring Site 4.2 and monitoring Site 6
6. Evaluate potential bed substrate mobility under bankfull, and flood flows, including impacts of possible flushing flows
7. Comment on the potential benefits, disadvantages, and outcomes of using flushing flows to mobilize sediment and LWM through the Bishop Creek Project
8. Develop a summary report that outlines the methods, field work, conclusions, and recommendations as they pertain to sediment and LWM in the Bishop Creek study reach

Methods for this Study Plan Steps 4 and 5 have been modified, per the revisions described in Section 5, with steps 6 through 8 being completed in 2021.

4.1 TASK1: FIELD SURVEYS

The first part of Task 1 (Task 1A) was a field reconnaissance visit, in July 2019, to recover the eight cross-sections at each of the monitoring Sites 2 through 6 (from the SLA Report Sites 2 through 6), establish a new Site 7, and evaluate nearby locations at each for sediment sampling. The prior cross-sections were marked in the field in 1989 with rebar and aluminum tags marked S1 through S8 from downstream to upstream. Some of the sites were recoverable after approximately 30 years. For this study, field staff surveyed one cross-section in each of three separate riffles (in the upstream two-thirds of the riffle) at each site as part of a later field effort. Sediment mobility was calculated in riffles; therefore, any cross-sections in a pool, run or glide would not adequately represent the sediment transport capacity of the reach. If the SLA Report cross-sections were not in suitable locations, new cross-sections were selected, as the sediment transport modeling requires cross-sections to be in the active portion of the riffle. During the field reconnaissance visit, the location of Site 7 was evaluated and modified, based on field conditions. After this visit, the sites each had three cross-sections identified in a riffle reach suitable for evaluation of sediment transport with additional survey and data collection.

To inform sediment sampler size selection and support the evaluation of sediment transport, a sieve analysis of previously excavated sediment was performed during this initial site visit. Field staff consulted with plant operators to understand the frequency of sediment removal, frequency of drawdowns, feasibility of flushing deposited sediment, and LWM mobilization at each of these impoundments. The particle size of sediments previously excavated from the impoundments was determined by sieve analysis in the field for three composite samples at identified piles of excavated sediment, including samples from removed sediment from Intakes 2, 4, 5, 6, and the LADWP impoundment directly downstream of Powerhouse No. 6. The composite samples included a sample from approximately 6-inches-below the existing surface at three well-spaced locations to minimize any sorting of particles by erosion processes on the surface of the excavated sediment.

The second part of Task 1 (Task 1B) was to collect additional field data, including cross-section and longitudinal surveys, bed substrate characterization, and bankfull bed sediment transport measurements needed to support subsequent analytical tasks.

Fieldwork for Task 1B was conducted in September 2019. For each of the 18 cross-sections in the SLA Report, the survey utilized the same local datum as the SLA Report to the extent possible. Three new cross-sections were established at monitoring Site 7. Each cross-section used the same cross-section endpoints (rebar), if they were recovered; otherwise, new rebar monuments were established well outside the bankfull channel. Each monument (recovered and new) was recorded with a sub-meter global positioning system (GPS). The survey captured major breaks in topography along the cross-section, the bankfull elevation (if a defined feature could be identified in the field), and the water level; generally based on the USFS protocol (Harrelson et al. 1994). Photos of each cross-section were taken facing upstream, downstream, and the left and right banks (relative to the downstream direction) to document the conditions at the time of the survey. Additionally, representative photos of the bed substrate as well as a photo of active bars in the site reach were captured. To inform bed substrate mobility, a Wolman pebble count[3] (minimum 100 samples) was performed within the active riffles at each site, as well as a bar sediment sample (grab sample to determine D_{84} particle size), if any bars were present in the site reach. This generally aligned with the methods and approach utilized in the SLA Report, which allows for comparisons with the prior study. To characterize the slopes at each site, a longitudinal profile was established through the monitoring site cross-sections with a length of approximately 20 times the bankfull width or through three riffle-pool sequences, whichever was less. This visit included a modified Pfankuch Channel Stability Rating (Rosgen 2014) to evaluate the condition of the channel and inform sediment transport calculations.

The cross-section survey was conducted in sufficient detail to capture any change in grade and characterize channel geometry, following standard survey procedures established by the USFS (Harrelson et al. 1994). This included capturing the bankfull elevation on both banks, the edge of water during the surveys, and the thalweg elevation. The survey approach ensured that all topographic breaks across the channel cross-section and all cross-section elevations within a given site were measured. 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.

A longitudinal profile of the channel thalweg was surveyed through the length and extended upstream and downstream of the cross-sections for a minimum total length of 20 times the bankfull width or a minimum of three pool riffle sequences, whichever was shorter. The longitudinal profile survey followed procedures established by the USFS (Harrelson et al.1994), including surveying a sufficient number of points with which to capture the topography of pools, riffles, and other habitat features, as well as other significant breaks in channel gradient.

A Wolman style pebble count (Wolman 1954) was performed to characterize channel bed particle size distribution on the full width of the stream bed along cross-sections and representative channel locations. Pebble counts entailed measuring the intermediate axis (b-axis) of 100 particles in the immediate vicinity of a cross-section transect. All silt- and sand-sized particles were classified as less than 2 millimeters (mm). At Sites 4.1 and 4.2, a number of the established cross-sections were primarily composed of large immobile framework boulders and standard Wolman style pebble counts would not inform potential streambed mobility or adequately characterize overall particle size distribution; therefore,

[3] The pebble count procedure (Wolman, 1954) is the measurement of 100 randomly selected stones from a homogeneous population on a riverbed or bar, which yields reproducible size distribution curves for surficial deposits of gravel and cobbles. https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1752-1688.1997.tb04084.x,

the area over which pebble counts were conducted was expanded to better inform sediment dynamics. Representative photos of channel bed substrate were collected throughout the study sites.

Additional cross-section and longitudinal profile surveys were conducted as part of the Tracer Rock Study (Appendix A) at Sites 4.1, 4.2, and 6 (Figure 3.1-1) July 27–August 6, 2020 utilizing Trimble S7 Real Time Service (RTS) and Trimble R12 Real-Time Kinematic Global navigation satellite system (RTK GNSS) survey equipment. Two semi-permanent benchmarks were installed near each study site to facilitate future monitoring efforts. The benchmarks consisted of a small magnetic nail and shiner set in large boulders or bedrock near ground level. Coordinates for one benchmark (primary benchmark) were obtained at each site by submitting static RTK GNSS observations to the National Geodetic Survey Online Positioning User Service (NGS OPUS). Coordinates for the secondary benchmark (backup), existing cross-section endpins, and all cross-section and longitudinal profile points were measured using standard RTK GNSS and RTS survey techniques and tied into the primary benchmark.

The proposed third part of Task 1 (Task 1C) was to measure bed sediment transport, which was to occur after Task 1B was completed and during a higher flow period (natural or man-made). Note that this subtask was modified as described in Section 5.0, based on field conditions, and as described in the Revised Study Plan to evaluate tracer rock mobility rather than to measure sediment transport loading. The selection of a bankfull flow to evaluate sediment mobility is one of the key drivers of the sediment transport capacity in the system. Due to this sensitivity, bankfull discharge identified in the field during the cross-section surveys was utilized, as in this regulated system, the regional curves and traditional statistical analysis were not as applicable.

The outcome of these field efforts resulted in the following information for use in subsequent analysis of sediment transport in Bishop Creek:

Site-wide Data

- Pfankuch channel stability rating
- Channel slope (elevation change divided by stream length)
- Riffle Substrate D_{50} and D_{84}
- D_{50}, D_{84}, and D_{100} for excavated sediments from previously excavated intake sediment disposal piles

Cross-section Specific Data

- Bankfull cross-section area
- Channel dimensions (width, depth, area)

4.2 TASK 2: ASSESSMENT OF LARGE WOOD MATERIAL

To evaluate the presence and potential mobility of LWM at each monitoring site, field staff recorded the size, quantity and likelihood of mobility of LWM in three zones;

1. Wetted channel (WET)
2. Above the waterline to bankfull elevation (BKF)
3. From bankfull up to an approximate elevation of twice the bankfull depth (to characterize LWM available in flood events [FLD]).

LWM that could be mobilized during flooding in the channel was considered as any wood larger than 3-inches in diameter and 4-feet-long that was not reasonably well anchored (e.g. well rooted, live vegetation, or mostly buried material) was excluded in this count. If substantial LWM existed in an area, the average size, length, and approximate quantity were noted. The study length for this assessment was the same as the stream length utilized to measure stream slope. The Bishop Creek Project operators provided input regarding the frequency of LWM mobilization and presence in the system, as described in the existing conditions of the Project.

4.3 TASK 3: ANNUAL SEDIMENT LOADING ESTIMATION

Based on field conditions and site safety constraints, this task was modified as described in Section 5, to focus on mobility of individual tracer rocks, rather than annual sediment loading, as such measurements were not feasible during this study. Refer to the Sediment & Geomorphology Study Plan for a review of what was proposed prior to the modified approach.

4.4 TASK 4: SUBSTRATE MOBILITY EVALUATION

Note that this task was modified as described in Section 5.0, based on field conditions; the methods summarized in this section are for the modified methodology, with additional detail provided in Appendix A.

Passive integrated transponder (PIT) tagged tracer rocks were deployed to inform sediment transport dynamics at study Sites 4.1, 4.2, and 6 (Figure 3.1-1, same sites as studied in 1990 baseline surveys). Tracer rocks bracketed the range of D_{10} to D_{84} particle sizes (32 to 350 mm) present at each site, determined by 2019 pebble counts. Table 4.4-1 describes the particle size classes and total quantity of tracer rocks installed in 2020.

Table 4.4-1 Tracer Rock Size Classes and Quantities Deployed

Size Class	B-axis Range (mm)	Quantity
A	32–45	30
B	45–60	30
C	60–90	33
D	90–128	31
E	128–180	31
F	180–256	19
G	256–350	9
	Total:	183

Tracer rock size classes A–F were obtained from an out of area aggregate source prior to the start of fieldwork. The out of area tracer rocks had similar lithology (igneous) and physical properties (e.g., specific gravity, sphericity, hardness, mineralogy) to native particles found at the Bishop Creek study sites. Tracer rocks in size class G were obtained on-site. The out of area tracer rocks were decontaminated with Virkon® aquatic disinfectant prior to deployment in Bishop Creek. The intermediate axis (B-axis) and mass were recorded for each particle in size classes A-F, but only the B-axis parameter was recorded for size class G particles. PIT tags were inserted into the tracers by drilling a 3/16-inch hole into each particle, cleaning out residual detritus and then sealing the PIT tag in place with a quick cure, high strength concrete and masonry anchoring adhesive. The adhesive was smoothed over to try and mimic natural particle surface texture. The tracer particles were painted a bright, high contrast color with concrete marking paint once the adhesive was dry.

Tracer rocks were deployed along study site cross sections and at other representative geomorphic units at the three study sites. Various geomorphic units were chosen for tracer rock placement to test rock particle mobility in a range of environments. Geomorphic units included riffles, cascades, flat-water sections (runs and glides), and plunge pools. 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 emplacement. The location of each tracer rock was surveyed with RTS or RTK GNSS equipment, and representative photographs were taken of the tracer locations.

As part of identifying the mobility of sediment in the study reach, an evaluation of sediment mobility was completed, based on the data collected during the field effort. This included an incipient motion calculation using the Shields equation (as used in the SLA Report). In addition to the Shields equation, particle mobility was evaluated using empirical data collected for streams in Colorado and summarized in the River Stability Field Guide, Worksheet 3-14 (Rosgen 2014). The Rosgen (2014) equation tends to show particle mobility at lower flows than the Shields equation and can provide a range of sediment particle size mobility for a given depth/shear stress. The results of the Shields and Rosgen methods were compared to the mobility anticipated in the SLA Report for the D_{65} and D_{84} particle size, as well as to the tracer rocks mobilization results (although not exactly at bankfull flows).

5.0 MODIFICATION TO METHODS

As described in the Initial Study Report (ISR) filed October 30, 2020, and subsequent progress reports, modifications were made to the approved study, based on safety and field conditions. These changes were implemented after consultation with the TWGs. A summary of these modifications follows:

- Task 1-Field Studies and Task 3-Annual Sediment Loading Estimation: Omitted the bed sediment sampling field effort and annual sediment loading estimate due to safety concerns and higher than anticipated bankfull conditions identified in this previously that prohibit this data collection.

- Task 4-Substrate Mobility Evaluation: Added a tracer rock study to supplement the previously proposed bed substrate mobility calculations utilizing data available from 2019 field efforts. This tracer rock study was expected to meet the objectives for this study by: confirming that the observations of coarse substrate in the riffles indicate that smaller (less than 60 mm) substrates were mobilized through the Bishop Creek Project during bankfull flows; and providing a better understanding of substrate mobility during a period of normal summer flows and a period of higher spring flows in Bishop Creek. This tracer rock study occurred at previously surveyed riffles at Site 4 (most upstream, steep site) and Site 6 (most downstream, lower gradient) over a period of high flows (near bankfull) and lower flows. This study involved tagging (paint and PIT tag) rocks of desired size classes (32 to 360 mm, capturing most of the surveyed riffle D50 rock sizes), placing the tagged rocks in target riffles, and then locating the tagged rocks after a high-flow event to determine if they were mobilized. The schedule was dependent on anticipated flows in Bishop Creek; the placement of tracer rocks occurred July 27–August 6, 2020, with recovery in May 2021 (after an approximately 60-70 cfs pulse flow) and in July 2021 (after an approximately 120 cfs pulse flow).

- Task 5-Flushing Flow Evaluation: This task essentially remained unchanged. SCE relied on previous studies at the site, field data collected during 2019, and the tracer rock study (proposed Task 4) to consider the impacts of utilizing flushing flows to mobilize sediment and large woody material in Bishop Creek, including a qualitative assessment of potential impacts to macroinvertebrates.

6.0 RESULTS

The results of the field study are presented in four sections to describe the findings associated with the Bishop Creek channel, substrate, and bankfull flows; the dredged sediment gradations; large woody material in Bishop Creek; and the tracer rock study.

6.1 CHANNEL CROSS SECTIONS, SUBSTRATE, AND BANKFULL FLOWS

As part of the 2019 field survey, three cross-sections were surveyed at each monitoring site. During the reconnaissance trip and field survey trip, the historic SLA cross-sections (eight cross-sections at each site) were evaluated to determine which were in the active portion of a riffle (to better inform sediment transport/mobility assessments). The three most ideal cross-sections for evaluating sediment transport in riffles were surveyed in 2019. For the purposes of analysis, a representative riffle cross-section was selected from the three surveyed cross-sections. Table 6.1-1 summarizes the geometry of each representative cross-section.

Table 6.1-1 Representative Cross Section

Site	Cross Section ID	Bankfull Width (ft)	Bankfull Depth (ft)	Bankfull Area (ft^2)	2019 Estimated Bankfull Discharge (cfs)	1990 Estimated Bankfull Discharge (cfs)*
4.1	4.9	30.1	1.1	31.5	128.9	270
4.2	4.4	28.2	1.2	33.2	86.2	100
7	7.1	28.4	1.6	44.2	162.8	N/A
3	3.2	26.7	1.6	42.6	147.3	110-1,500
5	5.3	37.1	1.0	37.0	91.4	800-1,500
6	6.5	16.1	1.3	21.6	59.3	50-165

Notes: Sites were ordered from upstream to downstream and bankfull was estimated based on geomorphic characteristics observed during the 2019 field survey.

*Simon 1990; Table 8.3.

The variability in bankfull area across sites is expected as each of the reaches has different minimum flows and hydro generation capacities, tributary inputs, and local slopes that dictate this dimension. Further, selecting bankfull elevation in the field can vary between observers, so while bankfull was called by the same crew on these sites, comparison to historic data may introduce another potential difference. A comparison of these values with historic data from the 1990 study is presented in Table 6.1-1.

A Wolman pebble count was conducted in the active riffles at each site to characterize the riffle substrate size. This pebble count was a composite sampling of the active riffles surveyed by the cross-section survey at each site. The riffle substrate D_{50} (meaning that 50 percent of the particles measured by the pebble count were equal to or less than this value) for the study sites ranged from 139 mm (large cobble) to 597 mm (medium boulder). The riffle substrate D_{84} for the study sites ranged from 342 mm (small boulder) to 1622 mm (large to very large boulder). The riffle substrate particle size distribution is provided in Figure 6.1-1 with a representative photo of the riffle substrate provided in Photo 6.1-1. A comparison with historic survey data from the 1990 SLA report shows relatively strong agreement on the D_{50} particle size found during the 2019 field effort, with the historic data indicating that the D_{50} particle sizes for Sites 1 to 6 ranging from approximately 200 to 600 mm.

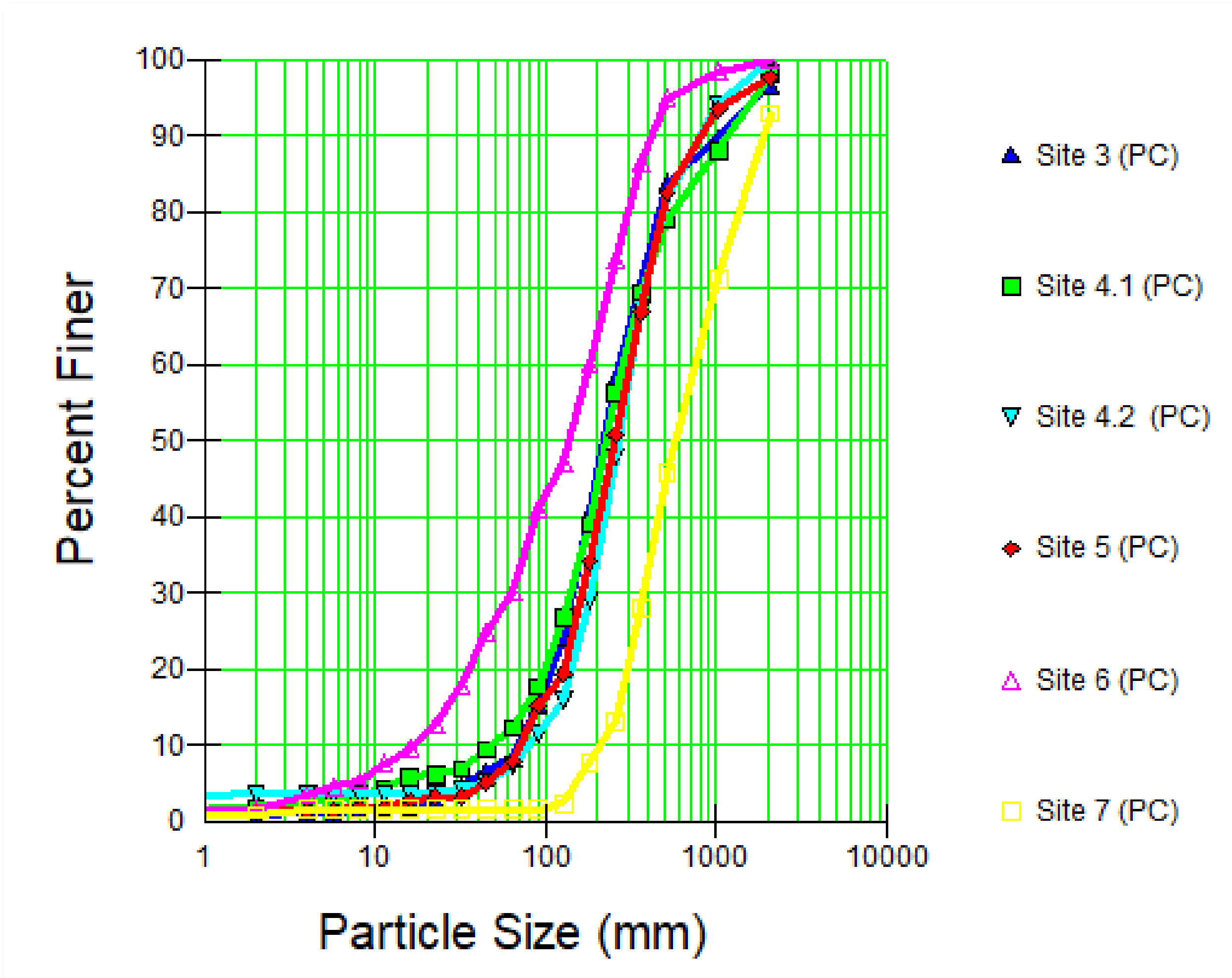


Figure 6.1-1 Riffle Substrate Particle Sizes.

Note: For reference the gravelometer in the creek is approximately 380 mm by 200 mm

Photo 6.1-1 Riffle Substrate at Site 6

The representative riffle cross-section geometry, riffle substrate D_{50}, and bankfull slope were utilized to classify the Rosgen stream type at each site. Bankfull slope was measured in RIVERMorph (publicly available program from RIVERMorph, LLC for storing and analyzing river data) based on the bankfull indicators surveyed in the long profile survey of each site, conducted during 2019. At sites where it was very difficult to find "typical" bankfull indicators (Sites 4.1, 4.2, and 7), head of riffle bed and water surface elevations were utilized to determine channel slope for classification and analysis. The Rosgen Stream Types are provided in Table 6.1-2.

Table 6.1-2 Rosgen Stream Classification

Site	Width / Depth Ratio (W_{bkf}/d_{bkf})	Maximum Depth (d_{mbkf}, ft)	Entrenchment Ratio (ER)	Riffle Substrate D_{50} (mm)	Slope (S, ft/ft)	Rosgen Stream Type
4.1	28.7	2.8	1.7	228	0.048	B3a
4.2	23.9	2.6	2.0	267	0.039	B2
7	18.2	3.5	1.8	597	0.080	B2
3	16.7	3.0	2.5	220	0.041	B3a
5	36.9	1.7	1.1	252	0.050	B3a
6	12.0	2.0	2.0	139	0.029	B3

At each site, channel stability was evaluated qualitatively during the field survey. These evaluations were documented using the modified Pfankuch Channel Stability Rating (Rosgen 2014) form. Stability ratings for the study sites ranged from fair to good; however, this rating was for free-flowing streams, thus it may not be directly applicable to the more-regulated Bishop Creek. The completed Pfankuch forms are included as Appendix B of this Final Technical Report.

Based upon a representative cross-section of each site's geometry, bankfull slope, and riffle substrate particle size distribution, the bankfull velocity, discharge, and shear stress were calculated in RIVERMorph. Jarrett's Equation[4] was utilized to calculate the Manning's n coefficient at each site for the estimated bankfull velocity and discharge. The estimated bankfull shear stress was utilized along with the Shields Curve and Colorado Curve to predict the largest movable particle size. The results from the Shield Curve ranged from mobilizing a 198 mm (large cobble) to 660 mm (medium boulder) bed particle for the estimated bankfull discharges. The results from the Colorado Curve resulted in slightly larger particles being mobilized under the same estimated bankfull discharges at each site (ranged from 293 mm/small boulder to 686 mm/medium boulder). Table 6.1-3 shows the predicted largest movable particle size for each study site and provides the historic data (critical particle size and bar sample D_{84}) from the earlier 1990 SLA report for comparison, although the earlier study looked at largest movable particle on a bar sample, so it is not a direct comparison.

[4] Jarretts equation is: n = 0.39*(S^0.38)*(R^-0.16), where S is the energy slope and R is the hydraulic radius of the stream. n-values in steep streams - Kleinschmidt (kleinschmidtgroup.com) accessed January 29, 2022.

Table 6.1-3 Predicted Largest Movable Particle under Estimated Bankfull Flow Conditions

Site	Cross-Section ID	Estimated Bankfull Velocity (ft/sec)	Estimated Bankfull Discharge (ft^3/sec)	Bankfull Shear Stress (lbs/ft^2)	Site D_{50} Riffle Particle Size (mm)	Predict Largest Movable Particle (mm)		1990 SLA Report	
						Shields Curve	Colorado Curve	Site D_{50} / D_{84} Substate Size (mm)	Critical Bar Substrate Particle Size * (mm)
4.1	4.9	2.8	128.9	3.6	228	298	392	Not part of study	
4.2	4.4	2.6	86.2	2.8	267	231	328	230 / 645	25-50
7	7.1	3.7	162.8	7.8	597	660	686	Not part of study	
3	3.2	3.5	147.3	4.1	220	341	431	300 / 870	60-135**
5	5.3	2.5	91.4	3.1	252	252	348	300 / 700	85-170
6	6.5	2.7	59.3	2.4	139	198	293	207 / 563	63-126 **

* Estimated for the stated bankfull flow from critical particle diameters near observed bars as reported in Appendix J of the SLA Report (1990) for a range of F* values and is provided for high-level comparison only, as this study evaluated bar sample mobility, while the current study evaluated bed substrate mobility in a riffle.

** Estimated from nearest cross sections, as this cross section was not reported in this study.

6.2 DREDGED SEDIMENT SIZE CLASSIFICATION

Sieve analyses of the sediment piles dredge from the Bishop Creek Project intakes and the LADWP intake, just below Powerhouse No. 6, were conducted during the 2019 reconnaissance and field survey trips. Generally, the dredge sediment would be a mixture of sand and gravel with some cobble. The dredge sediment D_{84} ranged from 6 mm (fine gravel) to 129 mm (large cobble) in the sieved sample; however, there were some larger rocks in the vicinity of the sample that were documented, but not included in the limited sample volume used in this study. The previously dredged sediment particle size distribution (Figure 6.2-1, Photo 6.2-1 and Photo 6.2-2) provided examples of the dredged sediment from Intake 2 and 5 sediment piles, respectively. The results of the dredged sediment sieving and largest observed particles near the sample site are provided in Table 6.2-1. However, it should be noted that due to dredging and relocating of sediments from these intakes, and the uncertainty if the dredged material was all sediment deposited by the channel (or if it was over-excavation of native soils), there is a small level of uncertainty in this data. Despite this uncertainty, field observations generally supported the evidence that most sediment in the intakes was sand and small gravel, with limited cobbles and boulders.

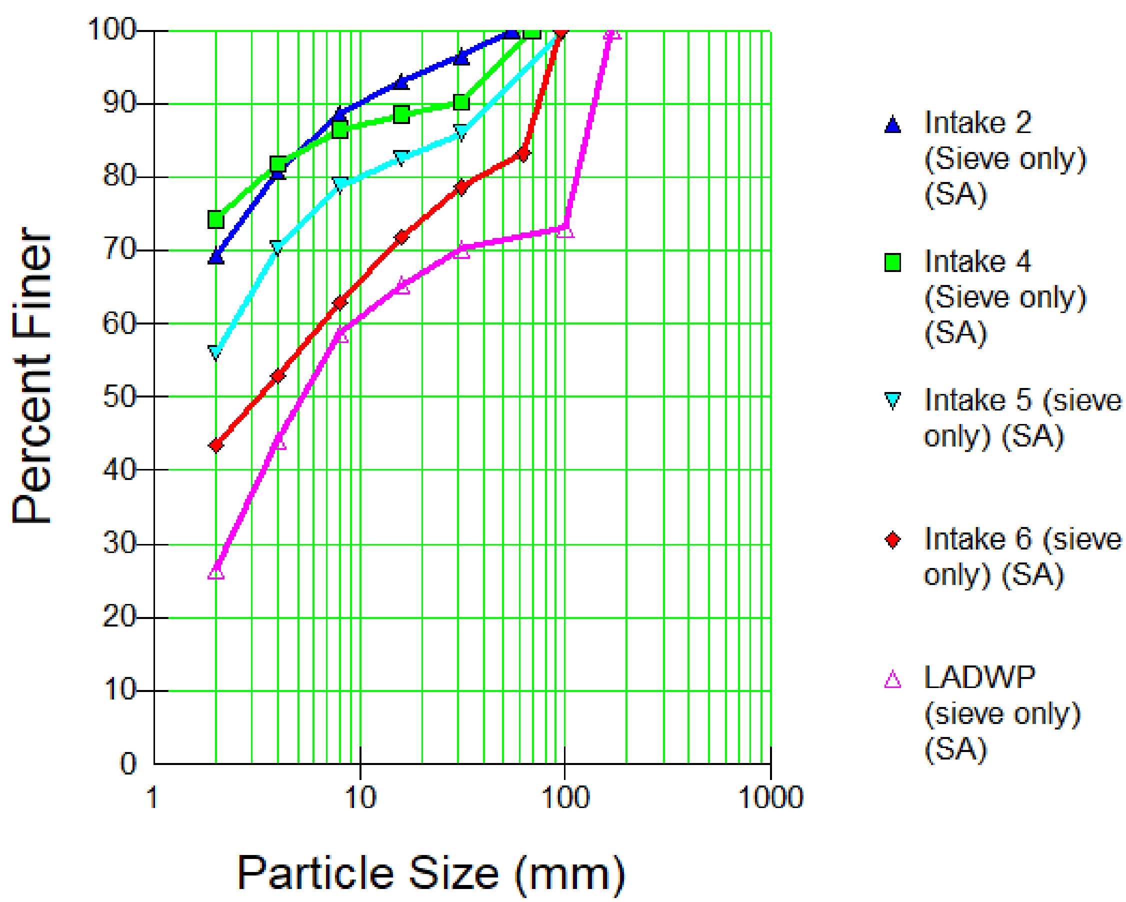


Figure 6.2-1 Dredged Sediment (Intake Impoundment) Particle Sizes

Photo 6.2-1 Sediment Pile from Intake 2

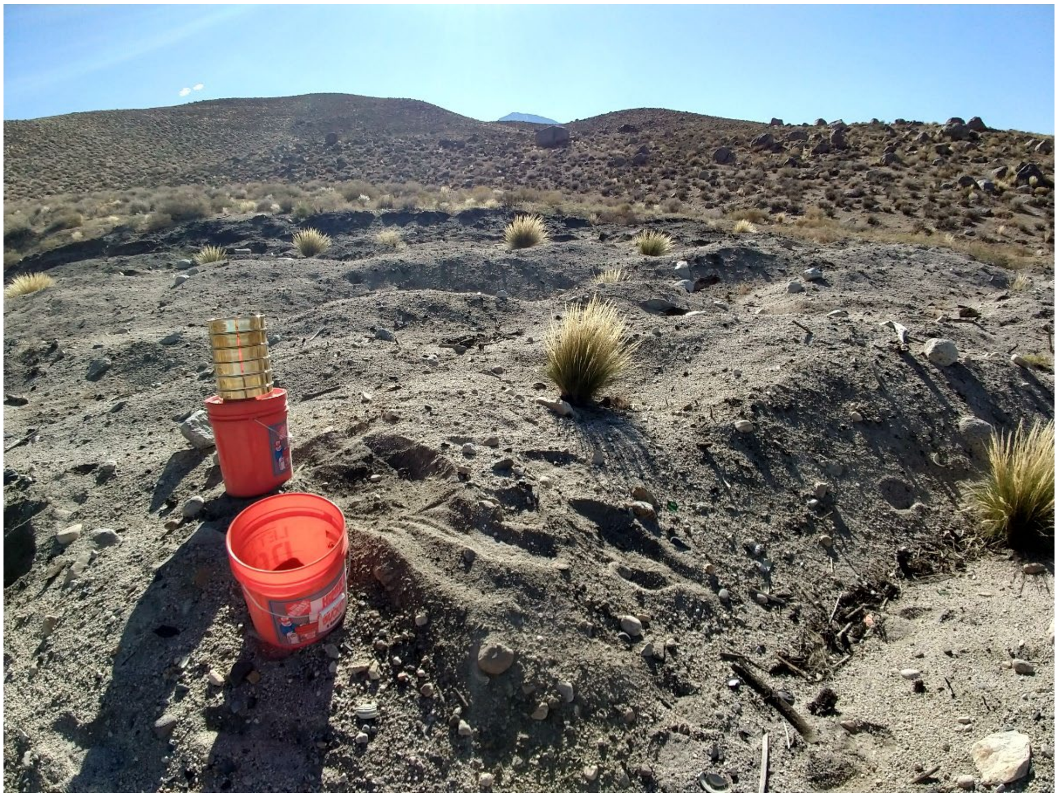


Photo 6.2-2 Sediment Pile from Intake 5

Table 6.2-1 Dredged Sediment Grain Sizes

Intake Number	Sieve Analysis			Largest Nearby Particle* (mm)
	% Sand/Silt (<2mm)	D_{50} (mm)	D_{84} (mm)	
2	69	<2	5.7	300
4	74	<2	6.0	220
5	56	<2	22.6	280
6	43	3.4	64.6	250
LADWP	26	5.6	128	270

* within ~5 feet of sampling sites, nearby particles not included in D_{50}/D_{84} calculations, as it is not clear if this is material mobilized during natural fluvial processes or included due to over-excavation of the sediment.

6.3 LARGE WOODY MATERIAL

During the 2019 field survey, LWM at each site was documented. Only dead wood larger than 4-inches in diameter and longer than 4.5-feet that could be mobilized by flow was documented. The stream channel was divided into three different zones and the location of LWM was categorized into five different zones/combinations of zone; some LWM was only categorized in two different zones. Thus, the location of the LWM was documented as a combination of those two zones. The three zones were WET (in baseflow), BKF, and RIP (riparian within floodplain). Table 6.3-1 summarizes the amount of LWM at each monitoring site and Photo 6.3-1 and Photo 6.3-2 provide the presence/absence of LWM at Sites 3 and 7, respectively. Additional information regarding large wood is provided Section 2.1.

Table 6.3-1 Large Woody Material

Site	Site Length (ft)	Zones										Total	
		WET		WET/BKF		BKF		BKF/RIP		RIP			
		# of pieces	pieces /100 LF	# of pieces	pieces /100 LF	# of pieces	pieces /100 LF	# of pieces	pieces /100 LF	# of pieces	pieces /100 LF	# of pieces	pieces /100 LF
4.1	258	1	0.4	8	3.1	2	0.8	7	2.7	1	0.4	19	7.4
4.2	231	1	0.4	0	0.0	8	3.5	0	0.0	16	6.9	25	10.8
7	290	5	1.7	3	1.0	21	7.2	0	0.0	235	81.0	264	91.0
3	278	0	0.0	5	1.8	0	0.0	0	0.0	3	1.1	8	2.9
5	285	2	0.7	0	0.0	8	2.8	0	0.0	15	5.3	25	8.8
6	249	0	0.0	0	0.0	1	0.4	0	0.0	12	4.8	13	5.2

Photo 6.3-1 Minimal LWM within and Along the Site 3 Channel

Note: Location is below the outlet of Coyote Creek Tributary

Photo 6.3-2 Substantial LWM in Riparian Zone of Site 7 Channel

6.4 SUBSTRATE MOBILITY EVALUATION

As detailed in Sections 4.4 and 5, a Substrate Mobility Evaluation Study was completed to further characterize the particle size distribution of sediments mobilized at or near bankfull flow conditions. PIT tagged rocks were deployed to inform sediment transport dynamics at Sites 4 (comprised on Sites 4.1 and 4.2) and 6 on Bishop Creek (Figure 6.4-1) The tagged tracer rocks were deployed along cross sections, and at other representative geomorphic units between the cross sections, at each study site. Field measurements taken during the study included cross section surveys, longitudinal profile surveys of the channel bed and water surface, surface measurements of bed particle size distribution, deployment and recovery of PIT tagged tracer rocks, and photo documentation. The full report on substrate mobility in Bishop Creek is included as Appendix A to this report, with a summary of the results provided in Section 6.4.1.

