Water Quality Monitoring Report

Sacramento Municipal Utility District

Hydro License Implementation • June 2017

Upper American River Project

FERC Project No. 2101

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Acronyms and Abbreviations

Acronym	Definition
ATL	Advisory Tissue Level
CDFW	California Department of Fish and Wildlife
cm	centimeter
ºC	degrees Celsius
FERC	Federal Energy Regulatory Commission
m	meter
MDL	Method Detection Limit
mg/L	milligram per liter
mL	milliliter
mm	millimeter
MPN	Most Probable Number
MPSL	Marine Pollution Studies Laboratories, at CDFW Moss Landing Marine Laboratories
MRL	Method Reporting Limit
NTU	Nephelometric Turbidity Unit
OEHHA	Office of Environmental Health Hazard Assessment
SFAR	South Fork American River
SMUD	Sacramento Municipal Utility District
s.u.	standard unit of pH
SWAMP	Surface Water Ambient Monitoring Program
SWRCB	State Water Resources Control Board
UARP	Upper American River Project
ug/g wet weight	micrograms per gram wet weight
uS	microsiemens = 10^{-6} siemens, a unit of electrical conductance
USFS	U.S. Forest Service

1.0 INTRODUCTION AND BACKGROUND

This Water Quality Monitoring Report (Report) addresses monitoring requirements set forth in Sacramento Municipal Utility District's (SMUD) Water Quality Monitoring Plan (SMUD 2016a). The requirements for this Plan are found in State Water Resources Control Board (SWRCB) Condition 8.A, and U.S. Forest Service (USFS) 4(e) Condition 31.1, located in Appendices A and B, respectively, of the Federal Energy Regulatory Commission's (FERC) Order Issuing New License for the Upper American River Project (UARP), dated July 23, 2014. The Plan was developed by SMUD (2015) in coordination with the Consultation Group and Resource Agencies stipulated in the license (FERC 2014). The plan was revised in 2015 (Revision 1) and again in 2016 (Revision 2) to update the referenced analytical methods for various sub-programs within the plan. At the completion of the first five years of monitoring, SMUD will consult with the SWRCB, Regional Water Quality Control Board (RWQCB), California Department of Fish and Wildlife (CDFW), USFS, and U.S. Bureau of Land Management (BLM) to determine if the results warrant further modifications to the Water Quality Monitoring Plan (SMUD 2016a).

This report describes the results of the second year (2016) of water quality monitoring of basic *in situ* parameters and bacteria, as well as one year of metals bioaccumulation monitoring, for the UARP. Year 1 (2015) monitoring results for basic *in situ* parameters and bacteria are presented in SMUD (2016b).

SMUD owns and operates the Upper American River Project (UARP) which is licensed by the Federal Energy Regulatory Commission (FERC). The UARP (FERC Project No. 2101) lies within El Dorado and Sacramento counties, primarily within lands of the Eldorado National Forest. The UARP consists of three major storage reservoirs: Loon Lake, Union Valley, and Ice House (with a combined capacity of approximately 379,000 acre-feet), eight smaller regulating or diversion reservoirs, and eight powerhouses. The UARP also includes recreation facilities containing over 700 campsites, five boat ramps, hiking paths, and bicycle trails at the reservoirs.

2.0 MONITORING OBJECTIVE

The objective of the 2016 monitoring program was to perform *in situ* water quality and bacteria monitoring in reservoirs and stream reaches of the UARP, in order to meet the objectives and rationale of the SWRCB Water Quality Certification Condition 8.J. Additionally, fish tissues were sampled in 2016 to assess potential bioaccumulation of metals in resident fish within specific UARP reservoirs.

The rationale for water quality monitoring, as described by the SWRCB Water Quality Certification, is as follows:

Water quality monitoring is important for determining compliance with state and federal water quality standards and examining long-term trends in water quality. The frequency of monitoring for any compound can be reduced if shown to be at background or non-detect levels for a statistically significant period of time. Fish sampling for the analysis of metal bioaccumulation allows for an evaluation of health risks to humans and wildlife and creates a long-term data set to detect trends in bioaccumulation through the license term.

3.0 STUDY AREA

The study area included UARP reservoirs and diverted stream reaches. All UARP reservoirs (Rubicon, Buck Island, Loon Lake, Gerle Creek, Ice House, Union Valley, Junction, Camino, Brush Creek, and Slab Creek) were included in the monitoring program except for the relatively small Robbs Peak Forebay (30 acre-feet). [Note: Rockbound Lake, although associated with the UARP, is not included within the FERC-defined UARP boundary.] The diverted stream reaches included in the monitoring program represented all streams and rivers downstream of UARP reservoirs (Figure 3-1).

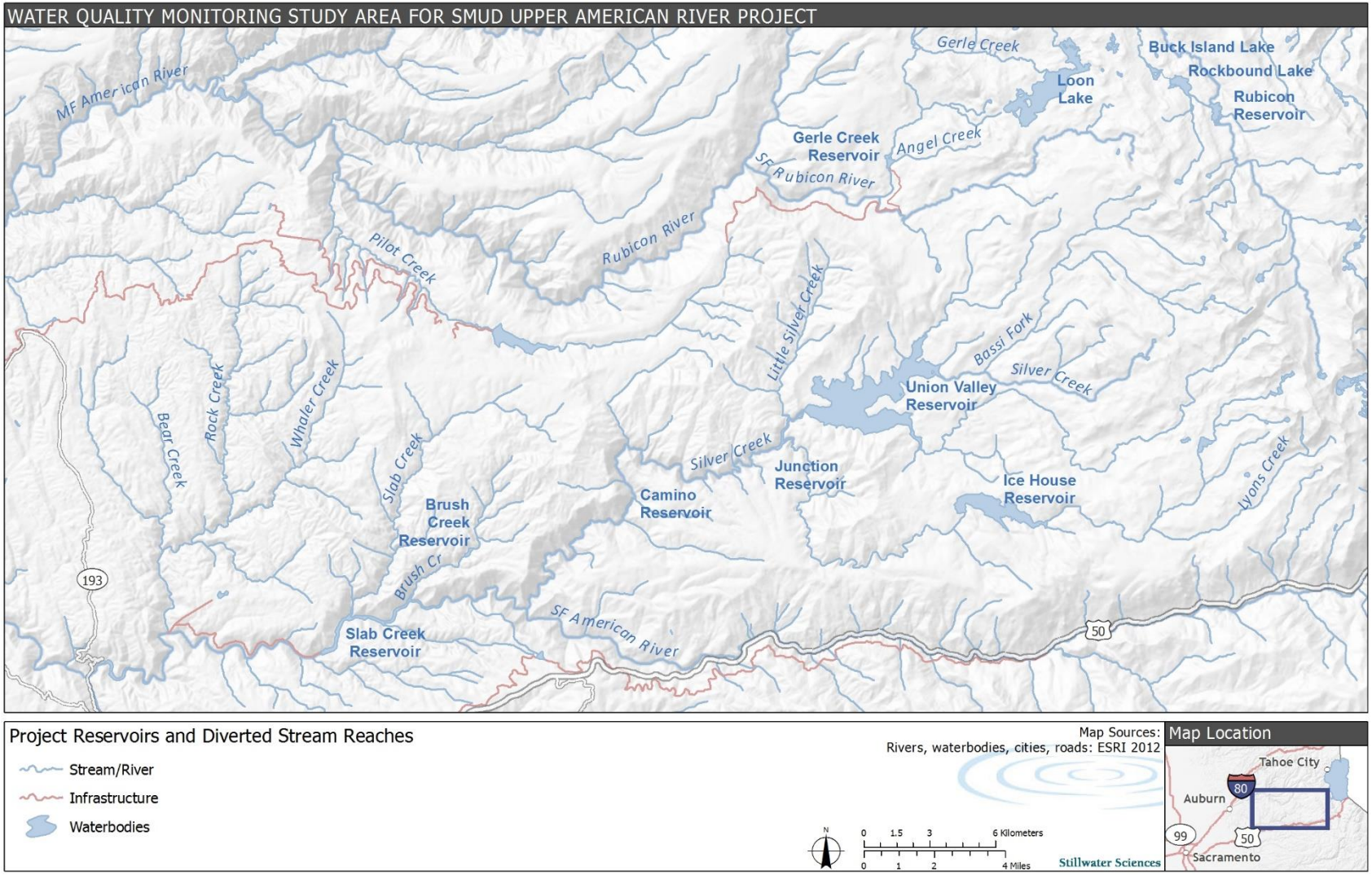

Figure 3-1. Study area for SMUD Upper American River Project *in situ*, bacteria, and metals bioaccumulation monitoring.

4.0 SAMPLING FREQUENCY AND LOCATIONS

Year 2 (2016) sampling frequency for *in situ* water quality was consistent with winter, spring, summer, and fall monitoring periods designated in the Water Quality Monitoring Plan (SMUD 2016a) (Table 4-1). Required bacteria monitoring was conducted by sampling the middle elevation UARP reservoir (Gerle Creek, Union Valley, Junction, Ice House, Brush Creek, Slab Creek) sites during the 30-day period surrounding 4th of July and sampling the upper elevation UARP reservoir (Loon Lake, Buck Island) sites during the 30-day period surrounding Labor Day. Fish tissue sampling for metals bioaccumulation was conducted one time during August/September at UARP reservoirs identified in the Water Quality Monitoring Plan (Table 4-1).

Table 4-1. Sampling Frequency for *in situ* Water Quality, Bacteria, and Metals Bioaccumulation.

Type	2016 (Year 2) Frequency
In situ reservoir	Once in spring – April or May Once in fall – October or November
In situ riverine	Once in winter – February Once in spring - May Once in summer – August Once in fall – November
Bacteria	Five samples within 30 days – around 4th of July Five samples within 30 days – around Labor Day
Metals bioaccumulation	Once in August/September

Specific sampling locations within reservoirs and diverted stream reaches varied depending on the general constituent under study. As specified in the Water Quality Monitoring Plan, *in situ* monitoring occurred at 15 representative reservoir locations (Figures 4-1 and 4-2, Table 4-2) and 19 representative stream reaches (Figures 4-1 and 4-2, Table 4-3), and bacteria sampling occurred at 15 locations (Figures 4-1 and 4-2, Table 4-4). Fish tissue sampling for metals bioaccumulation occurred in 6 reservoirs (Figures 4-1 and 4-2, Table 4-5), consistent with the Water Quality Monitoring Plan (Revision 2) (SMUD 2016a). Individual sampling locations within each reservoir are identified in Appendix G.

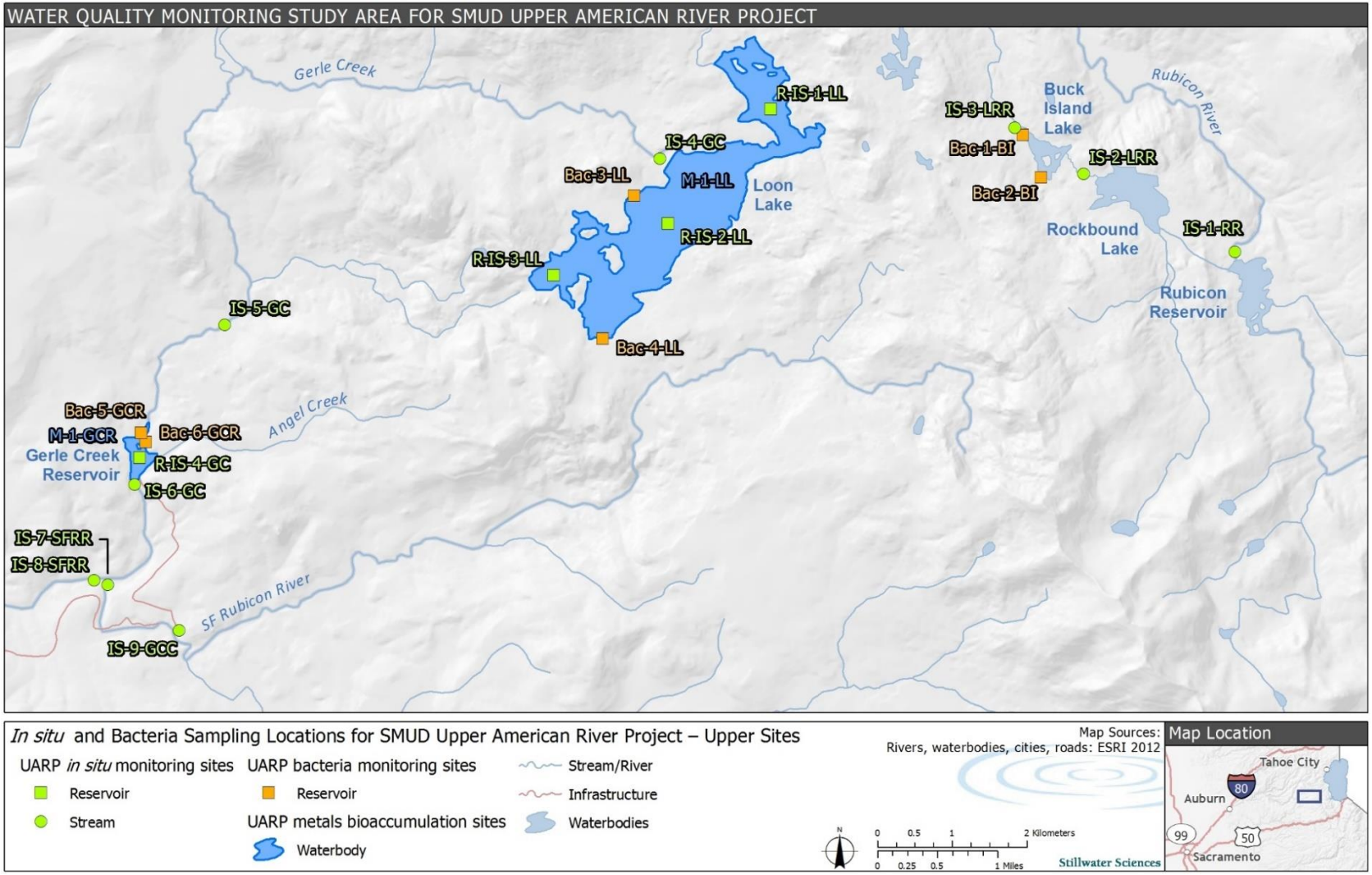

Figure 4-1. *In situ* water quality, bacteria, and metals bioaccumulation sampling locations for SMUD Upper American River Project – upper sites.

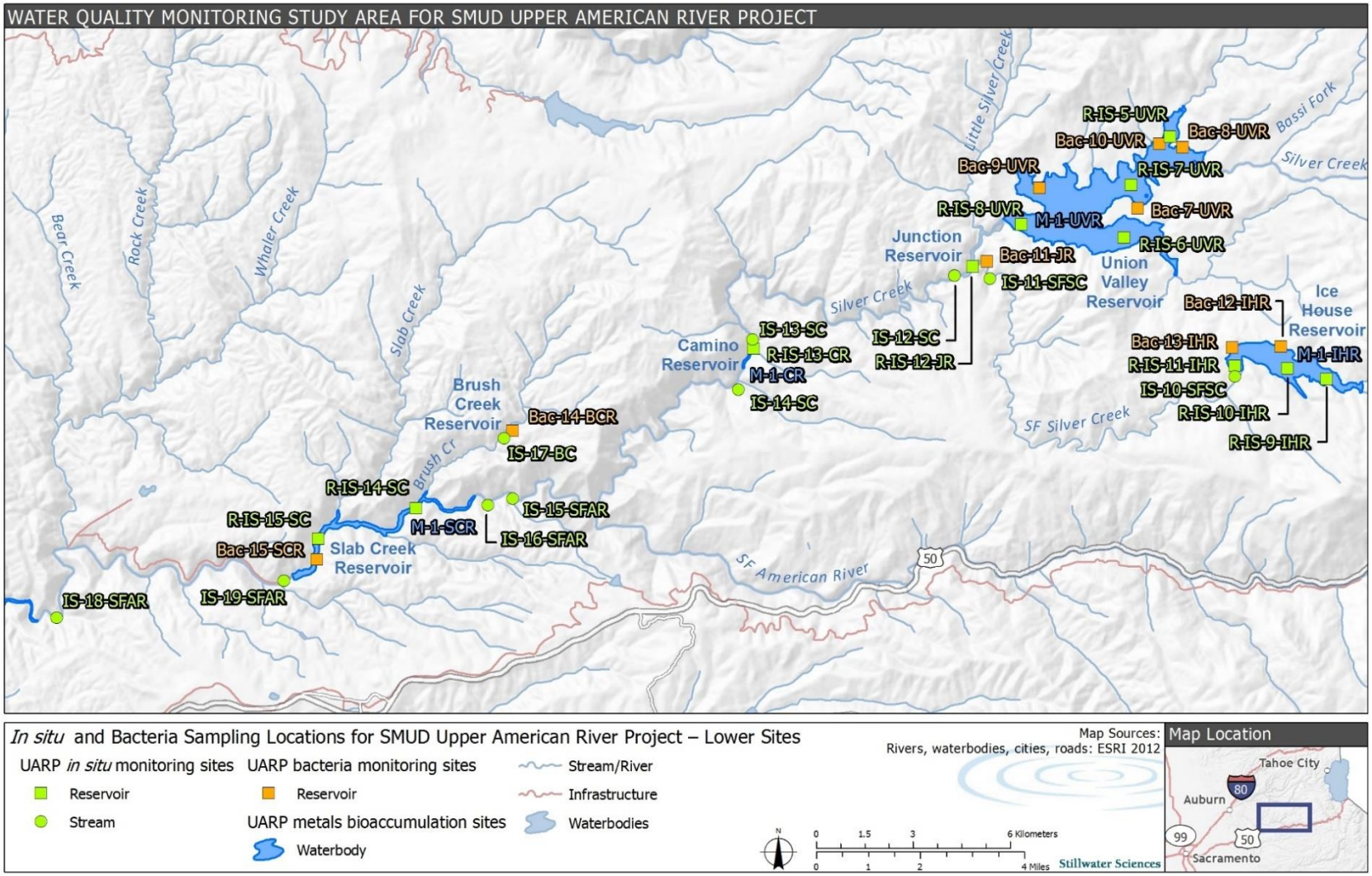

Figure 4-2. *In situ* water quality, bacteria, and metals bioaccumulation sampling locations for SMUD Upper American River Project – lower sites.

Table 4-2. *In situ* Water Quality Sampling Locations and Dates for SMUD Upper American River Project Reservoir Sites.

SMUD Site Name	Site ID	Location	2016 Sample Date[1]
R-4C	R-IS-1-LL	Loon Lake, upper reservoir (northeast body)	10/26
R-4B	R-IS-2-LL	Loon Lake, mid-reservoir (west body)	10/26
R-4A	R-IS-3-LL	Loon Lake, near dam	10/16
R-5	R-IS-4-GC	Gerle Creek Reservoir, mid-lake	5/17
R-6C	R-IS-5-UVR	Union Valley Reservoir, Robbs PH tailrace zone	4/26, 10/25
R-6D	R-IS-6-UVR	Union Valley Reservoir, Jones Fork Silver Creek arm	4/26, 10/25
R-6B	R-IS-7-UVR	Union Valley Reservoir, mid-reservoir	4/26, 10/25
R-6A	R-IS-8-UVR	Union Valley Reservoir, near dam	4/26, 10/25
R-7C	R-IS-9-IHR	Ice House Reservoir, upper lake body	4/25, 10/27
R-7B	R-IS-10-IHR	Ice House Reservoir, mid-reservoir	4/25, 10/27
R-7A	R-IS-11-IHR	Ice House Reservoir, near dam	4/25, 10/27
R-8	R-IS-12-JR	Junction Reservoir, mid-reservoir between arms	4/25, 10/27
R-9	R-IS-13-CR	Camino Reservoir, mid-reservoir	4/28, 10/24
R-11B	R-IS-14-SC	Slab Creek Reservoir, upper-reservoir	4/27, 10/24
R-11A	R-IS-15-SC	Slab Creek Reservoir, mid-reservoir	4/27, 10/24

[1] Loon Lake was under ice cover in April and was not sampled. Gerle Creek Reservoir was not sampled in October because the reservoir was spilling and it was not safe to launch a boat near the dam.