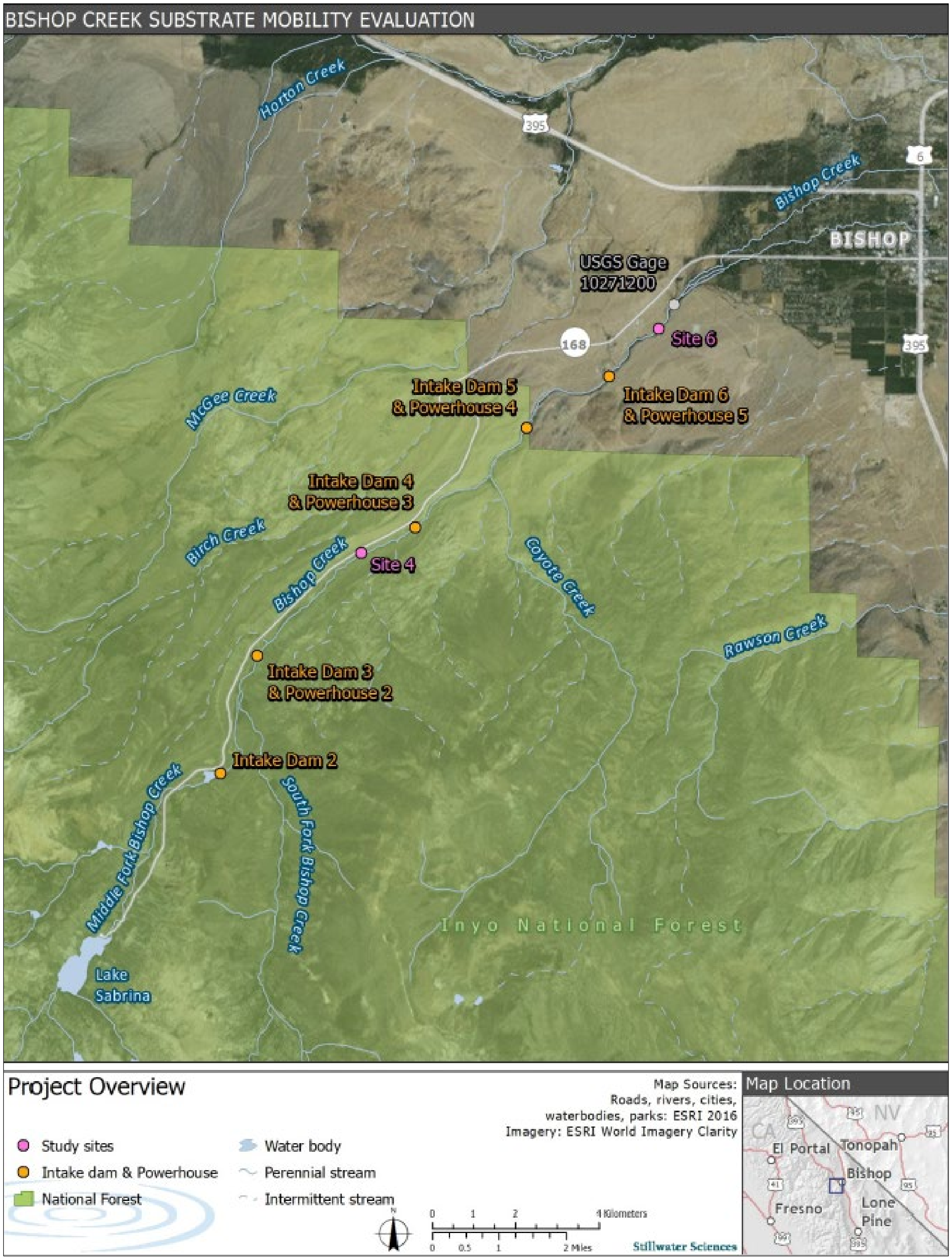


Figure 6.4-1 Bishop Creek Tracer Rock Evaluation Study Sites

6.4.1 Site 4 Results

Longitudinal profiles at Site 4 were approximately 550-feet-long during sampling events in 2020 and 2021. The average slope of the reach was calculated at 0.04 ft/ft (4 percent) during both years. No significant changes were apparent between the 2019 and 2020 longitudinal profiles. The cross-section geometry was similar between the two monitoring years, as was when recent cross sections were compared to riparian monitoring effort cross sections surveys since 1990. The bed at all three cross sections was predominantly cobbles, with gravel comprising less than 37 percent and boulders comprising less than 21 percent of the grain size distribution at each cross section. Sand content (less than 2 mm) from the 2020 pebble counts was 4, 16, and 1 percent of the measured particles at cross sections 4.9, 4.7, and 4.2, respectively. A summary of the pebble count data is provided in Table 6.4-1.

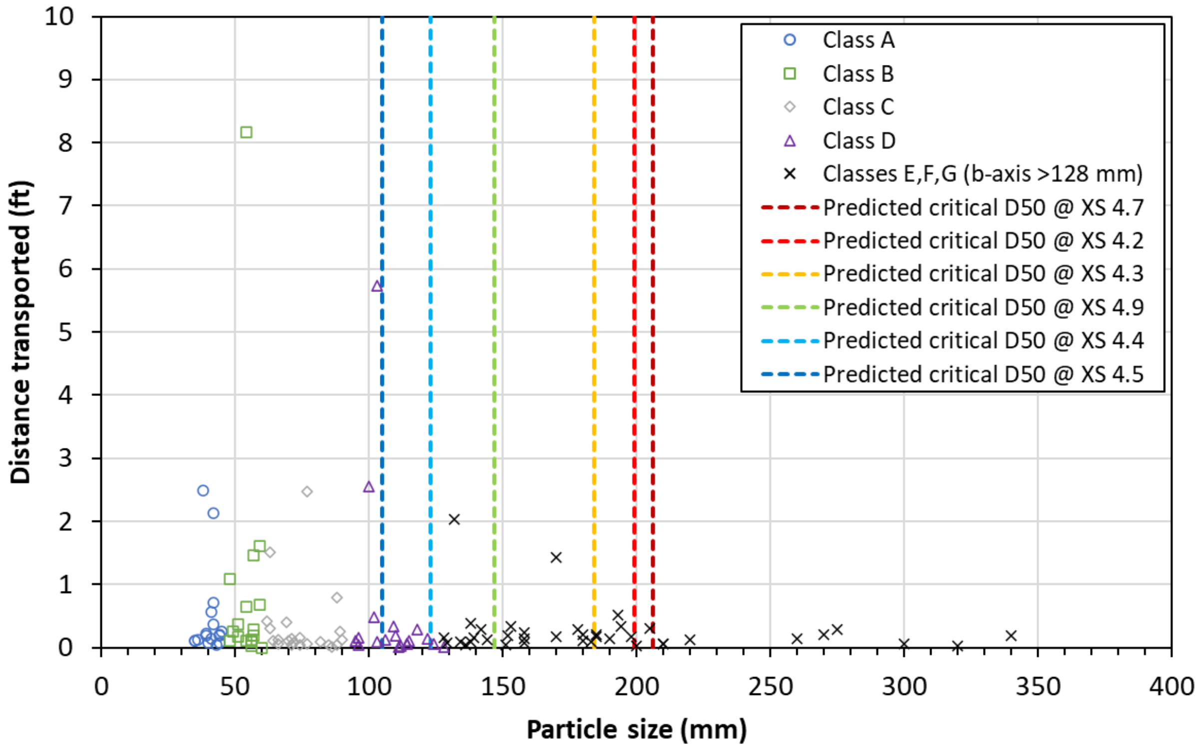
Table 6.4-1 Summary of Pebble Count Data From 2020 for Site 4

Cross Section (XS) ID	Year [1]	D_{16} (mm)	D_{50} (mm)	D_{84} (mm)
4.9	2020	25	78	239
4.7	2020	3	91	323
4.2	2020	43	117	226

[1]Pebble counts were not conducted at Site 4 in 2021 due to limited tracer mobility after the initial flushing flows.

One hundred and sixteen (100 percent) tracer rocks deployed on August 2, 2020, were recovered on May 26, 2021 after a pulse flow of approximately 70 cfs for a period of approximately 1 hour. Tracer rocks displacement calculations between the deployment and first recovery effort revealed that 114 (98 percent) of the recovered tracer rocks at Site 4 had not mobilized. The remaining 2 percent of tracers showed negligible transport distances, with a maximum displacement of 1.75 feet, indicating that short peak flows of 70 cfs do not substantially mobilize particles larger than 32 mm at this site.

A pulse flow of approximately 120 cfs was released to the study reach shortly after the first recovery effort to determine what size particles would mobilize during a higher flow. One hundred and fifteen (98 percent) of the deployed tracer rocks were recovered during the second recovery effort on July 21, 2021. A 24-hour pulse flow of approximately 120 cfs resulted in mobilization of 12 tracers (11 percent) and 17 percent of tracers with diameters less than 60 mm. Ninety-three percent of tracers with diameters greater than 60 mm had no mobilization. The largest mobilized particle had a diameter of 170 mm, although it was only transported 1.5 feet. Tracer movement by particle size is summarized in Figure 6.4-2, but this indicates that particles in the 32-60 mm size classes begin to mobilize more frequently at flows of 120 cfs, but most (over 80 percent) of the tracers less than 60 mm remained in place.



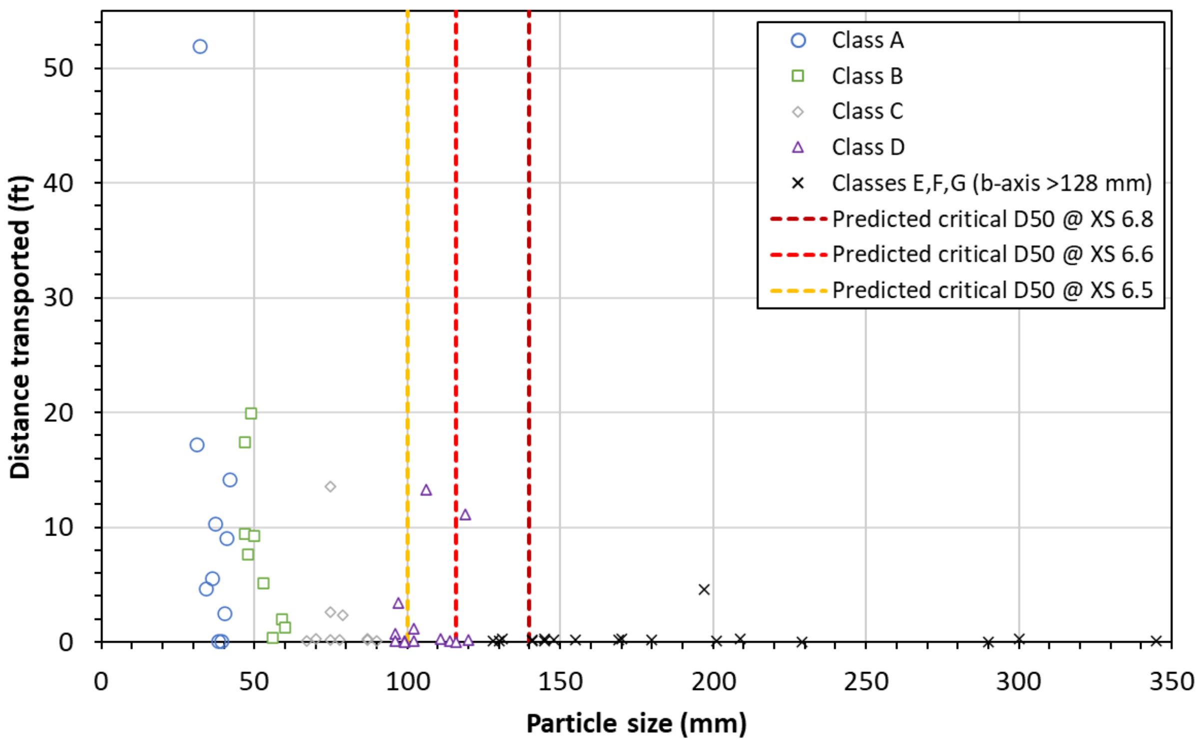
Note: Grain Size Classes Follow Conventions Used in Table 4-1.

Figure 6.4-2 Transport Distance of Tracer Rocks by Particle Size at Site 4 for a flow of 120 cfs in this reach of Bishop Creek

6.4.2 Site 6 Results

Longitudinal profiles at Site 6 were approximately 420-feet-long during sampling events in 2020 and 2021. The average slope of the reach was calculated at 0.02 ft/ft (2 percent) during both years. Cross section profiles were similar across previous years as was recent cross sections were compared to riparian monitoring effort cross sections surveys since 1990. The stream beds at all three cross sections primarily consisted of cobbles and gravel, with boulders comprising less than 21 percent of the pebble counts at each cross section during 2020 and 2021.

The 36 tracers (54 percent of all tracers deployed) that were recovered in the stream channel after a 24-hour flow of approximately 60 cfs were undisturbed and showed no movement from their initial placement locations (31 tracers were disturbed by non-fluvial processes and were not included in these results but were present for the higher flow). Non-fluvial disturbance was determined by observations of lateral and upstream movement of tracer rocks, presumably from anglers or other recreating individuals. This necessitated resetting approximately half of the tracers at Site 6 in May 2021, which resulted in shorter residence times for approximately half of the tracers at Site 6 prior to the second, larger pulse flow. Sixty (90 percent) of the deployed tracer rocks at Site 6 were recovered during the second recovery effort on July 21, 2021. The pulse flow resulted in mobilization of 40 percent (n = 24) of all recovered tracer rocks and 84 percent (n = 16) of tracers less than 60 mm. Eighty percent (n = 34) of tracers greater than 60 mm showed no mobilization. The largest mobilized particle was 197 mm and was transported 4.5 feet. This was the only mobile particle larger than the highest predicted critical D_{50} at the site and may have been due to the shorter period of time for the tracer to settle into the surrounding substrate prior to the high flow. Tracer movement by particle size is summarized in Figure 6.4-3. Since no tracers were mobilized at flows of 60 cfs, it was concluded that flows of this magnitude would not typically mobilize substrate particles larger than 32 mm in this reach of Bishop Creek, but at flows of 120 cfs, the majority (84 percent) of particles smaller than 60 mm mobilized at least 1-foot downstream (however, this is also with minimal settling time for the tracers prior to the high flow event).



Note: Grain Size Classes Follow Conventions Used in Table 4-1.

Figure 6.4-3 Transport Distance of Tracer Rock by Particle Size at Site 6 for Flow of 120 cfs in this Reach of Bishop Creek

7.0 DISCUSSION

The objective of the study was to better understand sediment dynamics in Bishop Creek. Specifically, the study was designed to understand what size particles were typically mobile in Bishop Creek, evaluate flow conditions under which mobilization of sediment and LWM occurs within the channel, evaluate how Bishop Creek Project operations may affect sediment transport flows, and understand how higher in-stream flows and sediment flushing may affect downstream reaches below Powerhouse No. 6.

7.1 SEDIMENT MOBILIZING FLOWS

One study was to evaluate bankfull flow to better understand sediment mobilizing flows in Bishop Creek. Bankfull flow is generally considered the channel forming flow and the point at which the flow just begins to utilize the floodplain and is often determined by review of field conditions and can vary based on site topography, site vegetation, the historic flow regime, and the observer. Since each reach of the study area of Bishop Creek has a different flow, minimum flow requirements, and upland/tributary inputs, the bankfull channel geometry, and bankfull flow of each reach were expected to differ, as shown in Table 6.1-3. Discharge at conditions that in an unregulated system would be equated with a bankfull discharge were estimated to range from approximately 60 cfs (Site 6) to 160 cfs (Site 7) for the Bishop Creek bypass study reaches.

At Site 6, a pulse of 60 cfs, approximately equal to the estimated bankfull discharge, did not mobilize particles greater than 32 mm; however, a pulse of 120 cfs mobilized a majority of particles less than 60 mm at least 1 foot. At Site 4, a pulse flow of 70 cfs did not substantially mobilize particles larger than 32 mm while a pulse flow of 120 cfs (approximately equal to the estimated bankfull discharge) mobilized particles between 32-60 mm more frequently (17 percent of particles mobilized); the pulse flow of 70 cfs did not mobilize any particles approaching the bed 2019 survey D_{50} greater than 220 mm, but showed limited (only 4) mobility of particles near the D_{50} of 78-117 mm for the substrate surveyed in 2020.

This substrate mobility study, when combined with the analysis of intake sediment and channel substrate sizes, indicates that for higher (bankfull and beyond) flows most of the sand and small gravel size particles flush downstream into the next impoundment, while coarse gravel, cobble, and boulders generally remain stable and in place in the stream channel. The establishment of vegetation along the stream banks further helps to limit the bank erosion and subsequent sediment inputs, thus reducing the overall sediment load in Bishop Creek as compared to unvegetated stream banks.

It is anticipated that a magnitude of flow greater than 60 cfs would be required to mobilize sediment in the 32-60 mm range in the Bishop Creek reaches, with some reaches requiring more than 120 cfs to mobilize most particles in this size range. However, the sand-size particles that dominate the dredged sediment were anticipated to be mobilized at lower flows, but an exact estimate of those threshold flows is not available from the information provided in this study. However, from the Sada and Hawkins study (1997), it is clear that a flushing flow of 200 cfs is capable of moving sand and gravel through the bypass reaches with minimal changes in gradation of the existing substrates. Thus, depending on the objective, a flushing flow of between 60 and 200 cfs could be considered to either distribute or flush a desired size class of sediment through the system.

Without lowering the intake headpond level, only sediment immediately adjacent to the low-level outlet inlets was anticipated to be mobilized during flushing flows. Lowering the headpond was anticipated to be required to produce adequate shear stress to mobilize sediment from the intake impoundments, where it currently settles under the current operation regime. Thus, any plans to mobilize sediment from the impoundments should include lowering of the water surface elevation to much closer to the invert elevations of the low level outlet(s).

7.2 MOBILE SEDIMENT PARTICLE DISTRIBUTION

It appears that Bishop Creek is relatively stable, even after a summer of near and beyond-bankfull flows (140 to 230 cfs) (e.g., such as 2019), as no substantial recent erosion was observed in the vicinity of the monitoring sites. This was further confirmed by limited differences between the cross sections surveys completed in 2020 and 2021, as well as when the 2019 surveys were compared to the early 1990 cross sections. The D_{50} of channel substrate observed in the riffles of Bishop Creek during the 2019 field investigation was generally cobbles and boulders (139 to 600 mm, Figure 6.1-1), which aligned relatively well with D_{50} particle sizes found at these sites in the SLA Report (1990). This supports the concept that this Bishop Creek channel has reached an equilibrium state with the current flow regime and there is only minor flushing of smaller sediment through the system as small sections of stream bank collapse, or surface runoff carries sediment into the channel from outside the primary Bishop Creek channel (such as Coyote Creek). The bed is well-armored and the substrate of cobbles and small boulders resists additional erosion, with a channel of adequate capacity and vegetated bank condition suitable for efficiently passing the smaller (less than 60 mm) size particles that enter into the system during episodic flows that happen during major runoff events (e.g., greater than 200 cfs) without any substantial changes to channel geometry or bed form.

The estimated bankfull shear stress at each study site was utilized along with the Shields Curve and Colorado Curve to estimate the largest movable particle at bankfull flow. The Shields and Colorado Curves produced largest movable particle sizes from approximately 200 to 660 mm and approximately 300 to 690 mm, respectively. These particle sizes were larger than the riffle substrate D_{50}, but less than the riffle substrate D_{84} (325 to 1050 mm, Figure 6.1-1).

The Substrate Mobility Evaluation results confirmed the largest mobilized tracer particle sizes were 170 mm (Site 4) and 197 mm (Site 6, with low “adjustment time” prior to pulse flow), during the 120 cfs pulse flow. These tracer particle sizes were between the D_{50} and D_{84} of the respective site riffle substrates and were only mobilized a short distance (shorter than 5 feet). At the lower gradient site (Site 6) with a bankfull estimate flow of 59 cfs, a majority of tracer particles less than 60 mm were mobilized at a flow of 120 cfs, with one particle traveling over 50 feet. While at the higher gradient site (Site 4) with a bankfull estimate flow of 86 to 129 cfs, tracers less 60 mm only began to mobilize during a 120 cfs pulse flow and the furthest tracer in this class traveled approximately 8 feet.

The sediment found in the dredge piles from past dredging at Intakes 2, 4, 5, 6, and the LADWP intake confirm that while there are some large particles that are deposited in the impoundments, the majority of the material is sand and fine gravel (all D_{50} values less than 6 mm, most less than 2 mm; Figure 6.2-1). The expected transport of sand-grained material through the system aligns generally with the findings of the Sada and Hawkins (1997) study that examined the pulse of sediment that was released when the low level outlet was opened at Intakes 3 and 4. That study concluded that the intake sediment (fines, sand, gravel, but predominantly sand) was generally deposited within 1.6 miles of the intake and was equally distributed across pools and riffles (Sada and Hawkins 1997). After a flushing flow of 200 cfs for 24 hours was applied, most of the intake sediment in the pools was removed by the flushing flow. In all except 3 of the 30 pools surveyed, there was no substantial change to substrate composition due to the sediment release (Sada and Hawkins 1997).. Based on the Sada & Hawkins study (1997), the smaller size classes of sediment (sand and gravel), such as those in the intake impoundments, are flushed entirely through the system with a pulse flow of 200 cfs. Therefore, it is possible to conclude that the average annual maximum flow over the past 27 years of 202 cfs most of which have more than 20 years of data available. These gauges were utilized where necessary to evaluate flow conditions in the study reaches, including peak annual flows, average flows, and estimations of bankfull based on flow-event return period would effectively flush the size classes of sediment found in the intake impoundments through the bypass reaches, but that particles in the range of the current riffle substrate (D_{50} from 140 to 600 mm) were not anticipated to frequently mobilize at this flow.

7.3 FLOW OPERATIONS IMPACT ON SEDIMENT TRANSPORT

The timing of higher flow releases is anticipated to have little effect on sediment tranport, but could have substantial effect on aquatic organisms if spawning beds were washed out. Further if sediment has more time to become more embedded in the substrate, it may be harder to mobilize, as compared to freshly deposited sediment, as was observed with some of he larger tracer rocks after replacement at Site 6 just prior to the larger flushing flow. The magnitude of flows was anticipated to have a susbtantial impact on sediment transport, with larger flows typically mobilizing larger sizes of substrate. The Substrate Mobility Evaluation revealed no substantial impact to channel substrate at bankfull flow for the two sites evaluted in this study. Low magnitude flows (e.g., less than bankful flow) were not anticipated to provide sediment tranport of the existing bed substate, but may mobilize the size classes of sediment found in the intake impoundments. The duration of flow releases can have a substantial impact on sediment transport, although that impact is reduced as the duration of small flows increases, the sediment supply was limited, and/or the bed becomes armored. In this system with limited sediment availability in the sand and fine gravel size classes of the riffle substrate, the sediment transport was primarily supply limited, thus adding additional flows was not anticipated to mobilize substantially more sediment, unless the flows become large enough to initiate bank erosion or mobilization of the bed substrate. Should sediment transport from the intake impoundments be desired, a flushing flow could be selected to either distribute that sediment throughout the downstream bypass reach or flush it to the next impoundment downstream. If implemented, the selection of any sediment transport flows should be made in consideration of the existing long-term agreement with CDFW (CDFW 2008), available water resources, seasonal spawning periods, and objectives of the sediment transport.

7.4 SEDIMENT AND FLUSHING FLOWS BEYOND PROJECT BOUNDARY

As Bishop Creek leaves the Project boundary, it is managed to meet the minimum flow requirements, but for larger flows, once the reservoirs are full and plant capacity is exceeded (e.g., during spring snowmelt in a wet year), the flow is unregulated. This snowmelt period is often when Bishop Creek experiences its annual peak flow, with flows in the bypass reach exceeding 200 cfs on average. The peak flows in the bypass reach exceed 300 cfs approximately every 5 years. When this peak flow in the bypass reach (within Bishop Creek) joins with any powerhouse discharge at that time, the downstream receiving water bodies could reasonably experience flows in excess of 200 cfs annually, on average. Thus, any combination of a flushing flow in Bishop Creek immediately above Plant 6 and a generation of less than 300 cfs would be within a reasonably anticipated 5-year return period peak flow experienced by downstream reaches.

Under the existing operating scenario, most of the sediment larger than silt that is transported by the bypass reaches of Bishop Creek settles in the next downstream Project intake impoundment, with the exception of the bypass reach between Intake 6 and Powerhouse No. 6, which tends to capture coarser material than the other intake impoundments (Figure 6.2-1). This lowest bypass reach discharges directly to a very small (3 to 5-feet-deep) impoundment managed by LADWP for use in their water management. This intake was reported to be dredged more frequently than the Bishop Creek Project impoundments (Charles Partridge, SCE Project Staff, personal communication).

Powerhouse No. 6 and Bishop Creek (bypass reach between Intake 6 and Powerhouse No. 6) discharge directly into the LADWP Intake. Based on the LADWP Intake's small impoundment size, the intake would not be anticipated to attenuate flushing flows in the bypass reach of Bishop Creek between Intake 6 and Powerhouse No.6. Depending on the storage capacity of the impoundment, the size of sediment particles in transport, the sediment volume released, and the magnitude of flow, the impoundment may capture very little to most of the sediment coming down the bypass reach. Thus, mobilizing sediment from Intake 6 impoundment periodically could reasonably be anticipated to decrease the timespan between necessary dredging of the LADWP Intake.

Bishop Creek has a high gradient while in the mountains and begins to become lower gradient as it reaches the valley floor. As is typical of these types of streams, a downstream fining of the sediment on the substrate typically develops as the gradient is reduced, with larger sediment dropping out first, then the smaller material dropping out as the stream no longer has sediment transport capacity for that size particle. This is evident in the bed substrates, which show that the steepest site (Site 7) has the coarsest bed substrate, while the lowest gradient site (and most downstream site) has the finest bed substrate. As Bishop Creek exits the Project site, it is at a moderate to low gradient, and while the area downstream of Plant 6 was not part of the Project area, it is understood that the lower-gradient slope continues to the Owens River given the valley topography. The fate of sediment released from Bishop Creek beyond the Project would depend on the downstream channel dimensions and slopes; sediment volume and particle size range; flushing flow magnitude, timing, and duration; and downstream water withdrawal operations. The behavior of the sediment will be highly reliant on concurrent operations of water infrastructure between Plant 6 and the Owens River. SCE anticipates that the Sediment Management Plan will include measures for coordination and communication with downstream operators in order to minimize this potential effect.

Flushing flows larger than bankfull flows may cause an increase in LWM entering the downstream impoundment based on the presence of moderate amounts of LWM above the bankfull elevation. However, the magnitude of flushing flows that are likely to be considered (e.g., less than 200 cfs) are not substantially different than the average peak annual flow. Thus, while LWM may mobilize with the flushing flow, the site infrastructure was likely already set up to handle such inputs.

7.5 LARGE WOODY MATERIAL MOBILIZATION FLOWS

For most of the study sites, the LWM present was located within the riparian zone (Table 6.3-1), which was generally inaccessible for transport; except for flows that substantially exceed bankfull flows in the channel. This was not surprising, given the sustained near-bankfull flow in the summer of 2019 prior to that field survey. During that time, LWM in the WET and BKF zones was likely mobilized and deposited in the downstream riparian zone or passed through Project reaches of Bishop Creek. The amount of LWM documented at Site 7 (91 pieces per 100-linear-feet, Table 6.3-1) was disproportionally higher than the amount of LWM documented at the other study sites (3 to 11 pieces per 100-linear-foot,Table 6.3-1). Site 7 was a newly established site to better understand the sediment and LWM transport dynamics in Bishop Creek below an unimpeded major tributary (Coyote Creek), and the results show that this unregulated tributary does tend to carry more LWM than the bypass reaches of Bishop Creek.

As detailed in Section 6.2, a minimal amount of LWM is found on the bottom of the intake impoundments and most LWM washes over the intake impoundment spillways. According to Bishop Creek Project staff, there have been minimal issues with large LWM flows clogging the intake structures. Bishop Creek Project staff did note that larger LWM loads could occur if a higher runoff year follows a few years of lower flows, and/or when the upstream beaver dams were blown out and beaver dam materials were released. Based on this information, it appears that there is minimal ability to capture additional LWM for redistribution in the channel, unless flows substantially exceed bankfull flows or there is an extended period of extremely low flow in the bypass reaches.

8.0 CONSULTATION SUMMARY

SCE distributed periodic progress reports on the following schedule:

- Progress Report 1: December 19, 2019
- Progress Report 2: April 14, 2020
- Progress Report 3: July 24, 2020
- Initial Study Report (Progress Report 4): October 30, 2020
- Initial Study Meeting: November 10, 2020
- Progress Report 1: March 2, 2021
- Progress Report 2: May 28, 2021
- Progress Report 3: August 27, 2021
- Updated Study Report Filing: November 4, 2021
- Updated Study Report Meeting: November 18, 2021

Eight technical memoranda (including one for the sediment and geomorphology study) summarizing the 2019 study implementations were submitted with Progress Report 2. Following Progress Report 2, SCE hosted a TWG meeting on May 7, 2020 to discuss the 2019 study season, work completed to date and the technical memoranda. After the meeting, TWG members submitted comments on the technical memoranda and SCE provided a general response to those comments as part of Progress Report 3.

The Initial Study Report (ISR) was filed with FERC on October 30, 2020 and a virtual ISR Meeting was held on November 10, 2020. No additional comments were received from TWG members or stakeholders on the Sediment ISR materials or on the previously provided responses to comments. Three progress reports were filed in 2021 after the ISR, as identified above. The Updated Study Report (USR) was filed with FERC on November 4, 2021, and a USR Meeting was held on November 18, 2021.

Table 7.5-1 provides a summary of comments received to date for this study and responses to those comments.

Table 7.5-1 Comment Response Table

Comment Number	Study	Date of Comment	Entity	Comments	SCE Response
1	Sediment and Geomorphology Technical Memorandum	May 21, 2020	CDFW	The technical memorandum states that an assessment of LWM was completed in July and September of 2019 but no results were included in the technical memorandum. The technical memorandum should include estimates of instream LWM, discuss historical removal practices, and discuss the feasibility of passing LWM over or around the intake dams, to reduce impact to this component of fish habitat.	The technical reports, provided as a supplement to the progress reports, are interim work-products intended to summarize work to date and help the team prepare for additional field work and were not intended to be full “Study Reports.” LWM is discussed in Section 7.5.
2	Sediment and Geomorphology Technical Memorandum	May 21, 2020	CDFW	The technical memorandum states that an assessment of LWM was completed in July and September of 2019 but no results were included.	The technical reports, provided as a supplement to the progress reports, are interim work-products intended to summarize work to date and help the team prepare for additional field work and were not intended to be full “Study Reports. Section 6.3 discusses findings from LWM assessments in this Final Technical Report.
3	Sediment and Geomorphology Technical Memorandum	May 21, 2020	CDFW	This goal/objective was not addressed in the Technical Study Plan but should be addressed after 2020 surveys. [Referring to Evaluate how operations (flow release timing, magnitude, and duration) could be modified to provide sediment transport flows.]	SCE notes CDFW’s comment and notes that this comment is discussed in Section 7.3 of this Final Study Report.

Comment Number	Study	Date of Comment	Entity	Comments	SCE Response
4	Sediment and Geomorphology Technical Memorandum	May 21, 2020	CDFW	This goal/objective was not addressed in the Technical Study Plan but should be addressed after 2020 surveys. [Referring to Understand potential sediment inputs and impacts from higher flows to reaches below Powerhouse No. 6 from changes in flow/operations.]	SCE notes CDFW's observation and notes that this comment is discussed in Section 7.4 of this Final Study Report.
5	Updated Study Report Meeting Summary	December 3, 2021	USFS	Are the sites referred to as Sites 4.1 and 4.2 in your results the same as the riparian study sites with the same names?	SCE confirmed that these sites align with the riparian study sites. The sites were established in approximately 1990 as part of monitoring required through the existing license.

Comment Number	Study	Date of Comment	Entity	Comments	SCE Response
6	Sediment and Geomorphology	December 29, 2021	CDFW	The results from the cross-sectional measurements and bed particle size distribution of Bishop Creek in the study area suggest the banks of Bishop Creek are stable and armored within the study area. The Preliminary Application Document also mentions that there is a general armoring of the stream bed due to the presence of glacially deposited stones larger than the stream sediment transport capacity during annual snow-melt runoff. While pre-project conditions are relatively unknown, as the Project has been in operation since 1917, streambed armoring under relatively constant bypass flows is a well-documented phenomenon, suggesting the high degree of stream armoring may be a result of Project effects. Enhanced bank stability of Bishop Creek due to low minimum flows released by Project operations may not be beneficial to CDFW trustee resources (e.g., lack of establishment of woody riparian species that depend on scour and decreases in benthic macroinvertebrate diversity).	SCE appreciates this comment and notes that the current minimum flow requirements were developed to consider a variety of resources, such as riparian vegetation, visual resources, as well as CDFW trustee resources. Following the filing of the DLA, SCE held several PME meetings with agencies, including CDFW, to discuss flows and sediment management in the Project. A Sediment Management Plan (PME-3) and inclusion of Geomorphic Flows (PME-1.4) were developed based on these discussions and is included as part of Appendix B of the FLA. While the Relicensing Team has not identified any Project effects pertaining to flows, sediment or riparian growth, SCE believes these measures, could enhance the existing environment, consistent with the desired conditions of the resource agencies.
7	Sediment and Geomorphology	December 29, 2021	CDFW	Results from the bed particle size distribution assessment/study of Bishop Creek show that the bed of Bishop Creek in the study area is primarily made up of cobbles and gravels with sand content...	SCE appreciates this comment, we agree that there is a flow value that could effectively flush sediment. Thresholds have been developed in the Sediment Management Plan being filed with the FLA, as part of Appendix B.

Comment Number	Study	Date of Comment	Entity	Comments	SCE Response
8	Sediment and Geomorphology	December 29, 2021	CDFW	CDFW recommends that SCE consider a sediment management plan for Bishop Creek that uses reintroduction of sediment into Bishop Creek below the forebays and intakes, in conjunction with O&M procedures (i.e., flushing flows) as a tool to benefit public trust resources. CDFW suggests that FERC base the protection mitigation and enhancement (PME) measures for Bishop Creek on the results of recent studies conducted in the FERC Relicensing Process, and not on existing operations.	While SCE has not identified any Project effects relating to sediment or flows, a Sediment Management Plan for the Bishop Creek Project has been developed and is included as part of Appendix B to the FLA. The was reviewed with stakeholders prior to finalization for the FLA. SCE has no comment on how FERC will evaluate PME measures; environmental studies conducted as part of this relicensing and proposed PME measures in the Draft License Application were developed in response to FERC's Scoping Document 1 to assist FERC with its National Environmental Policy Act (NEPA) analysis.

9.0 REFERENCES

California Department of Fish and Game (CDFW). 2008. Long Term Agreement Regarding Proposed Routine Maintenance Activities For Hydroelectric Projects In Inyo And Mono Counties. Notification No. 1600-2008-0099-R6. October 6, 2008.

Chandler Decree 1922. Hillside Water Company v. William A. Trickey et.al, U.S. District Court, Southern Division of California (Northern Division), No. B-61 EQ, Final Decree in Equity (Chandler Decree), January 27, 1922 (Unreported).

Harrelson, C.C., Rawlins, C.L., and Potyondy, J.P. 1994. Stream Channel Reference Sites: An Illustrated Guide to Field Technique. General Technical Report RM-245. U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station.

Psomas. 2005. Bishop Hydroelectric Project Phase 2 Year 2 Monitoring of Riparian and Aquatic Habitat. Unpubl. Tech. rept. prepared for Southern California Edison (results of monitoring in 2004).

Read, E. 2015. Bishop Hydroelectric Project (FERC No. 1394): Riparian Monitoring Results for 2014 and Comparison to Previous Years. Unpubl. Tech. rept. prepared for Southern California Edison (results of monitoring in 2014).

Read, E. and Sada, D. 2013. Bishop Hydroelectric Project (FERC No. 1394): Analysis of Riparian Vegetation, Aquatic Habitat, and Fish Populations, Phase 2 (Year 3) and Comparison to Baseline. (results of monitoring in 2009).

Rosgen, D. 2014. River Stability Field Guide, 2nd Edition. Wildlands Hydrology. Fort Collins, CO.

Sada, D.W. and Hawkins, H.G. 1997. Effects of Intake Pond Sediment Releases on Bishop Creek Turbidity and Pool Quality; Inyo County, California. Unpubl. Tech. rept. prepared for Southern California Edison, Rosemead, CA. Dated March 20, 1997.

Sierra Hydrotech. 1983. Technical Report, Septemeber 1982 Storm and Flood Bishop Creek Basin. Prepared for Southern California Edison Company, California. February, 1983.

Simons, Li & Associates (Simons). 1990. Evaluation of stream channel processes and the growth of riparian vegetation, Bishop Creek, California. Unpubl. Tech. rept. prepared for Southern California Edison, Rosemead, CA.

U.S. Geologic Survey (USGS). 2022. National Water Information System: Web Interface. USGS Gauge 10271200, Daily Statistics. https://waterdata.usgs.gov/nwis/inventory?agency_code=USGS&site_no=10271200. Accessed January 17, 2022.

Wolman, M.G. 1954. A Method of Sampling Coarse River-Bed Material. Transactions—American Geophysical Union, 35, 951-956. http://dx.doi.org/10.1029/TR035i006p00951

APPENDIX A

TRACER ROCK SUBSTRATE MOBILITY EVALUATION

SOUTHERN CALIFORNIA EDISON

Bishop Creek Hydroelectric Project

(FERC Project No. 1394)

TECHNICAL MEMORANDUM

BISHOP CREEK SUBSTRATE MOBILITY EVALUATION

SOUTHERN CALIFORNIA EDISON

An EDISON INTERNATIONAL Company

December 2021

Worksheet 3-10. Pfankuch (1975) channel stability rating procedure, as modified by Rosgen (1996, 2001c, 2006b).

Stream: Bishop Creek **Location:** Site 4.1 **Valley Type:** **Observers:** **Date:** 8/26/2020

Location	Key	Category	Excellent Description	Excellent Rating	Good Description	Good Rating	Fair Description	Fair Rating	Poor Description	Poor Rating
Upper banks	1	Landform slope	Bank slope gradient <30%.	2	Bank slope gradient 30–40%.	4	Bank slope gradient 40–60%.	6	Bank slope gradient > 60%.	8
Upper banks	2	Mass erosion	No evidence of past or future mass erosion.	3	Infrequent. Mostly healed over. Low future potential.	6	Frequent or large, causing sediment nearly yearlong.	9	Frequent or large, causing sediment nearly yearlong OR imminent danger of same.	12
Upper banks	3	Debris jam potential	Essentially absent from immediate channel area.	2	Present, but mostly small twigs and limbs.	4	Moderate to heavy amounts, mostly larger sizes.	6	Moderate to heavy amounts, predominantly larger sizes.	8
Upper banks	4	Vegetative bank protection	> 90% plant density. Vigor and variety suggest a deep, dense soil-binding root mass.	3	70–90% density. Fewer species or less vigor suggest less dense or deep root mass.	6	50–70% density. Lower vigor and fewer species from a shallow, discontinuous root mass.	9	<50% density plus fewer species and less vigor indicating poor, discontinuous and shallow root mass.	12
Lower banks	5	Channel capacity	Bank heights sufficient to contain the bankfull stage. Width/depth ratio departure from reference width/depth ratio = 1.0. Bank-Height Ratio (BHR) = 1.0.	1	Bankfull stage is contained within banks. Width/depth ratio departure from reference width/depth ratio = 1.0–1.2. Bank-Height Ratio (BHR) = 1.0–1.1.	2	Bankfull stage is not contained. Width/depth ratio departure from reference width/depth ratio = 1.2–1.4. Bank-Height Ratio (BHR) = 1.1–1.3.	3	Bankfull stage is not contained; over-bank flows are common with flows less than bankfull. Width/depth ratio departure from reference width/depth ratio > 1.4. Bank-Height Ratio (BHR) > 1.3.	4
Lower banks	6	Bank rock content	> 65% with large angular boulders. 12"+ common.	2	40–65%. Mostly boulders and small cobbles 6–12".	4	20–40%. Most in the 3–6" diameter class.	6	<20% rock fragments of gravel sizes, 1–3" or less.	8
Lower banks	7	Obstructions to flow	Rocks and logs firmly imbedded. Flow pattern w/o cutting or deposition. Stable bed.	2	Some present causing erosive cross currents and minor pool filling. Obstructions fewer and less firm.	4	Moderately frequent, unstable obstructions move with high flows causing bank cutting and pool filling.	6	Frequent obstructions and deflectors cause bank erosion yearlong. Sediment traps full, channel migration occurring.	8
Lower banks	8	Cutting	Little or none. Infrequent raw banks <6".	4	Some, intermittently at outcurves and constrictions. Raw banks may be up to 12".	6	Significant. Cuts 12–24" high. Root mat overhangs and sloughing evident.	12	Almost continuous cuts, some over 24" high. Failure of overhangs frequent.	16
Lower banks	9	Deposition	Little or no enlargement of channel or point bars.	4	Some new bar increase, mostly from coarse gravel.	8	Moderate depostion of new gravel and coarse sand on old and some new bars.	12	Extensive deposit of predominantly fine particles. Accelerated bar development.	16
Bottom	10	Rock angularity	Sharp edges and corners. Plane surfaces rough.	1	Rounded corners and edges. Surfaces smooth and flat.	2	Corners and edges well rounded in 2 dimensions.	3	Well rounded in all dimensions, surfaces smooth.	4
Bottom	11	Brightness	Surfaces dull, dark or stained. Generally not bright.	1	Mostly dull, but may have <35% bright surfaces.	2	Mixture dull and bright, i.e., 35–65% mixture range.	3	Predominantly bright, > 65%, exposed or scoured surfaces.	4
Bottom	12	Consolidation of particles	Assorted sizes tightly packed or overlapping.	2	Moderately packed with some overlapping.	4	Mostly loose assortment with no apparent overlap.	6	No packing evident. Loose assortment, easily moved.	8
Bottom	13	Bottom size distribution	No size change evident. Stable material 80–100%.	4	Distribution shift light. Stable material 50–80%.	8	Moderate change in sizes. Stable materials 20–50%.	12	Marked distribution change. Stable materials 0–20%.	16
Bottom	14	Scouring and deposition	<5% of bottom affected by scour or deposition.	6	5–30% affected. Scour at constrictions and where grades steepen. Some deposition in pools.	12	30–50% affected. Deposits and scour at obstructions, constrictions and bends. Some filling of pools.	18	More than 50% of the bottom in a state of flux or change nearly yearlong.	24
Bottom	15	Aquatic vegetation	Abundant growth moss-like, dark green perennial. In swift water too.	1	Common. Algae forms in low velocity and pool areas. Moss here too.	2	Present but spotty, mostly in backwater. Seasonal algae growth makes rocks slick.	3	Perennial types scarce or absent. Yellow-green, short-term bloom may be present.	4
			Excellent total =	28	Good total =	16	Fair total =	3	Poor total =	4

Stream type	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	D3	D4	D5	D6
Good (Stable)	38-43	38-43	54-90	60-95	60-95	50-80	38-45	38-45	40-60	40-64	48-68	40-60	38-50	38-50	60-85	70-90	70-90	60-85	85-107	85-107	85-107	67-98
Fair (Mod. unstable	44-47	44-47	91-129	96-132	96-142	81-110	46-58	46-58	61-78	65-84	69-88	61-78	51-61	51-61	86-105	91-110	91-110	86-105	108-132	108-132	108-132	99-125
Poor (Unstable)	48+	48+	130+	133+	143+	111+	59+	59+	79+	85+	89+	79+	62+	62+	106+	111+	111+	106+	133+	133+	133+	126+

Stream type	DA3	DA4	DA5	DA6	E3	E4	E5	E6	F1	F2	F3	F4	F5	F6	G1	G2	G3	G4	G5	G6
Good (Stable)	40-63	40-63	40-63	40-63	40-63	50-75	50-75	40-63	60-85	60-85	85-110	85-110	90-115	80-95	40-60	40-60	85-107	85-107	90-112	85-107
Fair (Mod. unstable	64-86	64-86	64-86	64-86	64-86	76-96	76-96	64-86	86-105	86-105	111-125	111-125	116-130	96-110	61-78	61-78	108-120	108-120	113-125	108-120
Poor (Unstable)	87+	87+	87+	87+	87+	97+	97+	87+	106+	106+	126+	126+	131+	111+	79+	79+	121+	121+	126+	121+

Grand total =	51
Existing stream type =	B 3a
*Potential stream type =	B3A
Modified channel stability rating =	Good

*Rating is adjusted to potential stream type, not existing.

Worksheet 3-10. Pfankuch (1975) channel stability rating procedure, as modified by Rosgen (1996, 2001c, 2006b).

Stream: Bishop Creek **Location:** Site 4.2 **Valley Type:** **Observers:** GSM, TAK **Date:** 9/13/2019

Location	Key	Category	Excellent Description	Excellent Rating	Good Description	Good Rating	Fair Description	Fair Rating	Poor Description	Poor Rating
Upper banks	1	Landform slope	Bank slope gradient <30%.	2	Bank slope gradient 30–40%.	4	Bank slope gradient 40–60%.	6	Bank slope gradient > 60%.	8
Upper banks	2	Mass erosion	No evidence of past or future mass erosion.	3	Infrequent. Mostly healed over. Low future potential.	6	Frequent or large, causing sediment nearly yearlong.	9	Frequent or large, causing sediment nearly yearlong OR imminent danger of same.	12
Upper banks	3	Debris jam potential	Essentially absent from immediate channel area.	2	Present, but mostly small twigs and limbs.	4	Moderate to heavy amounts, mostly larger sizes.	6	Moderate to heavy amounts, predominantly larger sizes.	8
Upper banks	4	Vegetative bank protection	> 90% plant density. Vigor and variety suggest a deep, dense soil-binding root mass.	3	70–90% density. Fewer species or less vigor suggest less dense or deep root mass.	6	50–70% density. Lower vigor and fewer species from a shallow, discontinuous root mass.	9	<50% density plus fewer species and less vigor indicating poor, discontinuous and shallow root mass.	12
Lower banks	5	Channel capacity	Bank heights sufficient to contain the bankfull stage. Width/depth ratio departure from reference width/depth ratio = 1.0. Bank-Height Ratio (BHR) = 1.0.	1	Bankfull stage is contained within banks. Width/depth ratio departure from reference width/depth ratio = 1.0–1.2. Bank-Height Ratio (BHR) = 1.0–1.1.	2	Bankfull stage is not contained. Width/depth ratio departure from reference width/depth ratio = 1.2–1.4. Bank-Height Ratio (BHR) = 1.1–1.3.	3	Bankfull stage is not contained; over-bank flows are common with flows less than bankfull. Width/depth ratio departure from reference width/depth ratio > 1.4. Bank-Height Ratio (BHR) > 1.3.	4
Lower banks	6	Bank rock content	> 65% with large angular boulders. 12"+ common.	2	40–65%. Mostly boulders and small cobbles 6–12".	4	20–40%. Most in the 3–6" diameter class.	6	<20% rock fragments of gravel sizes, 1–3" or less.	8
Lower banks	7	Obstructions to flow	Rocks and logs firmly imbedded. Flow pattern w/o cutting or deposition. Stable bed.	2	Some present causing erosive cross currents and minor pool filling. Obstructions fewer and less firm.	4	Moderately frequent, unstable obstructions move with high flows causing bank cutting and pool filling.	6	Frequent obstructions and deflectors cause bank erosion yearlong. Sediment traps full, channel migration occurring.	8
Lower banks	8	Cutting	Little or none. Infrequent raw banks <6".	4	Some, intermittently at outcurves and constrictions. Raw banks may be up to 12".	6	Significant. Cuts 12–24" high. Root mat overhangs and sloughing evident.	12	Almost continuous cuts, some over 24" high. Failure of overhangs frequent.	16
Lower banks	9	Deposition	Little or no enlargement of channel or point bars.	3	Some new bar increase, mostly from coarse gravel.	8	Moderate depostion of new gravel and coarse sand on old and some new bars.	12	Extensive deposit of predominantly fine particles. Accelerated bar development.	16
Bottom	10	Rock angularity	Sharp edges and corners. Plane surfaces rough.	1	Rounded corners and edges. Surfaces smooth and flat.	2	Corners and edges well rounded in 2 dimensions.	3	Well rounded in all dimensions, surfaces smooth.	4
Bottom	11	Brightness	Surfaces dull, dark or stained. Generally not bright.	1	Mostly dull, but may have <35% bright surfaces.	2	Mixture dull and bright, i.e., 35–65% mixture range.	3	Predominantly bright, > 65%, exposed or scoured surfaces.	4
Bottom	12	Consolidation of particles	Assorted sizes tightly packed or overlapping.	2	Moderately packed with some overlapping.	4	Mostly loose assortment with no apparent overlap.	6	No packing evident. Loose assortment, easily moved.	8
Bottom	13	Bottom size distribution	No size change evident. Stable material 80–100%.	4	Distribution shift light. Stable material 50–80%.	8	Moderate change in sizes. Stable materials 20–50%.	12	Marked distribution change. Stable materials 0–20%.	16
Bottom	14	Scouring and deposition	<5% of bottom affected by scour or deposition.	6	5–30% affected. Scour at constrictions and where grades steepen. Some deposition in pools.	12	30–50% affected. Deposits and scour at obstructions, constrictions and bends. Some filling of pools.	18	More than 50% of the bottom in a state of flux or change nearly yearlong.	24
Bottom	15	Aquatic vegetation	Abundant growth moss-like, dark green perennial. In swift water too.	1	Common. Algae forms in low velocity and pool areas. Moss here too.	2	Present but spotty, mostly in backwater. Seasonal algae growth makes rocks slick.	3	Perennial types scarce or absent. Yellow-green, short-term bloom may be present.	4
			Excellent total =	27	Good total =	14	Fair total =	6	Poor total =	4

Stream type	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	D3	D4	D5	D6
Good (Stable)	38-43	38-43	54-90	60-95	60-95	50-80	38-45	38-45	40-60	40-64	48-68	40-60	38-50	38-50	60-85	70-90	70-90	60-85	85-107	85-107	85-107	67-98
Fair (Mod. unstable	44-47	44-47	91-129	96-132	96-142	81-110	46-58	46-58	61-78	65-84	69-88	61-78	51-61	51-61	86-105	91-110	91-110	86-105	108-132	108-132	108-132	99-125
Poor (Unstable)	48+	48+	130+	133+	143+	111+	59+	59+	79+	85+	89+	79+	62+	62+	106+	111+	111+	106+	133+	133+	133+	126+

Stream type	DA3	DA4	DA5	DA6	E3	E4	E5	E6	F1	F2	F3	F4	F5	F6	G1	G2	G3	G4	G5	G6
Good (Stable)	40-63	40-63	40-63	40-63	40-63	50-75	50-75	40-63	60-85	60-85	85-110	85-110	90-115	80-95	40-60	40-60	85-107	85-107	90-112	85-107
Fair (Mod. unstable	64-86	64-86	64-86	64-86	64-86	76-96	76-96	64-86	86-105	86-105	111-125	111-125	116-130	96-110	61-78	61-78	108-120	108-120	113-125	108-120
Poor (Unstable)	87+	87+	87+	87+	87+	97+	97+	87+	106+	106+	126+	126+	131+	111+	79+	79+	121+	121+	126+	121+

Grand total =	51
Existing stream type =	B 2
*Potential stream type =	B2
Modified channel stability rating =	Fair

*Rating is adjusted to potential stream type, not existing.

Worksheet 3-10. Pfankuch (1975) channel stability rating procedure, as modified by Rosgen (1996, 2001c, 2006b).

Stream: Bishop Creek **Location:** Site 7 **Valley Type:** **Observers:** GSM,TAK **Date:** 9/11/2019

Location	Key	Category	Excellent Description	Excellent Rating	Good Description	Good Rating	Fair Description	Fair Rating	Poor Description	Poor Rating
Upper banks	1	Landform slope	Bank slope gradient <30%.	2	Bank slope gradient 30–40%.	4	Bank slope gradient 40–60%.	6	Bank slope gradient > 60%.	8
Upper banks	2	Mass erosion	No evidence of past or future mass erosion.	3	Infrequent. Mostly healed over. Low future potential.	6	Frequent or large, causing sediment nearly yearlong.	9	Frequent or large, causing sediment nearly yearlong OR imminent danger of same.	12
Upper banks	3	Debris jam potential	Essentially absent from immediate channel area.	2	Present, but mostly small twigs and limbs.	4	Moderate to heavy amounts, mostly larger sizes.	6	Moderate to heavy amounts, predominantly larger sizes.	8
Upper banks	4	Vegetative bank protection	> 90% plant density. Vigor and variety suggest a deep, dense soil-binding root mass.	3	70–90% density. Fewer species or less vigor suggest less dense or deep root mass.	6	50–70% density. Lower vigor and fewer species from a shallow, discontinuous root mass.	9	<50% density plus fewer species and less vigor indicating poor, discontinuous and shallow root mass.	12
Lower banks	5	Channel capacity	Bank heights sufficient to contain the bankfull stage. Width/depth ratio departure from reference width/depth ratio = 1.0. Bank-Height Ratio (BHR) = 1.0.	1	Bankfull stage is contained within banks. Width/depth ratio departure from reference width/depth ratio = 1.0–1.2. Bank-Height Ratio (BHR) = 1.0–1.1.	2	Bankfull stage is not contained. Width/depth ratio departure from reference width/depth ratio = 1.2–1.4. Bank-Height Ratio (BHR) = 1.1–1.3.	3	Bankfull stage is not contained; over-bank flows are common with flows less than bankfull. Width/depth ratio departure from reference width/depth ratio > 1.4. Bank-Height Ratio (BHR) > 1.3.	4
Lower banks	6	Bank rock content	> 65% with large angular boulders. 12"+ common.	2	40–65%. Mostly boulders and small cobbles 6–12".	4	20–40%. Most in the 3–6" diameter class.	6	<20% rock fragments of gravel sizes, 1–3" or less.	8
Lower banks	7	Obstructions to flow	Rocks and logs firmly imbedded. Flow pattern w/o cutting or deposition. Stable bed.	2	Some present causing erosive cross currents and minor pool filling. Obstructions fewer and less firm.	4	Moderately frequent, unstable obstructions move with high flows causing bank cutting and pool filling.	6	Frequent obstructions and deflectors cause bank erosion yearlong. Sediment traps full, channel migration occurring.	8
Lower banks	8	Cutting	Little or none. Infrequent raw banks <6".	4	Some, intermittently at outcurves and constrictions. Raw banks may be up to 12".	6	Significant. Cuts 12–24" high. Root mat overhangs and sloughing evident.	12	Almost continuous cuts, some over 24" high. Failure of overhangs frequent.	16
Lower banks	9	Deposition	Little or no enlargement of channel or point bars.	4	Some new bar increase, mostly from coarse gravel.	8	Moderate depostion of new gravel and coarse sand on old and some new bars.	12	Extensive deposit of predominantly fine particles. Accelerated bar development.	16
Bottom	10	Rock angularity	Sharp edges and corners. Plane surfaces rough.	1	Rounded corners and edges. Surfaces smooth and flat.	2	Corners and edges well rounded in 2 dimensions.	3	Well rounded in all dimensions, surfaces smooth.	4
Bottom	11	Brightness	Surfaces dull, dark or stained. Generally not bright.	1	Mostly dull, but may have <35% bright surfaces.	2	Mixture dull and bright, i.e., 35–65% mixture range.	3	Predominantly bright, > 65%, exposed or scoured surfaces.	4
Bottom	12	Consolidation of particles	Assorted sizes tightly packed or overlapping.	2	Moderately packed with some overlapping.	4	Mostly loose assortment with no apparent overlap.	6	No packing evident. Loose assortment, easily moved.	8
Bottom	13	Bottom size distribution	No size change evident. Stable material 80–100%.	4	Distribution shift light. Stable material 50–80%.	8	Moderate change in sizes. Stable materials 20–50%.	12	Marked distribution change. Stable materials 0–20%.	16
Bottom	14	Scouring and deposition	<5% of bottom affected by scour or deposition.	6	5–30% affected. Scour at constrictions and where grades steepen. Some deposition in pools.	12	30–50% affected. Deposits and scour at obstructions, constrictions and bends. Some filling of pools.	18	More than 50% of the bottom in a state of flux or change nearly yearlong.	24
Bottom	15	Aquatic vegetation	Abundant growth moss-like, dark green perennial. In swift water too.	1	Common. Algae forms in low velocity and pool areas. Moss here too.	2	Present but spotty, mostly in backwater. Seasonal algae growth makes rocks slick.	3	Perennial types scarce or absent. Yellow-green, short-term bloom may be present.	4
			Excellent total =	30	Good total =	8	Fair total =	6	Poor total =	8

Stream type	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	D3	D4	D5	D6
Good (Stable)	38-43	38-43	54-90	60-95	60-95	50-80	38-45	38-45	40-60	40-64	48-68	40-60	38-50	38-50	60-85	70-90	70-90	60-85	85-107	85-107	85-107	67-98
Fair (Mod. unstable	44-47	44-47	91-129	96-132	96-142	81-110	46-58	46-58	61-78	65-84	69-88	61-78	51-61	51-61	86-105	91-110	91-110	86-105	108-132	108-132	108-132	99-125
Poor (Unstable)	48+	48+	130+	133+	143+	111+	59+	59+	79+	85+	89+	79+	62+	62+	106+	111+	111+	106+	133+	133+	133+	126+

Stream type	DA3	DA4	DA5	DA6	E3	E4	E5	E6	F1	F2	F3	F4	F5	F6	G1	G2	G3	G4	G5	G6
Good (Stable)	40-63	40-63	40-63	40-63	40-63	50-75	50-75	40-63	60-85	60-85	85-110	85-110	90-115	80-95	40-60	40-60	85-107	85-107	90-112	85-107
Fair (Mod. unstable	64-86	64-86	64-86	64-86	64-86	76-96	76-96	64-86	86-105	86-105	111-125	111-125	116-130	96-110	61-78	61-78	108-120	108-120	113-125	108-120
Poor (Unstable)	87+	87+	87+	87+	87+	97+	97+	87+	106+	106+	126+	126+	131+	111+	79+	79+	121+	121+	126+	121+

Grand total =	52
Existing stream type =	B2
*Potential stream type =	B2
Modified channel stability rating =	Fair

*Rating is adjusted to potential stream type, not existing.

Worksheet 3-10. Pfankuch (1975) channel stability rating procedure, as modified by Rosgen (1996, 2001c, 2006b).

Stream: Bishop Creek **Location:** Site 3 **Valley Type:** **Observers:** GSM,TAK **Date:** 9/10/2019

Location	Key	Category	Excellent Description	Rating	Good Description	Rating	Fair Description	Rating	Poor Description	Rating
Upper banks	1	Landform slope	Bank slope gradient <30%.	2	Bank slope gradient 30–40%.	**4**	Bank slope gradient 40–60%.	6	Bank slope gradient > 60%.	8
	2	Mass erosion	No evidence of past or future mass erosion.	**3**	Infrequent. Mostly healed over. Low future potential.	6	Frequent or large, causing sediment nearly yearlong.	9	Frequent or large, causing sediment nearly yearlong OR imminent danger of same.	12
	3	Debris jam potential	Essentially absent from immediate channel area.	**2**	Present, but mostly small twigs and limbs.	4	Moderate to heavy amounts, mostly larger sizes.	6	Moderate to heavy amounts, predominantly larger sizes.	8
	4	Vegetative bank protection	> 90% plant density. Vigor and variety suggest a deep, dense soil-binding root mass.	**3**	70–90% density. Fewer species or less vigor suggest less dense or deep root mass.	6	50–70% density. Lower vigor and fewer species from a shallow, discontinuous root mass.	9	<50% density plus fewer species and less vigor indicating poor, discontinuous and shallow root mass.	12
Lower banks	5	Channel capacity	Bank heights sufficient to contain the bankfull stage. Width/depth ratio departure from reference width/depth ratio = 1.0. Bank-Height Ratio (BHR) = 1.0.	1	Bankfull stage is contained within banks. Width/depth ratio departure from reference width/depth ratio = 1.0–1.2. Bank-Height Ratio (BHR) = 1.0–1.1.	**2**	Bankfull stage is not contained. Width/depth ratio departure from reference width/depth ratio = 1.2–1.4. Bank-Height Ratio (BHR) = 1.1–1.3.	3	Bankfull stage is not contained; over-bank flows are common with flows less than bankfull. Width/depth ratio departure from reference width/depth ratio > 1.4. Bank-Height Ratio (BHR) > 1.3.	4
	6	Bank rock content	> 65% with large angular boulders. 12"+ common.	**2**	40–65%. Mostly boulders and small cobbles 6–12".	4	20–40%. Most in the 3–6" diameter class.	6	<20% rock fragments of gravel sizes, 1–3" or less.	8
	7	Obstructions to flow	Rocks and logs firmly imbedded. Flow pattern w/o cutting or deposition. Stable bed.	**2**	Some present causing erosive cross currents and minor pool filling. Obstructions fewer and less firm.	4	Moderately frequent, unstable obstructions move with high flows causing bank cutting and pool filling.	6	Frequent obstructions and deflectors cause bank erosion yearlong. Sediment traps full, channel migration occurring.	8
	8	Cutting	Little or none. Infrequent raw banks <6".	**4**	Some, intermittently at outcurves and constrictions. Raw banks may be up to 12".	6	Significant. Cuts 12–24" high. Root mat overhangs and sloughing evident.	12	Almost continuous cuts, some over 24" high. Failure of overhangs frequent.	16
	9	Deposition	Little or no enlargement of channel or point bars.	**4**	Some new bar increase, mostly from coarse gravel.	8	Moderate depostion of new gravel and coarse sand on old and some new bars.	12	Extensive deposit of predominantly fine particles. Accelerated bar development.	16
Bottom	10	Rock angularity	Sharp edges and corners. Plane surfaces rough.	1	Rounded corners and edges. Surfaces smooth and flat.	2	Corners and edges well rounded in 2 dimensions.	3	Well rounded in all dimensions, surfaces smooth.	**4**
	11	Brightness	Surfaces dull, dark or stained. Generally not bright.	1	Mostly dull, but may have <35% bright surfaces.	2	Mixture dull and bright, i.e., 35–65% mixture range.	**3**	Predominantly bright, > 65%, exposed or scoured surfaces.	4
	12	Consolidation of particles	Assorted sizes tightly packed or overlapping.	2	Moderately packed with some overlapping.	**4**	Mostly loose assortment with no apparent overlap.	6	No packing evident. Loose assortment, easily moved.	8
	13	Bottom size distribution	No size change evident. Stable material 80–100%.	**4**	Distribution shift light. Stable material 50–80%.	8	Moderate change in sizes. Stable materials 20–50%.	12	Marked distribution change. Stable materials 0–20%.	16
	14	Scouring and deposition	<5% of bottom affected by scour or deposition.	**6**	5–30% affected. Scour at constrictions and where grades steepen. Some deposition in pools.	12	30–50% affected. Deposits and scour at obstructions, constrictions and bends. Some filling of pools.	18	More than 50% of the bottom in a state of flux or change nearly yearlong.	24
	15	Aquatic vegetation	Abundant growth moss-like, dark green perennial. In swift water too.	1	Common. Algae forms in low velocity and pool areas. Moss here too.	**2**	Present but spotty, mostly in backwater. Seasonal algae growth makes rocks slick.	3	Perennial types scarce or absent. Yellow-green, short-term bloom may be present.	4
			Excellent total =	**30**	Good total =	**12**	Fair total =	**3**	Poor total =	**4**

Stream type	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	D3	D4	D5	D6
Good (Stable)	38-43	38-43	54-90	60-95	60-95	50-80	38-45	38-45	40-60	40-64	48-68	40-60	38-50	38-50	60-85	70-90	70-90	60-85	85-107	85-107	85-107	67-98
Fair (Mod. unstable	44-47	44-47	91-129	96-132	96-142	81-110	46-58	46-58	61-78	65-84	69-88	61-78	51-61	51-61	86-105	91-110	91-110	86-105	108-132	108-132	108-132	99-125
Poor (Unstable)	48+	48+	130+	133+	143+	111+	59+	59+	79+	85+	89+	79+	62+	62+	106+	111+	111+	106+	133+	133+	133+	126+

Stream type	DA3	DA4	DA5	DA6	E3	E4	E5	E6	F1	F2	F3	F4	F5	F6	G1	G2	G3	G4	G5	G6
Good (Stable)	40-63	40-63	40-63	40-63	40-63	50-75	50-75	40-63	60-85	60-85	85-110	85-110	90-115	80-95	40-60	40-60	85-107	85-107	90-112	85-107
Fair (Mod. unstable	64-86	64-86	64-86	64-86	64-86	76-96	76-96	64-86	86-105	86-105	111-125	111-125	116-130	96-110	61-78	61-78	108-120	108-120	113-125	108-120
Poor (Unstable)	87+	87+	87+	87+	87+	97+	97+	87+	106+	106+	126+	126+	131+	111+	79+	79+	121+	121+	126+	121+

Grand total =	**49**
Existing stream type =	**B3a**
*Potential stream type =	**B3A**
Modified channel stability rating =	**Good**

*Rating is adjusted to potential stream type, not existing.

Worksheet 3-10. Pfankuch (1975) channel stability rating procedure, as modified by Rosgen (1996, 2001c, 2006b).