Table 4-3. *In situ* Water Quality Sampling Locations and Dates for SMUD Upper American River Project Riverine Sites.

SMUD Site Name	Site ID	Location	2016 Sample Dates[1]
2	IS-1-RR	Rubicon River outflow from Rubicon Reservoir	8/23, 11/7
5	IS-2-LRR	Little Rubicon River outflow from Rockbound Lake	8/23, 11/8
6	IS-3-LRR	Little Rubicon outflow from Buck Island Lake	8/23, 11/8
7	IS-4-GC	Gerle Creek outflow from Loon Lake	8/23, 5/17, 11/7
14	IS-5-GC	Gerle Creek inflow to Gerle Creek Reservoir	5/1, 8/23, 11/7
15	IS-6-GC	Gerle Creek outflow from Gerle Creek Reservoir	2/9, 5/1, 8/23
18	IS-7-SFRR	S.F. Rubicon upstream of Gerle Creek confluence	5/1, 8/23, 11/7
19	IS-8-SFRR	S.F. Rubicon downstream of Gerle Creek confluence	5/1, 8/23,11/7
16	IS-9-GCC	Gerle Creek Canal inflow to Robbs Forebay	2/9 5/1, 8/23, 11/7
25	IS-10-SFSC	S.F. Silver Creek outflow from Ice House	2/8, 5/2, 8/25, 11/9
27	IS-11-SFSC	S.F. Silver Creek inflow to Junction Reservoir	2/8, 5/2, 8/26, 11/9
29	IS-12-SC	Silver Creek outflow from Junction Reservoir	2/8, 5/2, 8/26, 11/9
32	IS-13-SC	Silver Creek inflow to Camino Reservoir	2/8, 5/2, 8/26, 11/9
34	IS-14-SC	Silver Creek outflow from Camino Reservoir	2/8, 5/2, 8/26, 11/9
38	IS-15-SFAR	SFAR upstream of Camino Powerhouse	2/8, 5/3, 8/26, 11/10
41	IS-16-SFAR	SFAR downstream of Camino Powerhouse	2/8, 5/3,8/26, 11/10
40	IS-17-BC	Brush Creek outflow from Brush Creek Reservoir	2/8, 5/3, 8/26, 11/10
60	IS-18-SFAR	SFAR upstream of White Rock Powerhouse	2/9, 5/3, 8/24, 11/10
43	IS-19-SFAR	SFAR downstream of Slab Creek Reservoir	2/8, 5/3, 8/24, 11/10

[1] Sites IS-1-RR, IS-2-LRR, IS-3-LRR, IS-4-GC, IS-5-GC, IS-7-SFRR and IS-8-SFRR were inaccessible during the February sampling event due to snow accumulation. Sites IS-1-RR, IS-2-LRR, IS-3-LRR were inaccessible during the May sampling event due to snow accumulation Site IS-6-GC was unsafe to access during the November event

because it is located immediately downstream of Gerle Creek Reservoir, which was spilling during the sampling event.

Table 4-4. Bacteria Sampling Locations and Dates for SMUD Upper American River Project Riverine Sites.

Reservoir	SMUD Site Name	Site ID	Location	2016 Sample Dates
Buck Island Reservoir (beach locations)	R-3B	Bac-1-BI	On Northshore, near dam and Off-Highway Vehicle camping	8/23, 8/30, 9/6, 9/13, 9/20
	77	Bac-2-BI	On south shore, near Rubicon Hiking Trail	8/23, 8/30, 9/6, 9/13, 9/20
Loon Lake Reservoir (beach locations)	64	Bac-3-LL	West of main dam, near Red Fir Campground	8/23, 8/30, 9/6, 9/13, 9/20
	65	Bac-4-LL	West of Loon Lake Campground, near boat launch	8/23, 8/30, 9/6, 9/13, 9/20
Gerle Creek Reservoir (beach locations)	66	Bac-5-GCR	Near Gerle Creek Campground	6/21, 6/28, 7/6, 7/12, 7/19
	67	Bac-6-GCR	Near Angel Creek picnic area	6/21, 6/28, 7/6, 7/12, 7/19
Union Valley Reservoir (swim areas)	R-6H	Bac-7-UVR	At Fashoda Beach	6/21, 6/28, 7/6, 7/12, 7/19
	R-6E	Bac-8-UVR	Near Wench Creek Campground	6/21, 6/28, 7/6, 7/12, 7/19
	FC-2	Bac-9-UVR	Near Camino Cove Campground	6/21, 6/28, 7/6, 7/12, 7/19
	R-6F	Bac-10-UVR	Near Yellowjacket Campground	6/21, 6/28, 7/6, 7/12, 7/19
Other UARP Locations	R-8B	Bac-11-JR	Junction Reservoir, near boat launch	6/21, 6/28, 7/6, 7/12, 7/19
Ice House Reservoir (beach locations)	68	Bac-12-IHR	Northshore near private campground access	6/20, 6/27, 7/5, 7/11, 7/18
	69	Bac-13-IHR	East of boat launch and picnic area	6/20, 6/27, 7/5, 7/11, 7/18
Other UARP locations	R-10B	Bac-14-BCR	Brush Creek Reservoir, near boat launch	6/20, 6/27, 7/5, 7/11, 7/18
	R-11C	Bac-15-SCR	Slab Creek Reservoir, near boat launch	6/20, 6/27, 7/5, 7/11, 7/18

Table 4-5. Metals Bioaccumulation Sampling Locations and Dates for SMUD Upper American River Project Reservoir Sites.

Reservoir	SMUD Site Name	Site ID	Locations[1]	2016 Sample Dates
Loon Lake Reservoir	80	M-1-LL	Various	8/30
Gerle Creek Reservoir	81	M-1-GCR	Various	8/31
Union Valley Reservoir[2]	82	M-1-UVR	Various	8/30, 9/1
Ice House Reservoir	83	M-1-IHR	Various	8/29
Camino Reservoir	84	M-1-CR	Various	8/30
Slab Creek Reservoir	85	M-1-SCR	Various	8/31

[1] Electrofishing and gill-net placement locations are described in Appendix G.
[2] Union Valley Reservoir was divided into two separate locations and sampled on multiple days (see Appendix G).

5.0 METHODS

5.1 *IN SITU* PARAMETERS

Reservoir *in situ* water quality monitoring was conducted by watercraft to access mid-reservoir areas (Figure 5-1). A multi-probe Sonde (Yellow Springs Instruments [YSI] 6920) was deployed from the boat for measurement of *in situ* parameters, including water temperature, conductivity, dissolved oxygen, pH, and turbidity (Table 5-1).

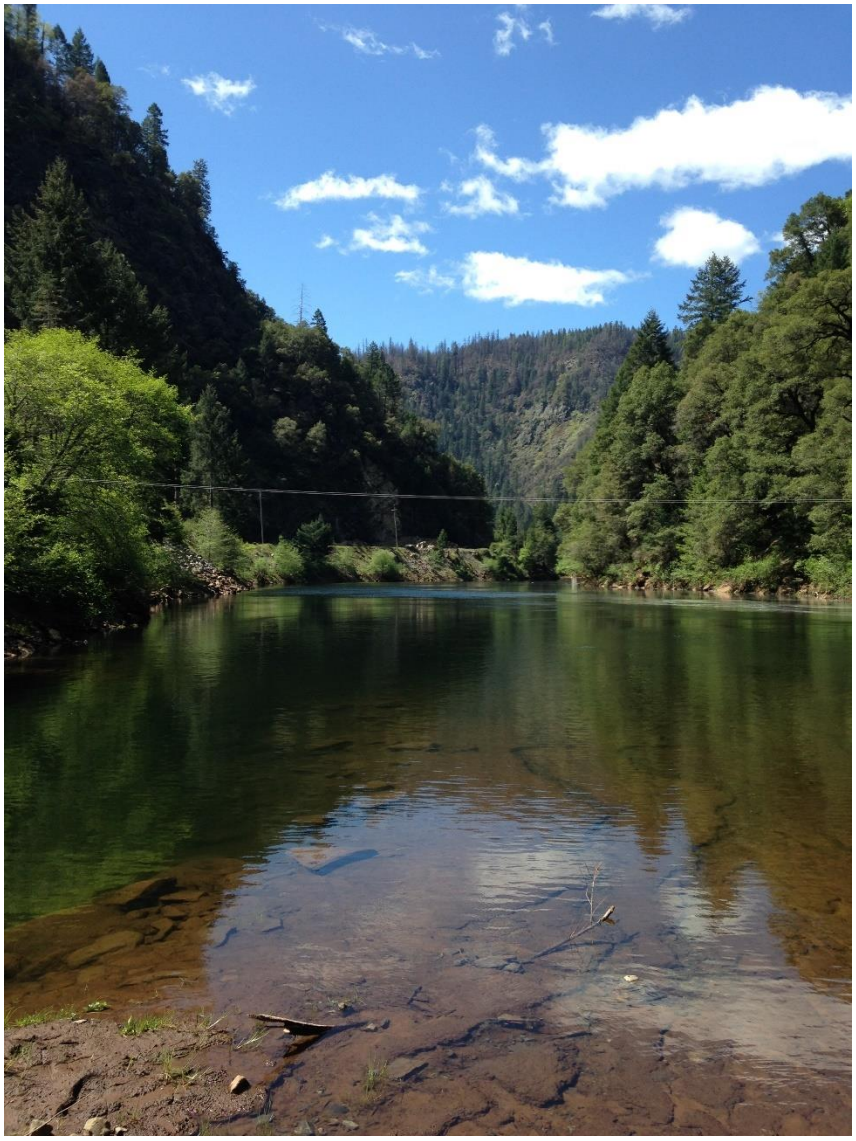

Figure 5-1. Example of mid-reservoir *in situ* water quality sampling site (R-IS-13-CR) at Camino Reservoir.

At each reservoir site, a vertical water column profile was collected for all *in situ* water quality parameters, at one-meter depth intervals. For bottom water samples, the Sonde was drawn back 0.5 meter (m) from the sediment layer before taking a reading. Prior to taking each reading, the Sonde was allowed to stabilize (typically requiring no more than 90 seconds). Water transparency was measured at reservoir stations with a standard Secchi disk.

At riverine sites, Sonde readings were obtained where sufficient stream turbulence provided good lateral and vertical mixing of the water, and as near as possible to the stream thalweg (Figure 5-2). Prior to taking each reading, the Sonde was allowed to stabilize (typically requiring no more than 90 seconds) such that there was little variability in parameter readings at each location.

Figure 5-2. Example of an *in situ* water quality sampling site (IS-14-SC) at Silver Creek outflow from Camino Reservoir.

For both reservoir and riverine *in situ* monitoring, Sonde calibration was conducted on-site prior to the start of each sampling day using standard solutions and recorded on calibration logs (Appendix E). Other data gathered at each monitoring station included date, time, site name, sampling location, collector's name, weather conditions, and any other pertinent observations related to the monitoring station. Following each field effort, data was added to a database template provided by SMUD, for eventual transfer into SMUD's master database.

All *in situ* water quality sampling was conducted in compliance with the final, approved Water Quality Monitoring Plan (SMUD 2016a).

Table 5-1. *In situ* Water Quality Methods.

Parameter	Method	Units	MDL
Water temperature (YSI 6560 Sensor)	EPA 170.1	degrees Celsius (ºC)	0.1
Conductivity (YSI 6560 Sensor)	SM 2510-B	microsiemens per centimeter (uS/cm)	1.0
DO (YSI 6562 Rapid Pulse Sensor)	SM 4500-O(G)	milligrams per liter (mg/L)	0.1
pH (YSI 6565 Sensor)	SM 4500-H	standard unit of pH (s.u.)	0.1
Turbidity (YSI 6136 Sensor)	SM 2130B	Nephelometric Turbidity Unit (NTU)	0.1
Secchi depth (Secchi disk)	USGS	meter (m)	0.1

DO= dissolved oxygen
EPA= Environmental Protection Agency
MDL= method detection limit
SM= Standard Methods

5.2 BACTERIA

Bacteria grab samples were collected near reservoir and river shorelines in shallow water, and in particular at swim areas/beach locations (Table 4-4, Figure 5-3). Samples were collected in sterilized bottles supplied by the analytical laboratory. Field sampling personnel filled each sample bottle by direct immersion in the reservoir or stream. Immediately after collection, samples were placed on ice for transport to the analytical laboratory within the required field hold time (Table 5-2).

Figure 5-3. Example of a Bacteria Sampling Site at Buck Island Reservoir (Bac-1-BI).

Table 5-2. Bacteria Analytical Methods and Field Hold Times.

Analyte	Method	Units	MDL	Hold time
Escherichia coli	SM9223B (Quantitray)	MPN/100 mL	1.8	8 hr
Fecal coliforms	SM9221E (MPN 15 or 25)	MPN/100 mL	1.8	8 hr

hr = hour
MDL = method detection limit
mL = milliliter
MPN = most probable number
SM = Standard Method

Field-based quality assurance and quality control (QA/QC) for bacterial samples was assured by accurate and thoroughly completed sample labels, field sheets, chain of custody, and sample log forms. Sample labels included sample identification code, date, time, preservative, client name, collector's name, reservoir/river name, sampling location, and analysis/sample type. All sample labels were cross-checked by a second field technician before delivering samples to the analytical laboratory.

5.3 METALS BIOACCUMULATION

Fish tissue samples were collected by the California Department of Fish and Wildlife (CDFW) on August 29, 2016 and analyzed at their Marine Pollution Studies Laboratories at Moss Landing, in accordance with protocols of the SWRCB Surface Water Ambient Monitoring Program (SWAMP). Fish collection was conducted by boat using gill netting and electrofishing. Target species included brown trout (Salmo trutta), smallmouth bass (*Micropterus dolomieu*), rainbow trout (*Oncorhynchus mykiss*), and Sacramento pikeminnow (*Ptychocheilus grandis*). In some cases, kokanee (*Oncorhynchus nerka*), lake trout (*Salvelinus namaycush*), and Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*) were collected. A minimum of three individuals per species were targeted from each reservoir, non-size specific. As hardhead (*Mylopharodon conocephalus*) are a state species of special concern and U.S. Forest Service sensitive species, these fish were returned to the reservoir unharmed when they were observed.

Physical characteristics were recorded for each individual fish, including: weight, total length, fork length [FL], and presence of any abnormalities. Each fish was individually tagged, wrapped in aluminum foil, placed in a labeled zipper-closure bag, and stored on dry ice at -20 degrees Celsius (^{o}C) for the duration of the trip. At the analytical laboratory, samples were stored in an ultra-cold freezer at -20 ^{o}C until they were processed for analysis.

Fish tissue samples were analyzed in accordance with the *General Protocol for Sport Fish Sampling and Analysis* (California Environmental Protection Agency 2005) and with methods comparable to those used at the CDFW/MPSL. Tissue samples were processed by removing skin from an area above the lateral line and then extracting a 9−13 gram tissue "plug". Samples were weighed for percent moisture analysis and analyzed using methods shown in Table 5-3.

Table 5-3. Metals, Method Detection and Reporting Limits for Fish Tissue Analyses[1].

Metal	Method	MDL (mg/kg ww)	MRL (mg/kg ww)	MDL (mg/kg dw)	MRL (mg/kg dw)
Copper	EPA 2052 and 220.8 [2]	0.06	0.20	0.34	1.00
Lead	EPA 2052 and 220.8 [2]	0.002	0.005	0.01	0.03
Mercury	EPA 7473 [3]	0.004	0.012	0.015	0.046
Silver	EPA 2052 and 220.8 [2]	0.003	0.01	0.02	0.06

EPA= Environmental Protection Agency
MDL= method detection limit
MRL= method reporting limit
ww= wet weight
dw= dry weight

[1] From the Water Quality Monitoring Plan (Revision 2) (SMUD 2016a).
[2] Digestion and analysis of total copper, total lead, and total silver.
[3] Total mercury is a proxy for methylmercury in fish (Weiner *et al.* 2007).

Table 5-4. Target Fish Species, Size Ranges, and Numbers by Location for Metals Bioaccumulation Sampling.

Reservoir (Site Name)	Species Common Name	Fork Length (range, in mm)	Number of Fish Collected
Loon Lake Reservoir (M-1-LL)	Rainbow Trout	198−373	4
	Brown Trout	436−496	3
Gerle Creek Reservoir (M-1-GCR)	Brown Trout	182−312	14
Union Valley Reservoir (M-1-UVR)	Smallmouth Bass	170−382	10
	Rainbow Trout	225−360	18
	Kokanee	209−212	4
	Brown Trout	486	1
	Lake Trout	278−647	5
Ice House Reservoir (M-1-IHR)	Rainbow Trout	264−385	5
	Brown Trout	410−586	3
Camino Reservoir (M-1-CR)	Lahontan Cutthroat Trout	225−233	3
	Brown Trout	245−305	10
Slab Creek Reservoir (M-1-SCR)	Rainbow Trout	173−249	4
	Sacramento Pikeminnow	201−461	7
	Brown Trout	230−505	4

6.0 RESULTS

6.1. *IN SITU* PARAMETERS

6.1.1. Riverine Sites

In situ water quality data for UARP riverine sites are summarized in Table 6-1.

February Sampling Event

During the February sampling event, water temperatures ranged from 2.1 to 6.7 °C and were variable by site. Riverine dissolved oxygen ranged from 8.5 to 11.6 milligram per liter (mg/L) (82 to 98% saturation), with no measurements falling below Basin Plan instantaneous minimum concentration of 7.0 mg/L for cold freshwater habitat (COLD) and spawning, reproduction, and/or early development (SPWN) designated beneficial uses. pH at riverine sites ranged from 5.1 to 7.1 standard units (s.u.), with three exceedances of the Basin Plan instantaneous minimum pH objective (6.5 s.u.) and no exceedances of the instantaneous maximum pH objective (8.5 s.u.). Measured pH below the Basin Plan instantaneous minimum occurred at sites IS-6-GC (5.9 s.u.), IS-9-GCC (6.0 s.u.), and IS-10-SFSC (5.5 s.u.) (Table 6-1).

Typical of granitic watersheds, conductivity at the riverine sites was low, ranging from 8 to 61 microsiemens per centimeter (uS/cm).

Turbidity measurements during the February sampling event ranged from 0.4 to 46.0 Nephelometric Turbidity Unit (NTU) with no particular spatial pattern. Turbidity at the Brush Creek outflow from Brush Creek Reservoir site (IS-17-BC) was 46.0 NTU during this survey (Table 6-1), which was higher than all the other sites and may be due to increased runoff from an area immediately downstream of the King Fire area, which burned over 97,000 acres of land in El Dorado County, California, in mid-September to mid-October 2014.

May Sampling Event

Water temperatures exhibited a greater range and were generally higher than winter temperatures during the May sampling event (5.2 to 11.5°C). Dissolved oxygen ranged from 9.5 to 10.9 mg/L (74 to 102% saturation) across all riverine sites, which is well above the minimum Basin Plan concentration of 7.0 mg/L for COLD and SPWN. pH ranged from 5.0 to 7.6 s.u., with seven exceedances of the Basin Plan instantaneous minimum pH objective (6.5 s.u.) and no exceedances of the instantaneous maximum (8.5 s.u.). Measured pH below the Basin Plan instantaneous minimum occurred at sites IS-6-GC (5.6 s.u.), IS-9-GCC (5.0 s.u.), IS-7-SFRR (5.3 s.u.), IS-8-SFRR (5.5 s.u.), IS-10-SFSC (5.3 s.u.), IS-11-SFSC (5.5 s.u.), and IS-12-SC (5.5 s.u.) (Table 6-1.