Stream: Bishop Creek **Location:** Site 5 **Valley Type:** **Observers:** GSM, TAK **Date:** 9/10/2019

Location	Key	Category	Excellent Description	Excellent Rating	Good Description	Good Rating	Fair Description	Fair Rating	Poor Description	Poor Rating
Upper banks	1	Landform slope	Bank slope gradient <30%.	2	Bank slope gradient 30–40%.	4	Bank slope gradient 40–60%.	6	Bank slope gradient > 60%.	8
Upper banks	2	Mass erosion	No evidence of past or future mass erosion.	3	Infrequent. Mostly healed over. Low future potential.	6	Frequent or large, causing sediment nearly yearlong.	9	Frequent or large, causing sediment nearly yearlong OR imminent danger of same.	12
Upper banks	3	Debris jam potential	Essentially absent from immediate channel area.	2	Present, but mostly small twigs and limbs.	4	Moderate to heavy amounts, mostly larger sizes.	6	Moderate to heavy amounts, predominantly larger sizes.	8
Upper banks	4	Vegetative bank protection	> 90% plant density. Vigor and variety suggest a deep, dense soil-binding root mass.	3	70–90% density. Fewer species or less vigor suggest less dense or deep root mass.	6	50–70% density. Lower vigor and fewer species from a shallow, discontinuous root mass.	9	<50% density plus fewer species and less vigor indicating poor, discontinuous and shallow root mass.	12
Lower banks	5	Channel capacity	Bank heights sufficient to contain the bankfull stage. Width/depth ratio departure from reference width/depth ratio = 1.0. Bank-Height Ratio (BHR) = 1.0.	1	Bankfull stage is contained within banks. Width/depth ratio departure from reference width/depth ratio = 1.0–1.2. Bank-Height Ratio (BHR) = 1.0–1.1.	2	Bankfull stage is not contained. Width/depth ratio departure from reference width/depth ratio = 1.2–1.4. Bank-Height Ratio (BHR) = 1.1–1.3.	3	Bankfull stage is not contained; over-bank flows are common with flows less than bankfull. Width/depth ratio departure from reference width/depth ratio > 1.4. Bank-Height Ratio (BHR) > 1.3.	4
Lower banks	6	Bank rock content	> 65% with large angular boulders. 12"+ common.	2	40–65%. Mostly boulders and small cobbles 6–12".	4	20–40%. Most in the 3–6" diameter class.	6	<20% rock fragments of gravel sizes, 1–3" or less.	8
Lower banks	7	Obstructions to flow	Rocks and logs firmly imbedded. Flow pattern w/o cutting or deposition. Stable bed.	2	Some present causing erosive cross currents and minor pool filling. Obstructions fewer and less firm.	4	Moderately frequent, unstable obstructions move with high flows causing bank cutting and pool filling.	6	Frequent obstructions and deflectors cause bank erosion yearlong. Sediment traps full, channel migration occurring.	8
Lower banks	8	Cutting	Little or none. Infrequent raw banks <6".	4	Some, intermittently at outcurves and constrictions. Raw banks may be up to 12".	6	Significant. Cuts 12–24" high. Root mat overhangs and sloughing evident.	12	Almost continuous cuts, some over 24" high. Failure of overhangs frequent.	16
Lower banks	9	Deposition	Little or no enlargement of channel or point bars.	4	Some new bar increase, mostly from coarse gravel.	8	Moderate depostion of new gravel and coarse sand on old and some new bars.	12	Extensive deposit of predominantly fine particles. Accelerated bar development.	16
Bottom	10	Rock angularity	Sharp edges and corners. Plane surfaces rough.	1	Rounded corners and edges. Surfaces smooth and flat.	2	Corners and edges well rounded in 2 dimensions.	3	Well rounded in all dimensions, surfaces smooth.	4
Bottom	11	Brightness	Surfaces dull, dark or stained. Generally not bright.	1	Mostly dull, but may have <35% bright surfaces.	2	Mixture dull and bright, i.e., 35–65% mixture range.	3	Predominantly bright, > 65%, exposed or scoured surfaces.	4
Bottom	12	Consolidation of particles	Assorted sizes tightly packed or overlapping.	2	Moderately packed with some overlapping.	4	Mostly loose assortment with no apparent overlap.	6	No packing evident. Loose assortment, easily moved.	8
Bottom	13	Bottom size distribution	No size change evident. Stable material 80–100%.	4	Distribution shift light. Stable material 50–80%.	8	Moderate change in sizes. Stable materials 20–50%.	12	Marked distribution change. Stable materials 0–20%.	16
Bottom	14	Scouring and deposition	<5% of bottom affected by scour or deposition.	6	5–30% affected. Scour at constrictions and where grades steepen. Some deposition in pools.	12	30–50% affected. Deposits and scour at obstructions, constrictions and bends. Some filling of pools.	18	More than 50% of the bottom in a state of flux or change nearly yearlong.	24
Bottom	15	Aquatic vegetation	Abundant growth moss-like, dark green perennial. In swift water too.	1	Common. Algae forms in low velocity and pool areas. Moss here too.	2	Present but spotty, mostly in backwater. Seasonal algae growth makes rocks slick.	3	Perennial types scarce or absent. Yellow-green, short-term bloom may be present.	4
			Excellent total =	29	Good total =	8	Fair total =	9	Poor total =	8

Stream type	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	D3	D4	D5	D6
Good (Stable)	38-43	38-43	54-90	60-95	60-95	50-80	38-45	38-45	40-60	40-64	48-68	40-60	38-50	38-50	60-85	70-90	70-90	60-85	85-107	85-107	85-107	67-98
Fair (Mod. unstable	44-47	44-47	91-129	96-132	96-142	81-110	46-58	46-58	61-78	65-84	69-88	61-78	51-61	51-61	86-105	91-110	91-110	86-105	108-132	108-132	108-132	99-125
Poor (Unstable)	48+	48+	130+	133+	143+	111+	59+	59+	79+	85+	89+	79+	62+	62+	106+	111+	111+	106+	133+	133+	133+	126+

Stream type	DA3	DA4	DA5	DA6	E3	E4	E5	E6	F1	F2	F3	F4	F5	F6	G1	G2	G3	G4	G5	G6
Good (Stable)	40-63	40-63	40-63	40-63	40-63	50-75	50-75	40-63	60-85	60-85	85-110	85-110	90-115	80-95	40-60	40-60	85-107	85-107	90-112	85-107
Fair (Mod. unstable	64-86	64-86	64-86	64-86	64-86	76-96	76-96	64-86	86-105	86-105	111-125	111-125	116-130	96-110	61-78	61-78	108-120	108-120	113-125	108-120
Poor (Unstable)	87+	87+	87+	87+	87+	97+	97+	87+	106+	106+	126+	126+	131+	111+	79+	79+	121+	121+	126+	121+

Grand total =	54
Existing stream type =	B3a
*Potential stream type =	B3A
Modified channel stability rating =	Good

*Rating is adjusted to potential stream type, not existing.

Worksheet 3-10. Pfankuch (1975) channel stability rating procedure, as modified by Rosgen (1996, 2001c, 2006b).

Stream: Bishop Creek **Location:** Site 6 **Valley Type:** **Observers:** GSM, TAK **Date:** 9/9/2019

Location	Key	Category	Excellent: Description	Rating	Good: Description	Rating	Fair: Description	Rating	Poor: Description	Rating
Upper banks	1	Landform slope	Bank slope gradient <30%.	2	Bank slope gradient 30–40%.	**4**	Bank slope gradient 40–60%.	6	Bank slope gradient > 60%.	8
	2	Mass erosion	No evidence of past or future mass erosion.	3	Infrequent. Mostly healed over. Low future potential.	**6**	Frequent or large, causing sediment nearly yearlong.	9	Frequent or large, causing sediment nearly yearlong OR imminent danger of same.	12
	3	Debris jam potential	Essentially absent from immediate channel area.	2	Present, but mostly small twigs and limbs.	**4**	Moderate to heavy amounts, mostly larger sizes.	6	Moderate to heavy amounts, predominantly larger sizes.	8
	4	Vegetative bank protection	> 90% plant density. Vigor and variety suggest a deep, dense soil-binding root mass.	3	70–90% density. Fewer species or less vigor suggest less dense or deep root mass.	**6**	50–70% density. Lower vigor and fewer species from a shallow, discontinuous root mass.	9	<50% density plus fewer species and less vigor indicating poor, discontinuous and shallow root mass.	12
Lower banks	5	Channel capacity	Bank heights sufficient to contain the bankfull stage. Width/depth ratio departure from reference width/depth ratio = 1.0. Bank-Height Ratio (BHR) = 1.0.	1	Bankfull stage is contained within banks. Width/depth ratio departure from reference width/depth ratio = 1.0–1.2. Bank-Height Ratio (BHR) = 1.0–1.1.	**2**	Bankfull stage is not contained. Width/depth ratio departure from reference width/depth ratio = 1.2–1.4. Bank-Height Ratio (BHR) = 1.1–1.3.	3	Bankfull stage is not contained; over-bank flows are common with flows less than bankfull. Width/depth ratio departure from reference width/depth ratio > 1.4. Bank-Height Ratio (BHR) > 1.3.	4
	6	Bank rock content	> 65% with large angular boulders. 12"+ common.	2	40–65%. Mostly boulders and small cobbles 6–12".	**4**	20–40%. Most in the 3–6" diameter class.	6	<20% rock fragments of gravel sizes, 1–3" or less.	8
	7	Obstructions to flow	Rocks and logs firmly imbedded. Flow pattern w/o cutting or deposition. Stable bed.	**2**	Some present causing erosive cross currents and minor pool filling. Obstructions fewer and less firm.	4	Moderately frequent, unstable obstructions move with high flows causing bank cutting and pool filling.	6	Frequent obstructions and deflectors cause bank erosion yearlong. Sediment traps full, channel migration occurring.	8
	8	Cutting	Little or none. Infrequent raw banks <6".	4	Some, intermittently at outcurves and constrictions. Raw banks may be up to 12".	**6**	Significant. Cuts 12–24" high. Root mat overhangs and sloughing evident.	12	Almost continuous cuts, some over 24" high. Failure of overhangs frequent.	16
	9	Deposition	Little or no enlargement of channel or point bars.	**4**	Some new bar increase, mostly from coarse gravel.	8	Moderate depostion of new gravel and coarse sand on old and some new bars.	12	Extensive deposit of predominantly fine particles. Accelerated bar development.	16
Bottom	10	Rock angularity	Sharp edges and corners. Plane surfaces rough.	1	Rounded corners and edges. Surfaces smooth and flat.	2	Corners and edges well rounded in 2 dimensions.	3	Well rounded in all dimensions, surfaces smooth.	**4**
	11	Brightness	Surfaces dull, dark or stained. Generally not bright.	1	Mostly dull, but may have <35% bright surfaces.	2	Mixture dull and bright, i.e., 35–65% mixture range.	3	Predominantly bright, > 65%, exposed or scoured surfaces.	**4**
	12	Consolidation of particles	Assorted sizes tightly packed or overlapping.	2	Moderately packed with some overlapping.	**4**	Mostly loose assortment with no apparent overlap.	6	No packing evident. Loose assortment, easily moved.	8
	13	Bottom size distribution	No size change evident. Stable material 80–100%.	**4**	Distribution shift light. Stable material 50–80%.	8	Moderate change in sizes. Stable materials 20–50%.	12	Marked distribution change. Stable materials 0–20%.	16
	14	Scouring and deposition	<5% of bottom affected by scour or deposition.	**6**	5–30% affected. Scour at constrictions and where grades steepen. Some deposition in pools.	12	30–50% affected. Deposits and scour at obstructions, constrictions and bends. Some filling of pools.	18	More than 50% of the bottom in a state of flux or change nearly yearlong.	24
	15	Aquatic vegetation	Abundant growth moss-like, dark green perennial. In swift water too.	1	Common. Algae forms in low velocity and pool areas. Moss here too.	2	Present but spotty, mostly in backwater. Seasonal algae growth makes rocks slick.	3	Perennial types scarce or absent. Yellow-green, short-term bloom may be present.	**4**
			Excellent total =	**16**	**Good total =**	**36**	**Fair total =**	**0**	**Poor total =**	**12**

Stream type	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	D3	D4	D5	D6
Good (Stable)	38-43	38-43	54-90	60-95	60-95	50-80	38-45	38-45	40-60	40-64	48-68	40-60	38-50	38-50	60-85	70-90	70-90	60-85	85-107	85-107	85-107	67-98
Fair (Mod. unstable	44-47	44-47	91-129	96-132	96-142	81-110	46-58	46-58	61-78	65-84	69-88	61-78	51-61	51-61	86-105	91-110	91-110	86-105	108-132	108-132	108-132	99-125
Poor (Unstable)	48+	48+	130+	133+	143+	111+	59+	59+	79+	85+	89+	79+	62+	62+	106+	111+	111+	106+	133+	133+	133+	126+

Stream type	DA3	DA4	DA5	DA6	E3	E4	E5	E6	F1	F2	F3	F4	F5	F6	G1	G2	G3	G4	G5	G6
Good (Stable)	40-63	40-63	40-63	40-63	40-63	50-75	50-75	40-63	60-85	60-85	85-110	85-110	90-115	80-95	40-60	40-60	85-107	85-107	90-112	85-107
Fair (Mod. unstable	64-86	64-86	64-86	64-86	64-86	76-96	76-96	64-86	86-105	86-105	111-125	111-125	116-130	96-110	61-78	61-78	108-120	108-120	113-125	108-120
Poor (Unstable)	87+	87+	87+	87+	87+	97+	97+	87+	106+	106+	126+	126+	131+	111+	79+	79+	121+	121+	126+	121+

Grand total =	64
Existing stream type =	B 3
*Potential stream type =	B3
Modified channel stability rating =	Fair

*Rating is adjusted to potential stream type, not existing.

SOUTHERN CALIFORNIA EDISON

Bishop Creek Hydroelectric Project

(FERC Project No. 1394)

TECHNICAL MEMORANDUM
BISHOP CREEK SUBSTRATE MOBILITY EVALUATION

Southern California Edison
1515 Walnut Grove Ave
Rosemead, CA 91770

December 2021

Support from:

Stillwater Sciences

and

Kleinschmidt

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1.0 INTRODUCTION

This Technical Memorandum summarizes results from supplemental field investigations conducted as part of Task 4 – Substrate Mobility Evaluation from the Sediment and Geomorphology Study, as described in the Modification to Methods of the Initial Study Report (section 12.5). The primary goals of Task 4 are to (1) characterize the particle size distribution of sediments mobilized at or near bankfull flow condition, and (2) evaluate hydraulic conditions required to mobilize D_{65} and D_{84} particle sizes. This tracer study primarily looks at the first goal, as based on estimated bankfull conditions for these sites.

2.0 STUDY AREA AND BACKGROUND

The Study Area included two study sites in the Bishop Creek watershed, Site 4 and Site 6. Site 4 is comprised of two contiguous sub-sites, 4.1 and 4.2, which are treated as one site for this Technical Memorandum. Both sites are downstream of Project reservoirs (i.e., South Lake and Lake Sabrina) (Figure 1) and located on natural stream reaches between a powerhouse intake impoundment and the associated powerhouse (a penstock carries flow parallel to the creek).

Bishop Creek is approximately 10 miles long and has a drainage area of approximately 70 square miles from its headwaters to its confluence with the Owens River. The Bishop Creek watershed drains the eastern side of the Sierra Nevada Range and joins Owens River near Bishop, California. This section of the watershed ranges in elevation from approximately 4,900 feet (ft) to 8,500 ft. Bishop Creek is separated into multiple segments by a series of powerhouses and intakes (Figure 1). The channel form is characterized by high gradient, coarse-grained, cascade and step-pool morphology.

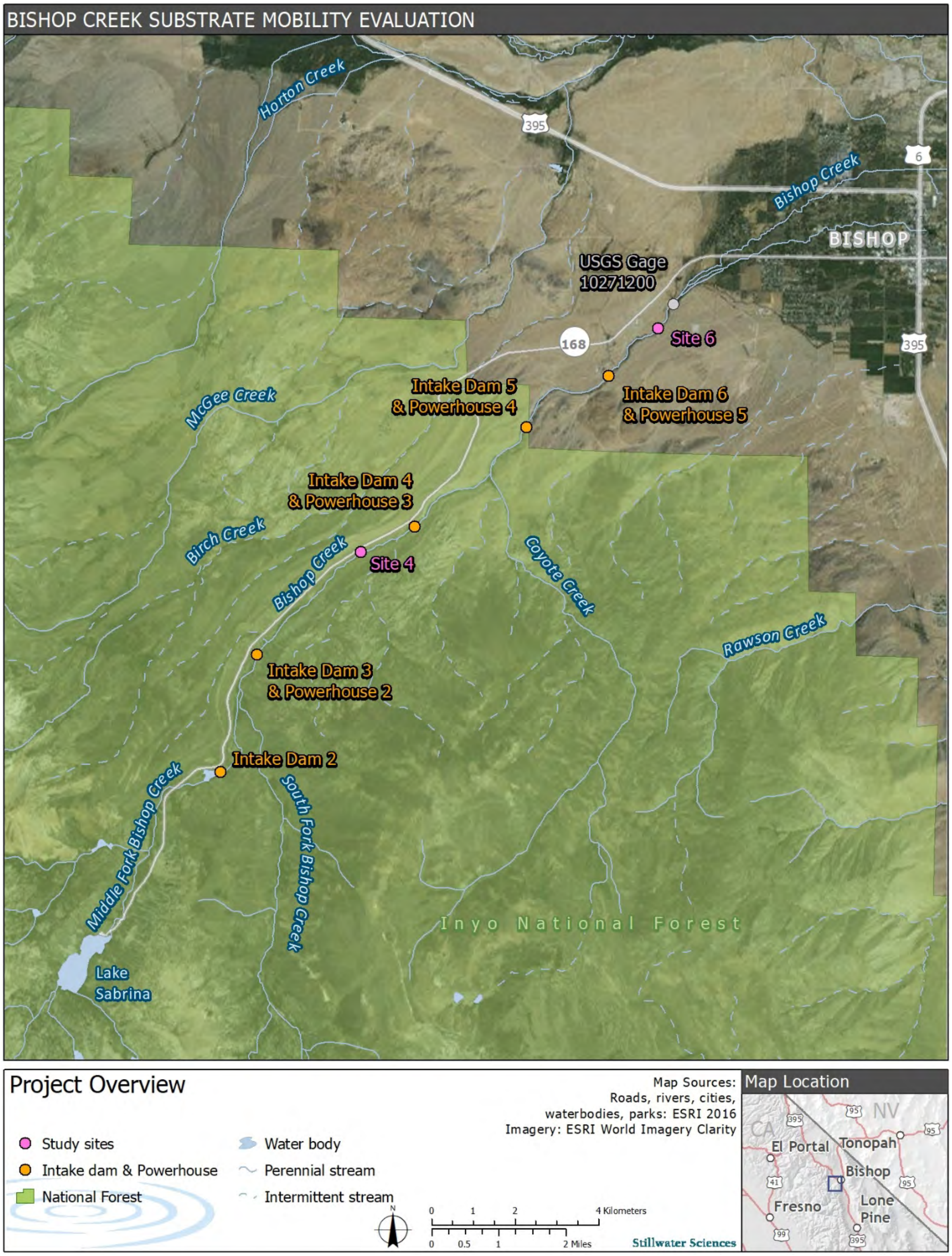


Figure 1. Bishop Creek Tracer Rock Study Site Overview

2.1 HYDROLOGY

Annual peak and 15-minute flow data were used to evaluate hydrology driving sediment transport at Sites 4 and 6. Daily flow data were obtained from Southern California Edison (SCE) for Bishop Creek below Intake 6 and Intake 3, which correspond to the flow in Bishop Creek at Sites 6 and 4, respectively. Fifteen-minute flow data were evaluated for the period of March 2020 to September 2021 to determine the magnitude and duration of high flow events that occurred over the duration of the tracer rock study. Annual peak flow data were obtained from U.S. Geological Survey (USGS) Gage ID 10271200, which is approximately 0.3 miles downstream of Site 6 (on Bishop Creek above Plant 6) and has a total record of 27 years under current in-stream flow requirements. Annual peak flow data are not available for Site 4. Because of this, Site 6 peak flow data were prorated using a standard flow transference formula based on drainage area ratios (Waananen and Crippen 1977):

$$Q_u = Q_g(A_u/A_g) \qquad (1)$$

Q_u = Ungaged discharge

Q_g = Gaged discharge

A_u = Ungaged drainage area

A_g = Gaged drainage area.

A flood frequency analysis was performed in accordance with Bulletin 17C (USGS 2019) for USGS Gage ID 10271200 using the Hydrologic Engineering Center's statistical software package (HEC-SSP) (USACE 2019). Table 1 presents peak discharges up to the 20-year recurrence interval (5% annual exceedance probability). Annual peak flows in Bishop Creek ranged from 15 cubic feet per second (cfs) to 453 cfs over the last 27 years (water years 1994 to 2020) (Figure 2). The largest flow on record (453 cfs) had a return period of approximately 20 years (Figure 3).

Table 1. Flood frequency flows for USGS Gage ID 10271200

Annual Exceedance Probability (%)	Site 6 Instantaneous Peak Flow (cfs)	Site 4 Instantaneous Peak Flow (cfs)[1]
5	487	342
10	403	283
20	313	220
50	176	124

[1] Discharge values were prorated by drainage area using equation 1. A_g =104 mi^2, A_u =73 mi^2.

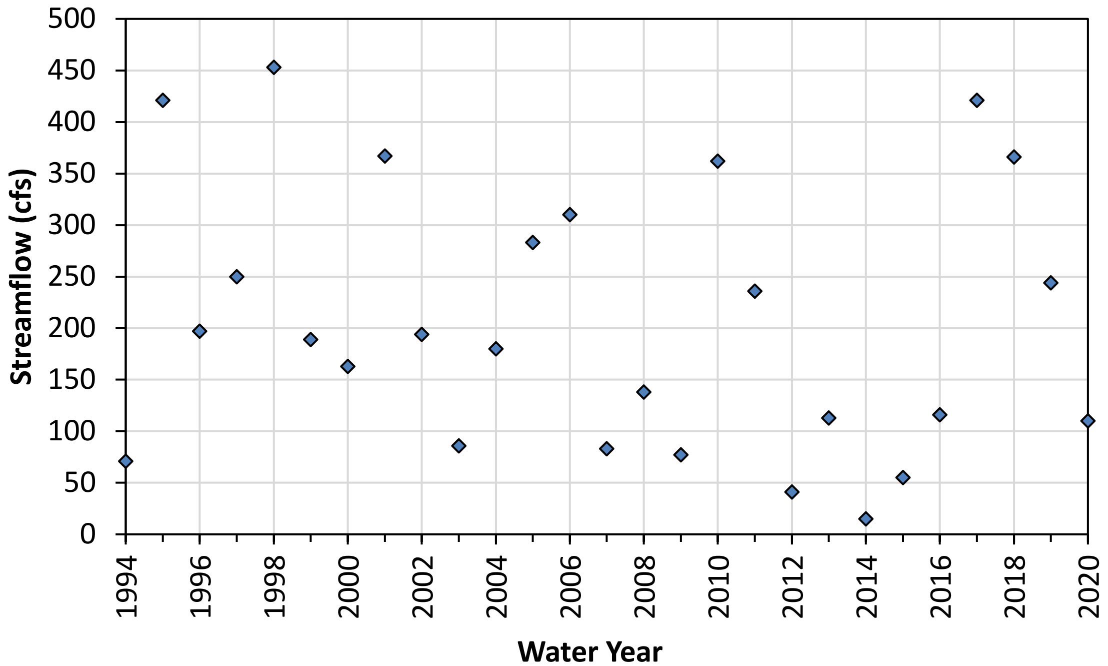


Figure 2. Instantaneous maximum annual peak flow record for water years 1994–2020 at USGS Gage ID 10271200 (Site 6)

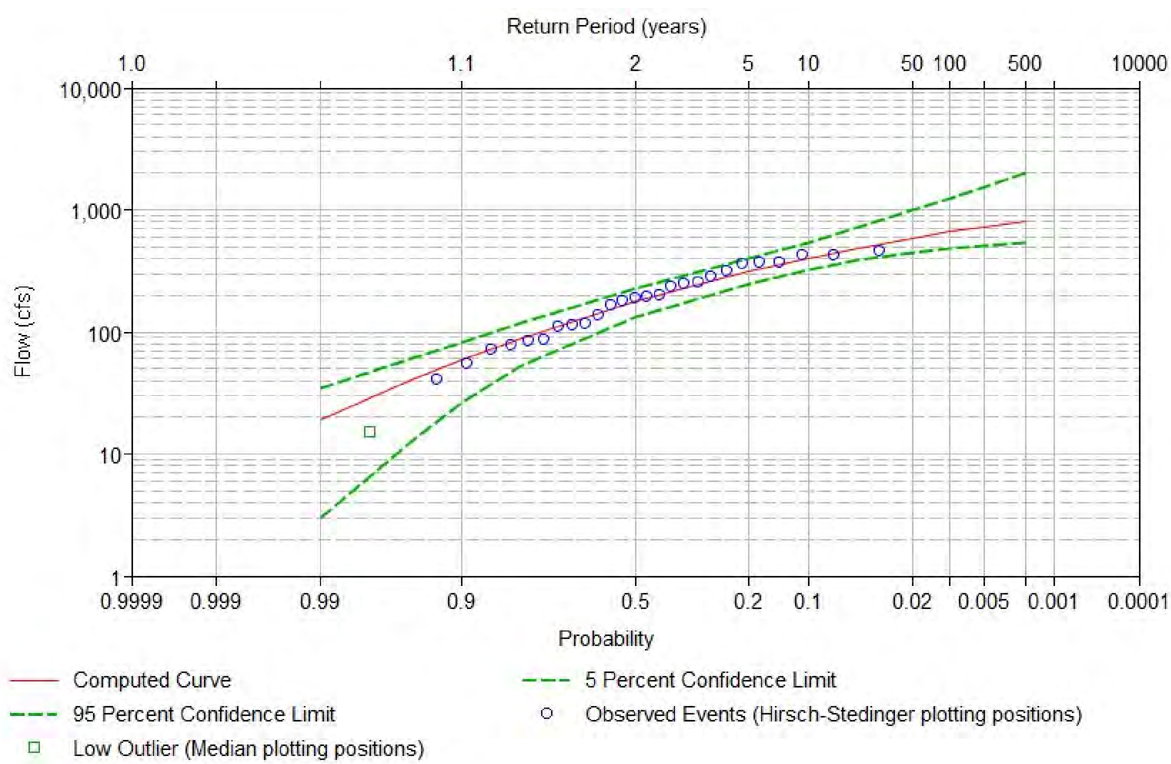


Figure 3. Flood frequency analysis for USGS Gage ID 10271200 (Site 6)

The Project utilizes water from Bishop Creek to generate electricity. Instream flow releases are made within bypass reaches as described in Section 12.2.3 of the PAD (Southern California Edison 2019). Other sources of water input between the junction of South Fork Bishop Creek and Middle Fork Bishop Creek and Powerhouse No. 6 include limited inter-basin transfers from Birch and McGee Creeks (directly into the penstocks) and three tributaries. The largest tributary, Coyote Creek, is unregulated and enters Bishop Creek upstream of Powerhouse No. 4, between Sites 4 and 6.

As described in the Operations Model Study Plan, flow at the site varies depending on the amount of runoff, instream minimum flow requirements, and SCE's release schedule, which is dictated by snowpack, snow melt, spring rain events, drought, power demand, and irrigation. In Bishop Creek, peak runoff generally occurs from June to August, as the snow melts in the higher mountain elevations. A discussion of general project hydrology and operations is available in SCE (2019).

3.0 METHODS

3.1 FIELD MEASUREMENTS

Field measurements at Study Sites 4 and 6 included cross section surveys, longitudinal profile surveys of the channel bed and water surface, surface measurements of bed particle size distribution, deployment, and recovery of Passive Integrated Transponder (PIT) tagged tracer rocks, and photo documentation.

Tracer rock deployments were conducted at Sites 4 and 6 between August 2 and August 6, 2020. Tracer rock recovery efforts 1 and 2 were conducted on May 26 and July 20, 2021, respectively.

3.1.1 LONGITUDINAL PROFILES AND CROSS SECTIONS

Cross section and longitudinal profile surveys were conducted at the study sites utilizing Trimble S7 robotic total station (RTS) and Trimble R10-2 Real-time kinematic Global Navigation Satellite System (RTK 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 (NGS OPUS).

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. Dept. of Agriculture, Forest Service (Forest Service) (Harrelson et al. 1994). The 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.

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 3 ft, with denser spacing in topographically complex areas. The longitudinal profile survey followed procedures described by the Forest Service (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.

3.1.2 SUBSTRATE CHARACTERIZATION

Wolman pebble counts (Wolman 1954) were conducted to characterize channel bed particle size distribution along cross sections and representative channel locations. Pebble counts were conducted in 2020 and 2021 at Site 6 and 2020 at Site 4. Pebble counts entailed measuring the intermediate axis (b-axis) of 100 particles in the immediate vicinity of a cross section transect. All silt- and sand-sized particles were classified as <2 millimeters (mm).

3.1.3 TRACER ROCKS

Passive Integrated Transponder (PIT)-tagged tracer rocks were deployed to inform sediment transport dynamics at sites 4 (consisting of sites 4.1 4.2) and 6. Tracer rocks bracketed the average range of D10 to D84 particle sizes (32 to 350 mm) based on 2019 pebble counts for these sites (Kleinschmidt 2020). Table 2 describes the particle size classes and total quantity of tracer rocks installed in 2020.

Table 2. Tracer rock size classes and quantities by site

Size Class	B-axis Range (mm)	Site[1]	Quantity
A	32–45	4	18
		6	12
B	45–64	4	18
		6	12
C	64–90	4	22
		6	11
D	90–128	4	19
		6	12
E	128–180	4	19
		6	12
F	180–256	4	14
		6	5
G	256–350	4	6
		6	3
Total		4	116
		6	67

[1] Sites 4.1 and 4.2 were treated as a single site (Site 4) for the tracer rock study because the sites are contiguous and tracer rocks were deployed between the two sites as well as at the cross sections.

Tracer rock size classes A–F were obtained from an out-of-area aggregate source prior to the start of fieldwork. The out-of-area tracer rocks had similar lithology (igneous) and physical properties (e.g., specific gravity, sphericity, hardness, mineralogy) to native particles found at the Bishop Creek study sites. Tracer rocks in size class G were obtained on site. The out-of-area tracer rocks were decontaminated with Virkon® aquatic disinfectant prior to deployment in Bishop Creek. The intermediate axis (B-axis) and mass were recorded for each particle in size classes A-F, but only the B-axis parameter was recorded for size class G particles. PIT tags were inserted into the tracers 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.

Tracer rocks were deployed along cross sections and at other representative geomorphic units between the cross sections at each study site. Various geomorphic units were chosen for tracer rock placement to test rock particle mobility in a range of environments. Geomorphic units included riffles, cascades, flat-water sections (runs and glides), and plunge pools. 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 emplacement. The location of each tracer rock was surveyed with RTS or RTK GNSS equipment, and representative photographs were taken of the tracer locations.

3.2 ANALYSIS

3.2.1 LONGITUDINAL PROFILES AND CROSS SECTIONS

Results from the 2021 cross section and longitudinal profile surveys during tracer recovery were compared with surveys from 2019 and 2020 to assess geomorphic change (e.g., aggradation or incision). The 2019 profiles and cross sections were completed as part of the larger Sediment & Geomorphology Study using local benchmarks and laser level surveying, so there may be some differences in precision between the 2019 and 2020/2021 surveys. Because the longitudinal profiles do not start and stop at endpins, there is likely some uncertainty in aligning the 2019, 2020, and 2021 surveys. Despite differences in longitudinal profile alignments, changes were quantified by comparing reach-average slope between monitoring years. Cross sections were evaluated for instances of aggradation or incision.

3.2.2 BED PARTICLE SIZE DISTRIBUTIONS

Bed particle size distribution data were used to calculate commonly used bed particle size metrics: the particle size for which 16% of the distribution is finer (D_{16}), the particle size for which 50% of the distribution is finer (D_{50}, or the median size), and the particle size for which 84% of the distribution is finer (D_{84}). Particle sizes were binned by size class using half-phi intervals and plotted using cumulative distribution functions (Bunte and Abt 2001).

3.2.3 SEDIMENT MOBILITY

Tracer rock displacement lengths were quantified between deployment and recovery effort 1, and recovery effort 1 and recovery effort 2. Tracer rocks with a displacement greater than 1 ft were considered mobilized. Sediment mobility was assessed at each study site using the channel shear stresses estimated from a Hydrologic Engineering Center's River Analysis System (HEC-RAS) hydraulic model for the largest pulse flow during tracer deployment, particle size data from the pebble counts, and the Shields relationship (equation 2) to compute the critical shear stresses acting on the channel bed during specific flows.

$$\tau^*_{crit} = \frac{\tau_b}{(\rho_s - \rho) g D_{50}} \quad (2)$$

Where:

τ^*_{crit} is the critical Shields number (unitless)

τ_b is basal shear stress (pascals)

ρ is the density of water (kilograms per square 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.

$$D_{50_{crit}} = \frac{\tau_b}{(\rho_s - \rho) g \tau^*_{crit}} \qquad (3)$$

To estimate shear stresses (τ_b) acting on the channel bed at each study site, flow hydraulics were modeled using the U.S. Army Corps of Engineers' (USACE) HEC-RAS. HEC-RAS is a one-dimensional hydraulic model that is widely used for estimating general flow characteristics. This was a simple HEC-RAS 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 assumed to be uniform. The geometry used in the HEC-RAS model was derived from the channel cross section surveys and the discharge was set equal to the largest pulse flows released by SCE during each tracer deployment. 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 professional judgement.

4.0 RESULTS

4.1 SITE 4

The following sections provide results from the 2020 surveys (during tracer installation) at Site 4 and a comparison with data collected in 2019 during separate study elements. Due to the limited mobility of the tracers observed during the tracer recovery efforts in 2021 at this site, the profile and cross section were not resurveyed. An overview of Site 4 and the survey extents are provided in Figure 4.

Figure 4. Site 4 overview

4.1.1 LONGITUDINAL PROFILE AND CROSS SECTIONS

The 2020 longitudinal profile was 550 ft long and extended 75 ft upstream of cross section 4.9 and 110 ft downstream of cross section 4.2 (Figure 4 and Figure 5). The reach average slope, calculated as a best-fit line to the long profile, was 0.04 (4%) in 2019 and 2020. No significant changes were apparent between the 2019 and 2020 longitudinal profiles, and minor variability in elevations between the two profiles is likely a result of profile alignment and/or survey point density.