Conductivity at the riverine sites was low, ranging from 10.0 to 57 uS/cm during May sampling. Turbidity measurements ranged from 0.0 to 20.1 NTU. All turbidity measurements were similar except for the Brush Creek outflow from Brush Creek Reservoir site (IS-17-BC), which exhibited 20.1 NTU (Table 6-1).

Table 6-1. *In situ* Water Quality for UARP Riverine Sites.

Site ID	2016 Sample Date	Water Temperature (°C)	pH (s.u.)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	Turbidity (NTU)
February 2016							
IS-1-RR	–	–	–	–	–	–	–
IS-2-LRR	–	–	–	–	–	–	–
IS-3-LRR	–	–	–	–	–	–	–
IS-4-GC	–	–	–	–	–	–	–
IS-5-GC	–	–	–	–	–	–	–
IS-6-GC	2/9	2.1	5.9	11.6	84	15 [Q]	0.7
IS-9-GCC	2/9	2.3	6.0	11.3	83	17 [Q]	0.5
IS-7-SFRR	–	–	–	–	–	–	–
IS-8-SFRR	–	–	–	–	–	–	–
IS-10-SFSC	2/8	3.6	5.5	10.9	82	8 [Q]	6.0
IS-11-SFSC	2/8	4.7	6.7	10.9	82	13 [Q]	1.0
IS-12-SC	2/8	3.2	6.8	10.9	82	10 [Q]	0.6
IS-13-SC	2/8	6.3	6.8	11.1	90	16 [Q]	1.9
IS-14-SC	2/8	6.7	7.0	10.1	88	11 [Q]	0.8
IS-15-SFAR	2/8	6.2	7.0	11.5	93	61 [Q]	1.3
IS-16-SFAR	2/8	4.9	7.1	10.8	84	29 [Q]	1.1
IS-17-BC	2/8	7.1	6.9	10.8	89	28 [Q]	46.0
IS-18-SFAR	2/9	7.7	6.8	11.7	98	22 [Q]	1.2
IS-19-SFAR	2/8	5.0	7.1	11.6	91	17 [Q]	2.1
May 2016							
IS-1-RR	–	–	–	–	–	–	–
IS-2-LRR	–	–	–	–	–	–	–
IS-3-LRR	–	–	–	–	–	–	–
IS-4-GC	5/17	7.0	7.1	9.8	81	10	1.4
IS-5-GC	5/1	7.0	7.1	9.8	81	10	0.0
IS-6-GC	5/1	6.7	5.6	10.6	86	12	0.2
IS-9-GCC	5/1	8.0	5.0	10.7	90	30	0.3
IS-7-SFRR	5/1	8.6	5.3	10.1	86	11	0.2
IS-8-SFRR	5/1	8.3	5.5	10.4	89	12	0.3
IS-10-SFSC	5/2	5.2	5.3 [Q]	10.6	83	10 [Q]	0.0
IS-11-SFSC	5/2	6.8	5.5 [Q]	10.9	89	12 [Q]	0.3

Site ID	2016 Sample Date	Water Temperature (°C)	pH (s.u.)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	Turbidity (NTU)
IS-12-SC	5/2	5.9	5.5 Q	10.9	89	12 Q	0.3
IS-13-SC	5/2	8.6	6.9 Q	10.0	93	18 Q	0.5
IS-14-SC	5/2	7.7	6.9 Q	10.0	94	10 Q	0.2
IS-15-SFAR	5/3	9.2	7.0	9.9	99	57	2.6
IS-16-SFAR	5/3	7.9	7.3	10.4	102	55	1.2
IS-17-BC	5/3	10.1	7.7	9.5	92	38	20.1
IS-18-SFAR	5/3	11.5	7.3	10.0	101	35	0.6
IS-19-SFAR	5/3	8.9	7.6	9.8	98	21	1.1
August 2016							
IS-1-RR	8/23	20.2	6.8	6.7	74	6	0.9
IS-2-LRR	8/23	18.0	6.9	6.3	66	7	1.2
IS-3-LRR	8/23	21.5	6.6	6.9	78	9	1.6
IS-4-GC	8/23	11.5	6.4	8.5	78	6	1.6
IS-5-GC	8/23	18.5	6.8	8.0	85	8	1.6
IS-6-GC	8/23	15.6	6.5	8.2	82	9	1.6
IS-9-GCC	8/23	18.3	6.8	8.4	89	8	1.6
IS-7-SFRR	8/23	18.0	6.7	8.1	85	9	0.1
IS-8-SFRR	8/23	18.2	6.9	8.1	88	11	1.6
IS-10-SFSC	8/25	7.4	6.4	9.9	82	10	1.4
IS-11-SFSC	8/26	12.3	6.9	9.3	87	14	0.4
IS-12-SC	8/26	9.2	6.4	9.6	84	11	0.6
IS-13-SC	8/26	15.1	6.9	9.0	91	11	0.7
IS-14-SC	8/26	11.0	6.7	10.2	93	13	0.6
IS-15-SFAR	8/26	19.0	7.1	9.0	97	34	1.2
IS-16-SFAR	8/26	12.1	6.7	10.5	97	41	0.7
IS-17-BC	8/26	18.8	7.3	8.4	90	24	3.4
IS-18-SFAR	8/24	15.7	6.5	9.5	95	23	0.8
IS-19-SFAR	8/24	12.5	6.1	10.0	94	20	0.2
November 2016							
IS-1-RR	11/7	5.2	6.6	9.8	77	6	1.0
IS-2-LRR	11/8	6.0	7.2	10.0	78	1 Q	1.2
IS-3-LRR	11/8	6.5	6.7	9.9	81	5 Q	1.1
IS-4-GC	11/7	9.0	7.1	9.3	80	10	1.3
IS-5-GC	11/7	6.9	6.9	10.0	82	12	1.3

Site ID	2016 Sample Date	Water Temperature (°C)	pH (s.u.)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	Turbidity (NTU)
IS-6-GC	–	–	–	–	–	–	–
IS-9-GCC	11/7	6.5	6.7	9.9	80	34	1.0
IS-7-SFRR	11/7	5.8	6.1	10.4	83	15	1.1
IS-8-SFRR	11/7	6.8	6.6	10.3	85	13	1.2
IS-10-SFSC	11/9	7.6	5.6	9.3	78	7 Q	3.5
IS-11-SFSC	11/9	5.3	6.1	10.6	84	10 Q	2.5
IS-12-SC	11/9	8.6	6.0	9.9	85	8 Q	2.7
IS-13-SC	11/9	9.5	6.9	10.4	91	12 Q	3.1
IS-14-SC	11/9	10.5	6.9	10.2	91	13 Q	3.1
IS-15-SFAR	11/10	9.0	6.0	10.1	87	30 Q	1.1
IS-16-SFAR	11/10	10.6	6.2	10.4	94	19 Q	1.2
IS-17-BC	11/10	11.6	6.3	10.0	91	22 Q	39.6
IS-18-SFAR	11/10	11.1	6.8	10.8	99	31 Q	1.9
IS-19-SFAR	11/10	10.3	6.6	10.4	93	18 Q	3.7

°C = degrees Celsius
s.u. = standard unit of pH
mg/L = milligrams per liter
% sat = percent saturation
uS/cm = microsiemens per centimeter
NTU = Nephelometric Turbidity Unit

"–" indicates that data were not collected due to site inaccessibility.
"Q" Data that are designated as "qualified" because the post-sampling calibration check measurement quality objective (MQO) for acceptability was not met (see Appendix E).

August Sampling Event

During the August sampling event, water temperatures ranged from 7.4 to 21.5°C and were variable by site. Riverine dissolved oxygen during the August sampling event ranged from 6.3 to 10.5 mg/L (66 to 98% saturation), with three measurements falling below the Basin Plan instantaneous minimum concentration of 7.0 mg/L for COLD and SPWN. Measured dissolved oxygen below the Basin Plan instantaneous minimum occurred at sites IS-1-RR (6.7 mg/L), IS-2-LRR (6.3 mg/L), and IS-3-LRR (6.9 mg/L) (Table 6-1), which may be due to low river flows or higher water temperatures at these sites in August. Riverine pH ranged from 6.1 to 7.1 with one exceedance of the Basin Plan instantaneous minimum pH objective (6.5 s.u.) and no exceedances of the instantaneous maximum (8.5 s.u.). Measured pH below the Basin Plan instantaneous minimum occurred at Site IS-19-SFAR (6.1 s.u.) (Table 6-1).

Conductivity at the riverine sites was low, ranging from 6 to 41 uS/cm. During the August sampling event, turbidity measurements were low, ranging from 0.1 to 3.4 NTU.

November Sampling Event

Water temperatures during the November sampling event ranged from 5.2 to 11.6 °C. Riverine dissolved oxygen ranged from 9.3 to 10.6 mg/L (78 to 99% saturation), with no measurements falling below Basin Plan instantaneous minimum concentration of 7.0 mg/L for COLD and SPWN. Riverine pH ranged from 5.6 to 7.2 during the November event with one exceedance of the Basin Plan instantaneous minimum pH objective (6.5 s.u.) and no exceedances of the instantaneous maximum (8.5 s.u.). Measured pH below the Basin Plan instantaneous minimum occurred at Site IS-10-SFSC (5.6 s.u.) (Table 6-1).

Conductivity at the riverine sites was low, ranging from 1 to 34 uS/cm during November sampling. Turbidity ranged from 1.0 to 39.6 NTU, with the highest turbidity occurring again at the Brush Creek outflow from Brush Creek Reservoir site (IS-17-BC) (Table 6-1). Overall, the increase in November riverine turbidity levels would not be expected to cause a nuisance or adversely affect beneficial uses.

6.1.2. Reservoir Sites

In situ water quality data for UARP reservoir sites are presented in Figures 6-1 through 6-13 and Appendix A.

April Sampling Event

During the April sampling event, the onset of seasonal thermal stratification was apparent in Union Valley, Ice House, and Junction reservoirs, with thermocline development between roughly 4 and 17 meters (m) deep, depending on the site (Figure 6-1 to Figure 6-5). Surface water temperatures at these sites ranged from 7.8° to 10.9°C and bottom water temperatures were lower, ranging from 4.9° to 5.9°C. Dissolved oxygen, pH, and

turbidity were generally consistent with depth, suggesting well-mixed water columns that had only recently begun to stratify due to increasing surface water temperatures. Dissolved oxygen concentrations were above 10 mg/L at all sites in these three reservoirs, well above the Basin Plan instantaneous minimum concentration of 7.0 mg/L for COLD and SPWN designated beneficial uses. pH was generally at or below the Basin Plan instantaneous minimum pH objective (6.5 s.u.) at all sites, with the exception of two sites in Ice House Reservoir (sites R-IS-10-IHR and R-IS-11-IHR) (Figure 6-4). The lowest pH values of approximately 5.5 s.u. were measured in Junction Reservoir (Site R-IS-12-JR) (Figure 6-5). There were no instances of pH measurements greater than the instantaneous maximum pH objective (8.5 s.u.). Turbidity levels were very low (≤1 NTU) in Union Valley, Ice House, and Junction reservoir sites, with the exception of bottom waters at Site R-IS-9-IHR, where turbidity ranged from <1 to 3 NTU (Figure 6-3). The minor increase in turbidity at Site R-IS-9-IHR may have been due to sampling disturbances of bottom sediments by the water quality probe.

Gerle Creek Reservoir, Camino Reservoir, and the relatively shallow site in Slab Creek Reservoir (Site R-IS-14-SCR) exhibited little variation in water temperature with depth, indicating that stratification was not underway at these locations (Figure 6-1, Figure 6-5, and Figure 6-6). As these three waterbodies are regulating reservoirs, their hydraulic residence times tend to be relatively low and they are not as likely to experience thermal stratification as the storage reservoirs (e.g., Union Valley, Ice House). Dissolved oxygen concentrations were above 10 mg/L at all reservoir sites in April, well above the Basin Plan instantaneous minimum concentration of 7.0 mg/L for COLD and SPWN designated beneficial uses. pH was generally at or below the Basin Plan instantaneous minimum pH objective (6.5 s.u.) at all three reservoir sites. There were no instances of pH measurements greater than the instantaneous maximum pH objective (8.5 s.u.). Turbidity levels were very low (≤1 NTU) at all reservoir sites, with the exception of waters near the bottom of Gerle Creek Reservoir where turbidity increased to approximately 3 NTU (Figure 6-1). The minor increases in turbidity at this location may have been due to sampling disturbances of bottom sediments by the water quality probe.

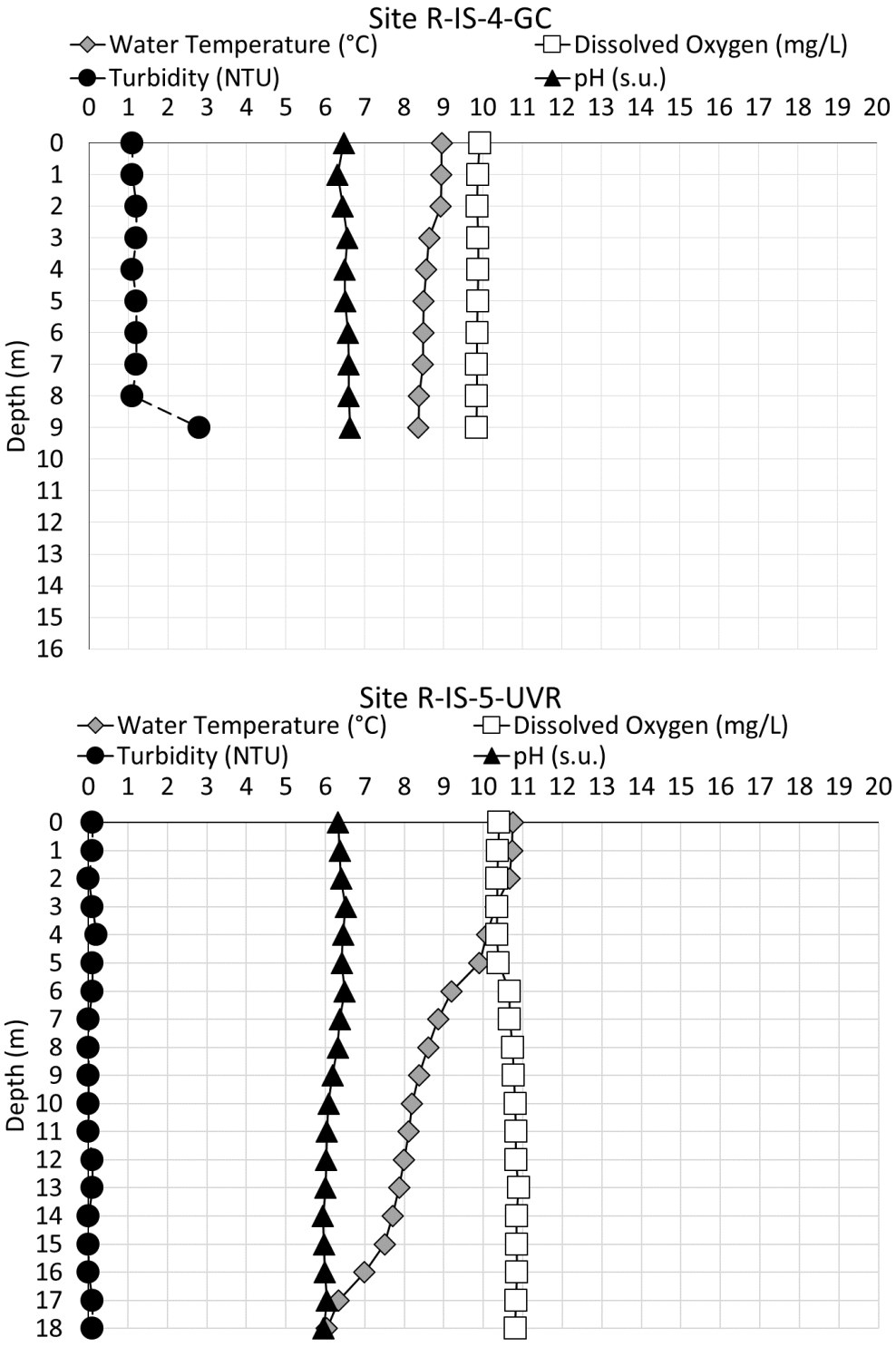

Figure 6-1. *In situ* water temperature, dissolved oxygen, turbidity, and pH at Gerle Creek Reservoir and Union Valley Reservoir sites R-IS-4-GC (top) and R-IS-5-UVR (bottom) during April/May 2016.

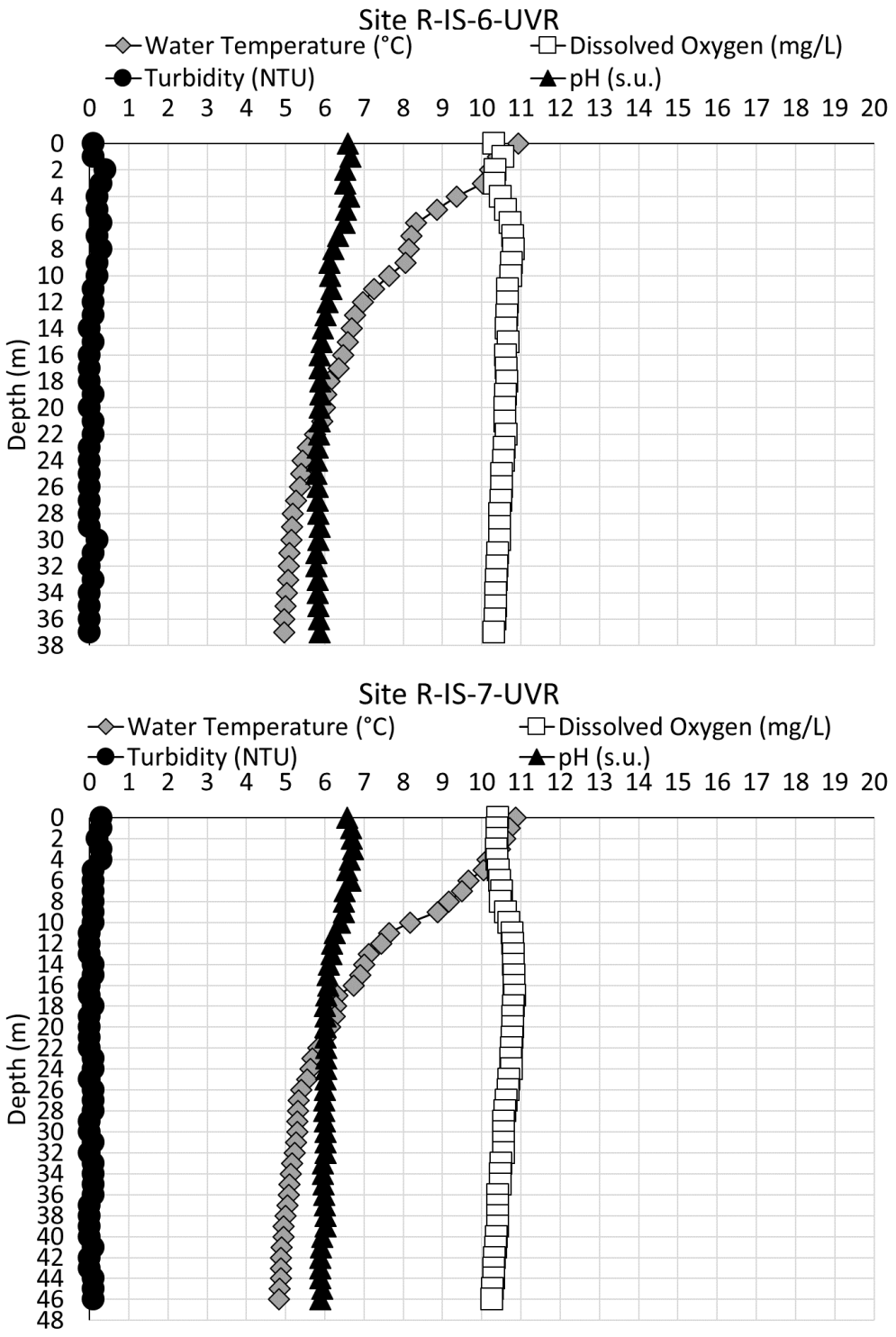

Figure 6-2. *In situ* water temperature, dissolved oxygen, turbidity, and pH at Union Valley Reservoir sites R-IS-6-UVR (top) and R-IS-7-UVR (bottom) during April 2016.