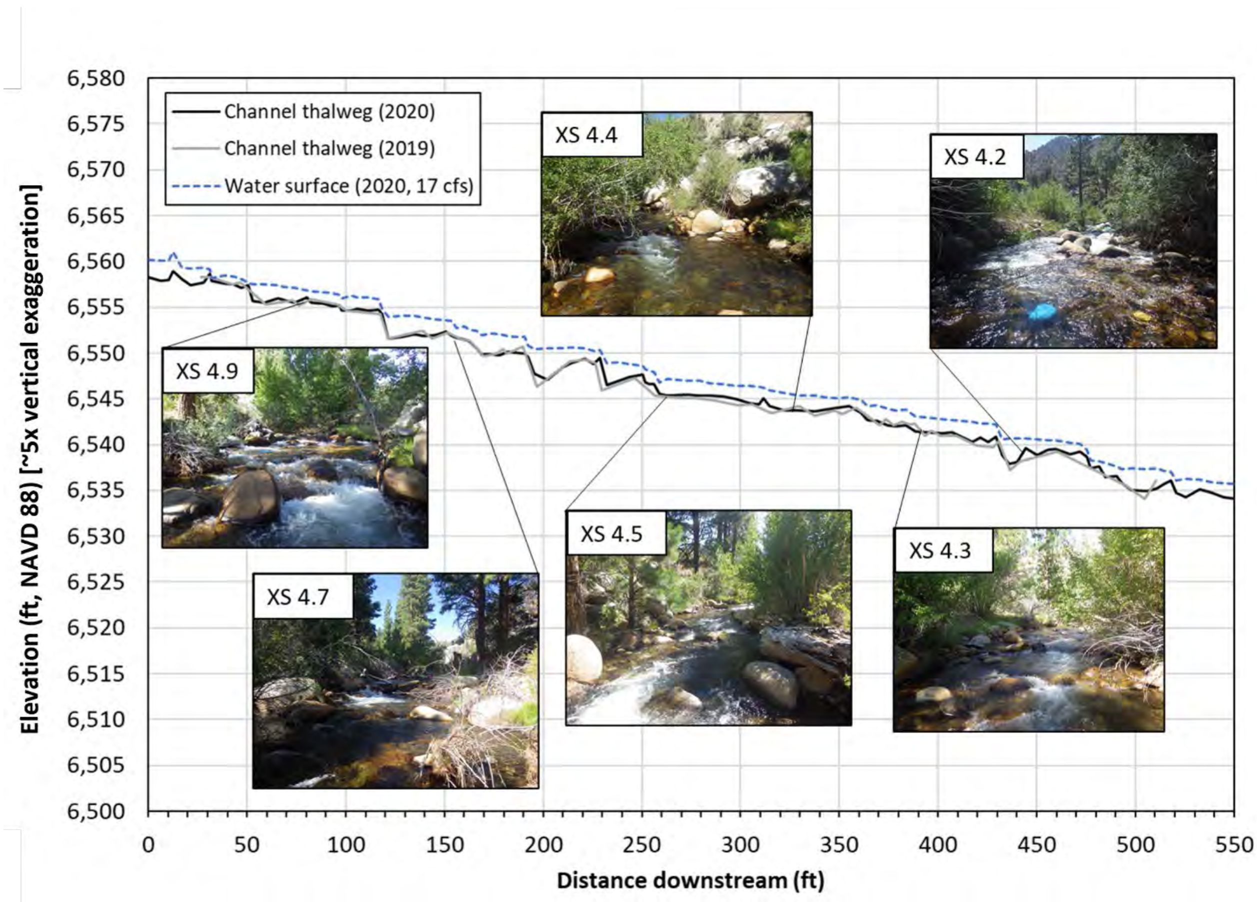
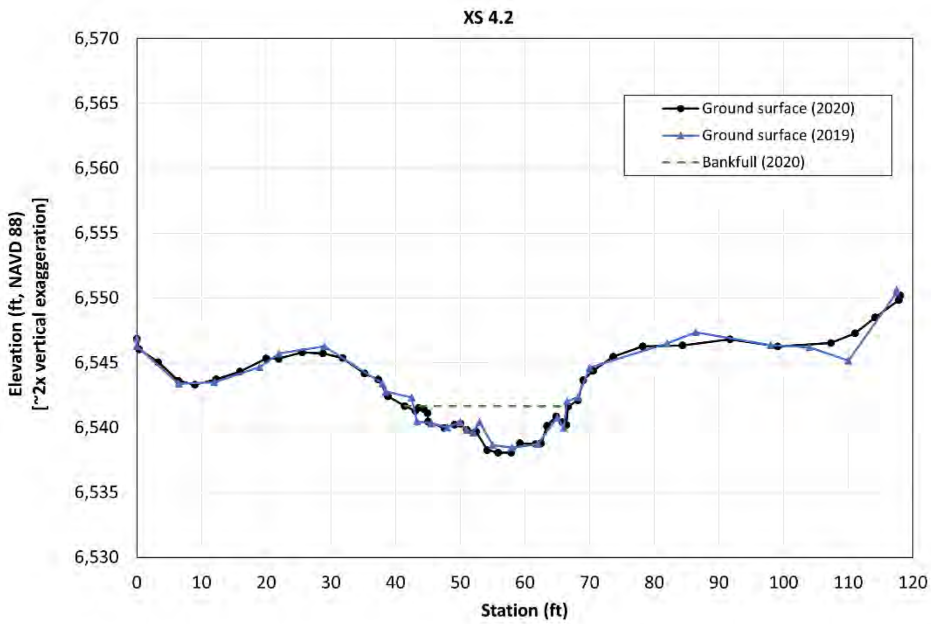


Figure 5. Longitudinal profile for Site 4. Leader lines indicate cross section locations along longitudinal profile. Inset photos show representative conditions of each cross section during 2020 surveys.

Cross sections from 2019 and 2020 are provided in Figure 6 through Figure 8. The cross section geometry was generally similar between the two monitoring years. Differences in bed elevation (e.g., cross section 4.4 between stations 35 and 45) between the monitoring years likely reflect variation in survey point locations rather than topographic changes. Apparent differences in cross section 4.5 are due to the 2019 cross section including survey points on large wood, where the 2020 cross section did not.



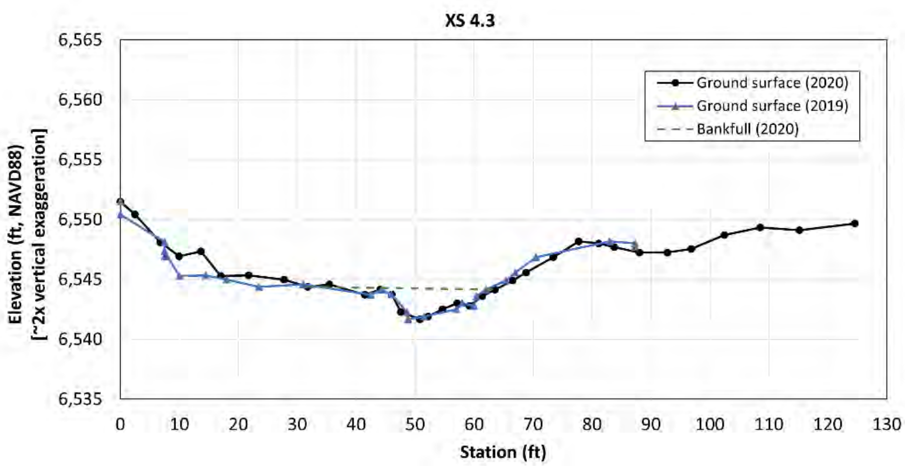
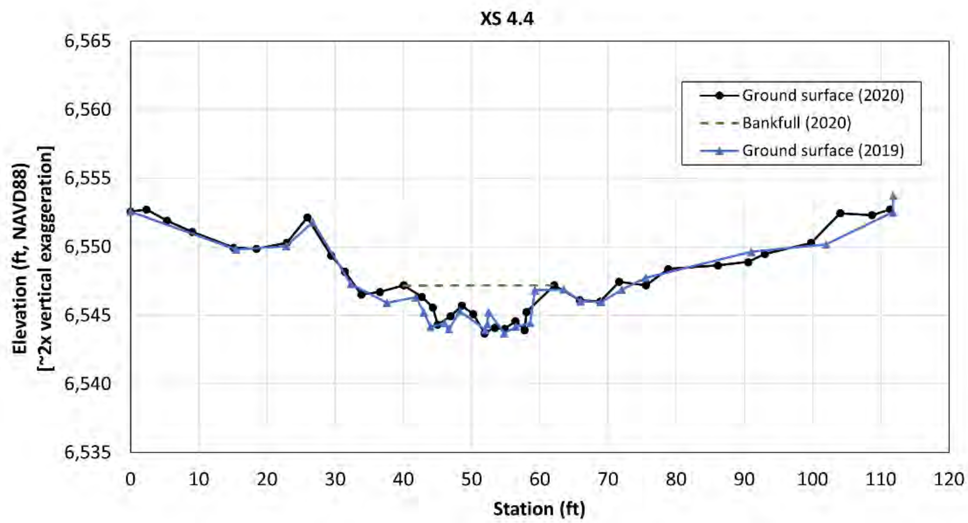


Figure 6. Cross sections 4.2 and 4.3. Stationing is from left to right bank looking downstream.



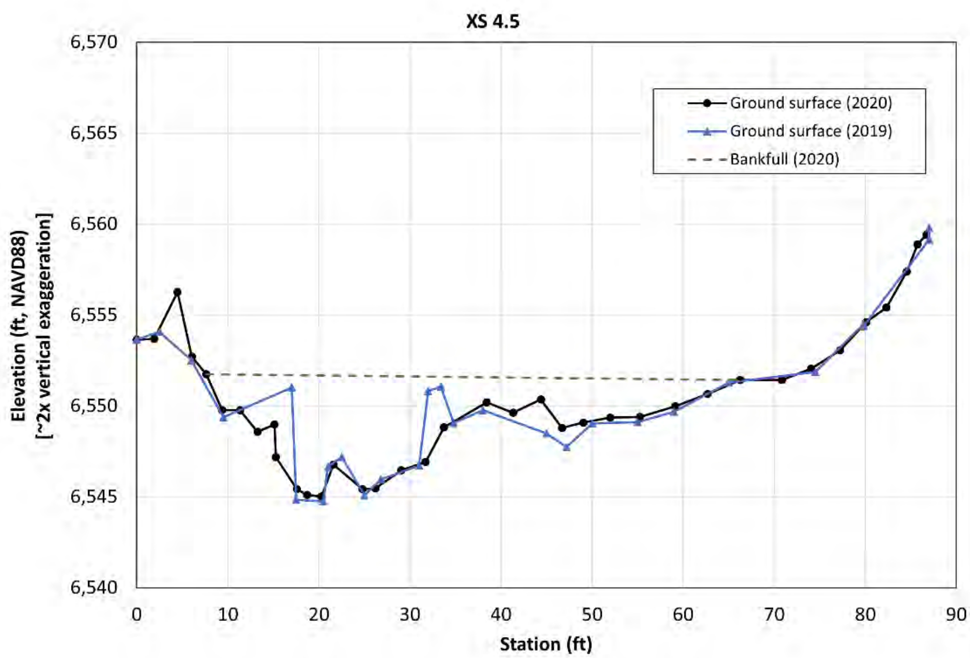
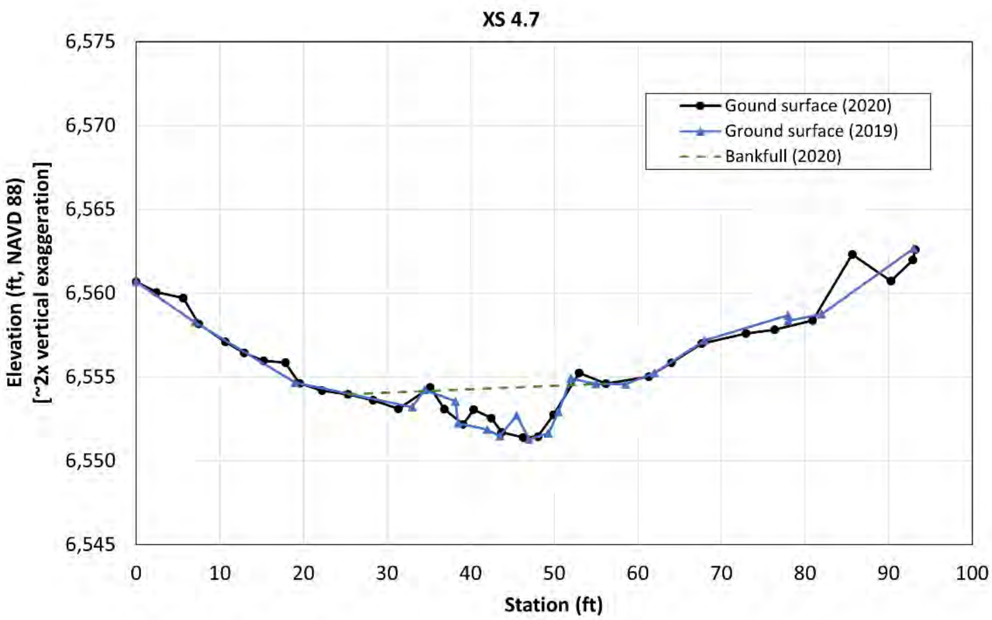


Figure 7. Cross sections 4.4 and 4.5. Stationing is from left to right bank looking downstream.



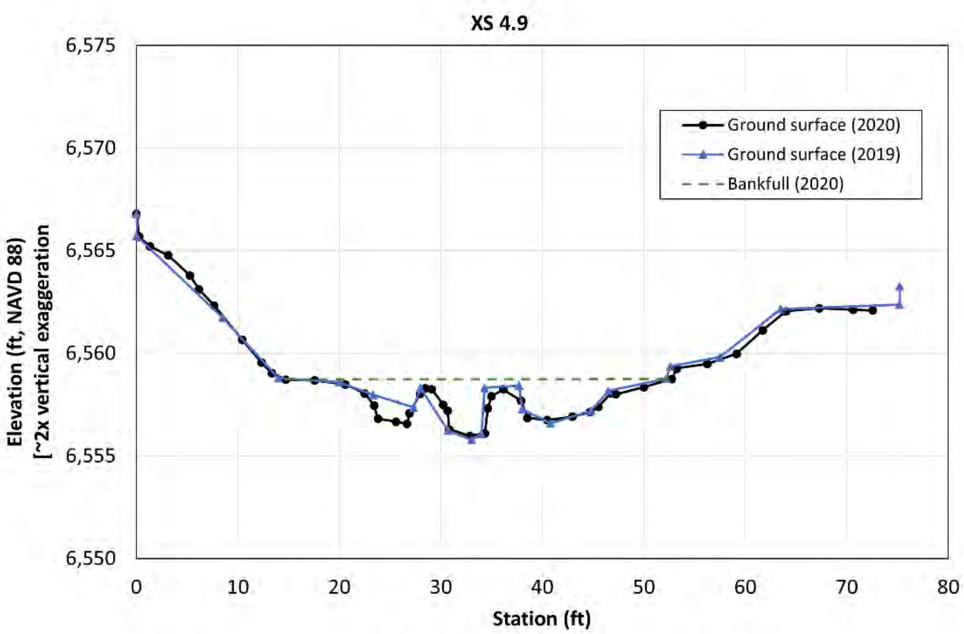


Figure 8. Cross sections 4.7 and 4.9. Stationing is from left to right bank looking downstream.

4.1.2 Bed Particle Size Distributions

Pebble counts were conducted at three cross section locations selected to best represent the variety of channel geometry and bed sediment conditions at Site 4. The bed at all three cross sections was predominantly made up of cobbles, with gravel comprising less than 37% and boulders comprising less than 21% of the grain size distribution at each cross section. Sand content (<2 mm) from the 2020 pebble counts was 4, 16, and 1% of the measured particles at cross sections 4.9, 4.7, and 4.2, respectively. A summary of the pebble count data is provided in Table 3 and a plot of the particle size distributions at each cross section is provided in Figure 9.

Pebble counts conducted during 2019 pooled multiple locations within Sites 4.1 and 4.2 as one count and therefore are not directly comparable to the cross section-specific pebble counts conducted in 2020. Although there was spatial variability in the pebble count locations between monitoring years, the 2019 and 2020 particle size distributions were plotted together to evaluate changes. The 2019 particle size distributions were coarser than the 2020 distributions (Figure 9). Differences between the 2019 and 2020 particle size distributions suggest that the bed fined between monitoring years. These differences may be due to measurement bias, variability in collection methods, and pebble count locations.

Table 3.Summary of pebble count data from 2020 for Site 4

Cross Section (XS) ID	Year[1]	D16 (mm)	D50 (mm)	D84 (mm)
4.9	2020	25	78	239
4.7	2020	3	91	323
4.2	2020	43	117	226

[1] Pebble counts were not conducted at Site 4 in 2021 due to limited tracer mobility after flushing flows.

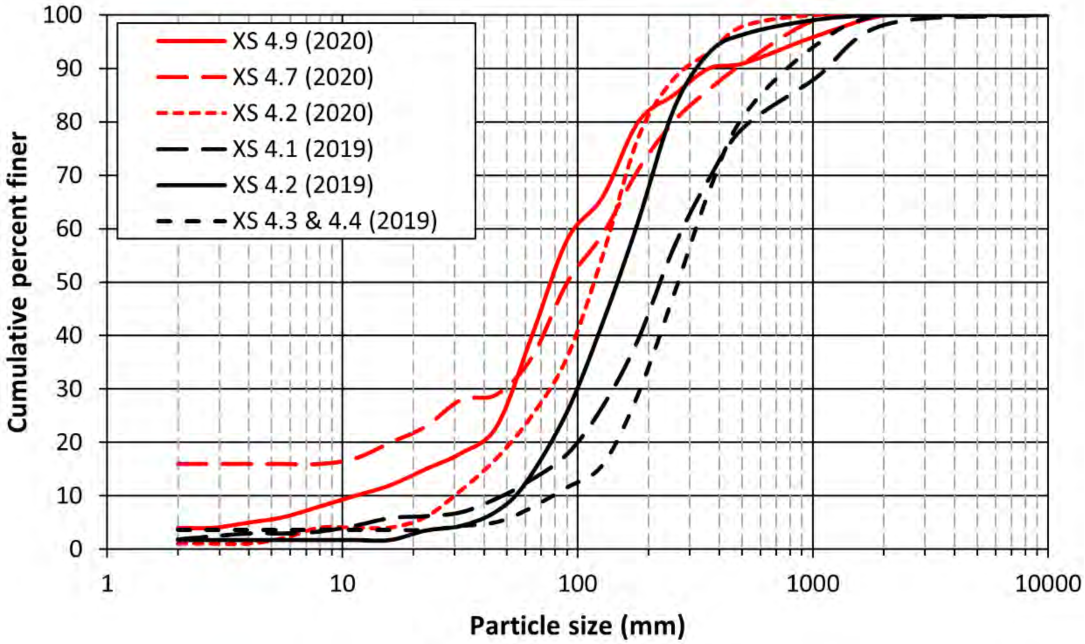


Figure 9. 2020 and 2019 particle size distributions at Site 4. 2020 pebble counts were conducted along cross sections. 2019 pebble counts were conducted at multiple riffles throughout the site.

4.1.3 TRACER ROCKS

One hundred and seventeen tracer rocks were deployed at Site 4 between August 2 and August 6, 2020. Tracer rock recovery surveys were conducted on May 26 and July 20, 2021. Pulse flows of approximately 70 cfs (recurrence interval of ~1.2 years) and 120 cfs (recurrence interval of ~1.6 years) were released to the study reach before recovery effort 1 and recovery effort 2, respectively (Figure 10).

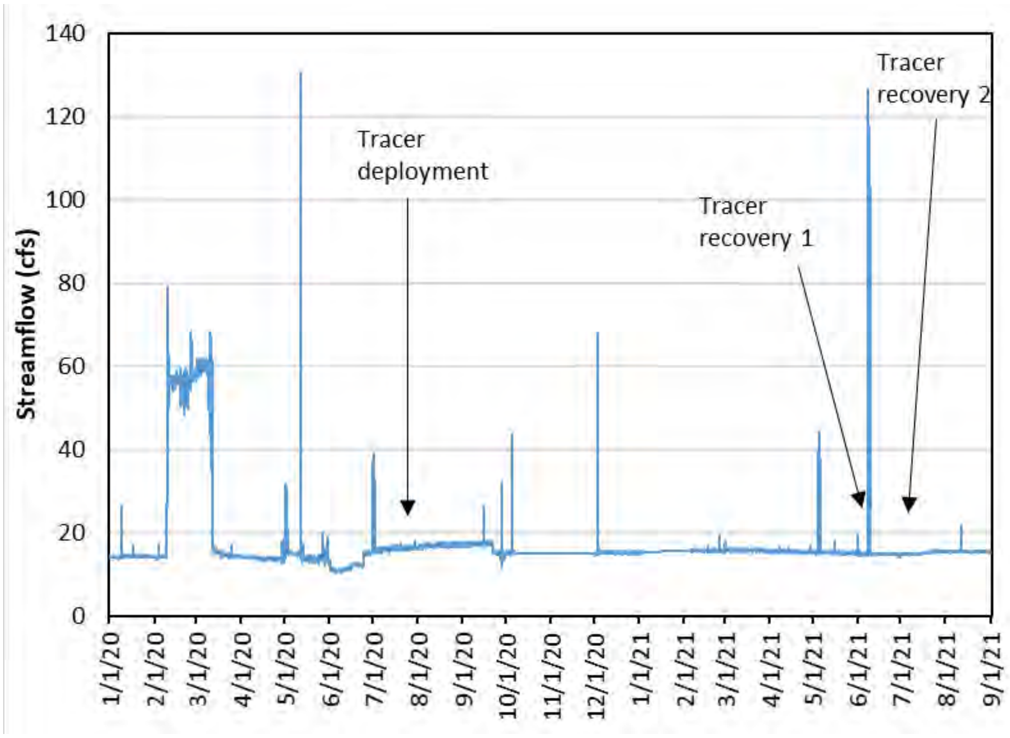


Figure 10. Hydrograph for Bishop Creek below Intake 3 (Site 4). Tracer deployment and recovery survey dates are annotated with arrows.

One hundred and seventeen (100%) of the tracer rocks deployed on August 2, 2020, were recovered on May 26, 2021 after a pulse flow of approximately 70 cfs for a period of approximately 1 hour. Tracer rocks displacement calculations between the deployment and first recovery effort showed that 114 (98%) of the recovered tracer rocks at Site 4 had not mobilized. The remaining 2% of mobile tracers showed negligible transport distances, with a maximum displacement of 1.75 ft. A pulse flow of approximately 120 cfs was released to the study reach shortly after the first recovery effort (Figure 11).

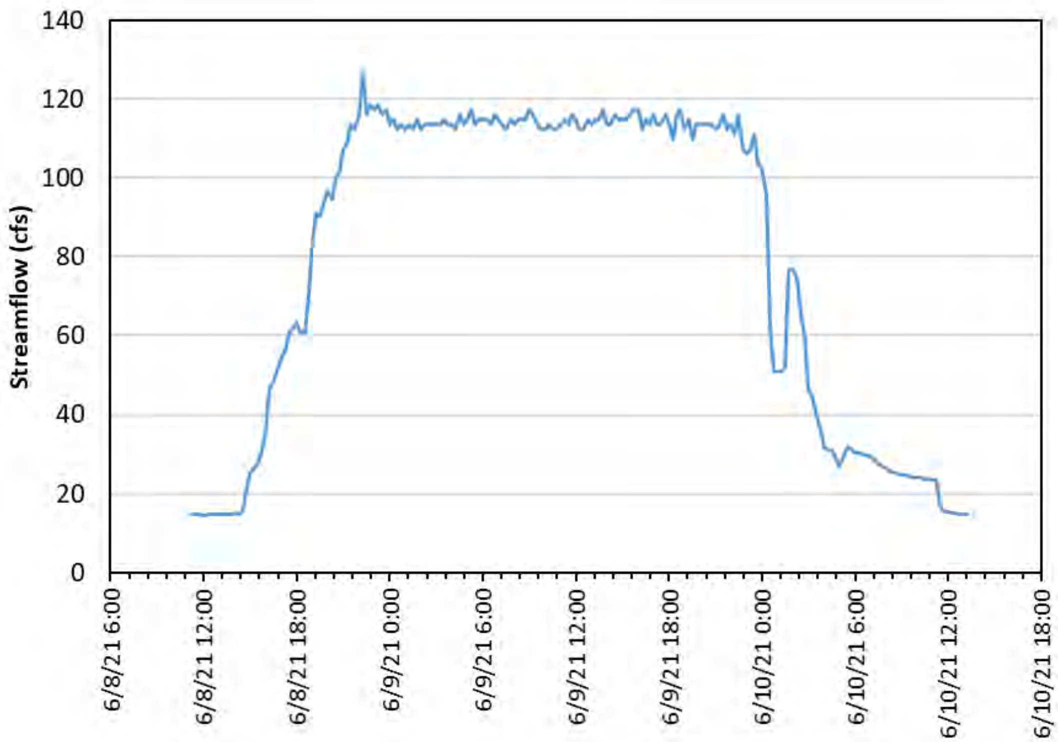


Figure 11. Hydrograph of pulse flow at Site 4 that occurred prior to the second tracer recovery effort.

One hundred and fifteen (98%) of the deployed tracer rocks were recovered during the second recovery effort on July 21, 2021. The pulse flow shown in Figure 11 had a magnitude of approximately 120 cfs and a duration of approximately 24 hours. This flow resulted in mobilization of twelve tracers (11%) and 17% of tracers with diameters <60 mm. Ninety-three percent of tracers with diameters >60 mm showed no mobilization. The largest mobilized particle had a diameter 170 mm, although it was only transported 1.5 ft. There were no mobile particles larger than highest predicted critical D50 at the site ($D50_{crit}$ = 206 mm at XS 4.7). Table 4 provides the channel shear stresses from HEC-RAS and the critical D50 at each cross section location. Tracer movement by particle size is summarized in Figure 12.

Table 4. Predicted critical D50 and modeled channel shear stress at Site 4 cross sections during a discharge of 120 cfs

Cross section	Channel shear stress (pascals)	Predicted critical D50 (mm)
4.9	105	147
4.7	148	206
4.5	77	105
4.4	91	123
4.3	134	184
4.2	144	199

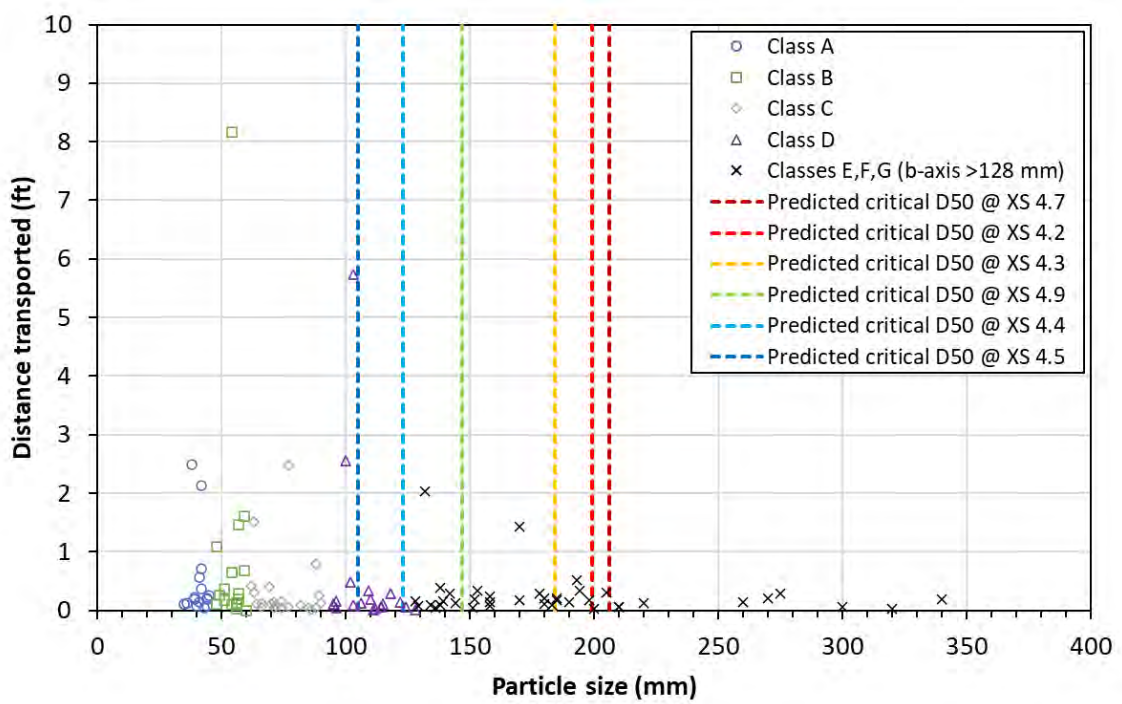


Figure 12. Transport distance of tracer rocks by particle size at Site 4 between recovery effort 1 and recovery effort 2 (after 120 cfs flushing flow). Grain size classes follow conventions used in Table 2.

4.2 SITE 6

The following sections provide results from the 2020 (tracer deployment) and 2021 (tracer recovery 1 and 2) surveys at Site 6, and a comparison with data collected in 2019 during a separate study element. An overview of Site 6 and the survey extents are provided in Figure 13. Cross sections are numbered sequentially from downstream to upstream.

Figure 13. Site 6 overview.

4.2.1 Longitudinal Profile and Cross Sections

The 2020 and 2021 longitudinal profiles were approximately 420 ft long and extended 100 ft upstream of cross section 6.8 and 160 ft downstream of cross section 6.5 (Figure 14). The 2019 long profile was 250 ft long and extended 35 ft upstream of cross section 6.8 and 60 ft downstream of cross section 6.5. The reach average slope, calculated as a best-fit line to the long profile, was 0.02 (2%) during all three monitoring years. The 2020 and 2021 longitudinal profiles are generally similar, and apparent differences in the two profiles are likely a result of slight misalignment or variability in survey point locations rather than changes in channel morphology. Apparent changes between the 2019 and the 2020 long profiles, particularly between stations 75 and 125, suggest channel aggradation but may be a result of misalignment and/or different survey point spacing.

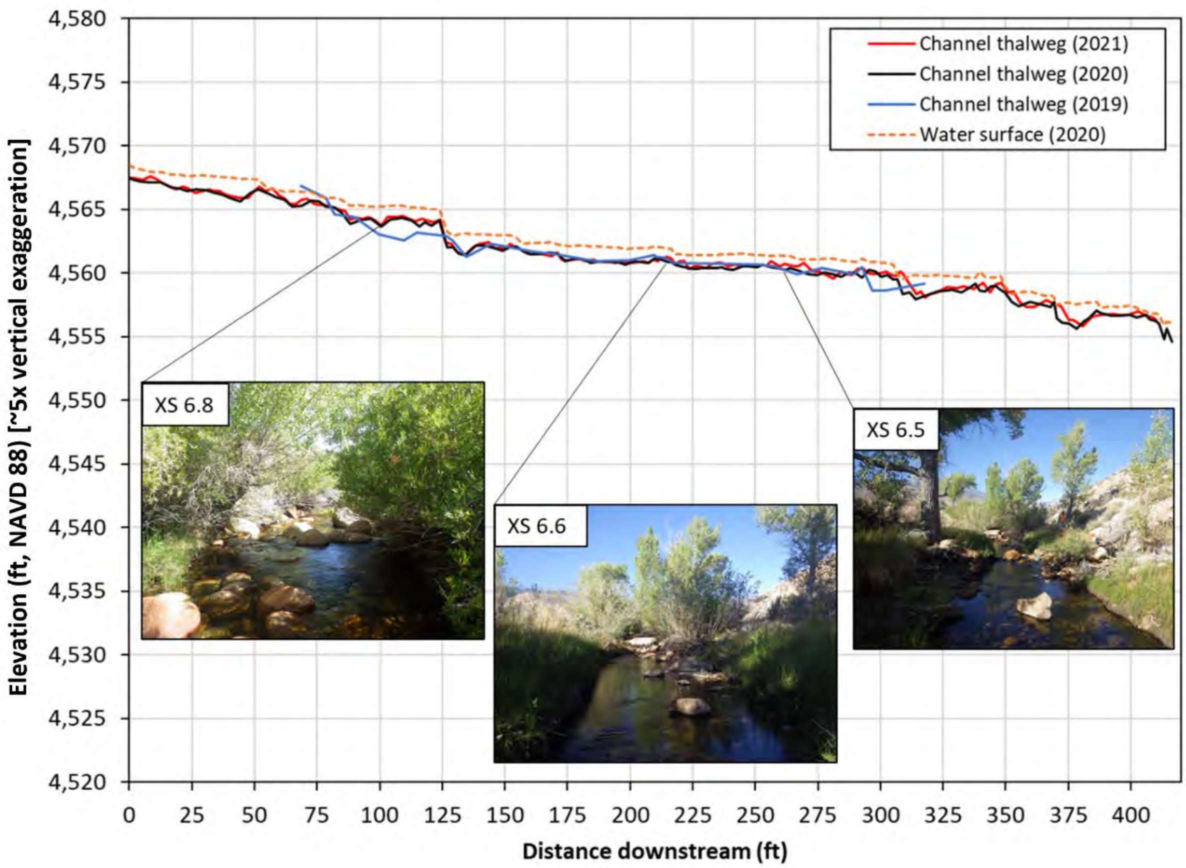


Figure 14. Site 6 longitudinal profiles from 2019, 2020, and 2021. Leader lines indicate cross section locations along longitudinal profile. Inset photos show representative conditions of each cross section during 2020 surveys.

Cross sections from 2019 through 2021 are provided in Figure 15 through Figure 17. The cross section geometry was generally similar between the three monitoring years. Minor differences in bed elevation (e.g., cross section 6.5 at station 35) between the monitoring years likely reflect variation in survey point locations rather than topographic changes.

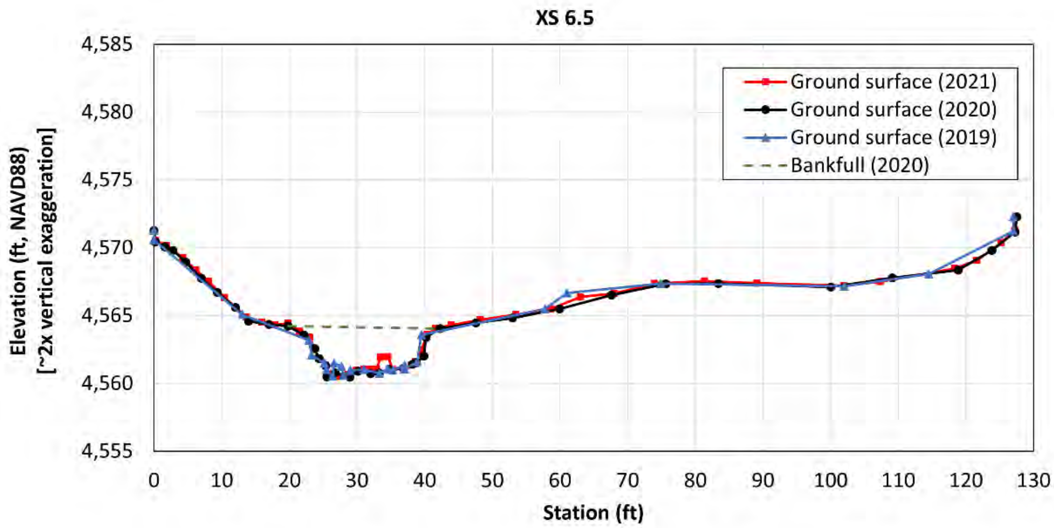


Figure 15. Cross section 6.5 during 2019, 2020, and 2021. Stationing is from left to right bank looking downstream

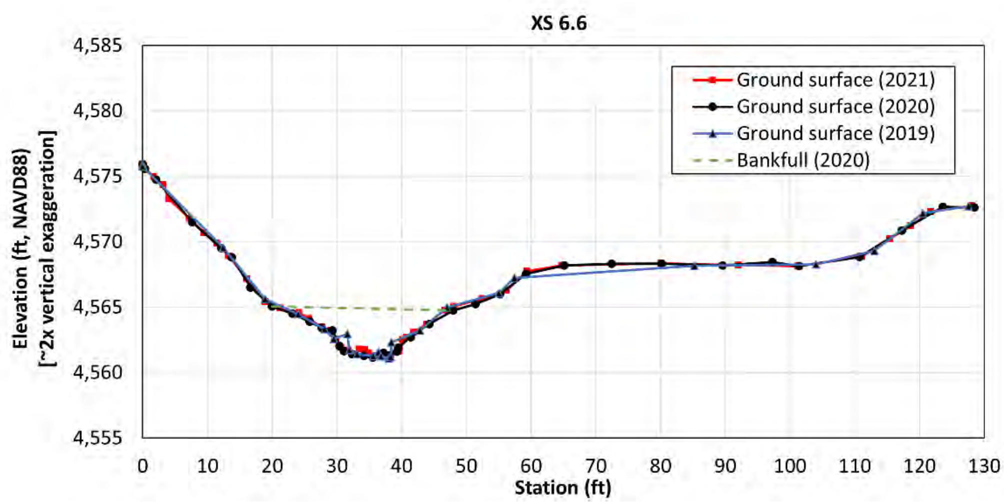


Figure 16. Cross section 6.6 during 2019, 2020, and 2021. Stationing is from left to right bank looking downstream.