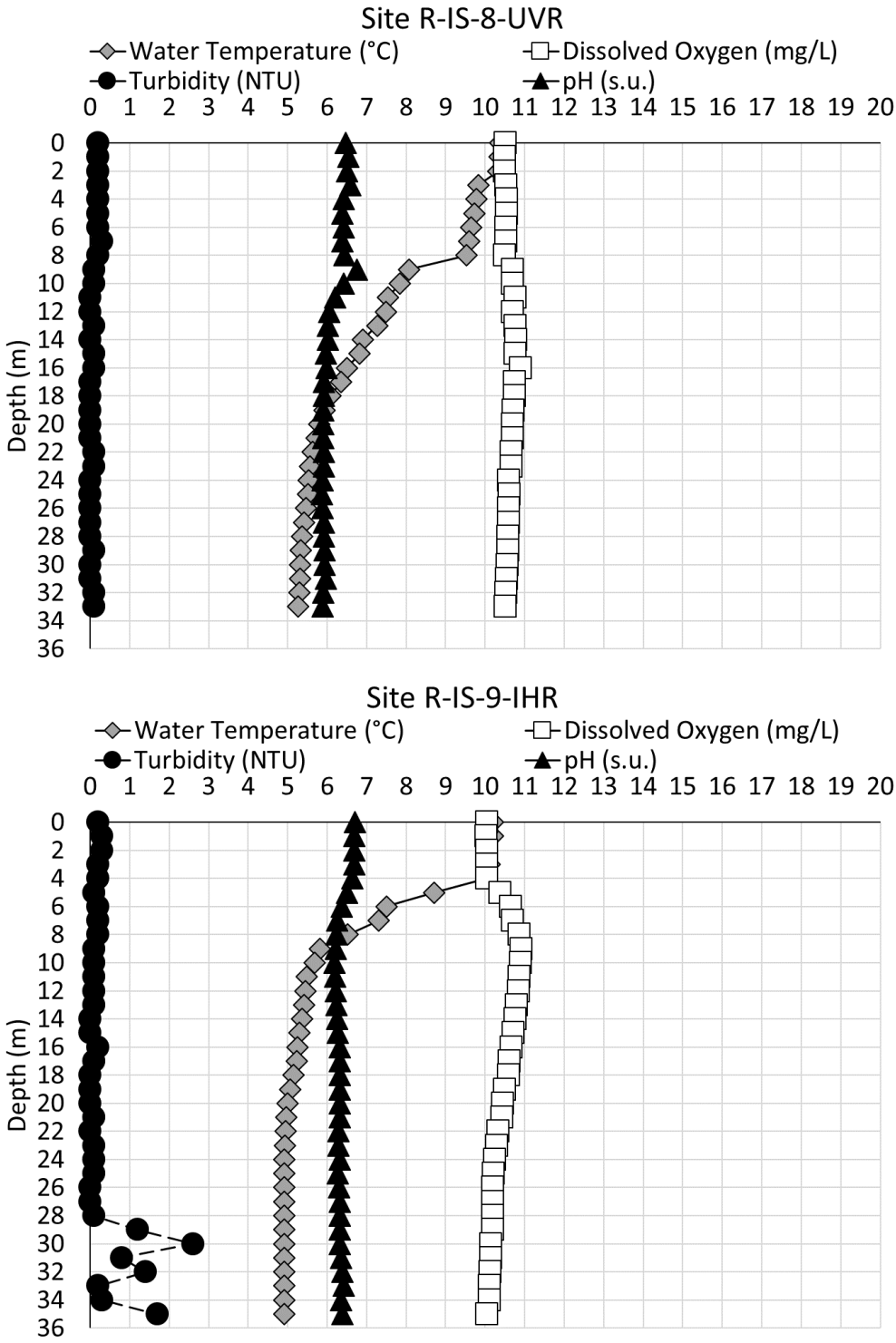

Figure 6-3. *In situ* water temperature, dissolved oxygen, turbidity, and pH at Union Valley Reservoir and Ice House Reservoir sites R-IS-8-UVR (top) and R-IS-9-IHR (bottom) during April 2016.

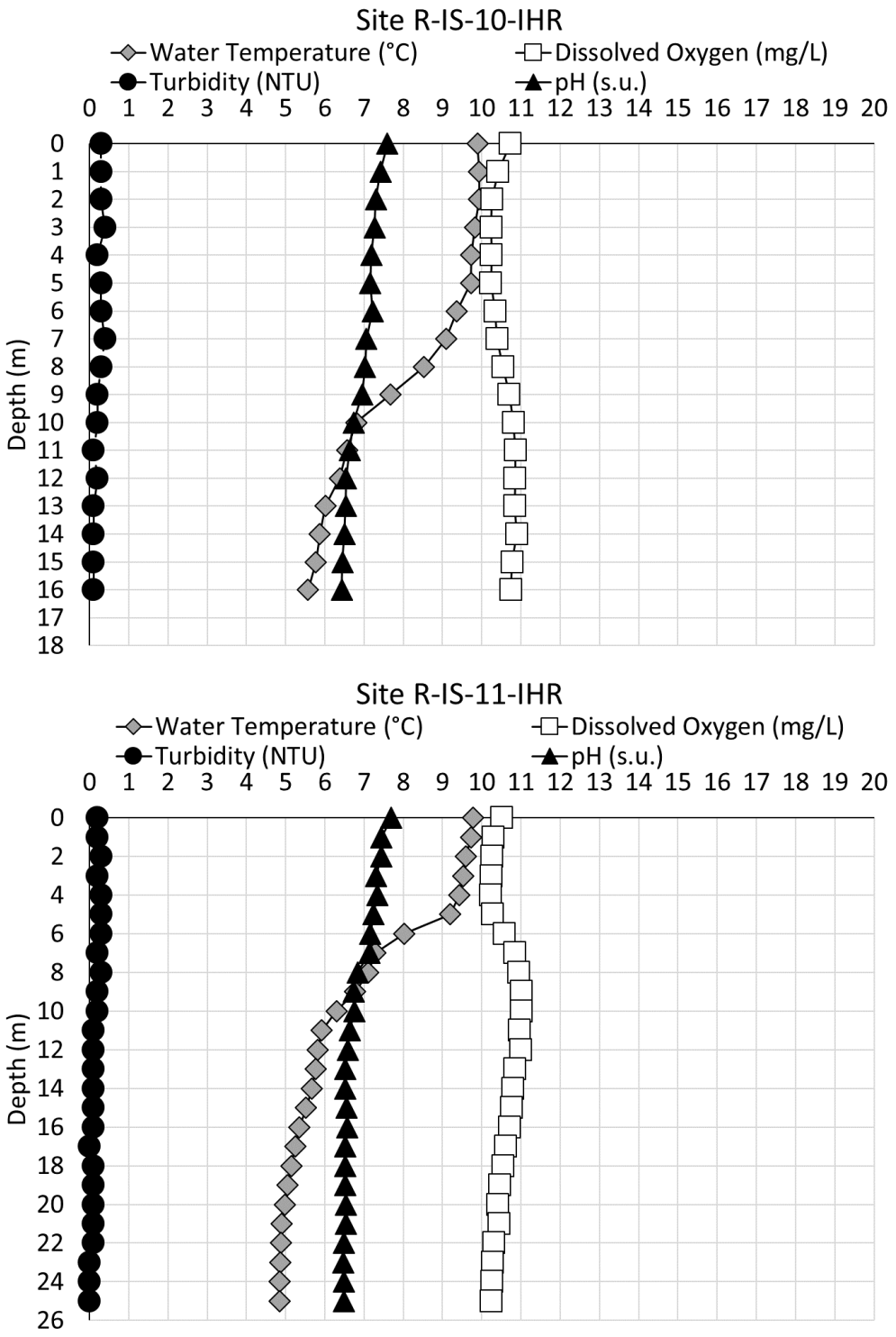

Figure 6-4. *In situ* water temperature, dissolved oxygen, turbidity, and pH at Ice House Reservoir sites R-IS-10-IHR (top) and R-IS-11-IHR (bottom) during April 2016.

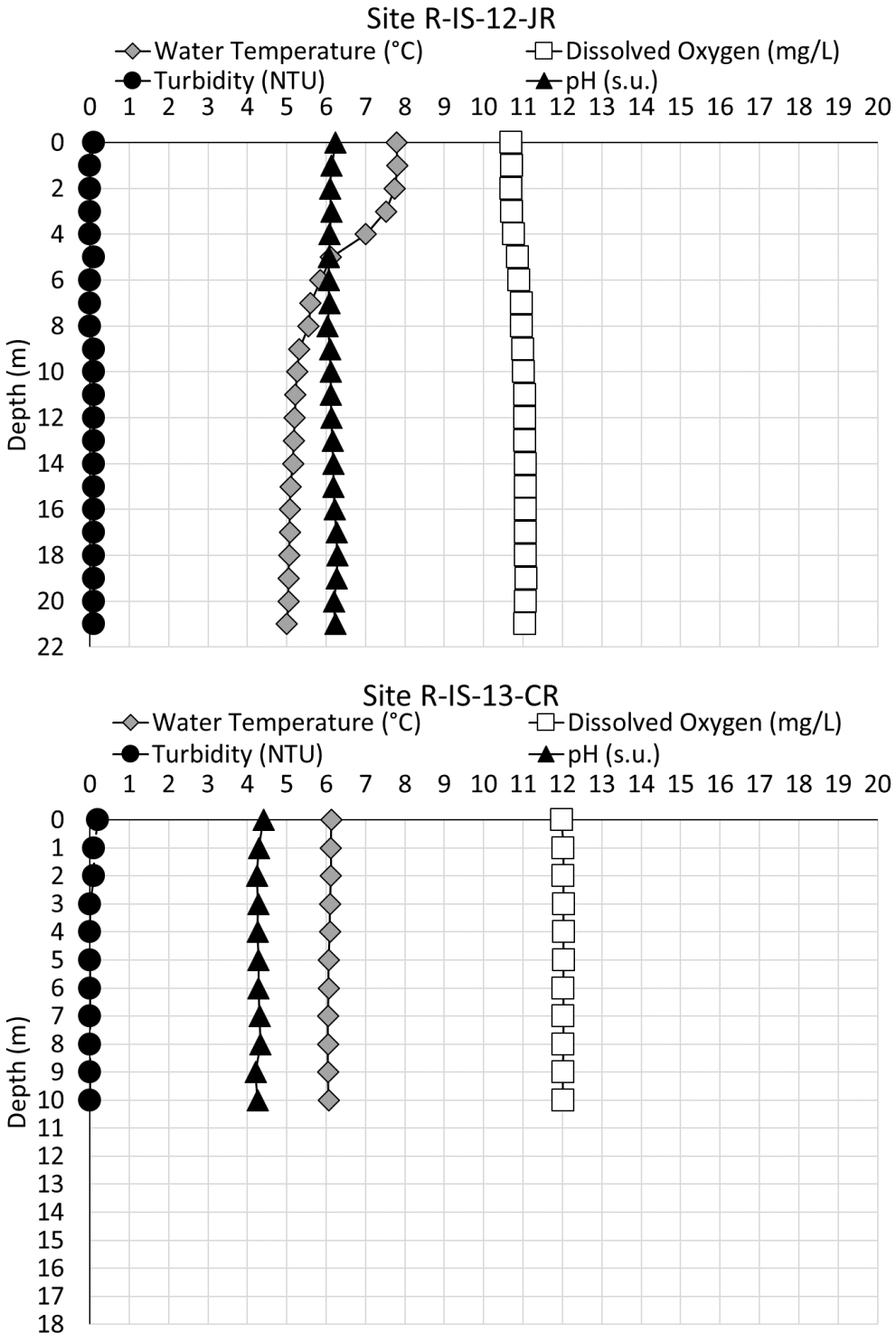

Figure 6-5. *In situ* water temperature, dissolved oxygen, turbidity, and pH at Junction Reservoir and Camino Reservoir sites R-IS-12-JR (top) and R-IS-13-CR (bottom) during April 2016.

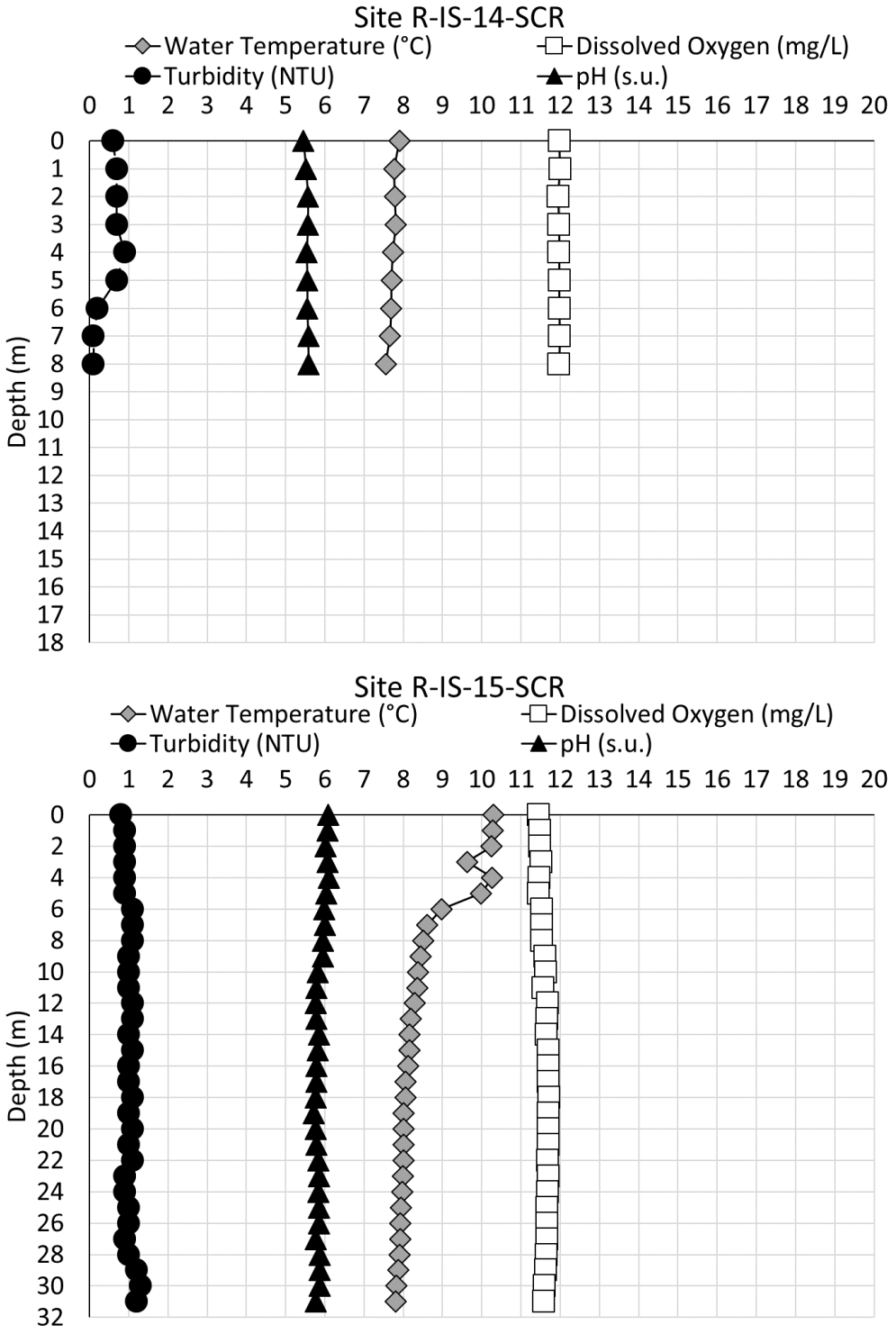

Figure 6-6. *In situ* water temperature, dissolved oxygen, turbidity, and pH at Slab Creek Reservoir Sites R-IS-14-SCR and R-IS-15-SCR during April 2016.

October Sampling Event

During the October sampling event, surface water temperatures at all reservoir sites ranged from 10 to 15 °C and bottom water temperatures ranged from 9.7° to 13.8°C. Loon Lake, Camino Reservoir, and Slab Creek Reservoir exhibited little to no variation in water temperature with depth (Figure 6-7, Figure 6-8, Figure 6-12, Figure 6-13), indicating that these three waterbodies had already mixed for the fall, or in the case of Camino and Slab Creek reservoirs, may not have stratified during 2016 (see *April Sampling Event* results above). Dissolved oxygen and pH in these reservoirs were generally consistent with depth, suggesting a well-mixed water column at each profile location. Dissolved oxygen concentrations were well above the Basin Plan instantaneous minimum concentration of 7.0 mg/L for COLD and SPWN designated beneficial uses. pH measurements at Site R-IS-1-LL were low and generally below the Basin Plan instantaneous minimum pH objective of 6.5 s.u. (Figure 6-7) There were no instances of pH measurements greater than the instantaneous maximum pH objective (8.5 s.u.) in Loon Lake, Camino Reservoir, and Slab Creek Reservoir. Turbidity levels were low (< 4 NTU), with the exception of waters between approximately 8 and 13 m at Slab Creek Reservoir Site R-IS-15-SC, where turbidity increased slightly to 12.2 NTU (Figure 6-13).

Union Valley Reservoir exhibited a deep thermocline at 21−23 m (except for the shallow site R-IS-5-UVR) (Figures 6-8 through 6-10), which may have been descending as surface waters cooled and the water column began to mix. Junction Reservoir exhibited a similar pattern, with a slight thermocline at roughly 18 m, or very close to the bottom of this waterbody (Figure 6-12). Dissolved oxygen and pH in these reservoirs were generally similar with depth, with slight variations between surface waters and deeper waters. At Site R-IS-8-UVR, dissolved oxygen decreased by 1 mg/L (from 8 mg/L to 7 mg/L) at the approximate location of the thermocline (23 m) and continued decreasing to approximately 6 mg/L in bottom waters (Figure 6-10). Dissolved oxygen concentrations at other Union Valley and Junction reservoir sites were well above Basin Plan instantaneous minimum concentration of 7.0 mg/L for COLD and SPWN designated beneficial uses. With the exception of sites R-IS-6-UVR (Figure 6-9) and R-IS-8-UVR (Figure 6-10), pH was generally above the Basin Plan instantaneous minimum pH objective (6.5 s.u.). There were no instances of pH measurements greater than the instantaneous maximum pH objective (8.5 s.u.) in Union Valley Reservoir. Turbidity levels were low (< 4 NTU) at all sites in Union Valley and Junction reservoir.

Ice House Reservoir showed the greatest degree of stratification during the October survey, with a thermocline between approximately 14 and 24 m at sites R-IS-9-IHR and R-IS-11-IHR (Figure 6-10 and Figure 6-11). Dissolved oxygen concentrations in the bottom waters at Site R-IS-11-IHR decreased to 1.3 mg/L near the sediment-water interface (Figure 6-11), a result that is not uncommon for deep waterbodies that have been thermally stratified for several months. Dissolved oxygen in surface waters at all sites in Ice House Reservoir was well above the Basin Plan instantaneous minimum concentration of 7.0 mg/L for COLD and SPWN designated beneficial uses. pH was generally above the Basin Plan instantaneous minimum pH objective (6.5 s.u.) and there

were no instances of pH measurements greater than the instantaneous maximum pH objective (8.5 s.u.) in Ice House Reservoir. Turbidity levels were low (< 4 NTU) at all sites in Ice House Reservoir.