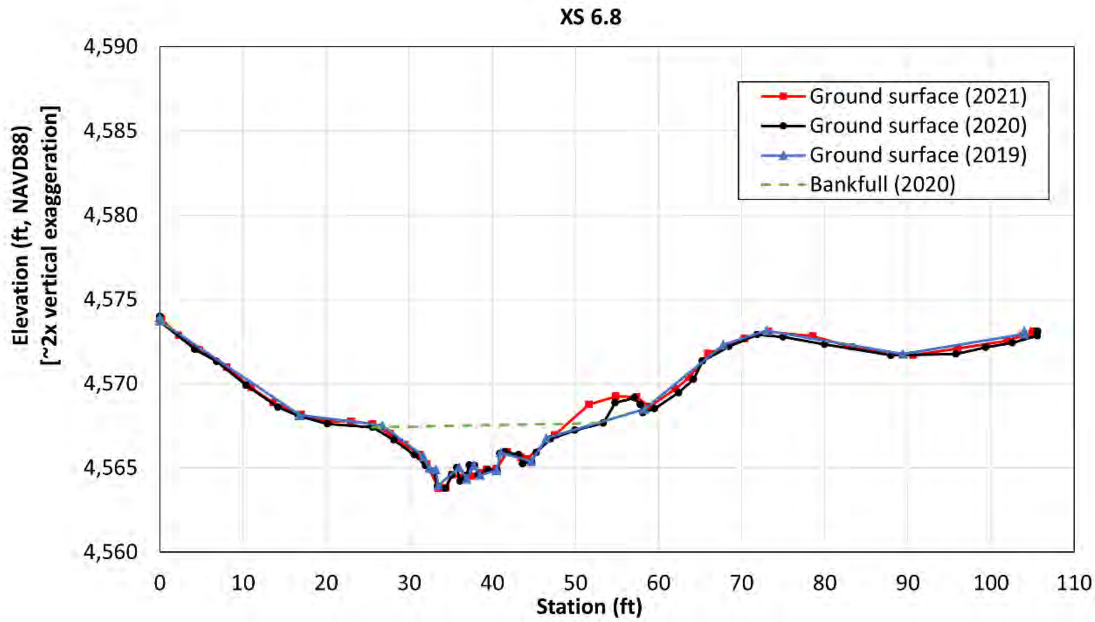


Figure 17. Cross section 6.8 during 2019, 2020, and 2021. Stationing is from left to right bank looking downstream.

4.2.2 Bed Particle Size Distributions

The bed at all three cross sections at this site was primarily made up of cobbles and gravel, with boulders comprising less than 21% of the pebble counts at each cross section in 2020 and 2021. Relative to the 2020 measurements, the bed coarsened at cross sections 6.6 and 6.5 (Figure 18 and Figure 19), with increases of cobble-sized material. The bed at cross section 6.8 remained mostly stable between 2020 and 2021 but showed a slight decrease in the coarse fraction of the particle size distribution (Figure 20). The amount of gravel decreased by 15% between 2020 and 2021 at cross sections 6.8 and 6.5 and decreased by 26% at cross section 6.6. A summary of the pebble count data from 2020 and 2021 is provided in Table 5 and plots of the particle size distributions at each cross section are provided in Figure 18 through Figure 20.

Pebble counts conducted during 2019 grouped the entire site as one count and therefore are not directly comparable to the cross section-specific pebble counts conducted in 2020. To compare the 2019 and 2020 particle size distributions, all three cross sectional pebble counts conducted during 2020 were grouped into a single distribution and plotted with the 2019 data. The 2019 distribution was coarser overall (Figure 21). Differences in the particle size distributions may be due to measurement bias and variability in collection methods.

Table 5. Summary of pebble count data from 2020 and 2021 for Site 6

Cross Section	**6.8**		**6.6**		**6.5**	
Year	2020	2021	2020	2021	2020	2021
D16 (mm)	17	18	23	60	4	23
D50 (mm)	76	74	69	130	58	137
D84 (mm)	283	177	58	137	199	256

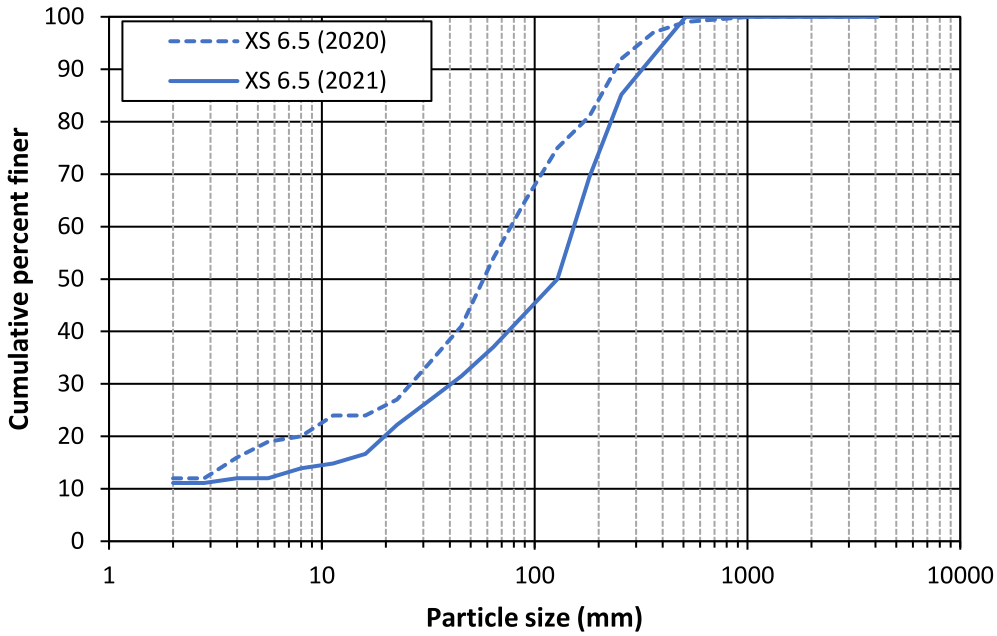


Figure 18. Particle size distributions at cross section 6.5 during 2020 and 2021

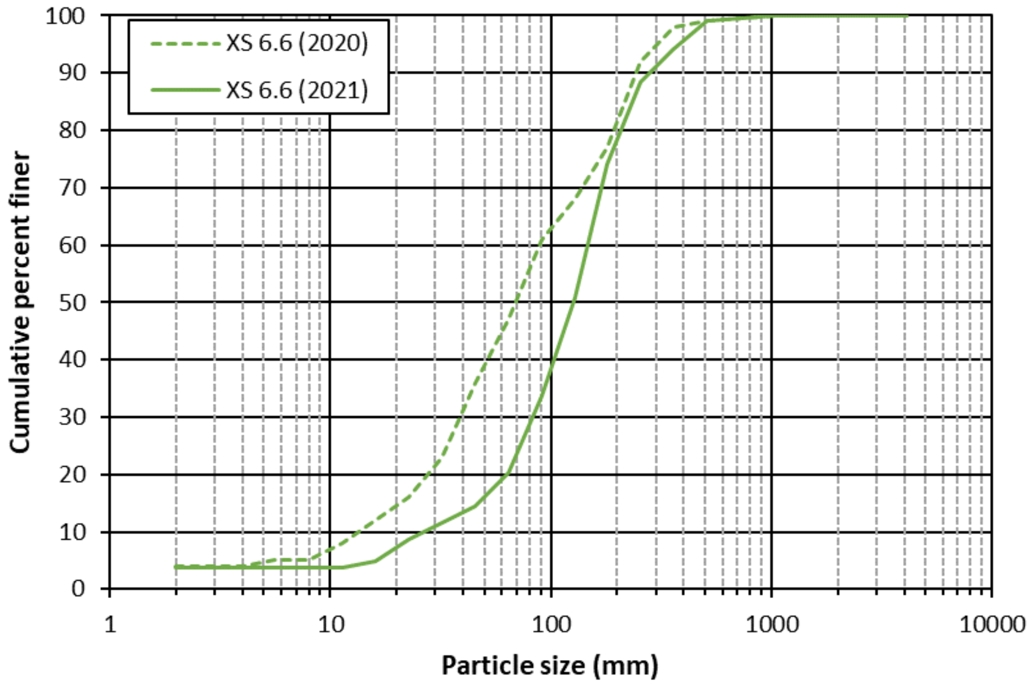


Figure 19. Particle size distributions at cross section 6.6 during 2020 and 2021

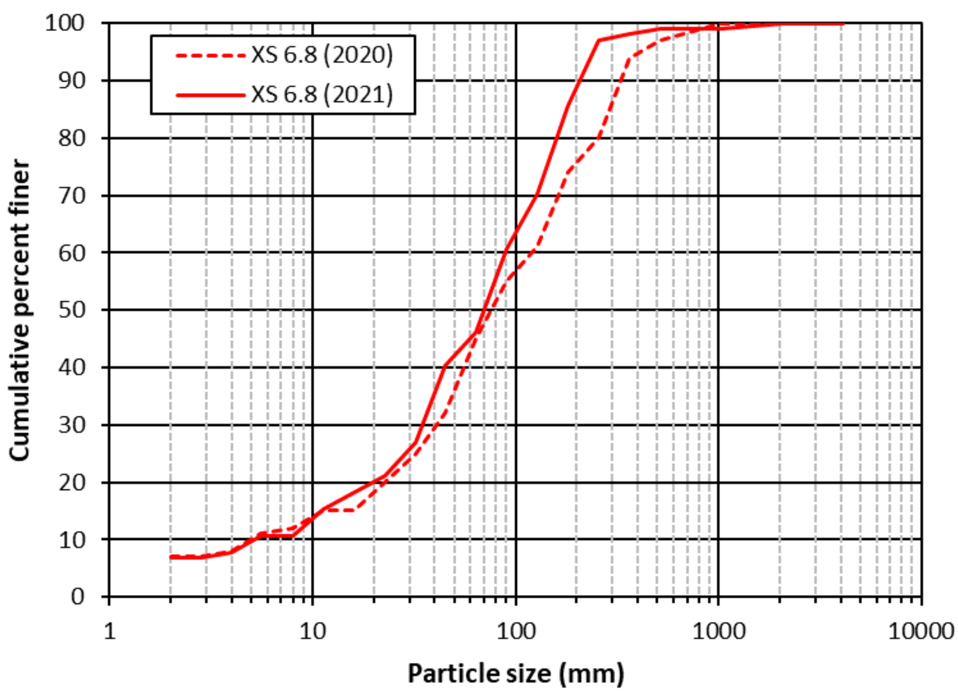


Figure 20. Particle size distributions at cross section 6.8 during 2020 and 2021

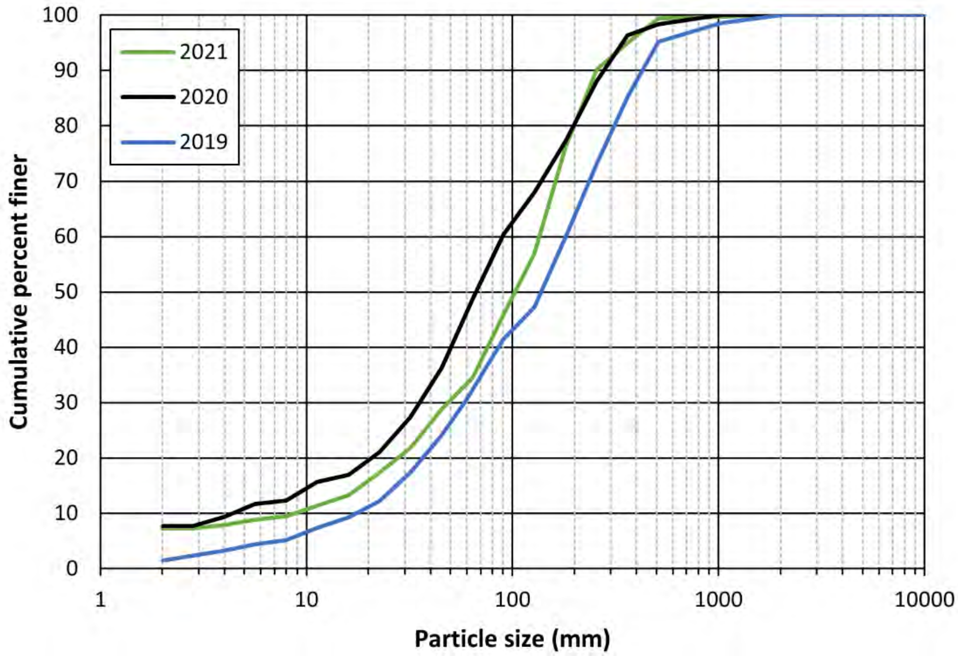


Figure 21. Particle size distributions at Site 6 during 2019 and 2020. Particle size data from 2019 was conducted throughout Site 6 riffles. Particle size data from 2020 was conducted at cross sections and grouped into a single distribution.

4.2.3 Tracer Rocks

Sixty-seven tracer rocks were deployed at Site 6 between July 29 and August 1, 2020. Tracer rock recovery surveys were conducted on May 26 and July 20, 2021. Pulse flows of approximately 60 cfs and 120 cfs were released to the Project reach before recovery effort 1 and recovery effort 2, respectively (Figure 22).

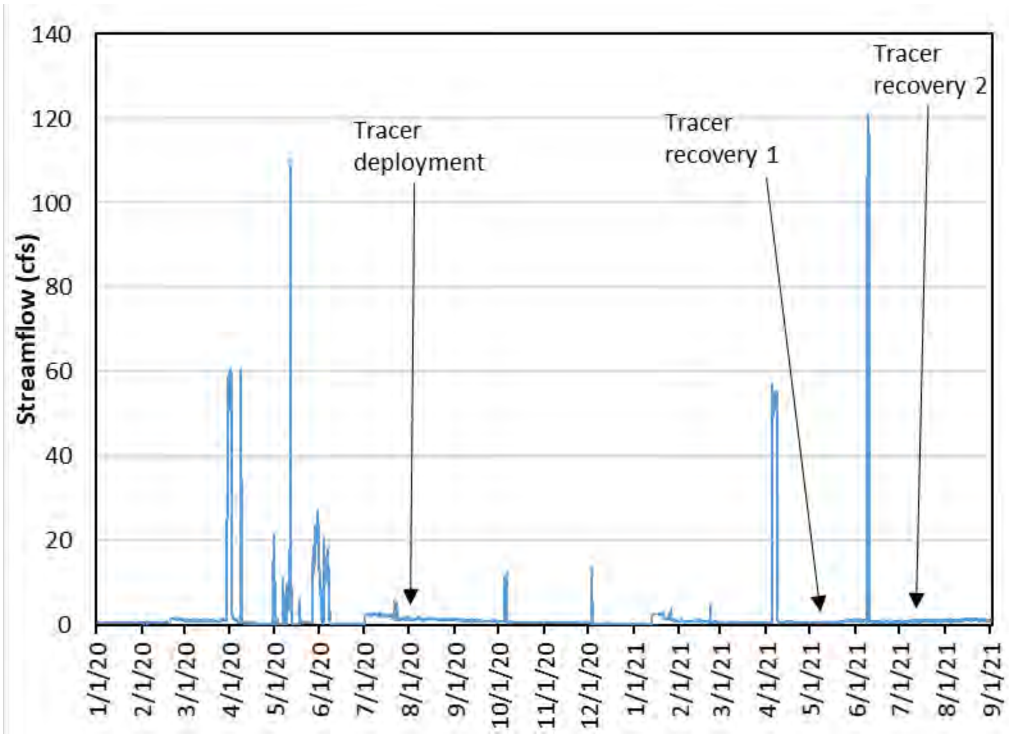


Figure 22. Hydrograph for Bishop Creek below Intake 6 (Site 6). Tracer deployment and recovery survey dates are annotated with arrows.

Sixty-two (93%) of the deployed tracer rocks were recovered during the first recovery effort on May 26, 2021. However, 31 (46%) of the total tracer rocks deployed at Site 6 had been heavily disturbed by non-fluvial processes prior to the recovery effort. The remaining 36 (54%) tracers that were recovered in the stream channel were undisturbed and showed no movement from their initial placement locations. Non-fluvial disturbance was determined by observations of lateral and upstream movement of tracer rocks, presumably from anglers or other recreating individuals. This necessitated resetting approximately half of the tracers at Site 6 in May 2021, which resulted in shorter residence times for approximately half of the tracers at Site 6 prior to the second, larger pulse flow. The pulse flow on June 9, 2021 had a peak discharge of 120 cfs and a duration of approximately 24 hours (Figure 23).

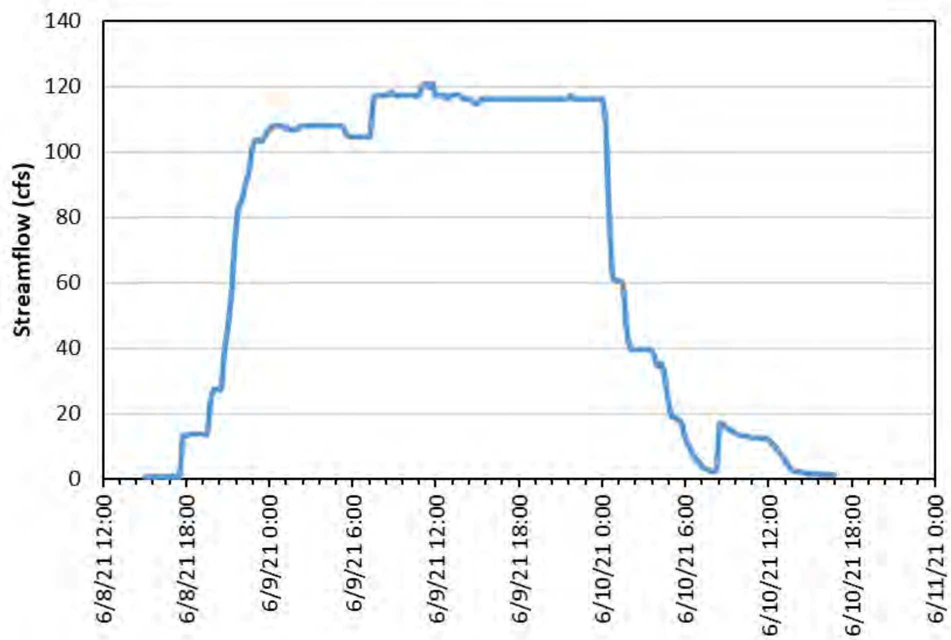


Figure 23. Magnitude and duration of pulse flow that occurred prior to the second tracer recovery effort

Sixty (90%) of the deployed tracer rocks were recovered during the second recovery effort on July 21, 2021. The pulse flow shown in Figure 23 resulted in mobilization of 40% (n = 24) of all recovered tracer rocks and 84% (n = 16) of tracers <60 mm. Eighty percent (n = 34) of tracers >60 mm showed no mobilization. The largest mobilized particle was 197 mm and was transported 4.5 ft. This was the only mobile particle larger than the highest predicted critical D_{50} at the site. Table 4 provides the channel shear stresses from HEC-RAS and associated critical D_{50} at each cross section location based on the pulse flow of 120 cfs. Tracer movement by particle size is summarized in Figure 24.

Table 6. Predicted critical D50 and modeled channel shear stress at Site 6 cross sections during a discharge of 120 cfs.

Cross section	Channel shear stress (pascals)	Predicted critical D50 (mm)
6.8	101	141
6.6	81	116
6.5	72	100

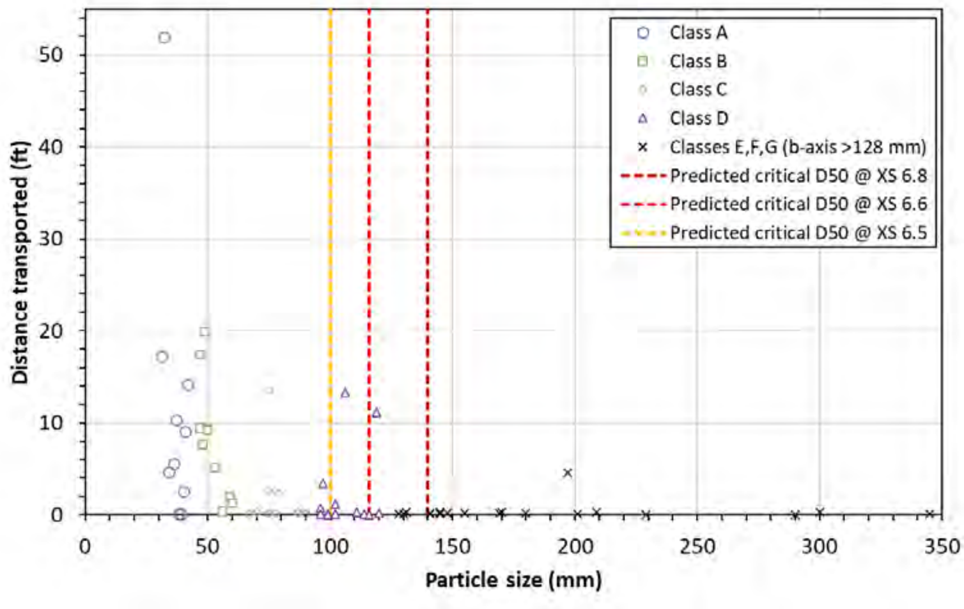


Figure 24. Transport distance of tracer rocks by particle size at Site 6 between recovery effort 1 and recovery effort 2. Grain size classes follow conventions used in Table 2.

5.0 DISCUSSION

Tracer rock disturbance by non-fluvial processes and associated lower particle residence time in the streambed prior to the larger pulse flow may partially explain higher transport distances observed at Site 6. Resetting the tracers at Site 6 on May 26, 2021 resulted in the tracer rocks having less than two weeks in the streambed prior to the larger pulse flow, where the tracer rocks at Site 4 had approximately 10 months in the streambed prior to the larger pulse flow. Shorter residence times of tracers in the streambed are likely associated with smaller degrees of embeddedness, which can affect the mobility of streambed particles (Parker 2008).

The smaller transport distances observed at Site 4 are likely a more accurate depiction of sediment mobility in these reaches because the tracer rocks had longer residence times in the streambed, which is a more accurate representation of native particles.

6.0 REFERENCES

Harrelson, Cheryl C; Rawlins, C. L.; Potyondy, John P. 1994. Stream channel reference sites: an illustrated guide to field technique. Gen. Tech. Rep. RM-245. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 61 p.

Bunte, A., and Abt, S.T. 2001. Sampling Surface and Subsurface Particle-Size Distributions in Wadable Gravel- and cobble-Bed Streams for Analyses in Sediment Transport, Hydraulics, and Streambed Monitoring. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fort Collins, Colorado.

Kleinschmidt 2020. Sediment & Geomorphology Study Progress Report Technical Memorandum. Submitted to Southern California Edison to support the Bishop Creek Hydroelectric Project No. 1394. Filed with FERC April 14, 2020 as Appendix H of Progress Report 2.

Parker, G. 2008. Sedimentation Engineering: Processes, Measurements, Modeling, and Practice. Chapter 3. Transport of Gravel and Sediment Mixtures.

SCE (Southern California Edison). 2019. Bishop Creek Hydroelectric Project, FERC Project No. 1394. Pre-Application Document.

USACE (United States Army Corps of Engineer). 2019. HEC-SSP Statistical Software Package User's Manual Version 2.2. June.

USGS. 2019. Guidelines for Determining Flood Flow Frequency Bulletin 17C. Techniques and Methods 4-B5. Version 1.1. May.

Waananen, A. O., and J. R. Crippen. 1977. Magnitude and frequency of floods in California. U.S. Geological Survey. Water Resources Investigation 77-21.

Wolman, M.G., 1954. A method of sampling coarse river-bed material. EOS, Transactions American Geophysical Union, 35(6), pp. 951–956.

SOUTHERN CALIFORNIA EDISON

Bishop Creek Hydroelectric Project

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APPENDIX A
Photo Log

Figure A-1. Cross section 4.9 in August 2020, view upstream from mid channel.

Figure A-2. Cross section 4.9 in August 2020, view downstream from mid channel.

Figure A-3. Cross section 4.9 in August 2020, view of left bank from right bank.

Figure A-4. Cross section 4.9 in August 2020, view of right bank from left bank.

Figure A-5. Cross section 4.9 in August 2020, view of tracers from right bank.

Figure A-6. Cross section 4.9 in August 2020, view of tracers from left bank.

Figure A-7. Cross section 4.9 in August 2020, close up view of right bank pin.

Figure A-8. Cross section 4.9 in August 2020, landscape view of right bank pin.

Figure A-9. Cross section 4.9 in August 2020, close up view of left bank pin.

Figure A-10. Cross section 4.9 in August 2020, landscape view of left bank pin.

Figure A-11. Cross section 4.7 in August 2020, view upstream from mid channel.

Figure A-12. Cross section 4.7 in August 2020, view downstream from mid channel.

Figure A-13. Cross section 4.7 in August 2020, view of left bank from right bank.

Figure A-14. Cross section 4.7 in August 2020, view of right bank from left bank.

Figure A-15. Cross section 4.7 in August 2020, view of tracers from right bank.

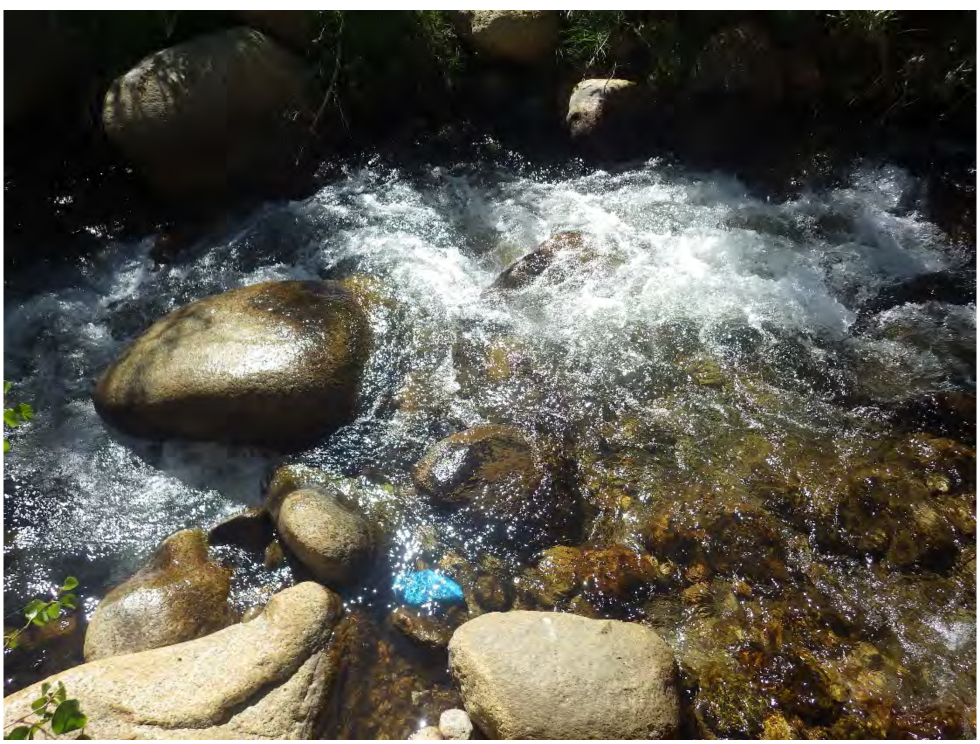

Figure A-16. Cross section 4.7 in August 2020, view of tracers from left bank.

Figure A-17. Cross section 4.7 in August 2020, close up view of right bank pin.

Figure A-18. Cross section 4.7 in August 2020, landscape view of right bank pin.

Figure A-19. Cross section 4.7 in August 2020, close up view of left bank pin.

Figure A-20. Cross section 4.7 in August 2020, landscape view of left bank pin.

Figure A-21. Cross section 4.5 in August 2020, view upstream from mid channel.

Figure A-22. Cross section 4.5 in August 2020, view downstream from mid channel.

Figure A-23. Cross section 4.5 in August 2020, view of left bank from right bank.

Figure A-24. Cross section 4.5 in August 2020, view of right bank from left bank.

Figure A-25. Cross section 4.5 in August 2020, view of tracers from left bank.

Figure A-26. Cross section 4.5 in August 2020, landscape view of right bank pin.

Figure A-27. Cross section 4.5 in August 2020, close up view of left bank pin.

Figure A-28. Cross section 4.5 in August 2020, landscape view of left bank pin.

Figure A-29. Cross section 4.4 in August 2020, view upstream from mid channel.

Figure A-30. Cross section 4.4 in August 2020, view downstream from mid channel.

Figure A-31. Cross section 4.4 in August 2020, view of left bank from right bank.

Figure A-32. Cross section 4.4 in August 2020, view of right bank from left bank.

Figure A-33. Cross section 4.4 in August 2020, view of tracers from right bank.

Figure A-34. Cross section 4.4 in August 2020, view of tracers from left bank.

Figure A-35. Cross section 4.4 in August 2020, close up view of right bank pin.

Figure A-36. Cross section 4.4 in August 2020, landscape view of right bank pin.

Figure A-37. Cross section 4.4 in August 2020, close up view of left bank pin.

Figure A-38. Cross section 4.4 in August 2020, landscape view of left bank pin.

Figure A-39. Cross section 4.3 in August 2020, view upstream from mid channel.

Figure A-40. Cross section 4.3 in August 2020, view downstream from mid channel.

Figure A-41. Cross section 4.3 in August 2020, view of left bank from right bank.

Figure A-42. Cross section 4.3 in August 2020, view of right bank from left bank.

Figure A-43. Cross section 4.3 in August 2020, view of tracers from right bank.

Figure A-44. Cross section 4.3 in August 2020, view of tracers from left bank.

Figure A-45. Cross section 4.3 in August 2020, close up view of right bank pin.

Figure A-46. Cross section 4.3 in August 2020, landscape view of right bank pin.

Figure A-47. Cross section 4.3 in August 2020, close up view of left bank pin.

Figure A-48. Cross section 4.3 in August 2020, landscape view of left bank pin.

Figure A-49. Cross section 4.2 in August 2020, view upstream from mid channel.

Figure A-50. Cross section 4.2 in August 2020, view downstream from mid channel.

Figure A-51. Cross section 4.2 in August 2020, view of left bank from right bank.

Figure A-52. Cross section 4.2 in August 2020, view of right bank from left bank.

Figure A-53. Cross section 4.2 in August 2020, view of tracers from right bank.

Figure A-54. Cross section 4.2 in August 2020, view of tracers from left bank.

Figure A-55. Cross section 4.2 in August 2020, close up view of right bank pin.

Figure A-56. Cross section 4.2 in August 2020, landscape view of right bank pin.

Figure A-57. Cross section 4.2 in August 2020, close up view of left bank pin.

Figure A-58. Cross section 4.2 in August 2020, landscape view of left bank pin.

Figure A-61. Cross section 6.8 in August 2020, view upstream from mid channel.

Figure A-62. Cross section 6.8 in August 2020, view downstream from mid channel.

Figure A-63. Cross section 6.8 in August 2020, view of left bank from right bank.

Figure A-64. Cross section 6.8 in August 2020, view of right bank from left bank.

Figure A-65. Cross section 6.8 in August 2020, view of tracers from right bank.

Figure A-66. Cross section 6.8 in August 2020, view of tracers from left bank.

Figure A-67. Cross section 6.8 in August 2020, close up view of right bank pin.

Figure A-68. Cross section 6.8 in August 2020, landscape view of right bank pin.

Figure A-69. Cross section 6.8 in August 2020, close up view of left bank pin.

Figure A-70. Cross section 6.8 in August 2020, landscape view of left bank pin.

Figure A-71. Cross section 6.6 in August 2020, view upstream from mid channel.

Figure A-72. Cross section 6.6 in August 2020, view downstream from mid channel.

Figure A-73. Cross section 6.6 in August 2020, view of left bank from right bank.

Figure A-74. Cross section 6.6 in August 2020, view of right bank from left bank.

Figure A-75. Cross section 6.6 in August 2020, view of tracers from right bank.

Figure A-76. Cross section 6.6 in August 2020, view of tracers from left bank.

Figure A-77. Cross section 6.6 in August 2020, close up view of right bank pin.

Figure A-78. Cross section 6.6 in August 2020, landscape view of right bank pin.

Figure A-79. Cross section 6.6 in August 2020, close up view of left bank pin.

Figure A-80. Cross section 6.6 in August 2020, landscape view of left bank pin.

Figure A-81. Cross section 6.5 in August 2020, view upstream from mid channel.

Figure A-82. Cross section 6.5 in August 2020, view downstream from mid channel.

Figure A-83. Cross section 6.5 in August 2020, view of left bank from right bank.

Figure A-84. Cross section 6.5 in August 2020, view of right bank from left bank.

Figure A-87. Cross section 6.5 in August 2020, view of tracers from right bank.

Figure A-88. Cross section 6.5 in August 2020, view of tracers from left bank.

Figure A-89. Cross section 6.5 in August 2020, close up view of right bank pin.

Figure A-90. Cross section 6.5 in August 2020, landscape view of right bank pin.

Figure A-91. Cross section 6.5 in August 2020, close up view of left bank pin.

Figure A-92. Cross section 6.5 in August 2020, landscape view of left bank pin.