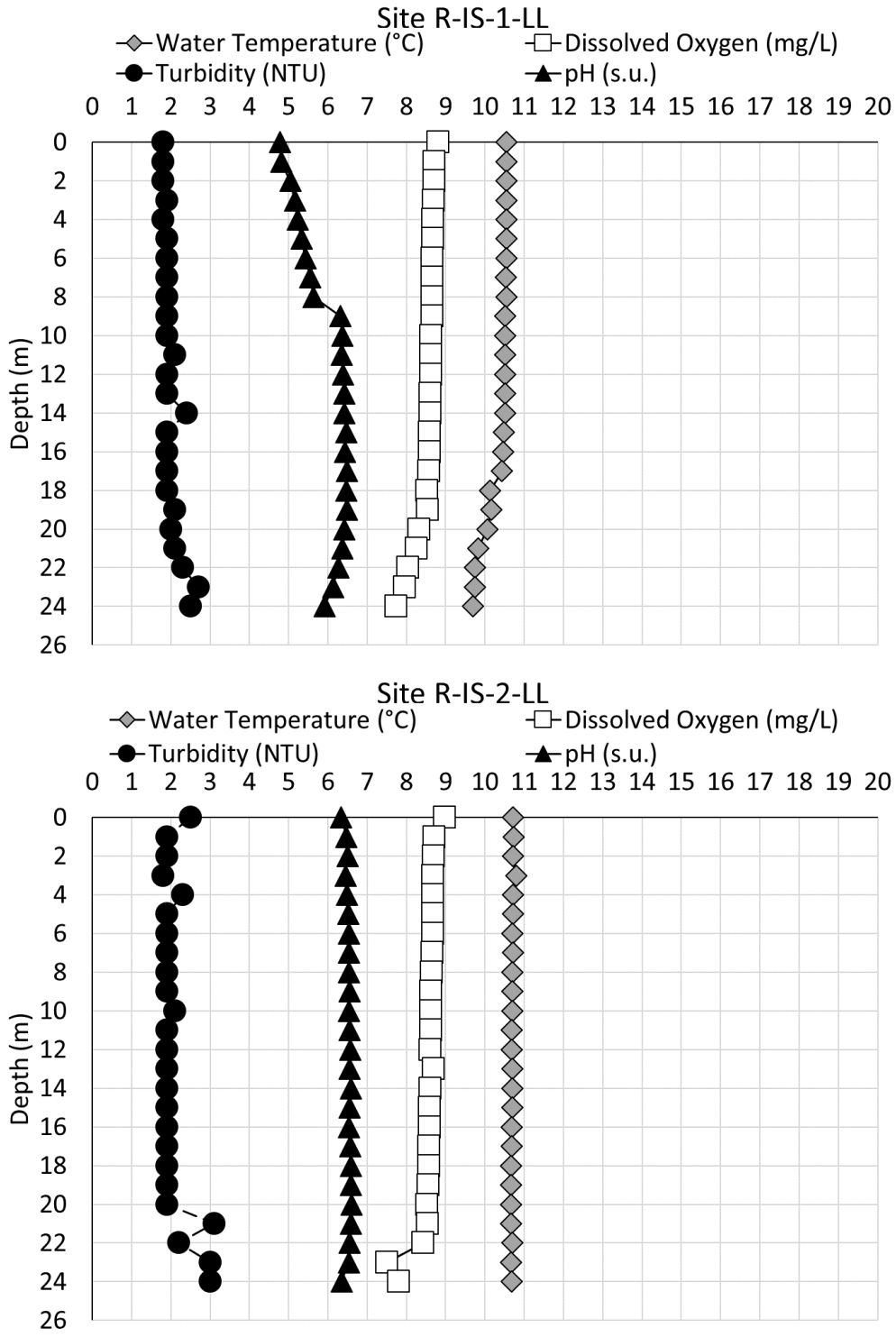

Figure 6-7. *In situ* water temperature, dissolved oxygen, turbidity, and pH at Loon Lake sites R-IS-1-LL (top) and R-IS-2-LL (bottom) during October 2016.

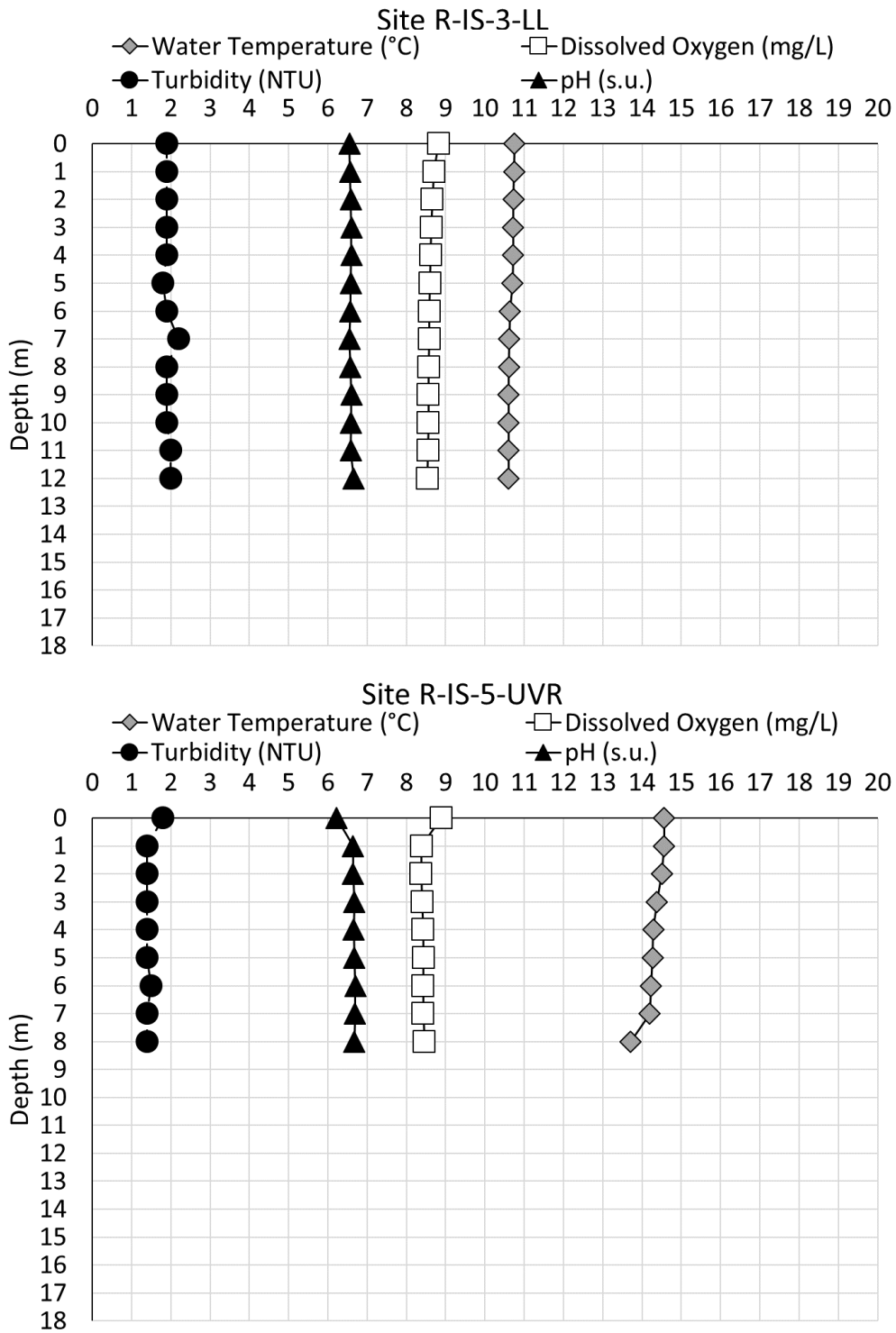

Figure 6-8. *In situ* water temperature, dissolved oxygen, turbidity, and pH at Loon Lake and Union Valley Reservoir sites R-IS-3-LL (top) and R-IS-5-UVR (bottom) during October 2016.

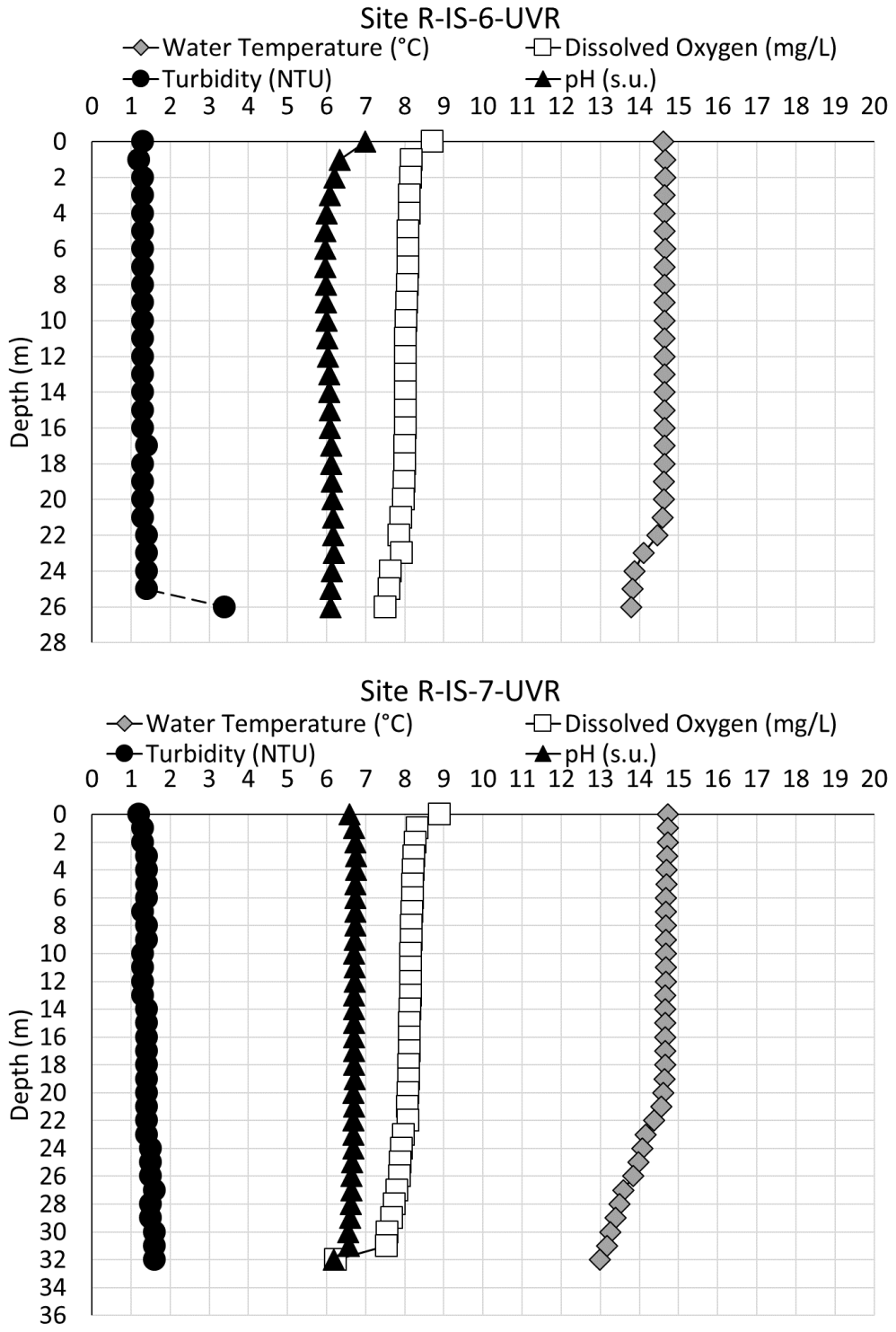

Figure 6-9. *In situ* water temperature, dissolved oxygen, turbidity, and pH at Union Valley Reservoir sites R-IS-6-UVR (top) and R-IS-7-UVR (bottom) during October 2016.

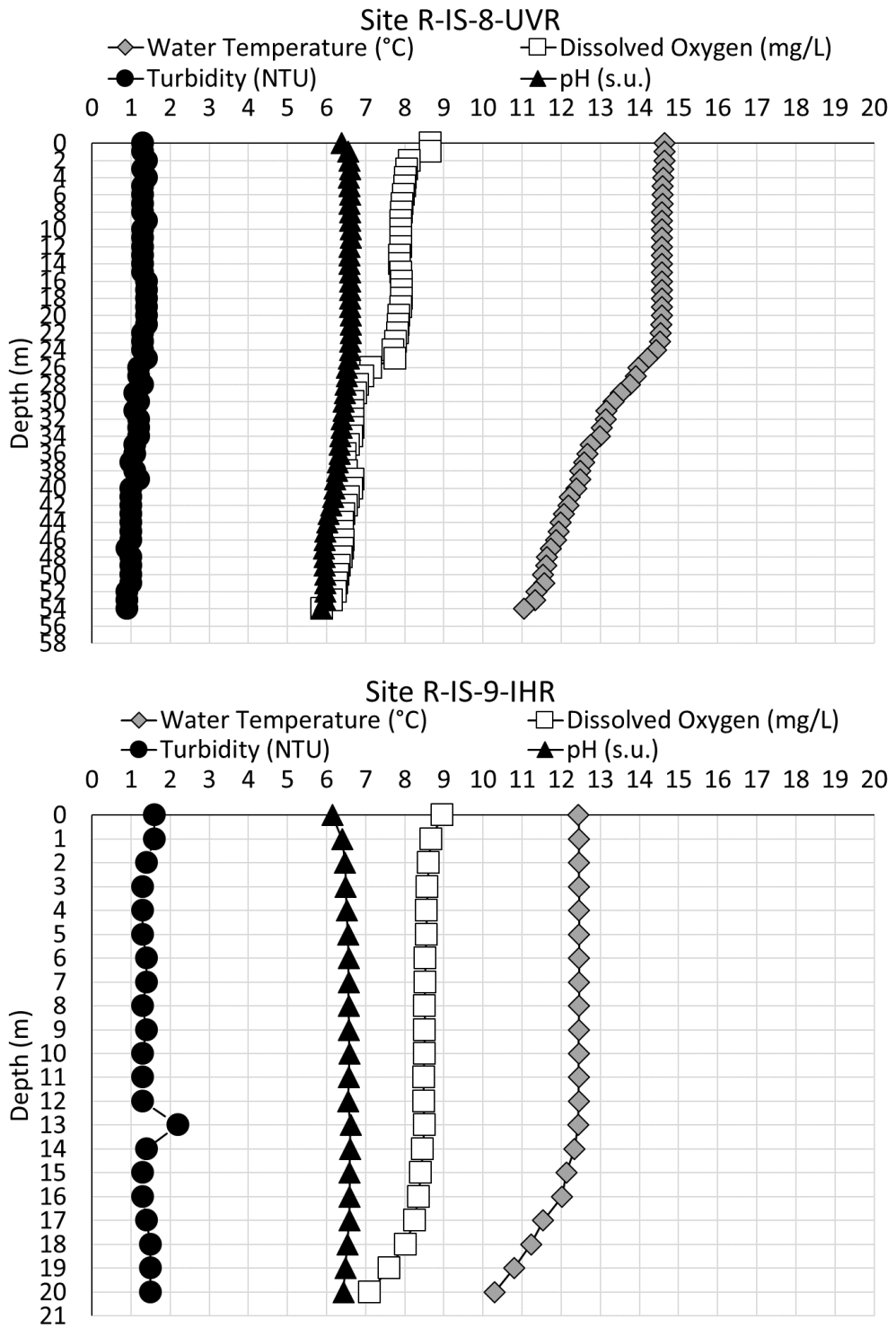

Figure 6-10. *In situ* water temperature, dissolved oxygen, turbidity, and pH at Union Valley Reservoir and Ice House Reservoir sites R-IS-8-UVR (top) and R-IS-9-IHR (bottom) during October 2016.

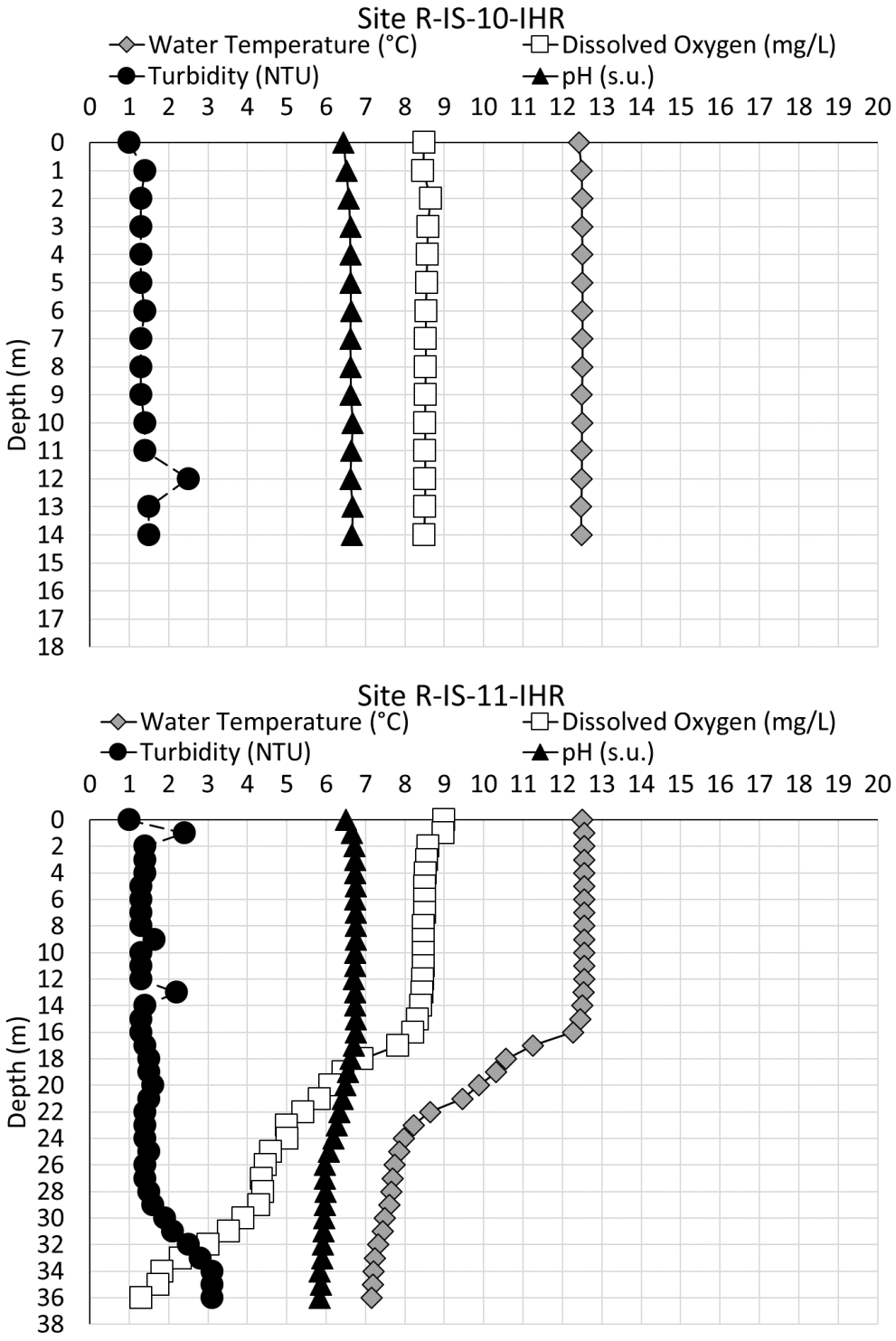

Figure 6-11. *In situ* water temperature, dissolved oxygen, turbidity, and pH at Ice House Reservoir sites R-IS-10-IHR (top) and R-IS-11-IHR (bottom) during October 2016.

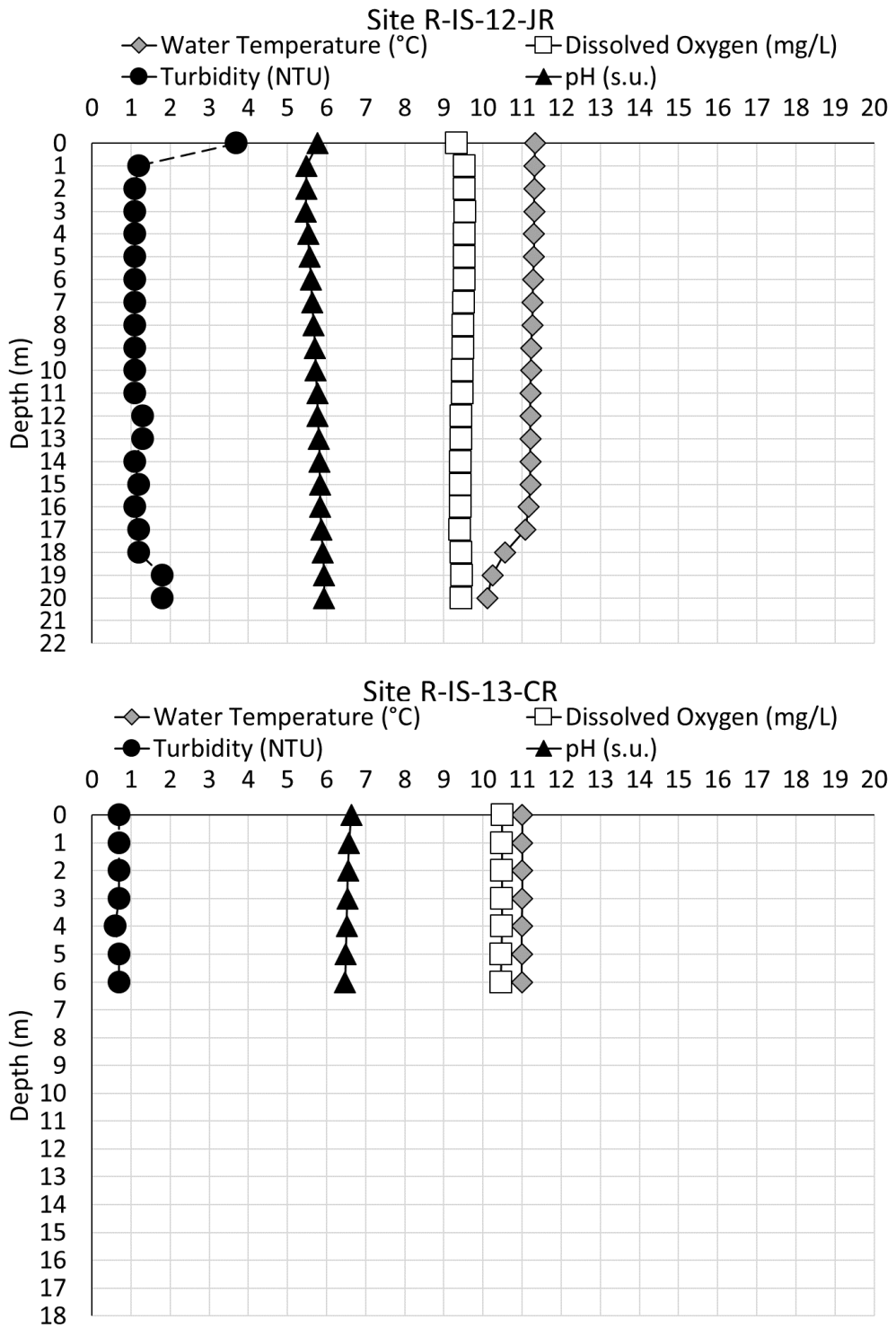

Figure 6-12. *In situ* water temperature, dissolved oxygen, turbidity, and pH at Junction Reservoir site R-IS-12-JR (top) and Camino Reservoir site R-IS-13-CR (bottom) during October 2016.

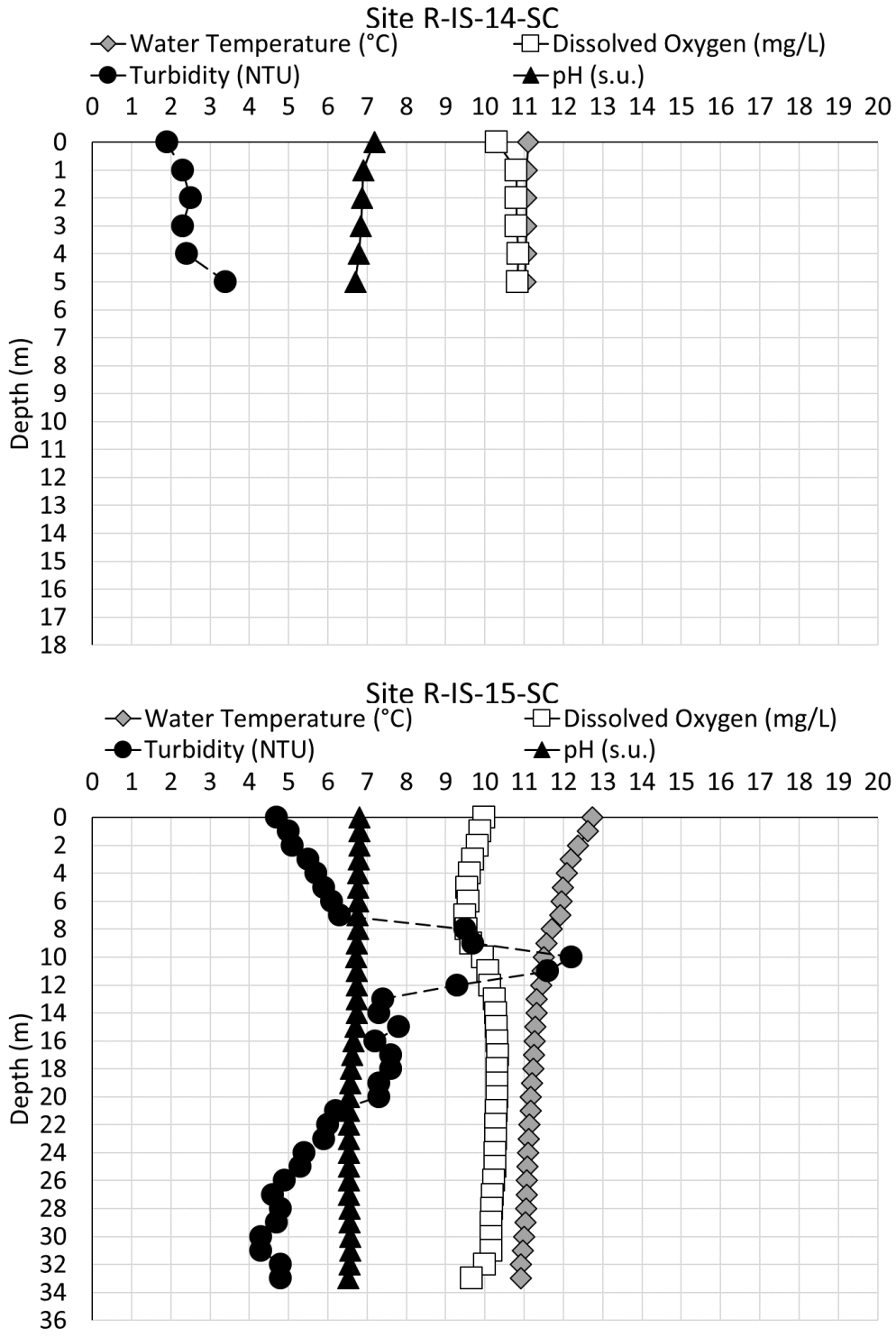

Figure 6-13. *In situ* water temperature, dissolved oxygen, turbidity, and pH at Slab Creek Reservoir sites R-IS-14-SC (top) and R-IS-15-SC (bottom) during October 2016.

6.2. BACTERIA

Instantaneous fecal coliform counts ranged from less than the method detection limit (MDL) (1.8 most probable number per 100 milliliters [MPN/100 mL]) to 94 MPN/100 mL during both the 2016 Independence Day and Labor Day sampling events (Appendix B, Table B-1). Overall, the geometric mean fecal coliform counts for the 2016 sampling events ranged from 0.9 to 6.4 MPN/100 mL (Table 6-2), where results less than the MDL were treated as 0.5 x MDL for the calculation. The lowest geometric mean fecal coliform counts (0.9 MPN/100 mL) occurred in Union Valley Reservoir (Bac-8-UVR) during the Independence Day sampling event and in Buck Island Reservoir (Bac-1-BI, Bac-2-BI) and Loon Lake (Site Bac-3-LL) during the Labor Day sampling event (Table 6-2). The highest geometric mean fecal coliform count (6.4 MPN/100 mL) occurred in Junction Reservoir (Site Bac-11-JR) during the Independence Day sampling event. The highest count was well below the Basin Plan objective of 200 MPN/100 mL, as a geometric mean of five samples collected over 30 days, for the recreational water contact (REC-1) designated beneficial use. Further, none of the 2016 samples exceeded the instantaneous maximum Basin Plan objective of 400 MPN/100 mL.

Instantaneous *Escherichia coli* counts ranged from less than the MDL (1 MPN/100 mL) to 36 MPN/100 mL during the 2016 Independence Day and Labor Day sampling events (Appendix B, Table B-1). Overall, the geometric mean *E. coli* counts for the 2016 events ranged from 0.5 to 10.6 MPN/100 mL (Table 6-2), where results less than the MDL were treated as 0.5 x MDL for the calculation. The three lowest geometric mean *E. coli* counts (0.5 MPN/100 mL) occurred in Buck Island Reservoir (Site Bac-2-BI) and Loon Lake (sites Bac-3-LL and Bac-4-LL) during the Labor Day sampling event, while the highest geometric mean *E. coli* count (10.6 MPN/100 mL) occurred in Junction Reservoir (Site Bac-11-JR) during the Independence Day sampling event. There is no Basin Plan numeric objective for *E. coli.*

Table 6-2. Bacteria Counts for UARP Reservoir Sites.

Site ID	Fecal coliform geometric mean [1,2] (MPN/100 mL)	*E. coli* geometric mean (MPN/100 mL)
Independence Day		
Bac-5-GCR	4.7	3.2
Bac-6-GCR	3.5	3.5
Bac-7-UVR	1.8	0.9
Bac-8-UVR	0.9	0.9
Bac-9-UVR	1.7	0.9
Bac-10-UVR	2.0	0.9
Bac-11-JR	6.4	10.6
Bac-12-IHR	1.5	0.8
Bac-13-IHR	1.7	1.0
Bac-14-BCR	5.6	1.3

Site ID	Fecal coliform geometric mean [1,2] (MPN/100 mL)	*E. coli* geometric mean (MPN/100 mL)
Bac-15-SCR	5.0	1.9
Labor Day		
Bac-1-BI	0.9	0.6
Bac-2-BI	0.9	0.5
Bac-3-LL	0.9	0.5
Bac-4-LL	1.1	0.5

MPN/100 mL = most probable number per 100 milliliters

[1] Method detection limit (MDL for fecal coliform = 1.8 MPN/100 mL. MDL for *E. coli* = 1.0 MPN/100 mL. Individual results less than the MDL were treated as 0.5 x MDL for the geometric mean calculations.
[2] The Basin Plan REC-1 water quality objective is 200 MPN/100 mL expressed as the geometric mean of five samples collected over 30 days.

6.3. METALS BIOACCUMULATION

Metals bioaccumulation data for UARP reservoirs are presented in Table 6-3, Figures 6-14 and 6-15, and Appendix C.

6.3.1. Loon Lake Reservoir

Two fish species (i.e., rainbow trout and brown trout) were collected from Loon Lake Reservoir. Fish tissue samples exhibited total mercury concentrations ranging from 0.02−0.32 micrograms per gram wet weight (ug/g wet weight) on average, with the highest average concentration in brown trout, the largest fish sampled (Table 6-3). Just over 40% of samples, including all three brown trout, collected in Loon Lake Reservoir exhibited total mercury concentrations greater than the Office of Environmental Health Hazard Assessment's (OEHHA's) most protective Advisory Tissue Level (ATL) of 0.07 ug/g methylmercury wet weight[1] (Figure 6-14, Table 6-4), where total mercury is a surrogate for methylmercury in fish tissue (Weiner et al. 2007). OEHHA's ATLs are California's current screening values for determining the potential impairment of a body of water due to the presence of pollutants in fish tissue (Davis et al. 2009). ATLs are not size-specific. No 2016 fish tissue samples were greater than the next most protective ATL of 0.44 ug/g wet weight[1].

[1] OEHHA's two most protective methylmercury ATLs include (Klasing and Brodberg 2008):

- 0.070 ug/g wet weight − OEHHA would begin to consider advising children and women of child-bearing age to limit consumption to fewer than eight meals per month;
- 0.44 ug/g wet weight − OEHHA may recommend no consumption by children and women of child-bearing age.

Copper concentrations ranged from 0.16−0.18 ug/g wet weight on average, with the highest average concentration in brown trout, the largest fish sampled. Lead and silver concentrations were near or below MDLs for all fish sampled (Table 6-3, Figure 6-15). There are no existing advisory levels for copper, lead, or silver.

6.3.2. Gerle Creek Reservoir

One fish species (i.e., brown trout) was collected from Gerle Creek Reservoir. Fish tissue samples exhibited a total mercury concentration of 0.07 ug/g wet weight on average (Table 6-3). Four of fourteen brown trout (24% of samples), exhibited total mercury concentrations greater than OEHHA's most protective ATL of 0.07 ug/g methylmercury wet weight[1]. No samples were greater than the next most protective ATL of 0.44 ug/g wet weight[1] (Figure 6-14, Table 6-4).

The average copper concentration for brown trout collected in Gerle Creek Reservoir was 0.2 ug/g wet weight. With the exception of lead concentrations in three fish, lead and silver concentrations were below MDLs for all fish sampled (Table 6-3, Figure 6-15). There are no existing advisory levels for copper, lead, or silver.

6.3.3. Union Valley Reservoir

Five fish species (i.e., rainbow trout, brown trout, smallmouth bass, kokanee, and lake trout) were collected from Union Valley Reservoir. Fish tissue samples exhibited total mercury concentrations ranging from 0.11−0.22 ug/g wet weight on average, with the highest average concentration in smallmouth bass (Table 6-3). Just over 40% of samples, including all ten smallmouth bass samples, two of four kokanee samples, four of five lake trout samples, and the only brown trout sample, exhibited total mercury concentrations greater than OEHHA's most protective ATL of 0.07 ug/g methylmercury wet weight[1] (Figure 6-14, Table 6-4). One smallmouth bass sample was greater than the next most protective ATL of 0.44 ug/g wet weight[1], exhibiting a tissue concentration of 0.71 ug/g wet weight.

Copper concentrations ranged from 0.16−0.26 ug/g wet weight on average. With the exception of lead concentrations in five fish, lead and silver concentrations were below MDLs for all fish sampled (Table 6-3, Figure 6-15). There are no existing advisory levels for copper, lead, or silver.

6.3.4. Ice House Reservoir

Two fish species (i.e., rainbow trout and brown trout) were collected from Ice House Reservoir. Fish tissue samples exhibited total mercury concentrations ranging from 0.03−0.41 ug/g wet weight on average, with the highest average concentration in brown trout, the largest fish sampled (Table 6-3). Just over 30% of samples, including all three brown trout samples, exhibited total mercury concentrations greater than OEHHA's most protective ATL of 0.07 ug/g methylmercury wet weight[1] (Figure 6-14, Table 6-4). One

brown trout sample was also greater than the ATL of 0.44 ug/g wet weight[1], exhibiting a tissue concentration of 0.59 ug/g wet weight.

Copper concentrations ranged from 0.22−0.20 ug/g wet weight on average. With the exception of lead concentration in one brown trout, lead and silver concentrations were below MDLs for all fish sampled (Table 6-3, Figure 6-15). There are no existing advisory levels for copper, lead, or silver.

6.3.5. Camino Reservoir

Two fish species (i.e., brown trout and Lahontan cutthroat trout) were collected from Camino Reservoir. Fish tissue samples exhibited total mercury concentrations ranging from 0.04−0.05 ug/g wet weight on average (Table 6-3). One of ten brown trout samples (7% of total samples) exhibited total mercury concentrations greater than OEHHA's most protective ATL of 0.07 ug/g methylmercury wet weight[1] (Figure 6-15, Table 6-4). No samples were greater than the next most protective ATL of 0.44 ug/g wet weight[1].

Copper concentrations ranged from 0.17−0.22 ug/g wet weight on average. With the exception of lead concentration in one brown trout, lead and silver concentrations were below MDLs for all fish sampled (Table 6-3, Figure 6-17). There are no existing advisory levels for copper, lead, or silver.

6.3.6. Slab Creek Reservoir

Three fish species (i.e., rainbow trout, brown trout, and Sacramento pikeminnow) were collected from Slab Creek Reservoir. Fish tissue samples exhibited total mercury concentrations ranging from 0.03−0.25 ug/g wet weight on average (Table 6-3). By species, mercury concentrations ranged from 0.025−0.036 ug/g wet weight in rainbow trout (173−249 mm FL), 0.125−0.516 ug/g wet weight in Sacramento pikeminnow (201−461 mm FL), and 0.046−0.406 ug/g wet weight in brown trout (230−505 mm FL). Sixty-five percent of fish samples, including all of seven Sacramento pikeminnow and three of four brown trout samples, exhibited total mercury concentrations greater than OEHHA's most protective ATL of 0.07 ug/g methylmercury wet weight[1] (Figure 6-15, Table 6-4). One Sacramento pikeminnow sample was also greater than the next most protective ATL of 0.44 ug/g wet weight[1], exhibiting a tissue concentration of 0.52 ug/g wet weight.

Copper concentrations ranged from 0.16−0.24 ug/g wet weight on average. With the exception of lead concentration in one rainbow trout, fish samples exhibited lead and silver concentrations below MDLs (Table 6-3, Figure 6-17). There are no existing advisory levels for copper, lead, or silver.

Table 6-3. Fish Tissue Metals Concentrations in UARP Reservoirs.

Location	Species Common Name	2016 Samp-ling Date	Number of Fish Sampled	Mercury (Hg) (ug/g ww)			Copper (Cu) (ug/g ww)			Lead (Pb) (ug/g ww)			Silver (Ag) (ug/g ww)		
				Range		Avg [1]	Range		Avg [1]	Range		Avg [1]	Range		Avg [1]
Loon Lake Reservoir (M-1-LL)	rainbow trout	8/30	4	0.012	0.018	0.015	0.140	0.190	0.155	< 0.002	0.015	0.012	< 0.003	< 0.003	0.002
	brown trout		3	0.206	0.416	0.322	0.150	0.220	0.180	< 0.002	0.003	0.004	< 0.003	< 0.003	0.002
Gerle Creek Reservoir (M-1-GCR)	brown trout	8/31	14	0.029	0.171	0.067	0.130	0.320	0.209	< 0.002	0.011	0.031	< 0.003	< 0.003	0.002
Union Valley Reservoir (M-1-UVR)	smallmouth bass	8/30, 8/31, 9/1	10	0.076	0.713	0.219	0.120	0.200	0.156	< 0.002	0.004	0.003	< 0.003	< 0.003	0.002
	rainbow trout		18	0.011	0.049	0.017	0.140	0.250	0.182	< 0.002	0.018	0.008	< 0.003	< 0.003	0.002
	kokanee		4	0.068	0.247	0.116	0.230	0.280	0.260	< 0.002	< 0.002	0.001	< 0.003	< 0.003	0.002
	brown trout		1	0.145	0.145	0.145	0.260	0.260	0.260	< 0.002	< 0.002	0.001	< 0.003	< 0.003	0.002
	lake trout		5	0.053	0.202	0.110	0.200	0.320	0.244	< 0.002	0.017	0.023	< 0.003	< 0.003	0.002
Ice House Reservoir (M-1-IHR)	rainbow trout	8/28	5	0.013	0.042	0.030	0.200	0.240	0.216	< 0.002	< 0.002	0.001	< 0.003	< 0.003	0.002
	brown trout		3	0.255	0.585	0.409	0.180	0.240	0.203	< 0.002	0.015	0.021	< 0.003	< 0.003	0.002
Camino Reservoir (M-1-CR)	Lahontan cutthroat trout	8/30	3	0.029	0.045	0.039	0.160	0.190	0.173	< 0.002	< 0.002	0.001	< 0.003	< 0.003	0.002
	brown trout		10	0.034	0.092	0.047	0.150	0.270	0.216	< 0.002	0.017	0.008	< 0.003	< 0.003	0.002
Slab Creek Reservoir (M-1-SCR)	rainbow trout	8/31	4	0.025	0.036	0.032	0.200	0.300	0.240	< 0.002	0.005	0.006	< 0.003	< 0.003	0.002
	Sacramento pikeminnow		7	0.125	0.516	0.251	0.110	0.260	0.160	< 0.002	< 0.002	0.001	< 0.003	< 0.003	0.002
	brown trout		4	0.046	0.406	0.211	0.200	0.210	0.205	< 0.002	< 0.002	0.001	< 0.003	< 0.003	0.002

ug/g = microgram per gram
ww = wet weight
dw = dry weight

[1] Results <MDL were treated as 0.5 x MDL for the calculation of averages.