SOUTHERN CALIFORNIA EDISON

Bishop Creek Hydroelectric Project

(FERC Project No. 1394)

APPENDIX B
Tracer Coordinates

Site 4 Tracers

Tracer ID	Paint Color	B-AXIS (mm)	PIT Tag Code	Original Placement			Last Found Location (July 2021)		
				Northing (ft)	Easting (ft)	Elevation (ft)	Northing (ft)	Easting (ft)	Elevation (ft)
A-3	yellow	45	986112100280859	2,355,331.20	6,693,999.28	6,544.42	2,355,331.47	6,694,001.72	6,543.96
A-5	yellow	42	986112100298737	2,355,301.92	6,693,897.15	6,549.29	2,355,301.54	6,693,897.11	6,549.22
A-11	yellow	41	986112100298043	2,355,192.31	6,693,812.88	6,558.04	2,355,190.66	6,693,813.05	6,558.20
A-12	yellow	42	986112100283940	2,355,301.85	6,694,049.66	6,542.99	2,355,302.73	6,694,049.79	6,542.95
A-13	yellow	43	986112100279682	2,355,299.53	6,693,906.35	6,549.52	2,355,299.62	6,693,906.27	6,549.67
A-14	yellow	36	986112100288814	2,355,296.31	6,693,908.50	6,549.94	2,355,296.31	6,693,908.41	6,549.85
A-16	yellow	40	986112100290299	2,355,197.07	6,693,805.23	6,556.86	2,355,197.13	6,693,805.17	6,556.86
A-18	yellow	35	986112100288773	2,355,263.34	6,693,865.94	6,551.82	not recovered		
A-19	yellow	39	986112100290596	2,355,313.83	6,693,942.48	6,546.95	2,355,313.26	6,693,942.40	6,547.09
A-21	yellow	39	986112100280202	2,355,203.79	6,693,811.34	6,556.37	2,355,203.58	6,693,811.37	6,556.26
A-22	yellow	35	986112100279748	2,355,297.36	6,694,102.79	6,539.92	2,355,297.33	6,694,102.62	6,539.89
A-23	yellow	45	986112100298437	2,355,214.02	6,693,835.94	6,557.01	2,355,213.97	6,693,835.85	6,557.12
A-24	yellow	42	986112100279994	2,355,300.82	6,694,102.39	6,540.08	2,355,300.57	6,694,102.24	6,539.94
A-25	yellow	41	986112100284194	2,355,300.36	6,694,102.62	6,540.22	2,355,244.34	6,693,849.13	6,552.91
A-26	yellow	44	986112100291935	2,355,242.32	6,693,848.82	6,552.92	2,355,299.51	6,693,897.88	6,548.98
A-27	yellow	44	986112100280372	2,355,299.44	6,693,898.34	6,549.01	2,355,285.12	6,694,102.73	6,540.10
A-28	yellow	44	986112100280072	2,355,285.24	6,694,102.96	6,540.05	2,355,243.58	6,694,137.92	6,537.23
A-29	yellow	38	986112100278894	2,355,243.83	6,694,137.01	6,537.25	2,355,316.68	6,694,006.05	6,544.67
B-2	blue	60	986112100289313	2,355,295.99	6,693,900.87	6,549.06	not recovered		
B-4	blue	48	986112100294959	2,355,301.98	6,694,103.17	6,540.31	2,355,301.73	6,694,104.29	6,540.29
B-5	blue	54	986112100283978	2,355,297.92	6,694,102.83	6,540.01	2,355,297.78	6,694,101.99	6,540.14
B-6	blue	51	986112100279932	2,355,297.49	6,693,906.96	6,549.93	2,355,298.41	6,693,907.47	6,549.99
B-8	blue	59	986112100290868	2,355,308.29	6,694,051.52	6,541.96	2,355,308.71	6,694,053.66	6,541.52
B-9	blue	57	986112100280365	2,355,306.32	6,693,900.79	6,549.77	2,355,306.12	6,693,900.53	6,549.71
B-15	blue	54	986112100296419	2,355,284.27	6,694,101.95	6,540.05	2,355,279.79	6,694,108.73	6,539.89
B-16	blue	51	986112100295944	2,355,219.95	6,693,810.55	6,556.43	2,355,219.88	6,693,810.44	6,556.24

Tracer ID	Paint Color	B-AXIS (mm)	PIT Tag Code	Original Placement			Last Found Location (July 2021)		
				Northing (ft)	Easting (ft)	Elevation (ft)	Northing (ft)	Easting (ft)	Elevation (ft)
B-17	blue	56	986112100281350	2,355,195.06	6,693,809.64	6,556.80	2,355,195.15	6,693,809.61	6,556.84
B-18	blue	56	986112100293290	2,355,244.54	6,694,137.75	6,537.02	2,355,244.42	6,694,137.75	6,536.87
B-22	blue	57	986112100291392	2,355,321.24	6,694,009.29	6,543.80	2,355,321.48	6,694,009.46	6,543.71
B-23	blue	54	986112100297929	2,355,246.64	6,694,140.04	6,536.77	2,355,246.37	6,694,139.85	6,536.75
B-24	blue	56	986112100293303	2,355,200.85	6,693,800.92	6,555.80	2,355,200.63	6,693,800.85	6,556.07
B-26	blue	57	986112100281625	2,355,333.41	6,693,999.98	6,544.89	2,355,332.37	6,694,000.53	6,544.75
B-27	blue	49	986112100282879	2,355,259.29	6,693,871.60	6,551.39	2,355,259.37	6,693,871.67	6,551.40
B-28	blue	56	986112100282939	2,355,304.82	6,693,894.97	6,549.56	2,355,304.85	6,693,895.13	6,549.64
B-29	blue	59	986112100297430	2,355,219.12	6,693,830.77	6,554.55	2,355,220.22	6,693,829.63	6,554.67
B-30	blue	48	986112100279077	2,355,316.12	6,693,941.63	6,546.27	2,355,315.71	6,693,941.58	6,546.41
C-1	orange	69	986112100258401	2,355,284.25	6,694,100.29	6,540.04	2,355,284.66	6,694,100.11	6,539.94
C-2	orange	62	986112100258387	2,355,337.21	6,694,000.76	6,544.53	2,355,337.07	6,694,001.11	6,544.54
C-3	orange	71	986112100281585	2,355,178.02	6,693,787.55	6,557.77	2,355,178.18	6,693,787.50	6,557.81
C-5	orange	85	986112100258432	2,355,297.83	6,693,899.64	6,548.83	2,355,297.78	6,693,899.60	6,548.92
C-7	orange	74	986112100258541	2,355,289.93	6,694,106.21	6,539.29	2,355,289.87	6,694,106.17	6,539.27
C-8	orange	86	986112100258525	2,355,304.49	6,693,902.21	6,549.48	2,355,304.47	6,693,902.19	6,549.51
C-9	orange	72	986112100258443	2,355,207.00	6,693,805.74	6,555.93	2,355,207.04	6,693,805.91	6,556.11
C-10	orange	74	986112100258416	2,355,303.77	6,693,895.82	6,549.36	2,355,303.73	6,693,895.91	6,549.46
C-11	orange	82	986112100258478	2,355,280.56	6,694,105.73	6,539.97	2,355,280.46	6,694,105.47	6,540.04
C-12	orange	77	986112100258459	2,355,283.38	6,694,105.62	6,540.26	2,355,283.63	6,694,108.03	6,540.05
C-13	orange	66	986112100258435	2,355,304.13	6,694,049.92	6,542.94	2,355,304.40	6,694,049.82	6,542.94
C-15	orange	71	986112100258499	2,355,299.05	6,693,906.64	6,549.99	2,355,298.99	6,693,906.66	6,550.00
C-16	orange	88	986112100258394	2,355,258.25	6,693,873.39	6,552.81	2,355,258.11	6,693,872.64	6,552.81
C-17	orange	63	986112100258377	2,355,197.81	6,693,802.35	6,556.41	2,355,199.47	6,693,801.30	6,556.17
C-18	orange	63	986112100258479	2,355,332.03	6,694,000.57	6,544.68	2,355,332.42	6,694,000.28	6,544.56
C-19	orange	77	986112100258487	2,355,191.17	6,693,802.11	6,556.76	2,355,191.06	6,693,802.18	6,556.79
C-21	orange	89	986112100258452	2,355,229.75	6,693,820.75	6,555.19	2,355,229.84	6,693,820.86	6,555.07
C-22	orange	64	986112100258393	2,355,289.66	6,694,102.33	6,539.64	2,355,289.96	6,694,102.38	6,539.59

Tracer ID	Paint Color	B-AXIS (mm)	PIT Tag Code	Original Placement			Last Found Location (July 2021)		
				Northing (ft)	Easting (ft)	Elevation (ft)	Northing (ft)	Easting (ft)	Elevation (ft)
C-23	orange	90	986112100258528	2,355,327.84	6,694,015.55	6,543.68	2,355,327.91	6,694,015.28	6,543.65
C-24	orange	88	986112100290195	2,355,211.02	6,693,791.88	6,558.86	2,355,211.12	6,693,791.67	6,558.86
C-25	orange	66	986112100289218	2,355,314.17	6,693,941.67	6,547.06	2,355,313.86	6,693,941.88	6,547.15
C-26	orange	70	986112100283594	2,355,244.96	6,694,138.10	6,536.93	2,355,244.76	6,694,137.93	6,537.03
D-2	yellow	100	986112100258379	2,355,249.80	6,694,143.49	6,535.17	2,355,247.18	6,694,144.47	6,535.85
D-3	yellow	115	986112100258371	2,355,310.07	6,694,051.74	6,542.11	2,355,310.28	6,694,051.27	6,542.04
D-5	yellow	109	986112100258509	2,355,278.70	6,694,100.14	6,541.76	2,355,278.11	6,694,100.04	6,541.64
D-7	yellow	102	986112100258560	2,355,262.17	6,693,867.50	6,551.92	2,355,261.86	6,693,867.73	6,551.81
D-13	yellow	111	986112100258472	2,355,288.14	6,694,101.28	6,539.85	2,355,288.28	6,694,101.33	6,540.00
D-14	yellow	103	986112100258425	2,355,320.14	6,693,938.64	6,545.72	2,355,321.83	6,693,944.36	6,545.67
D-18	yellow	106	986112100258493	2,355,292.18	6,694,104.57	6,539.24	2,355,292.01	6,694,104.52	6,539.30
D-19	yellow	112	986112100283712	2,355,177.06	6,693,781.66	6,557.76	2,355,177.02	6,693,781.64	6,557.81
D-20	yellow	95	986112100258500	2,355,306.86	6,693,899.55	6,550.16	2,355,306.94	6,693,899.47	6,550.15
D-21	yellow	96	986112100258442	2,355,302.73	6,693,903.47	6,549.56	2,355,302.85	6,693,903.45	6,549.54
D-22	yellow	124	986112100258533	2,355,206.33	6,693,795.71	6,556.96	2,355,205.76	6,693,795.79	6,557.04
D-24	yellow	128	986112100258410	2,355,212.23	6,693,838.52	6,557.13	2,355,212.23	6,693,838.40	6,557.33
D-25	yellow	96	986112100298504	2,355,245.34	6,694,139.27	6,536.78	2,355,245.10	6,694,139.18	6,536.79
D-26	yellow	122	986112100298555	2,355,281.87	6,694,104.23	6,540.32	2,355,281.68	6,694,104.04	6,540.18
D-27	yellow	110	986112100258399	2,355,293.26	6,693,903.58	6,549.88	2,355,293.14	6,693,903.26	6,549.86
D-28	yellow	103	986112100258458	2,355,201.51	6,693,799.38	6,555.97	2,355,201.27	6,693,799.65	6,556.19
D-29	yellow	114	986112100258388	2,355,296.77	6,693,900.20	6,548.96	2,355,296.62	6,693,900.22	6,548.93
D-30	yellow	114	986112100258513	2,355,318.66	6,694,007.89	6,544.50	2,355,318.76	6,694,007.39	6,544.57
D-31	yellow	118	986112199258409	2,355,327.83	6,693,996.64	6,544.07	2,355,328.15	6,693,996.21	6,544.11
E-4	blue	138	986112100258414	2,355,247.53	6,694,142.21	6,535.64	2,355,247.39	6,694,142.17	6,535.62
E-5	blue	134	986112100280016	2,355,180.52	6,693,790.31	6,557.93	2,355,180.50	6,693,790.09	6,557.89
E-6	blue	138	986112100258422	2,355,324.37	6,694,011.57	6,544.17	2,355,324.33	6,694,011.34	6,544.20
E-7	blue	158	986112100258543	2,355,294.82	6,693,901.02	6,549.28	2,355,294.88	6,693,900.83	6,549.29
E-9	blue	142	986112100258440	2,355,321.54	6,693,944.72	6,545.56	2,355,321.82	6,693,944.68	6,545.57

Tracer ID	Paint Color	B-AXIS (mm)	PIT Tag Code	Original Placement			Last Found Location (July 2021)		
				Northing (ft)	Easting (ft)	Elevation (ft)	Northing (ft)	Easting (ft)	Elevation (ft)
E-11	blue	170	986112100258538	2,355,291.67	6,694,094.97	6,538.93	2,355,290.45	6,694,096.05	6,538.82
E-12	blue	139	986112100258392	2,355,265.84	6,693,865.73	6,552.56	2,355,265.67	6,693,865.72	6,552.53
E-13	blue	132	986112100258531	2,355,280.46	6,694,103.45	6,540.45	2,355,278.90	6,694,104.95	6,540.15
E-14	blue	128	986112100258521	2,355,301.22	6,693,897.29	6,549.24	2,355,301.27	6,693,897.28	6,549.32
E-16	blue	136	986112100258390	2,355,205.68	6,693,796.03	6,556.94	2,355,205.88	6,693,796.19	6,556.98
E-19	blue	158	986112100258455	2,355,222.63	6,693,827.04	6,555.29	2,355,222.60	6,693,826.95	6,555.20
E-20	blue	178	986112100258434	2,355,188.19	6,693,806.99	6,558.06	2,355,188.48	6,693,806.96	6,558.22
E-21	blue	170	986112100258398	2,355,325.11	6,693,995.29	6,544.77	2,355,325.32	6,693,995.20	6,544.80
E-22	blue	151	986112100291983	2,355,172.91	6,693,782.79	6,558.10	2,355,172.95	6,693,782.56	6,558.16
E-25	blue	152	986112100258363	2,355,298.73	6,693,908.02	6,550.23	2,355,298.89	6,693,908.02	6,550.22
E-27	blue	158	986112100258431	2,355,313.70	6,694,053.51	6,542.48	2,355,313.98	6,694,053.52	6,542.17
E-28	blue	144	986112100258381	2,355,197.09	6,693,803.84	6,557.15	2,355,197.00	6,693,803.54	6,557.07
E-29	blue	129	986112100258474	2,355,300.82	6,693,905.16	6,549.97	2,355,300.90	6,693,905.08	6,549.97
E-31	blue	153	986112100258524	2,355,253.45	6,694,147.19	6,536.55	2,355,253.72	6,694,147.11	6,536.61
F-1	orange	198	986112100258476	2,355,299.34	6,694,100.48	6,540.90	2,355,299.27	6,694,100.16	6,540.88
F-3	orange	181	986112100258556	2,355,223.32	6,693,832.37	6,555.46	2,355,223.12	6,693,832.00	6,555.44
F-9	orange	180	986112100258482	2,355,306.51	6,693,894.05	6,549.96	2,355,306.57	6,693,893.90	6,550.09
F-10	orange	193	986112100258445	2,355,294.57	6,694,096.98	6,538.16	2,355,294.43	6,694,096.57	6,538.19
F-11	orange	180	986112100258549	2,355,315.43	6,694,052.79	6,543.68	2,355,315.51	6,694,052.77	6,543.79
F-12	orange	200	986112100258546	2,355,329.61	6,693,998.84	6,544.36	2,355,330.07	6,693,998.89	6,544.31
F-13	orange	220	986112100258429	2,355,219.71	6,693,816.68	6,556.26	2,355,219.87	6,693,816.71	6,556.09
F-14	orange	185	986112100258413	2,355,194.37	6,693,808.43	6,557.32	2,355,194.42	6,693,808.18	6,557.43
F-15	orange	210	986112100258536	2,355,286.62	6,694,107.00	6,540.07	2,355,286.50	6,694,106.71	6,539.98
F-16	orange	205	986112100258375	2,355,335.93	6,693,999.81	6,544.72	2,355,336.30	6,694,000.21	6,544.74
F-17	orange	210	896112100258427	2,355,260.53	6,693,870.22	6,552.16	2,355,260.45	6,693,870.12	6,552.05
F-18	orange	190	986112100258514	2,355,260.53	6,693,870.22	6,552.16	2,355,248.70	6,693,845.68	6,554.50
F-19	orange	194	986112100258447	2,355,293.43	6,693,901.66	6,549.80	2,355,293.40	6,693,901.46	6,549.79
F-20	orange	183	986112100258522	2,355,321.76	6,693,937.51	6,545.69	2,355,321.24	6,693,938.83	6,545.58

Tracer ID	Paint Color	B-AXIS (mm)	PIT Tag Code	Original Placement			Last Found Location (July 2021)		
				Northing (ft)	Easting (ft)	Elevation (ft)	Northing (ft)	Easting (ft)	Elevation (ft)
F-21	orange	185	986112100258436	2,355,199.98	6,693,798.93	6,556.14	2,355,199.73	6,693,798.74	6,556.18
G-4	blue	320	986112100283920	2,355,198.99	6,693,800.59	6,556.63	2,355,198.71	6,693,800.64	6,556.66
G-5	blue	260	986112100289274	2,355,195.11	6,693,806.59	6,557.33	2,355,194.96	6,693,806.61	6,557.26
G-6	blue	270	986112100280431	2,355,175.59	6,693,789.00	6,558.55	2,355,175.49	6,693,789.07	6,558.51
G-8	blue	275	986112100289864	2,355,294.92	6,693,895.98	6,549.06	2,355,294.81	6,693,895.85	6,548.85
G-9	blue	258	986112100283565	2,355,298.96	6,694,049.76	6,544.59	2,355,299.00	6,694,049.49	6,544.67
G-10	blue	300	98611210093614	2,355,289.34	6,694,110.11	6,539.88	2,355,289.26	6,694,109.83	6,539.96

Site 6 Tracers

Tracer ID	Paint Color	B-AXIS (mm)	PIT Tag Code	Original Placement			Last Found Location (July 2021)		
				Northing (ft)	Easting (ft)	Elevation (ft)	Northing (ft)	Easting (ft)	Elevation (ft)
A-1	yellow	34	986112100283912	2,373,427.60	6,717,006.99	4,560.89	2,373,431.69	6,717,009.46	4,560.01
A-2	yellow	36	986112100298399	2,373,412.15	6,716,989.45	4,560.77	2,373,413.79	6,716,994.19	4,561.16
A-4	yellow	37	986112100280396	2,373,447.03	6,717,035.78	4,559.82	not recovered		
A-6	yellow	38	986112100278885	2,373,348.72	6,716,948.58	4,563.24	2,373,348.70	6,716,948.58	4,563.16
A-7	yellow	42	986112100295408	2,373,292.76	6,716,914.35	4,565.44	2,373,305.37	6,716,920.89	4,564.30
A-8	yellow	40	986112100280516	2,373,309.42	6,716,923.37	4,564.38	2,373,310.97	6,716,921.15	4,564.12
A-9	yellow	32	986112100278928	2,373,329.86	6,716,926.41	4,564.42	2,373,381.89	6,716,959.64	4,562.13
A-10	yellow	31	986112100278987	2,373,431.26	6,717,004.19	4,560.70	2,373,432.76	6,717,013.11	4,560.08
A-15	yellow	39	986112100294813	2,373,353.51	6,716,940.65	4,561.96	2,373,352.51	6,716,940.72	4,561.99
A-17	yellow	40	986112100278966	2,373,306.88	6,716,925.66	4,564.80	not recovered		
A-20	yellow	39	986112100283422	2,373,398.60	6,716,973.12	4,561.76	not recovered		
A-30	yellow	41	986112100283400	2,373,395.89	6,716,977.14	4,561.27	2,373,401.86	6,716,983.90	4,560.44
B-1	blue	53	986112100284748	2,373,426.24	6,717,008.05	4,561.29	2,373,434.95	6,717,011.59	4,560.12
B-3	blue	47	986112100298328	2,373,393.74	6,716,977.81	4,561.48	2,373,409.26	6,716,986.82	4,561.05
B-7	blue	49	986112100289497	2,373,352.04	6,716,940.84	4,561.99	2,373,369.21	6,716,950.74	4,562.04
B-10	blue	56	986112100298316	2,373,398.17	6,716,975.97	4,561.32	not recovered		
B-11	blue	56	986112100298135	2,373,307.09	6,716,929.47	4,565.53	2,373,307.14	6,716,925.97	4,564.72
B-12	blue	47	986112100298759	2,373,325.45	6,716,927.22	4,564.49	2,373,339.16	6,716,929.85	4,561.98
B-13	blue	56	986112100297656	2,373,442.49	6,717,040.25	4,560.57	not recovered		
B-14	blue	50	986112100279549	2,373,285.64	6,716,914.12	4,566.08	2,373,294.85	6,716,912.58	4,565.42
B-19	blue	54	986112100278832	2,373,292.74	6,716,913.96	4,565.43	not recovered		
B-20	blue	60	986112100279159	2,373,433.69	6,717,002.75	4,560.27	2,373,430.22	6,717,011.22	4,560.68
B-21	blue	59	986112100291205	2,373,371.38	6,716,959.89	4,561.35	2,373,371.03	6,716,961.78	4,561.38
B-25	blue	48	986112100284474	2,373,309.95	6,716,922.70	4,564.35	2,373,317.08	6,716,924.74	4,564.42
C-4	orange	70	986112100258557	2,373,311.21	6,716,920.72	4,564.11	2,373,311.75	6,716,920.87	4,563.98
C-6	orange	67	986112100258527	2,373,349.98	6,716,938.37	4,561.97	2,373,349.97	6,716,938.37	4,561.95

Tracer ID	Paint Color	B-AXIS (mm)	PIT Tag Code	Original Placement			Last Found Location (July 2021)		
				Northing (ft)	Easting (ft)	Elevation (ft)	Northing (ft)	Easting (ft)	Elevation (ft)
C-14	orange	75	986112100258418	2,373,293.21	6,716,914.46	4,565.55	2,373,304.60	6,716,922.45	4,564.42
C-20	orange	75	986112100258373	2,373,425.75	6,717,009.17	4,561.43	2,373,425.31	6,717,007.91	4,561.24
C-27	orange	87	986112100279350	2,373,373.46	6,716,960.67	4,561.19	2,373,373.53	6,716,960.68	4,561.27
C-28	orange	87	986112100289366	2,373,395.27	6,716,975.45	4,561.41	2,373,395.28	6,716,975.21	4,561.31
C-29	orange	99	986112100281375	2,373,414.69	6,716,987.67	4,560.58	2,373,414.68	6,716,991.08	4,560.87
C-30	orange	90	986112100279987	2,373,309.16	6,716,923.91	4,564.63	2,373,309.06	6,716,924.16	4,564.80
C-31	orange	79	986112100289071	2,373,402.32	6,716,974.18	4,561.82	2,373,398.14	6,716,973.45	4,561.68
C-32	orange	78	986112100295473	2,373,301.80	6,716,920.95	4,564.38	2,373,301.99	6,716,920.77	4,564.42
C-33	orange	75	986112100289760	2,373,427.86	6,717,007.40	4,561.01	2,373,429.64	6,717,009.35	4,560.85
D-1	yellow	106	986112100258481	2,373,282.83	6,716,923.46	4,566.62	2,373,282.85	6,716,923.38	4,566.67
D-4	yellow	120	986112100258469	2,373,310.98	6,716,923.17	4,564.57	2,373,310.69	6,716,923.46	4,564.53
D-6	yellow	102	986112100258491	2,373,433.68	6,717,004.09	4,560.28	2,373,429.89	6,717,001.58	4,560.76
D-8	yellow	114	986112100258384	2,373,412.34	6,716,987.58	4,560.66	2,373,420.92	6,716,990.59	4,561.01
D-9	yellow	96	986112100258480	2,373,424.98	6,717,009.42	4,561.57	2,373,426.69	6,717,010.16	4,561.47
D-10	yellow	119	986112100258380	2,373,397.70	6,716,974.68	4,561.48	2,373,397.01	6,716,976.26	4,561.67
D-11	yellow	96	986112100281712	2,373,326.23	6,716,927.26	4,564.56	2,373,325.83	6,716,927.76	4,564.28
D-12	yellow	102	986112100258370	2,373,360.00	6,716,950.72	4,561.58	2,373,359.99	6,716,950.83	4,561.59
D-15	yellow	97	986112100258488	2,373,351.30	6,716,943.79	4,562.73	2,373,350.49	6,716,947.39	4,563.16
D-16	yellow	111	986112100258554	2,373,394.61	6,716,976.23	4,561.37	2,373,394.71	6,716,976.27	4,561.52
D-17	yellow	116	986112100258451	2,373,309.18	6,716,926.33	4,564.94	2,373,309.46	6,716,926.53	4,564.92
D-23	yellow	99	986112100258376	2,373,439.49	6,717,040.52	4,561.00	2,373,441.69	6,717,041.99	4,560.58
E-1	blue	128	986112100258510	2,373,319.64	6,716,931.65	4,564.63	2,373,320.89	6,716,931.63	4,564.48
E-2	blue	145	986112100258364	2,373,428.04	6,717,006.12	4,561.11	2,373,428.06	6,716,998.84	4,560.88
E-3	blue	155	986112100258534	2,373,430.18	6,717,006.34	4,560.62	2,373,431.02	6,717,001.40	4,560.76
E-8	blue	142	986112100258420	2,373,292.40	6,716,913.14	4,565.86	not recovered		
E-10	blue	130	986112100258504	2,373,374.51	6,716,961.71	4,561.41	2,373,374.39	6,716,961.69	4,561.49
E-15	blue	148	986112100258365	2,373,444.23	6,717,034.15	4,560.29	2,373,444.62	6,717,034.41	4,560.13
E-17	blue	141	986112100258403	2,373,347.03	6,716,952.46	4,564.03	2,373,347.06	6,716,952.41	4,563.89

Tracer ID	Paint Color	B-AXIS (mm)	PIT Tag Code	Original Placement			Last Found Location (July 2021)		
				Northing (ft)	Easting (ft)	Elevation (ft)	Northing (ft)	Easting (ft)	Elevation (ft)
E-18	blue	141	pit tag stopped	2,373,308.00	6,716,922.00	4,564.00	2,373,310.15	6,716,922.86	4,564.90
E-23	blue	141	986112100258502	2,373,397.37	6,716,978.82	4,560.97	2,373,395.86	6,716,978.97	4,561.61
E-24	blue	169	986112100258378	2,373,287.45	6,716,911.74	4,565.95	2,373,287.53	6,716,911.99	4,565.97
E-26	blue	170	986112100298383	2,373,309.62	6,716,928.96	4,564.77	2,373,309.79	6,716,928.70	4,564.77
E-30	blue	131	986112100258453	2,373,400.26	6,716,975.17	4,561.48	2,373,391.13	6,716,971.67	4,561.37
F-2	orange	201	986112100258415	2,373,432.68	6,717,004.34	4,560.54	2,373,432.71	6,717,004.17	4,560.81
F-5	orange	209	986112100258419	2,373,327.39	6,716,930.18	4,564.57	2,373,326.92	6,716,929.93	4,564.54
F-6	orange	229	986112100258558	2,373,309.75	6,716,925.60	4,565.25	2,373,309.82	6,716,925.36	4,565.30
F-7	orange	197	986112100258426	2,373,397.21	6,716,975.99	4,561.80	2,373,405.01	6,716,978.86	4,561.21
F-8	orange	180	986112100258503	2,373,404.40	6,716,973.75	4,562.88	2,373,397.24	6,716,974.72	4,561.75
G-1	blue	290	986112100258477	2,373,402.44	6,716,975.70	4,562.30	2,373,402.47	6,716,975.73	4,562.31
G-2	blue	300	986112100258382	2,373,424.97	6,717,008.58	4,561.66	2,373,425.16	6,717,008.75	4,561.74
G-3	blue	345	986112100258395	2,373,308.69	6,716,924.90	4,565.63	2,373,308.67	6,716,924.90	4,565.69

APPENDIX B

2019 PFANKUCH FORMS

Kleinschmidt

Pfankuch Channel Rating

Stream: Bishop Creek, CA **Site ID:** #3 **Stream Type:** B1 **Observers:** TAK/GSM **Date:** 9-10-19

Loca-tion	Key	Category	Excellent Description	Excellent Rating	Good Description	Good Rating	Fair Description	Fair Rating	Poor Description	Poor Rating	Assigned Rating
Upper banks	1	Landform slope	Bank slope gradient <30%.	2	Bank slope gradient 30–40%.	4	Bank slope gradient 40–60%.	6	Bank slope gradient > 60%.	8	
	2	Mass erosion	No evidence of past or future mass erosion.	3	Infrequent. Mostly healed over. Low future potential.	6	Frequent or large, causing sediment nearly yearlong.	9	Frequent or large, causing sediment nearly yearlong OR imminent danger of same.	12	
	3	Debris jam potential	Essentially absent from immediate channel area.	2	Present, but mostly small twigs and limbs.	4	Moderate to heavy amounts, mostly larger sizes.	6	Moderate to heavy amounts, predominantly larger sizes.	8	
	4	Vegetative bank protection	> 90% plant density. Vigor and variety suggest a deep, dense, soil-binding root mass.	3	70–90% density. Fewer species or less vigor suggest less dense or deep root mass.	6	50–70% density. Lower vigor and fewer species from a shallow, discontinuous root mass.	9	<50% density plus fewer species and less vigor indicating poor, discontinuous, and shallow root mass.	12	
Lower banks	5	Channel capacity	Bank heights sufficient to contain the bankfull stage. Width/depth ratio departure from reference width/depth ratio = 1.0. Bank-Height Ratio (BHR) = 1.0.	1	Bankfull stage is contained within banks. Width/depth ratio departure from reference width/depth ratio = 1.0–1.2. Bank-Height Ratio (BHR) = 1.0–1.1.	2	Bankfull stage is not contained. Width/depth ratio departure from reference width/depth ratio = 1.2–1.4. Bank-Height Ratio (BHR) = 1.1–1.3.	3	Bankfull stage is not contained; over-bank flows are common with flows less than bankfull. Width/depth ratio departure from reference width/depth ratio > 1.4. Bank-Height Ratio (BHR) > 1.3.	4	
	6	Bank rock content	> 65% with large angular boulders. 12"+ common.	2	40–65%. Mostly boulders and small cobbles 6–12".	4	20–40%. Most in the 3–6" diameter class.	6	<20% rock fragments of gravel sizes, 1–3" or less.	8	
	7	Obstructions to flow	Rocks and logs firmly imbedded. Flow pattern w/o cutting or deposition. Stable bed.	2	Some present causing erosive cross currents and minor pool filling. Obstructions fewer and less firm.	4	Moderately frequent, unstable obstructions move with high flows causing bank cutting and pool filling.	6	Frequent obstructions and deflectors cause bank erosion yearlong. Sediment traps full, channel migration occurring.	8	
	8	Cutting	Little or none. Infrequent raw banks <6".	4	Some, intermittently at outcurves and constrictions. Raw banks may be up to 12".	6	Significant. Cuts 12–24" high. Root mat overhangs and sloughing evident.	12	Almost continuous cuts, some over 24" high. Failure of overhangs frequent.	16	
	9	Deposition	Little or no enlargement of channel or point bars.	4	Some new bar increase, mostly from coarse gravel.	8	Moderate depostion of new gravel and coarse sand on old and some new bars.	12	Extensive deposit of predominantly fine particles. Accelerated bar development.	16	
Bottom	10	Rock angularity	Sharp edges and corners. Plane surfaces rough.	1	Rounded corners and edges. Surfaces smooth and flat.	2	Corners and edges well-rounded in two dimensions.	3	Well-rounded in all dimensions, surfaces smooth.	4	
	11	Brightness	Surfaces dull, dark, or stained. Generally not bright.	1	Mostly dull, but may have <35% bright surfaces.	2	Mixture dull and bright, i.e., 35–65% mixture range.	3	Predominantly bright, > 65%, exposed or scoured surfaces.	4	
	12	Consolidation of particles	Assorted sizes tightly packed or overlapping.	2	Moderately packed with some overlapping.	4	Mostly loose assortment with no apparent overlap.	6	No packing evident. Loose assortment, easily moved.	8	
	13	Bottom size distribution	No size change evident. Stable material 80–100%.	4	Distribution shift light. Stable material 50–80%.	8	Moderate change in sizes. Stable materials 20–50%.	12	Marked distribution change. Stable materials 0–20%.	16	
	14	Scouring and deposition	<5% of bottom affected by scour or deposition.	6	5–30% affected. Scour at constrictions and where grades steepen. Some deposition in pools.	12	30–50% affected. Deposits and scour at obstructions, constrictions, and bends. Some filling of pools.	18	More than 50% of the bottom in a state of flux or change nearly yearlong.	24	
	15	Aquatic vegetation	Abundant growth moss-like, dark green perennial. In swift water too.	1	Common. Algae forms in low velocity and pool areas. Moss here too.	2	Present but spotty, mostly in backwater. Seasonal algae growth makes rocks slick.	3	Perennial types scarce or absent. Yellow-green, short-term bloom may be present.	4	

Excellent Total = **Good Total =** **Fair Total =** **Poor Total =**

Stream type	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	D3	D4	D5	D6
Good (Stable)	38-43	38-43	54-90	60-95	60-95	50-80	38-45	38-45	40-60	40-64	48-68	40-60	38-50	38-50	60-85	70-90	70-90	60-85	85-107	85-107	85-107	67-98
Fair (Mod. unstable)	44-47	44-47	91-129	96-132	96-142	81-110	46-58	46-58	61-78	65-84	69-88	61-78	51-61	51-61	86-105	91-110	91-110	86-105	108-132	108-132	108-132	99-125
Poor (Unstable)	48+	48+	130+	133+	143+	111+	59+	59+	79+	85+	89+	79+	62+	62+	106+	111+	111+	106+	133+	133+	133+	126+

Stream type	DA3	DA4	DA5	DA6	E3	E4	E5	E6	F1	F2	F3	F4	F5	F6	G1	G2	G3	G4	G5	G6
Good (Stable)	40-63	40-63	40-63	40-63	40-63	50-75	50-75	40-63	60-85	60-85	85-110	85-110	90-115	80-95	40-60	40-60	85-107	85-107	90-112	85-107
Fair (Mod. unstable)	64-86	64-86	64-86	64-86	64-86	76-96	76-96	64-86	86-105	86-105	111-125	111-125	116-130	96-110	61-78	61-78	108-120	108-120	113-125	108-120
Poor (Unstable)	87+	87+	87+	87+	87+	97+	97+	87+	106+	106+	126+	126+	131+	111+	79+	79+	121+	121+	126+	121+

Grand Total = 49

Existing Stream Type =

***Potential Stream Type =**

Modified channel stability rating =

*Rating is adjusted to *potential* stream type, not existing stream type

Kleinschmidt

Pfankuch Channel Rating

Stream: Bishop Creek, CA **Site ID:** 4.1 Upper **Stream Type:** **Observers:** **Date:**

Location	Key	Category	Excellent Description	Rating	Good Description	Rating	Fair Description	Rating	Poor Description	Rating	Assigned Rating
Upper banks	1	Landform slope	Bank slope gradient <30%.	2	Bank slope gradient 30–40%.	4	Bank slope gradient 40–60%.	6	Bank slope gradient > 60%.	8	
	2	Mass erosion	No evidence of past or future mass erosion.	3	Infrequent. Mostly healed over. Low future potential.	6	Frequent or large, causing sediment nearly yearlong.	9	Frequent or large, causing sediment nearly yearlong OR imminent danger of same.	12	
	3	Debris jam potential	Essentially absent from immediate channel area.	2	Present, but mostly small twigs and limbs.	4	Moderate to heavy amounts, mostly larger sizes.	6	Moderate to heavy amounts, predominantly larger sizes.	8	
	4	Vegetative bank protection	> 90% plant density. Vigor and variety suggest a deep, dense, soil-binding root mass.	3	70–90% density. Fewer species or less vigor suggest less dense or deep root mass.	6	50–70% density. Lower vigor and fewer species from a shallow, discontinuous root mass.	9	<50% density plus fewer species and less vigor indicating poor, discontinuous, and shallow root mass.	12	
Lower banks	5	Channel capacity	Bank heights sufficient to contain the bankfull stage. Width/depth ratio departure from reference width/depth ratio = 1.0. Bank-Height Ratio (BHR) = 1.0.	1	Bankfull stage is contained within banks. Width/depth ratio departure from reference width/depth ratio = 1.0–1.2. Bank-Height Ratio (BHR) = 1.0–1.1.	2	Bankfull stage is not contained. Width/depth ratio departure from reference width/depth ratio = 1.2–1.4. Bank-Height Ratio (BHR) = 1.1–1.3.	3	Bankfull stage is not contained; over-bank flows are common with flows less than bankfull. Width/depth ratio departure from reference width/depth ratio > 1.4. Bank-Height Ratio (BHR) > 1.3.	4	
	6	Bank rock content	> 65% with large angular boulders. 12"+ common.	2	40–65%. Mostly boulders and small cobbles 6–12".	4	20–40%. Most in the 3–6" diameter class.	6	<20% rock fragments of gravel sizes, 1–3" or less.	8	
	7	Obstructions to flow	Rocks and logs firmly imbedded. Flow pattern w/o cutting or deposition. Stable bed.	2	Some present causing erosive cross currents and minor pool filling. Obstructions fewer and less firm.	4	Moderately frequent, unstable obstructions move with high flows causing bank cutting and pool filling.	6	Frequent obstructions and deflectors cause bank erosion yearlong. Sediment traps full, channel migration occurring.	8	
	8	Cutting	Little or none. Infrequent raw banks <6".	4	Some, intermittently at outcurves and constrictions. Raw banks may be up to 12".	6	Significant. Cuts 12–24" high. Root mat overhangs and sloughing evident.	12	Almost continuous cuts, some over 24" high. Failure of overhangs frequent.	16	
	9	Deposition	Little or no enlargement of channel or point bars.	4	Some new bar increase, mostly from coarse gravel.	8	Moderate depostion of new gravel and coarse sand on old and some new bars.	12	Extensive deposit of predominantly fine particles. Accelerated bar development.	16	
Bottom	10	Rock angularity	Sharp edges and corners. Plane surfaces rough.	1	Rounded corners and edges. Surfaces smooth and flat.	2	Corners and edges well-rounded in two dimensions.	3	Well-rounded in all dimensions, surfaces smooth.	4	
	11	Brightness	Surfaces dull, dark, or stained. Generally not bright.	1	Mostly dull, but may have <35% bright surfaces.	2	Mixture dull and bright, i.e., 35–65% mixture range.	3	Predominantly bright, > 65%, exposed or scoured surfaces.	4	
	12	Consolidation of particles	Assorted sizes tightly packed or overlapping.	2	Moderately packed with some overlapping.	4	Mostly loose assortment with no apparent overlap.	6	No packing evident. Loose assortment, easily moved.	8	
	13	Bottom size distribution	No size change evident. Stable material 80–100%.	4	Distribution shift light. Stable material 50–80%.	8	Moderate change in sizes. Stable materials 20–50%.	12	Marked distribution change. Stable materials 0–20%.	16	
	14	Scouring and deposition	<5% of bottom affected by scour or deposition.	6	5–30% affected. Scour at constrictions and where grades steepen. Some deposition in pools.	12	30–50% affected. Deposits and scour at obstructions, constrictions, and bends. Some filling of pools.	18	More than 50% of the bottom in a state of flux or change nearly yearlong.	24	
	15	Aquatic vegetation	Abundant growth moss-like, dark green perennial. In swift water too.	1	Common. Algae forms in low velocity and pool areas. Moss here too.	2	Present but spotty, mostly in backwater. Seasonal algae growth makes rocks slick.	3	Perennial types scarce or absent. Yellow-green, short-term bloom may be present.	4	

Excellent Total = **Good Total =** **Fair Total =** **Poor Total =**

Stream type	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	D3	D4	D5	D6
Good (Stable)	38-43	38-43	54-90	60-95	60-95	50-80	38-45	38-45	40-60	40-64	48-68	40-60	38-50	38-50	60-85	70-90	70-90	60-85	85-107	85-107	85-107	67-98
Fair (Mod. unstable)	44-47	44-47	91-129	96-132	96-142	81-110	46-58	46-58	61-78	65-84	69-88	61-78	51-61	51-61	86-105	91-110	91-110	86-105	108-132	108-132	108-132	99-125
Poor (Unstable)	48+	48+	130+	133+	143+	111+	59+	59+	79+	85+	89+	79+	62+	62+	106+	111+	111+	106+	133+	133+	133+	126+

Stream type	DA3	DA4	DA5	DA6	E3	E4	E5	E6	F1	F2	F3	F4	F5	F6	G1	G2	G3	G4	G5	G6
Good (Stable)	40-63	40-63	40-63	40-63	40-63	50-75	50-75	40-63	60-85	60-85	85-110	85-110	90-115	80-95	40-60	40-60	85-107	85-107	90-112	85-107
Fair (Mod. unstable)	64-86	64-86	64-86	64-86	64-86	76-96	76-96	64-86	86-105	86-105	111-125	111-125	116-130	96-110	61-78	61-78	108-120	108-120	113-125	108-120
Poor (Unstable)	87+	87+	87+	87+	87+	97+	97+	87+	106+	106+	126+	126+	131+	111+	79+	79+	121+	121+	126+	121+

Grand Total =	~~0~~ 51
Existing Stream Type =	
*Potential Stream Type =	
Modified channel stability rating =	

*Rating is adjusted to *potential* stream type, not existing stream type

Kleinschmidt

Pfankuch Channel Rating

Stream: Bishop Creek, CA **Site ID:** 4.2 **Stream Type:** **Observers:** GSM / TAL **Date:** 9/13/19

Location	Key	Category	Excellent		Good		Fair		Poor		Assigned Rating
			Description	Rating	Description	Rating	Description	Rating	Description	Rating	
Upper banks	1	Landform slope	Bank slope gradient <30%.	2	Bank slope gradient 30–40%.	4	Bank slope gradient 40–60%.	6	Bank slope gradient > 60%.	8	
	2	Mass erosion	No evidence of past or future mass erosion.	3	Infrequent. Mostly healed over. Low future potential.	6	Frequent or large, causing sediment nearly yearlong.	9	Frequent or large, causing sediment nearly yearlong OR imminent danger of same.	12	
	3	Debris jam potential	Essentially absent from immediate channel area.	2	Present, but mostly small twigs and limbs.	4	Moderate to heavy amounts, mostly larger sizes.	6	Moderate to heavy amounts, predominantly larger sizes.	8	
	4	Vegetative bank protection	> 90% plant density. Vigor and variety suggest a deep, dense, soil-binding root mass.	3	70–90% density. Fewer species or less vigor suggest less dense or deep root mass.	6	50–70% density. Lower vigor and fewer species from a shallow, discontinuous root mass.	9	<50% density plus fewer species and less vigor indicating poor, discontinuous, and shallow root mass.	12	
Lower banks	5	Channel capacity	Bank heights sufficient to contain the bankfull stage. Width/depth ratio departure from reference width/depth ratio = 1.0. Bank-Height Ratio (BHR) = 1.0.	1	Bankfull stage is contained within banks. Width/depth ratio departure from reference width/depth ratio = 1.0–1.2. Bank-Height Ratio (BHR) = 1.0–1.1.	2	Bankfull stage is not contained. Width/depth ratio departure from reference width/depth ratio = 1.2–1.4. Bank-Height Ratio (BHR) = 1.1–1.3.	3	Bankfull stage is not contained; over-bank flows are common with flows less than bankfull. Width/depth ratio departure from reference width/depth ratio > 1.4. Bank-Height Ratio (BHR) > 1.3.	4	
	6	Bank rock content	> 65% with large angular boulders. 12"+ common.	2	40–65%. Mostly boulders and small cobbles 6–12".	4	20–40%. Most in the 3–6" diameter class.	6	<20% rock fragments of gravel sizes, 1–3" or less.	8	
	7	Obstructions to flow	Rocks and logs firmly imbedded. Flow pattern w/o cutting or deposition. Stable bed.	2	Some present causing erosive cross currents and minor pool filling. Obstructions fewer and less firm.	4	Moderately frequent, unstable obstructions move with high flows causing bank cutting and pool filling.	6	Frequent obstructions and deflectors cause bank erosion yearlong. Sediment traps full, channel migration occurring.	8	
	8	Cutting	Little or none. Infrequent raw banks <6".	4	Some, intermittently at outcurves and constrictions. Raw banks may be up to 12".	6	Significant. Cuts 12–24" high. Root mat overhangs and sloughing evident.	12	Almost continuous cuts, some over 24" high. Failure of overhangs frequent.	16	
	9	Deposition	Little or no enlargement of channel or point bars.	4	Some new bar increase, mostly from coarse gravel.	8	Moderate depostion of new gravel and coarse sand on old and some new bars.	12	Extensive deposit of predominantly fine particles. Accelerated bar development.	16	
Bottom	10	Rock angularity	Sharp edges and corners. Plane surfaces rough.	1	Rounded corners and edges. Surfaces smooth and flat.	2	Corners and edges well-rounded in two dimensions.	3	Well-rounded in all dimensions, surfaces smooth.	4	
	11	Brightness	Surfaces dull, dark, or stained. Generally not bright.	1	Mostly dull, but may have <35% bright surfaces.	2	Mixture dull and bright, i.e., 35–65% mixture range.	3	Predominantly bright, > 65%, exposed or scoured surfaces.	4	
	12	Consolidation of particles	Assorted sizes tightly packed or overlapping.	2	Moderately packed with some overlapping.	4	Mostly loose assortment with no apparent overlap.	6	No packing evident. Loose assortment, easily moved.	8	
	13	Bottom size distribution	No size change evident. Stable material 80–100%.	4	Distribution shift light. Stable material 50–80%.	8	Moderate change in sizes. Stable materials 20–50%.	12	Marked distribution change. Stable materials 0–20%.	16	
	14	Scouring and deposition	<5% of bottom affected by scour or deposition.	6	5–30% affected. Scour at constrictions and where grades steepen. Some deposition in pools.	12	30–50% affected. Deposits and scour at obstructions, constrictions, and bends. Some filling of pools.	18	More than 50% of the bottom in a state of flux or change nearly yearlong.	24	
	15	Aquatic vegetation	Abundant growth moss-like, dark green perennial. In swift water too.	1	Common. Algae forms in low velocity and pool areas. Moss here too.	2	Present but spotty, mostly in backwater. Seasonal algae growth makes rocks slick.	3	Perennial types scarce or absent. Yellow-green, short-term bloom may be present.	4	

Excellent Total = **Good Total =** **Fair Total =** **Poor Total =**

Stream type	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	D3	D4	D5	D6
Good (Stable)	38-43	38-43	54-90	60-95	60-95	50-80	38-45	38-45	40-60	40-64	48-68	40-60	38-50	38-50	60-85	70-90	70-90	60-85	85-107	85-107	85-107	67-98
Fair (Mod. unstable)	44-47	44-47	91-129	96-132	96-142	81-110	46-58	46-58	61-78	65-84	69-88	61-78	51-61	51-61	86-105	91-110	91-110	86-105	108-132	108-132	108-132	99-125
Poor (Unstable)	48+	48+	130+	133+	143+	111+	59+	59+	79+	85+	89+	79+	62+	62+	106+	111+	111+	106+	133+	133+	133+	126+
Stream type	**DA3**	**DA4**	**DA5**	**DA6**	**E3**	**E4**	**E5**	**E6**	**F1**	**F2**	**F3**	**F4**	**F5**	**F6**	**G1**	**G2**	**G3**	**G4**	**G5**	**G6**		
Good (Stable)	40-63	40-63	40-63	40-63	40-63	50-75	50-75	40-63	60-85	60-85	85-110	85-110	90-115	80-95	40-60	40-60	85-107	85-107	90-112	85-107		
Fair (Mod. unstable)	64-86	64-86	64-86	64-86	64-86	76-96	76-96	64-86	86-105	86-105	111-125	111-125	116-130	96-110	61-78	61-78	108-120	108-120	113-125	108-120		
Poor (Unstable)	87+	87+	87+	87+	87+	97+	97+	87+	106+	106+	126+	126+	131+	111+	79+	79+	121+	121+	126+	121+		

Grand Total = 52

Existing Stream Type =

***Potential Stream Type =**

Modified channel stability rating =

*Rating is adjusted to *potential* stream type, not existing stream type

Kleinschmidt

Pfankuch Channel Rating

Stream: Bishop Creek, CA **Site ID:** 5 **Stream Type:** A1 **Observers:** TAK GSM **Date:** 9-10-19

Location	Key	Category	Excellent Description	Excellent Rating	Good Description	Good Rating	Fair Description	Fair Rating	Poor Description	Poor Rating	Assigned Rating
Upper banks	1	Landform slope	Bank slope gradient <30%.	2	Bank slope gradient 30–40%.	4	Bank slope gradient 40–60%.	6	Bank slope gradient > 60%.	8	
Upper banks	2	Mass erosion	No evidence of past or future mass erosion.	3	Infrequent. Mostly healed over. Low future potential.	6	Frequent or large, causing sediment nearly yearlong.	9	Frequent or large, causing sediment nearly yearlong OR imminent danger of same.	12	
Upper banks	3	Debris jam potential	Essentially absent from immediate channel area.	2	Present, but mostly small twigs and limbs.	4	Moderate to heavy amounts, mostly larger sizes.	6	Moderate to heavy amounts, predominantly larger sizes.	8	
Upper banks	4	Vegetative bank protection	> 90% plant density. Vigor and variety suggest a deep, dense, soil-binding root mass.	3	70–90% density. Fewer species or less vigor suggest less dense or deep root mass.	6	50–70% density. Lower vigor and fewer species from a shallow, discontinuous root mass.	9	<50% density plus fewer species and less vigor indicating poor, discontinuous, and shallow root mass.	12	
Lower banks	5	Channel capacity	Bank heights sufficient to contain the bankfull stage. Width/depth ratio departure from reference width/depth ratio = 1.0. Bank-Height Ratio (BHR) = 1.0.	1	Bankfull stage is contained within banks. Width/depth ratio departure from reference width/depth ratio = 1.0–1.2. Bank-Height Ratio (BHR) = 1.0–1.1.	2	Bankfull stage is not contained. Width/depth ratio departure from reference width/depth ratio = 1.2–1.4. Bank-Height Ratio (BHR) = 1.1–1.3.	3	Bankfull stage is not contained; over-bank flows are common with flows less than bankfull. Width/depth ratio departure from reference width/depth ratio > 1.4. Bank-Height Ratio (BHR) > 1.3.	4	
Lower banks	6	Bank rock content	> 65% with large angular boulders. 12"+ common.	2	40–65%. Mostly boulders and small cobbles 6–12".	4	20–40%. Most in the 3–6" diameter class.	6	<20% rock fragments of gravel sizes, 1–3" or less.	8	
Lower banks	7	Obstructions to flow	Rocks and logs firmly imbedded. Flow pattern w/o cutting or deposition. Stable bed.	2	Some present causing erosive cross currents and minor pool filling. Obstructions fewer and less firm.	4	Moderately frequent, unstable obstructions move with high flows causing bank cutting and pool filling.	6	Frequent obstructions and deflectors cause bank erosion yearlong. Sediment traps full, channel migration occurring.	8	
Lower banks	8	Cutting	Little or none. Infrequent raw banks <6".	4	Some, intermittently at outcurves and constrictions. Raw banks may be up to 12".	6	Significant. Cuts 12–24" high. Root mat overhangs and sloughing evident.	12	Almost continuous cuts, some over 24" high. Failure of overhangs frequent.	16	
Lower banks	9	Deposition	Little or no enlargement of channel or point bars.	4	Some new bar increase, mostly from coarse gravel.	8	Moderate depostion of new gravel and coarse sand on old and some new bars.	12	Extensive deposit of predominantly fine particles. Accelerated bar development.	16	
Bottom	10	Rock angularity	Sharp edges and corners. Plane surfaces rough.	1	Rounded corners and edges. Surfaces smooth and flat.	2	Corners and edges well-rounded in two dimensions.	3	Well-rounded in all dimensions, surfaces smooth.	4	
Bottom	11	Brightness	Surfaces dull, dark, or stained. Generally not bright.	1	Mostly dull, but may have <35% bright surfaces.	2	Mixture dull and bright, i.e., 35–65% mixture range.	3	Predominantly bright, > 65%, exposed or scoured surfaces.	4	
Bottom	12	Consolidation of particles	Assorted sizes tightly packed or overlapping.	2	Moderately packed with some overlapping.	4	Mostly loose assortment with no apparent overlap.	6	No packing evident. Loose assortment, easily moved.	8	
Bottom	13	Bottom size distribution	No size change evident. Stable material 80–100%.	4	Distribution shift light. Stable material 50–80%.	8	Moderate change in sizes. Stable materials 20–50%.	12	Marked distribution change. Stable materials 0–20%.	16	
Bottom	14	Scouring and deposition	<5% of bottom affected by scour or deposition.	6	5–30% affected. Scour at constrictions and where grades steepen. Some deposition in pools.	12	30–50% affected. Deposits and scour at obstructions, constrictions, and bends. Some filling of pools.	18	More than 50% of the bottom in a state of flux or change nearly yearlong.	24	
Bottom	15	Aquatic vegetation	Abundant growth moss-like, dark green perennial. In swift water too.	1	Common. Algae forms in low velocity and pool areas. Moss here too.	2	Present but spotty, mostly in backwater. Seasonal algae growth makes rocks slick.	3	Perennial types scarce or absent. Yellow-green, short-term bloom may be present.	4	
			Excellent Total =		**Good Total =**		**Fair Total =**		**Poor Total =**		

Stream type	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	D3	D4	D5	D6
Good (Stable)	38-43	38-43	54-90	60-95	60-95	50-80	38-45	38-45	40-60	40-64	48-68	40-60	38-50	38-50	60-85	70-90	70-90	60-85	85-107	85-107	85-107	67-98
Fair (Mod. unstable)	44-47	44-47	91-129	96-132	96-142	81-110	46-58	46-58	61-78	65-84	69-88	61-78	51-61	51-61	86-105	91-110	91-110	86-105	108-132	108-132	108-132	99-125
Poor (Unstable)	48+	48+	130+	133+	143+	111+	59+	59+	79+	85+	89+	79+	62+	62+	106+	111+	111+	106+	133+	133+	133+	126+

Stream type	DA3	DA4	DA5	DA6	E3	E4	E5	E6	F1	F2	F3	F4	F5	F6	G1	G2	G3	G4	G5	G6
Good (Stable)	40-63	40-63	40-63	40-63	40-63	50-75	50-75	40-63	60-85	60-85	85-110	85-110	90-115	80-95	40-60	40-60	85-107	85-107	90-112	85-107
Fair (Mod. unstable)	64-86	64-86	64-86	64-86	64-86	76-96	76-96	64-86	86-105	86-105	111-125	111-125	116-130	96-110	61-78	61-78	108-120	108-120	113-125	108-120
Poor (Unstable)	87+	87+	87+	87+	87+	97+	97+	87+	106+	106+	126+	126+	131+	111+	79+	79+	121+	121+	126+	121+

Grand Total =	~~0~~ 54
Existing Stream Type =	
*Potential Stream Type =	
Modified channel stability rating =	

*Rating is adjusted to *potential* stream type, not existing stream type

Kleinschmidt

Pfankuch Channel Rating

Stream: Bishop Creek, CA **Site ID:** 6 **Stream Type:** B1 **Observers:** TAK/GSM **Date:** 9-9-19

Loca-tion	Key	Category	Excellent Description	Rating	Good Description	Rating	Fair Description	Rating	Poor Description	Rating	Assigned Rating
Upper banks	1	Landform slope	Bank slope gradient <30%.	2	Bank slope gradient 30–40%.	4	Bank slope gradient 40–60%.	6	Bank slope gradient > 60%.	8	4
	2	Mass erosion	No evidence of past or future mass erosion.	3	Infrequent. Mostly healed over. Low future potential.	6	Frequent or large, causing sediment nearly yearlong.	9	Frequent or large, causing sediment nearly yearlong OR imminent danger of same.	12	
	3	Debris jam potential	Essentially absent from immediate channel area.	2	Present, but mostly small twigs and limbs.	4	Moderate to heavy amounts, mostly larger sizes.	6	Moderate to heavy amounts, predominantly larger sizes.	8	
	4	Vegetative bank protection	> 90% plant density. Vigor and variety suggest a deep, dense, soil-binding root mass.	3	70–90% density. Fewer species or less vigor suggest less dense or deep root mass.	6	50–70% density. Lower vigor and fewer species from a shallow, discontinuous root mass.	9	<50% density plus fewer species and less vigor indicating poor, discontinuous, and shallow root mass.	12	
Lower banks	5	Channel capacity	Bank heights sufficient to contain the bankfull stage. Width/depth ratio departure from reference width/depth ratio = 1.0. Bank-Height Ratio (BHR) = 1.0.	1	Bankfull stage is contained within banks. Width/depth ratio departure from reference width/depth ratio = 1.0–1.2. Bank-Height Ratio (BHR) = 1.0–1.1.	2	Bankfull stage is not contained. Width/depth ratio departure from reference width/depth ratio = 1.2–1.4. Bank-Height Ratio (BHR) = 1.1–1.3.	3	Bankfull stage is not contained; over-bank flows are common with flows less than bankfull. Width/depth ratio departure from reference width/depth ratio > 1.4. Bank-Height Ratio (BHR) > 1.3.	4	
	6	Bank rock content	> 65% with large angular boulders. 12"+ common.	2	40–65%. Mostly boulders and small cobbles 6–12".	4	20–40%. Most in the 3–6" diameter class.	6	<20% rock fragments of gravel sizes, 1–3" or less.	8	
	7	Obstructions to flow	Rocks and logs firmly imbedded. Flow pattern w/o cutting or deposition. Stable bed.	2	Some present causing erosive cross currents and minor pool filling. Obstructions fewer and less firm.	4	Moderately frequent, unstable obstructions move with high flows causing bank cutting and pool filling.	6	Frequent obstructions and deflectors cause bank erosion yearlong. Sediment traps full, channel migration occurring.	8	
	8	Cutting	Little or none. Infrequent raw banks <6".	4	Some, intermittently at outcurves and constrictions. Raw banks may be up to 12".	6	Significant. Cuts 12–24" high. Root mat overhangs and sloughing evident.	12	Almost continuous cuts, some over 24" high. Failure of overhangs frequent.	16	
	9	Deposition	Little or no enlargement of channel or point bars.	4	Some new bar increase, mostly from coarse gravel.	8	Moderate depostion of new gravel and coarse sand on old and some new bars.	12	Extensive deposit of predominantly fine particles. Accelerated bar development.	16	
Bottom	10	Rock angularity	Sharp edges and corners. Plane surfaces rough.	1	Rounded corners and edges. Surfaces smooth and flat.	2	Corners and edges well-rounded in two dimensions.	3	Well-rounded in all dimensions, surfaces smooth.	4	
	11	Brightness	Surfaces dull, dark, or stained. Generally not bright.	1	Mostly dull, but may have <35% bright surfaces.	2	Mixture dull and bright, i.e., 35–65% mixture range.	3	Predominantly bright, > 65%, exposed or scoured surfaces.	4	
	12	Consolidation of particles	Assorted sizes tightly packed or overlapping.	2	Moderately packed with some overlapping.	4	Mostly loose assortment with no apparent overlap.	6	No packing evident. Loose assortment, easily moved.	8	
	13	Bottom size distribution	No size change evident. Stable material 80–100%.	4	Distribution shift light. Stable material 50–80%.	8	Moderate change in sizes. Stable materials 20–50%.	12	Marked distribution change. Stable materials 0–20%.	16	
	14	Scouring and deposition	<5% of bottom affected by scour or deposition.	6	5–30% affected. Scour at constrictions and where grades steepen. Some deposition in pools.	~~12~~	30–50% affected. Deposits and scour at obstructions, constrictions, and bends. Some filling of pools.	18	More than 50% of the bottom in a state of flux or change nearly yearlong.	24	
	15	Aquatic vegetation	Abundant growth moss-like, dark green perennial. In swift water too.	1	Common. Algae forms in low velocity and pool areas. Moss here too.	2	Present but spotty, mostly in backwater. Seasonal algae growth makes rocks slick.	3	Perennial types scarce or absent. Yellow-green, short-term bloom may be present.	4	
			Excellent Total =		Good Total =		Fair Total =		Poor Total =		

Stream type	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	D3	D4	D5	D6
Good (Stable)	38-43	38-43	54-90	60-95	60-95	50-80	38-45	38-45	40-60	40-64	48-68	40-60	38-50	38-50	60-85	70-90	70-90	60-85	85-107	85-107	85-107	67-98
Fair (Mod. unstable)	44-47	44-47	91-129	96-132	96-142	81-110	46-58	46-58	61-78	65-84	69-88	61-78	51-61	51-61	86-105	91-110	91-110	86-105	108-132	108-132	108-132	99-125
Poor (Unstable)	48+	48+	130+	133+	143+	111+	59+	59+	79+	85+	89+	79+	62+	62+	106+	111+	111+	106+	133+	133+	133+	126+

Stream type	DA3	DA4	DA5	DA6	E3	E4	E5	E6	F1	F2	F3	F4	F5	F6	G1	G2	G3	G4	G5	G6
Good (Stable)	40-63	40-63	40-63	40-63	40-63	50-75	50-75	40-63	60-85	60-85	85-110	85-110	90-115	80-95	40-60	40-60	85-107	85-107	90-112	85-107
Fair (Mod. unstable)	64-86	64-86	64-86	64-86	64-86	76-96	76-96	64-86	86-105	86-105	111-125	111-125	116-130	96-110	61-78	61-78	108-120	108-120	113-125	108-120
Poor (Unstable)	87+	87+	87+	87+	87+	97+	97+	87+	106+	106+	126+	126+	131+	111+	79+	79+	121+	121+	126+	121+

Grand Total =	~~0~~ 64
Existing Stream Type =	
*Potential Stream Type =	
Modified channel stability rating =	

*Rating is adjusted to *potential* stream type, not existing stream type

Kleinschmidt

Pfankuch Channel Rating

Stream: Bishop Creek, CA **Site ID:** **Stream Type:** **Observers:** **Date:**

Location	Key	Category	Excellent Description	Rating	Good Description	Rating	Fair Description	Rating	Poor Description	Rating	Assigned Rating
Upper banks	1	Landform slope	Bank slope gradient <30%.	2	Bank slope gradient 30–40%.	4	Bank slope gradient 40–60%.	6	Bank slope gradient > 60%.	8	
	2	Mass erosion	No evidence of past or future mass erosion.	3	Infrequent. Mostly healed over. Low future potential.	6	Frequent or large, causing sediment nearly yearlong.	9	Frequent or large, causing sediment nearly yearlong OR imminent danger of same.	12	
	3	Debris jam potential	Essentially absent from immediate channel area.	2	Present, but mostly small twigs and limbs.	4	Moderate to heavy amounts, mostly larger sizes.	6	Moderate to heavy amounts, predominantly larger sizes.	8	
	4	Vegetative bank protection	> 90% plant density. Vigor and variety suggest a deep, dense, soil-binding root mass.	3	70–90% density. Fewer species or less vigor suggest less dense or deep root mass.	6	50–70% density. Lower vigor and fewer species from a shallow, discontinuous root mass.	9	<50% density plus fewer species and less vigor indicating poor, discontinuous, and shallow root mass.	12	
Lower banks	5	Channel capacity	Bank heights sufficient to contain the bankfull stage. Width/depth ratio departure from reference width/depth ratio = 1.0. Bank-Height Ratio (BHR) = 1.0.	1	Bankfull stage is contained within banks. Width/depth ratio departure from reference width/depth ratio = 1.0–1.2. Bank-Height Ratio (BHR) = 1.0–1.1.	2	Bankfull stage is not contained. Width/depth ratio departure from reference width/depth ratio = 1.2–1.4. Bank-Height Ratio (BHR) = 1.1–1.3.	3	Bankfull stage is not contained; over-bank flows are common with flows less than bankfull. Width/depth ratio departure from reference width/depth ratio > 1.4. Bank-Height Ratio (BHR) > 1.3.	4	
	6	Bank rock content	> 65% with large angular boulders. 12"+ common.	2	40–65%. Mostly boulders and small cobbles 6–12".	4	20–40%. Most in the 3–6" diameter class.	6	<20% rock fragments of gravel sizes, 1–3" or less.	8	
	7	Obstructions to flow	Rocks and logs firmly imbedded. Flow pattern w/o cutting or deposition. Stable bed.	2	Some present causing erosive cross currents and minor pool filling. Obstructions fewer and less firm.	4	Moderately frequent, unstable obstructions move with high flows causing bank cutting and pool filling.	6	Frequent obstructions and deflectors cause bank erosion yearlong. Sediment traps full, channel migration occurring.	8	
	8	Cutting	Little or none. Infrequent raw banks <6".	4	Some, intermittently at outcurves and constrictions. Raw banks may be up to 12".	6	Significant. Cuts 12–24" high. Root mat overhangs and sloughing evident.	12	Almost continuous cuts, some over 24" high. Failure of overhangs frequent.	16	
	9	Deposition	Little or no enlargement of channel or point bars.	4	Some new bar increase, mostly from coarse gravel.	8	Moderate depostion of new gravel and coarse sand on old and some new bars.	12	Extensive deposit of predominantly fine particles. Accelerated bar development.	16	
Bottom	10	Rock angularity	Sharp edges and corners. Plane surfaces rough.	1	Rounded corners and edges. Surfaces smooth and flat.	2	Corners and edges well-rounded in two dimensions.	3	Well-rounded in all dimensions, surfaces smooth.	4	
	11	Brightness	Surfaces dull, dark, or stained. Generally not bright.	1	Mostly dull, but may have <35% bright surfaces.	2	Mixture dull and bright, i.e., 35–65% mixture range.	3	Predominantly bright, > 65%, exposed or scoured surfaces.	4	
	12	Consolidation of particles	Assorted sizes tightly packed or overlapping.	2	Moderately packed with some overlapping.	4	Mostly loose assortment with no apparent overlap.	6	No packing evident. Loose assortment, easily moved.	8	
	13	Bottom size distribution	No size change evident. Stable material 80–100%.	4	Distribution shift light. Stable material 50–80%.	8	Moderate change in sizes. Stable materials 20–50%.	12	Marked distribution change. Stable materials 0–20%.	16	
	14	Scouring and deposition	<5% of bottom affected by scour or deposition.	6	5–30% affected. Scour at constrictions and where grades steepen. Some deposition in pools.	12	30–50% affected. Deposits and scour at obstructions, constrictions, and bends. Some filling of pools.	18	More than 50% of the bottom in a state of flux or change nearly yearlong.	24	
	15	Aquatic vegetation	Abundant growth moss-like, dark green perennial. In swift water too.	1	Common. Algae forms in low velocity and pool areas. Moss here too.	2	Present but spotty, mostly in backwater. Seasonal algae growth makes rocks slick.	3	Perennial types scarce or absent. Yellow-green, short-term bloom may be present.	4	
			Excellent Total =		Good Total =		Fair Total =		Poor Total =		

Stream type	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	D3	D4	D5	D6
Good (Stable)	38-43	38-43	54-90	60-95	60-95	50-80	38-45	38-45	40-60	40-64	48-68	40-60	38-50	38-50	60-85	70-90	70-90	60-85	85-107	85-107	85-107	67-98
Fair (Mod. unstable)	44-47	44-47	91-129	96-132	96-142	81-110	46-58	46-58	61-78	65-84	69-88	61-78	51-61	51-61	86-105	91-110	91-110	86-105	108-132	108-132	108-132	99-125
Poor (Unstable)	48+	48+	130+	133+	143+	111+	59+	59+	79+	85+	89+	79+	62+	62+	106+	111+	111+	106+	133+	133+	133+	126+

Stream type	DA3	DA4	DA5	DA6	E3	E4	E5	E6	F1	F2	F3	F4	F5	F6	G1	G2	G3	G4	G5	G6
Good (Stable)	40-63	40-63	40-63	40-63	40-63	50-75	50-75	40-63	60-85	60-85	85-110	85-110	90-115	80-95	40-60	40-60	85-107	85-107	90-112	85-107
Fair (Mod. unstable)	64-86	64-86	64-86	64-86	64-86	76-96	76-96	64-86	86-105	86-105	111-125	111-125	116-130	96-110	61-78	61-78	108-120	108-120	113-125	108-120
Poor (Unstable)	87+	87+	87+	87+	87+	97+	97+	87+	106+	106+	126+	126+	131+	111+	79+	79+	121+	121+	126+	121+

Grand Total =	~~0~~ 52
Existing Stream Type =	
*Potential Stream Type =	
Modified channel stability rating =	

*Rating is adjusted to *potential* stream type, not existing stream type