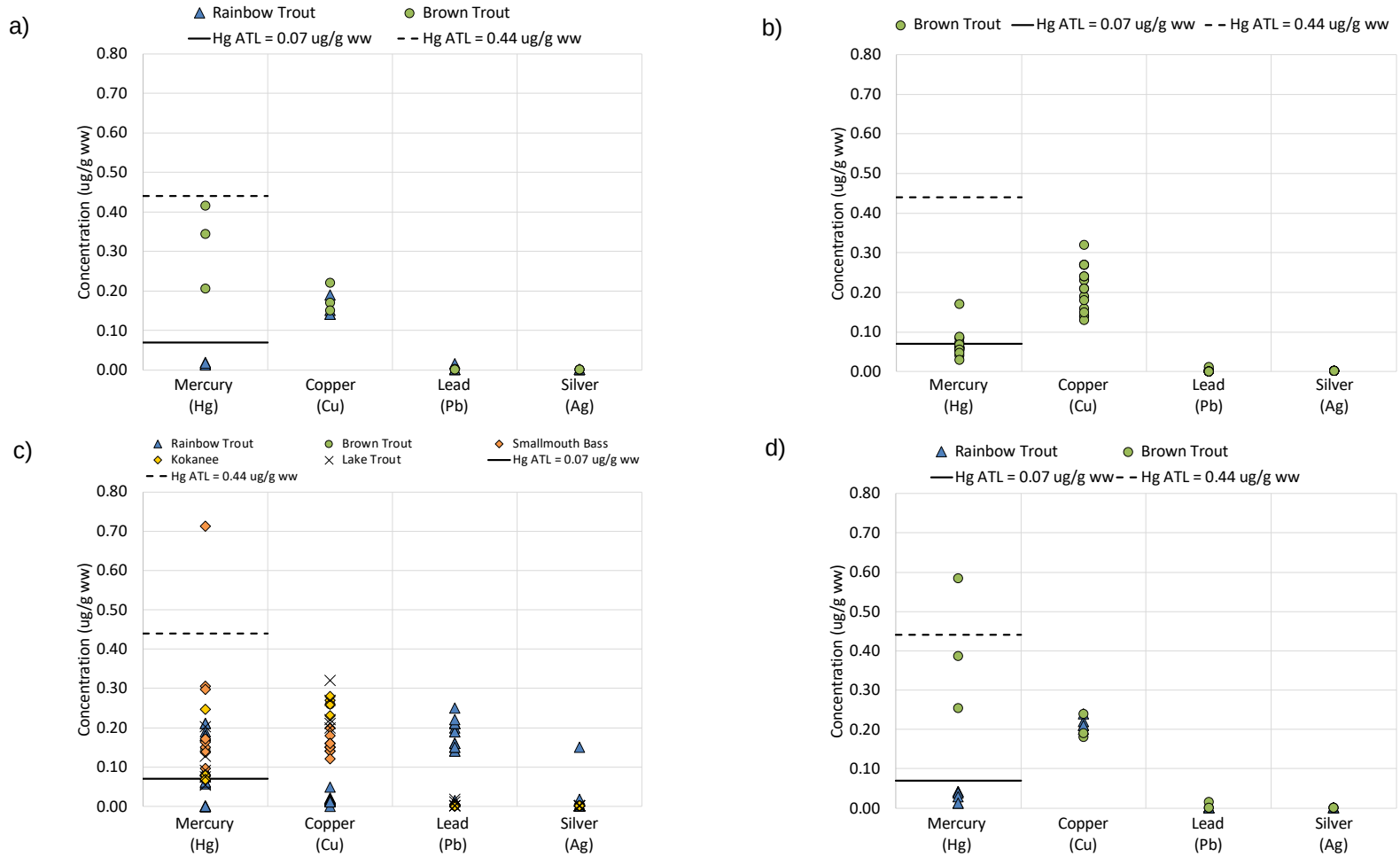

Figure 6-14. Fish tissue metals concentrations in a) Loon Lake Reservoir, b) Gerle Creek Reservoir, c) Union Valley Reservoir and d) Ice House Reservoir during August and September 2016.

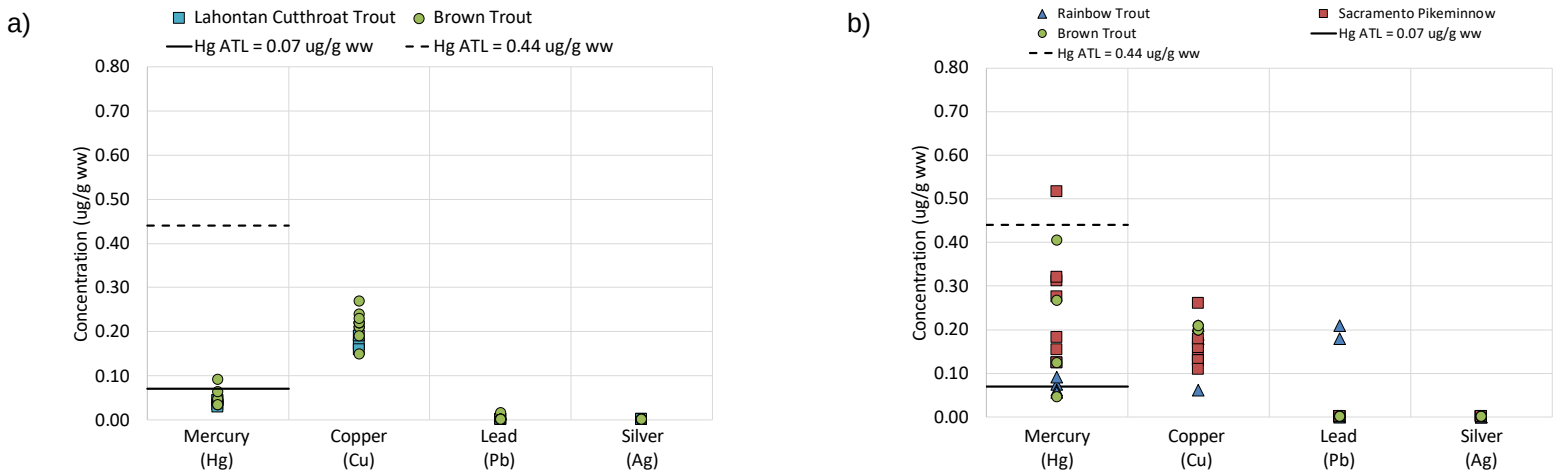

Figure 6-15. Fish tissue metals concentrations in a) Camino Reservoir and b) Slab Creek Reservoir during August and September 2016.

Table 6-4. Percentage of Fish Tissue Samples Greater Than OEHHA Methylmercury ATLs.

Location	Samples greater than 0.07 ug/g ATL[1]	Samples greater than 0.44 ug/g ATL[1]
Loon Lake Reservoir (M-1-LL)	43%	0%
Gerle Creek Reservoir (M-1-GCR)	24%	0%
Union Valley Reservoir (M-1-UVR)	44%	3%
Ice House Reservoir (M-1-IHR)	33%	11%
Camino Reservoir (M-1-CR)	7%	0%
Slab Creek Reservoir (M-1-SCR)	65%	6%

[1] ATL = Advisory Tissue Level, Office of Environmental Health Hazard Assessment (OEHHA) (Klasing and Brodberg 2008)

7.0 CONCLUSIONS

Based on 2016 *in situ* and bacteria monitoring results, riverine water quality in the UARP study area consistently met Basin Plan water quality objectives for dissolved oxygen and turbidity. There were several instances of pH measured below the Basin Plan instantaneous minimum objective (6.5 s.u.), which may be due to low buffering capacity characteristic of headwater reaches in granitic watersheds. There were no instances of pH measured above the Basin Plan instantaneous maximum objective (8.5 s.u.). Reservoir water quality was also generally good, with occasional values measured below the Basin Plan instantaneous minimum objectives for dissolved oxygen (5 mg/L) in the bottom waters of stratified reservoirs (*i.e.,* Union Valley Reservoir, Ice House Reservoir), a result that is not uncommon for deep waterbodies that have been thermally stratified for several months. As with riverine sites, there were also several instances of pH measured below the Basin Plan instantaneous minimum objective (6.5 s.u.) in surface and bottom waters. There were no instances of pH measured above the Basin Plan instantaneous maximum objective (8.5 s.u.) in reservoir waters and no instances of elevated turbidity. Despite occasional low dissolved oxygen and pH measurements, 2016 monitoring results indicate that overall, surface waters of the UARP study area support designated beneficial uses, including COLD, SPWN, and REC-1.

With the exception of Camino Reservoir, metals bioaccumulation sampling indicated that fish tissue mercury concentrations were greater than the most protective OEHHA ATL (0.07 ug/g wet weight) for 24−65% of samples, particularly for larger fish (FL>300 mm). A small number (n=3) of fish exhibited mercury concentrations greater than the next most protective ATL of 0.44 ug/g wet weight in Union Valley, Ice House, and Slab Creek reservoirs. One TL3 fish and 13 TL4 fish exceeded the SWRCB's proposed WQO (0.2 ug/g) in Loon Lake, Union Valley, Ice House, and Slab Creek reservoirs.

Copper concentrations varied depending on location and species, but all were less than 0.35 ug/g wet weight. Lead and silver concentrations were generally near or below the

method detection limits (<0.002 ug/g wet weight and <0.003 ug/g wet weight, respectively). There are no existing advisory levels for copper, lead, or silver.

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APPENDIX A
In situ Vertical Profile Data for UARP Reservoir Sites

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Table A-1. *In situ* Vertical Profile Data for UARP Reservoir Sites (Spring).

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
Gerle Creek Reservoir									
R-IS-4-GC	5/17	surface	9.0	9.9	86	6	6.5	1.1	5.8
		1	9.0	9.9	85	6	6.3	1.1	
		2	8.9	9.9	85	9	6.4	1.2	
		3	8.6	9.9	85	6	6.6	1.2	
		4	8.6	9.9	85	6	6.5	1.1	
		5	8.5	9.9	84	6	6.5	1.2	
		6	8.5	9.9	84	6	6.6	1.2	
		7	8.5	9.9	84	6	6.6	1.2	
		8	8.4	9.9	84	6	6.6	1.1	
		9	8.4	9.8	84	7	6.6	2.8	
Union Valley Reservoir									
R-IS-5-UVR	4/26	surface	10.7	10.4	94	11	6.3	0.1	4.9
		1	70.7	10.4	94	11	6.4	0.1	
		2	10.7	10.4	93	11	6.4	0.0	
		3	10.3	10.4	92	10	6.5	0.1	
		4	10.1	10.3	92	10	6.5	0.2	
		5	9.9	10.4	92	10	6.4	0.1	
		6	9.2	10.7	93	10	6.5	0.1	
		7	8.9	10.7	92	10	6.4	0.0	
		8	8.6	10.7	92	10	6.3	0.0	
		9	8.4	10.8	92	10	6.2	0.0	
		10	8.2	10.8	92	10	6.1	0.0	
		11	8.1	10.8	92	10	6.0	0.0	
		12	8.0	10.8	91	9	6.0	0.1	

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
		13	7.9	10.9	92	9	6.0	0.1	
		14	7.7	10.8	91	9	5.9	0.0	
		15	7.5	10.8	90	9	6.0	0.0	
		16	7.0	10.9	89	9	6.0	0.0	
		17	6.3	10.8	88	9	6.0	0.1	
		18	6.0	10.8	87	9	6.0	0.1	
		19	5.9	10.8	86	9	5.9	0.1	
		20	5.9	10.8	86	9	5.9	0.1	
		21	5.9	10.6	85	9	5.9	0.1	
R-IS-6-UVR	4/26	surface	6.58	10.93	10.32	93.4	0.011	0.1	0.0
		1.0	6.65	10.42	10.54	94.2	0.011	0.1	
		2.0	6.52	10.21	10.34	91.9	0.011	0.4	
		3.0	6.51	10.03	10.33	91.5	0.011	0.3	
		4.0	6.62	9.36	10.48	91.4	0.011	0.2	
		5.0	6.53	8.85	10.61	91.5	0.010	0.2	
		6.0	6.50	8.33	10.73	91.4	0.010	0.3	
		7.0	6.33	8.20	10.79	91.5	0.010	0.2	
		8.0	6.21	8.14	10.82	91.3	0.010	0.3	
		9.0	6.12	8.05	10.76	90.9	0.010	0.2	
		10.0	6.14	7.64	10.74	89.8	0.010	0.2	
		11.0	6.17	7.26	10.67	88.4	0.010	0.1	
		12.0	6.06	6.97	10.66	87.8	0.010	0.1	
		13.0	6.01	6.77	10.64	87.2	0.009	0.1	
		14.0	5.95	6.69	10.63	86.9	0.009	0.0	
		15.0	5.92	6.58	10.68	87.0	0.009	0.1	
		16.0	5.86	6.47	10.62	86.3	0.009	0.0	
		17.0	5.86	6.35	10.63	86.1	0.009	0.0	
		18.0	5.89	6.12	10.64	85.7	0.009	0.0	

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
		19.0	5.88	6.04	10.61	85.3	0.009	0.1	
		20.0	5.86	6.00	10.60	85.1	0.009	0.0	
		21.0	5.86	5.93	10.59	84.8	0.010	0.1	
		22.0	5.85	5.75	10.63	84.8	0.010	0.1	
		23.0	5.81	5.57	10.58	84.0	0.010	0.0	
		24.0	5.80	5.43	10.56	83.6	0.010	0.0	
		25.0	5.79	5.40	10.52	83.2	0.010	0.0	
		26.0	5.81	5.36	10.51	82.9	0.010	0.0	
		27.0	5.82	5.27	10.49	82.7	0.010	0.0	
		28.0	5.84	5.18	10.46	82.3	0.010	0.0	
		29.0	5.86	5.17	10.46	82.3	0.010	0.0	
		30.0	5.83	5.15	10.47	82.3	0.010	0.2	
		31.0	5.78	5.10	10.41	81.7	0.010	0.1	
		32.0	5.79	5.08	10.39	81.5	0.010	0.0	
		33.0	5.81	5.06	10.38	81.4	0.010	0.1	
		34.0	5.82	5.03	10.36	81.2	0.010	0.0	
		35.0	5.84	4.99	10.36	81.1	0.010	0.0	
		36.0	5.85	4.96	10.34	80.9	0.010	0.0	
		37.0	5.87	4.96	10.31	80.7	0.010	998.1	
R-IS-7-UVR	4/26	surface	10.9	10.4	94	11	6.6	0.3	5.8
		1	10.7	10.4	94	11	6.7	0.3	
		2	10.6	10.4	93	11	6.7	0.2	
		3	10.5	10.4	93	10	6.7	0.3	
		4	10.2	10.4	92	10	6.6	0.3	
		5	10.1	10.4	93	10	6.6	0.1	
		6	9.7	10.5	92	10	6.7	0.1	
		7	9.5	10.5	92	10	6.5	0.1	
		8	9.2	10.5	92	10	6.5	0.1	
		9	8.9	10.6	92	10	6.5	0.1	

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
		10	8.2	10.7	91	9	6.4	0.1	
		11	7.6	10.8	90	9	6.3	0.0	
		12	7.4	10.8	90	9	6.2	0.0	
		13	7.1	10.8	89	9	6.2	0.0	
		14	7.0	10.8	89	9	6.1	0.1	
		15	6.9	10.8	89	9	6.1	0.1	
		16	6.7	10.8	89	9	6.1	0.0	
		17	6.3	10.8	88	9	6.0	0.0	
		18	6.3	10.8	88	9	6.0	0.1	
		19	6.3	10.8	87	9	6.0	0.0	
		20	6.1	10.8	87	9	6.0	0.0	
		21	6.0	10.8	87	9	6.0	0.0	
		22	5.8	10.8	86	9	6.0	0.0	
		23	5.7	10.8	86	9	6.0	0.1	
		24	5.6	10.8	86	9	6.0	0.1	
		25	5.6	10.7	85	9	6.0	0.0	
		26	5.4	10.7	84	9	6.0	0.1	
		27	5.3	10.6	84	9	6.0	0.1	
		28	5.3	10.6	84	9	6.0	0.1	
		29	5.3	10.6	83	9	6.0	0.0	
		30	5.3	10.6	83	9	6.0	0.0	
		31	5.3	10.6	83	9	6.0	0.1	
		32	5.2	10.6	83	9	6.0	0.0	
		33	5.2	10.5	83	9	6.0	0.1	
		34	5.1	10.5	82	9	6.0	0.1	
		35	5.1	10.5	82	9	6.0	0.1	
		36	5.1	10.4	82	9	6.0	0.1	
		37	5.0	10.4	82	9	6.0	0.0	

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
		38	5.0	10.4	81	9	6.0	0.0	
		39	5.0	10.4	81	10	6.0	0.0	
		40	4.9	10.4	81	10	5.9	0.0	
		41	4.9	10.4	81	10	5.9	0.1	
		42	4.9	10.3	81	10	5.9	0.0	
		43	4.9	10.3	81	9	5.9	0.0	
		44	4.9	10.3	80	9	5.9	0.1	
		45	4.8	10.3	80	10	5.9	0.1	
		46	4.8	10.3	80	10	5.9	201.8	
R-IS-8-UVR	4/26	surface	10.4	10.5	95	11	6.5	0.2	5.5
		1	10.4	10.5	94	11	6.5	0.2	
		2	10.3	10.5	94	11	6.5	0.2	
		3	9.8	10.5	93	11	6.6	0.2	
		4	9.8	10.5	93	11	6.4	0.2	
		5	9.7	10.5	93	11	6.4	0.2	
		6	9.7	10.5	93	11	6.4	0.2	
		7	9.6	10.5	92	11	6.4	0.3	
		8	9.5	10.5	92	10	6.4	0.2	
		9	8.1	10.7	90	10	6.8	0.1	
		10	7.8	10.7	90	10	6.4	0.1	
		11	7.5	10.8	90	10	6.2	0.0	
		12	7.5	10.7	90	10	6.1	0.0	
		13	7.3	10.8	89	10	6.0	0.1	
		14	6.9	10.8	89	10	6.0	0.0	
		15	6.8	10.8	88	10	6.0	0.1	
		16	6.5	10.9	89	10	6.0	0.1	
		17	6.4	10.8	87	10	5.9	0.0	
		18	6.1	10.7	86	10	5.9	0.0	
		19	5.9	10.7	86	10	5.9	0.0	

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
		20	5.8	10.7	86	10	5.9	0.0	
		21	5.7	10.7	85	10	5.9	0.0	
		22	5.6	10.7	85	10	5.9	0.1	
		23	5.6	10.7	85	10	5.9	0.1	
		24	5.5	10.6	84	10	5.9	0.0	
		25	5.5	10.6	84	10	5.9	0.0	
		26	5.5	10.6	84	10	5.9	0.0	
		27	5.4	10.6	84	10	5.9	0.0	
		29	5.3	10.6	84	10	5.9	0.1	
		30	5.3	10.6	83	10	5.9	0.0	
		31	5.3	10.6	83	10	6.0	0.0	
		32	5.3	10.5	83	10	5.9	0.1	
		33	5.3	10.5	83	10	5.9	472.3	
Ice House Reservoir									
R-IS-9-IHR	4/25	surface	10.2	10.0	89	10	6.7 Q	0.2	5.5
		1	10.2	10.0	89	10	6.7 Q	0.3	
		2	10.0	10.1	89	10	6.7 Q	0.3	
		3	10.1	10.1	89	10	6.7 Q	0.2	
		4	10.0	10.1	89	10	6.6 Q	0.2	
		5	8.7	10.4	89	9	6.5 Q	0.1	
		6	7.5	10.7	89	8	6.4 Q	0.2	
		7	7.3	10.7	89	8	6.3 Q	0.2	
		8	6.5	10.9	88	8	6.2 Q	0.2	
		9	5.8	10.9	87	8	6.2 Q	0.1	
		10	5.7	10.9	87	8	6.2 Q	0.1	
		11	5.5	10.9	86	8	6.2 Q	0.1	
		12	5.4	10.8	86	8	6.2 Q	0.1	
		13	5.4	10.8	85	8	6.2 Q	0.1	

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
		14	5.4	10.8	85	8	6.3 Q	0.0	
		15	5.3	10.7	85	8	6.3 Q	0.0	
		16	5.3	10.7	84	8	6.3 Q	0.2	
		17	5.2	10.6	84	8	6.3 Q	0.1	
		18	5.1	10.6	83	8	6.3 Q	0.0	
		19	5.1	10.5	82	8	6.3 Q	0.0	
		20	5.0	10.4	82	8	6.3 Q	0.0	
		21	5.0	10.4	81	8	6.3 Q	0.1	
		22	5.0	10.3	81	8	6.3 Q	0.0	
		23	4.9	10.3	80	8	6.3 Q	0.1	
		24	4.9	10.3	80	8	6.3 Q	0.1	
		25	4.9	10.2	80	8	6.3 Q	0.1	
		26	4.9	10.2	80	8	6.3 Q	0.0	
		27	4.9	10.2	80	8	6.3 Q	0.0	
		28	4.9	10.2	80	8	6.3 Q	0.1	
		29	4.9	10.2	80	8	6.3 Q	1.2	
		30	4.9	10.2	79	8	6.3 Q	2.6	
		31	4.9	10.1	79	8	6.4 Q	0.8	
		32	4.9	10.1	79	8	6.4 Q	1.4	
		33	4.9	10.1	79	8	6.4 Q	0.2	
		34	4.9	10.1	79	8	6.4 Q	0.3	
		35	4.9	10.0	78	8	6.4 Q	1.7	
R-IS-10-IHR	4/25	surface	9.9	10.7	94	10	7.6 Q	0.3	5.5
		1	9.9	10.4	92	10	7.4 Q	0.3	
		2	9.9	10.3	91	10	7.3 Q	0.3	
		3	9.8	10.2	90	9	7.3 Q	0.4	
		4	9.7	10.3	90	9	7.2 Q	0.2	
		5	9.7	10.2	90	9	7.2 Q	0.3	
		6	9.4	10.3	90	9	7.2 Q	0.3	

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
		7	9.1	10.4	90	9	7.1 Q	0.4	
		8	8.5	10.5	90	9	7.0 Q	0.3	
		9	7.7	10.7	90	8	7.0 Q	0.2	
		10	6.8	10.8	89	8	6.7 Q	0.2	
		11	6.6	10.9	88	8	6.6 Q	0.1	
		12	6.4	10.9	88	8	6.5 Q	0.2	
		13	6.0	10.8	87	8	6.5 Q	0.1	
		14	5.9	10.9	87	8	6.5 Q	0.1	
		15	5.8	10.8	86	8	6.5 Q	0.1	
		16	5.6	10.7	85	8	6.4 Q	225.4	
R-IS-11-IHR	4/25	surface	9.8	10.5	92	10	7.7 Q	0.2	5.5
		1	9.7	10.3	91	10	7.4 Q	0.2	
		2	9.6	10.3	90	9	7.4 Q	0.3	
		3	9.5	10.2	90	9	7.3 Q	0.2	
		4	9.4	10.2	89	9	7.3 Q	0.3	
		5	9.2	10.3	89	9	7.2 Q	0.3	
		6	8.0	10.6	89	9	7.2 Q	0.3	
		7	7.3	10.8	90	9	7.1 Q	0.2	
		8	7.1	11.0	90	9	6.8 Q	0.3	
		9	6.8	11.0	90	9	6.7 Q	0.2	
		10	6.3	11.0	89	8	6.8 Q	0.2	
		11	5.9	11.0	88	8	6.6 Q	0.1	
		12	5.8	11.0	88	8	6.6 Q	0.1	
		13	5.8	10.8	87	8	6.5 Q	0.1	
		14	5.7	10.8	86	8	6.5 Q	0.1	
		15	5.5	10.8	85	8	6.6 Q	0.1	
		16	5.4	10.7	85	8	6.6 Q	0.1	
		17	5.2	10.6	84	8	6.5 Q	0.0	

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
		18	5.1	10.6	83	8	6.5 Q	0.1	
		19	5.1	10.5	82	8	6.5 Q	0.1	
		20	5.0	10.4	82	8	6.5 Q	0.1	
		21	4.9	10.4	82	8	6.5 Q	0.1	
		22	4.9	10.3	80	8	6.5 Q	0.1	
		23	4.9	10.3	80	8	6.5 Q	0.0	
		24	4.9	10.3	80	8	6.5 Q	0.0	
		25	4.9	10.2	80	8	6.5 Q	304.2	
Junction Reservoir									
R-IS-12-JR	4/25	surface	7.8	10.7	90	12	6.2 Q	0.1	5.5
		1	7.8	10.7	90	12	6.1 Q	0.0	
		2	7.7	10.7	90	12	6.1 Q	0.0	
		3	7.5	10.7	89	12	6.1 Q	0.0	
		4	7.0	10.8	89	11	6.1 Q	0.0	
		5	6.1	10.9	88	11	6.1 Q	0.1	
		6	5.9	10.9	87	11	6.1 Q	0.0	
		7	5.6	11.0	87	11	6.1 Q	0.0	
		8	5.6	11.0	87	10	6.0 Q	0.0	
		9	5.3	11.0	87	10	6.1 Q	0.1	
		10	5.3	11.0	87	10	6.1 Q	0.1	
		11	5.2	11.0	87	10	6.1 Q	0.1	
		12	5.2	11.1	87	10	6.1 Q	0.1	
		13	5.2	11.1	87	10	6.2 Q	0.1	
		14	5.2	11.1	87	10	6.2 Q	0.1	
		15	5.1	11.1	87	10	6.2 Q	0.1	
		16	5.1	11.1	87	10	6.2 Q	0.1	
		17	5.1	11.1	87	10	6.3 Q	0.1	
		18	5.1	11.1	87	10	6.3 Q	0.1	
		19	5.0	11.1	87	10	6.3 Q	0.1	

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
		20	5.0	11.1	87	10	6.2 Q	0.1	
		21	5.0	11.1	87	10	6.2 Q	470.0	
Camino Reservoir									
R-IS-13-CR	4/28	surface	6.1	12.0	97	11 Q	4.4	0.2	8.0
		1	6.1	12.0	97	11 Q	4.3	0.1	
		2	6.1	12.0	97	11 Q	4.2	0.1	
		3	6.1	12.0	97	11 Q	4.3	0.0	
		4	6.1	12.0	97	11 Q	4.3	0.0	
		5	6.1	12.0	97	11 Q	4.3	0.0	
		6	6.1	12.0	97	11 Q	4.3	0.0	
		7	6.1	12.0	97	11 Q	4.3	0.0	
		8	6.1	12.0	97	11 Q	4.3	0.0	
		9	6.1	12.0	97	11 Q	4.2	0.0	
		10	6.1	12.0	97	11 Q	4.3	424.7	
Slab Creek Reservoir									
R-IS-14-SC	4/27	surface	7.9	12.0	101	23	5.5	0.6	4.3
		1	7.8	12.0	101	23	5.5	0.7	
		2	7.8	12.0	100	23	5.6	0.7	
		3	7.8	12.0	100	23	5.6	0.7	
		4	7.7	12.0	100	23	5.5	0.9	
		5	7.7	12.0	100	23	5.6	0.7	
		6	7.7	12.0	100	23	5.6	0.2	
		7	7.7	12.0	100	23	5.6	0.1	
		8	7.6	12.0	100	23	5.6	5.6	
R-IS-15-SC	4/27	surface	10.3	11.5	102	21	6.1	0.8	3.3
		1	10.3	11.5	102	21	6.1	0.9	
		2	10.3	11.5	102	21	6.0	0.9	
		3	9.6	11.5	101	21	6.1	0.9	

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
		4	10.3	11.5	101	21	6.1	0.9	
		5	10.0	11.5	102	21	6.0	0.9	
		6	9.0	11.5	101	21	6.0	1.1	
		7	8.6	11.5	100	21	6.0	1.1	
		8	8.5	11.5	101	21	6.0	1.1	
		9	8.4	11.6	99	22	6.0	1.0	
		10	8.4	11.6	99	22	5.8	1.0	
		11	8.4	11.6	99	22	5.8	1.0	
		12	8.3	11.7	99	22	5.8	1.1	
		13	8.2	11.7	99	22	5.8	1.1	
		14	8.2	11.7	99	21	5.9	1.0	
		15	8.2	11.7	99	21	5.8	1.1	
		16	8.1	11.7	99	21	5.8	1.0	
		17	8.1	11.7	99	21	5.8	1.0	
		18	8.1	11.7	99	20	5.8	1.1	
		19	8.0	11.7	99	20	5.7	1.0	
		20	8.0	11.7	99	20	5.8	1.1	
		21	8.0	11.7	99	20	5.8	1.0	
		22	8.0	11.7	99	20	5.8	1.1	
		23	8.0	11.7	99	20	5.9	0.9	
		24	8.0	11.7	99	20	5.8	0.9	
		25	7.9	11.7	98	20	5.9	1.0	
		26	7.9	11.7	98	20	5.9	1.0	
		27	7.9	11.7	98	20	5.8	0.9	
		28	7.9	11.7	98	20	5.9	1.0	
		29	7.9	11.6	98	20	5.9	1.2	
		30	7.8	11.6	98	21	5.9	1.3	
		31	7.8	11.6	98	21	5.8	1.2	

°C = degrees Celsius

m = meter
mg/L = milligrams per liter
s.u = standard unit of pH
uS/cm = microsiemens per centimeter
NTU = Nephelometric Turbidity Unit
“Q” indicates data qualified based on post-sampling calibration check (see Appendix E).

Table A-2. *In situ* Vertical Profile Data for UARP Reservoir Sites (Fall).

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
Loon Lake									
R-IS-1-LL	10/26	surface	10.6	8.8	79	14	4.8	1.8	5.2
		1	10.6	8.7	78	13	4.8	1.8	
		2	10.6	8.7	78	12	5.0	1.8	
		3	10.5	8.7	78	11	5.2	1.9	
		4	10.5	8.7	78	11	5.2	1.8	
		5	10.5	8.7	78	11	5.3	1.9	
		6	10.5	8.7	78	11	5.4	1.9	
		7	10.5	8.7	78	11	5.6	1.9	
		8	10.5	8.7	78	13	5.6	1.9	
		9	10.5	8.7	78	9	6.3	1.9	
		10	10.5	8.6	77	12	6.4	1.9	
		11	10.5	8.6	77	9	6.4	2.1	
		12	10.5	8.6	77	9	6.4	1.9	
		13	10.5	8.6	77	9	6.4	1.9	
		14	10.5	8.6	77	9	6.4	2.4	
		15	10.5	8.6	77	9	6.5	1.9	
		16	10.5	8.6	77	9	6.4	1.9	
		17	10.4	8.6	77	9	6.5	1.9	
		18	10.1	8.5	76	9	6.5	1.9	
		19	10.2	8.5	76	8	6.5	2.1	
		20	10.1	8.3	74	9	6.4	2.0	
		21	9.8	8.3	73	9	6.4	2.1	
		22	9.8	8.0	71	9	6.3	2.3	
		23	9.7	8.0	70	8	6.1	2.7	
		24	9.7	7.7	68	31	5.9	66.0	
R-IS-2-LL	10/26	surface	10.7	9.0	80	9	6.3	2.5	3.7
		1	10.7	8.7	78	9	6.5	1.9	

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
		2	10.7	8.7	78	9	6.5	1.9	
		3	10.8	8.7	78	9	6.5	1.8	
		4	10.7	8.7	78	9	6.5	2.3	
		5	10.7	8.7	78	9	6.5	1.9	
		6	10.7	8.7	78	9	6.5	1.9	
		7	10.7	8.7	78	9	6.5	1.9	
		8	10.7	8.6	77	9	6.5	1.9	
		9	10.7	8.6	78	9	6.6	1.9	
		10	10.7	8.6	78	11	6.5	2.1	
		11	10.7	8.6	78	9	6.6	1.9	
		12	10.7	8.6	78	9	6.6	1.9	
		13	10.7	8.7	78	9	6.6	1.9	
		14	10.7	8.6	77	9	6.6	1.9	
		15	10.7	8.6	77	9	6.6	1.9	
		16	10.7	8.6	77	12	6.5	1.9	
		17	10.7	8.6	77	9	6.6	1.9	
		18	10.7	8.6	77	9	6.6	1.9	
		19	10.7	8.6	77	9	6.6	1.9	
		19	10.7	8.6	77	9	6.6	1.9	
		20	10.7	8.5	77	9	6.6	1.9	
		21	10.7	8.5	77	8	6.6	3.1	
		22	10.7	8.4	54	9	6.6	2.2	
		23	10.7	7.5	67	9	6.5	3.0	
		24	10.7	7.8	67	18	6.4	432.0	
R-IS-3-LL	10/26	surface	10.8	8.8	79	9	6.6	1.9	7.3
		1	10.7	8.7	78	9	6.6	1.9	
		2	10.7	8.7	78	9	6.6	1.9	
		3	10.7	8.6	78	9	6.6	1.9	

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
		4	10.7	8.6	78	9	6.6	1.9	
		5	10.7	8.6	77	9	6.6	1.8	
		6	10.6	8.6	77	12	6.6	1.9	
		7	10.6	8.6	77	11	6.6	2.2	
		8	10.6	8.6	77	9	6.6	1.9	
		9	10.6	8.6	77	9	6.6	1.9	
		10	10.6	8.6	77	9	6.6	1.9	
		11	10.6	8.6	77	9	6.6	2.0	
		12	10.6	8.5	77	9	6.7	8.1	
Union Valley Reservoir									
R-IS-5-UVR	10/25	surface	14.6	8.9	87	16 Q	6.2	1.8	4.3
		1	14.6	8.4	82	15 Q	6.6	1.4	
		2	14.5	8.4	82	15 Q	6.6	1.4	
		3	14.4	8.4	82	18 Q	6.7	1.4	
		4	14.3	8.4	82	15 Q	6.7	1.4	
		5	14.3	8.4	82	15 Q	6.7	1.4	
		6	14.2	8.4	82	15 Q	6.7	1.5	
		7	14.2	8.4	82	15 Q	6.7	1.4	
		8	13.7	8.5	81	16 Q	6.7	4.3	

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
R-IS-6-UVR	10/25	surface	14.6	8.7	85	17 Q	7.0	1.3	4.6
		1	14.7	8.2	80	16 Q	6.3	1.2	
		2	14.7	8.2	80	16 Q	6.2	1.3	
		3	14.6	8.1	80	16 Q	6.1	1.3	
		4	14.6	8.1	80	17 Q	6.0	1.3	
		5	14.6	8.1	80	15 Q	6.0	1.3	
		6	14.7	8.1	80	15 Q	6.0	1.3	
		7	14.6	8.1	80	15 Q	6.0	1.3	
		8	14.6	8.1	79	15 Q	6.0	1.3	
		9	14.6	8.1	79	15 Q	6.0	1.3	
		10	14.6	8.0	79	15 Q	6.0	1.3	
		11	14.6	8.0	79	15 Q	6.0	1.3	
		12	14.6	8.0	79	15 Q	6.0	1.3	
		13	14.6	8.0	79	17 Q	6.1	1.3	
		14	14.6	8.0	79	15 Q	6.1	1.3	
		15	14.6	8.0	79	15 Q	6.1	1.3	
		16	14.6	8.0	79	15 Q	6.1	1.3	
		17	14.6	8.0	79	15 Q	6.1	1.4	
		18	14.6	8.0	79	15 Q	6.1	1.3	
		19	14.6	8.0	79	15 Q	6.1	1.3	
		20	14.6	8.0	78	15 Q	6.2	1.3	
		21	14.6	7.9	78	15 Q	6.2	1.3	
		22	14.5	7.9	77	18 Q	6.2	1.4	
		23	14.1	7.9	77	17 Q	6.2	1.4	
		24	13.9	7.6	74	15 Q	6.1	1.4	
		25	13.8	7.6	73	16 Q	6.1	1.4	
R-IS-7-UVR	10/25	surface	14.7	8.9	88	16 Q	6.6	1.2	4.0
		1	14.7	8.3	82	16 Q	6.7	1.3	

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
		2	14.7	8.3	82	15 Q	6.7	1.3	
		3	14.7	8.2	81	15 Q	6.8	1.4	
		4	14.7	8.2	81	15 Q	6.8	1.4	
		5	14.7	8.2	81	15 Q	6.7	1.4	
		6	14.7	8.2	81	15 Q	6.7	1.4	
		7	14.7	8.2	81	15 Q	6.7	1.3	
		8	14.7	8.2	81	15 Q	6.7	1.4	
		9	14.7	8.2	80	14 Q	6.7	1.4	
		10	14.7	8.2	80	14 Q	6.7	1.3	
		11	14.7	8.2	80	15 Q	6.7	1.3	
		12	14.7	8.2	80	14 Q	6.7	1.3	
		13	14.7	8.2	80	14 Q	6.7	1.3	
		14	14.7	8.1	80	14 Q	6.7	1.4	
		15	14.7	8.1	80	14 Q	6.7	1.4	
		16	14.7	8.1	80	14 Q	6.7	1.4	
		17	14.7	8.1	80	14 Q	6.7	1.4	
		18	14.7	8.1	80	14 Q	6.7	1.4	
		19	14.6	8.1	80	14 Q	6.7	1.4	
		20	14.6	8.1	80	14 Q	6.7	1.4	
		21	14.6	8.1	79	15 Q	6.7	1.4	
		22	14.4	8.1	79	17 Q	6.7	1.4	
		23	14.2	8.0	78	15 Q	6.7	1.4	
		24	14.1	7.9	77	15 Q	6.7	1.5	
		25	14.0	7.9	77	15 Q	6.7	1.5	
		26	13.8	7.9	76	15 Q	6.6	1.5	
		27	13.6	7.8	75	15 Q	6.6	1.6	
		28	13.5	7.7	74	15 Q	6.6	1.5	
		29	13.4	7.7	73	15 Q	6.6	1.5	
		30	13.3	7.6	72	15 Q	6.6	1.6	

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
		31	13.2	7.5	72	18 Q	6.6	1.6	
		32	13.0	6.2	59	52 Q	6.2	12.3	
R-IS-8-UVR	10/25	surface	14.6	8.7	85	17 Q	6.4	1.3	4.9
		1	14.6	8.7	85	16 Q	6.6	1.3	
		2	14.6	8.1	80	16 Q	6.6	1.4	
		3	14.6	8.1	79	16 Q	6.6	1.3	
		4	14.6	8.0	79	16 Q	6.6	1.4	
		5	14.6	8.0	79	15 Q	6.6	1.3	
		6	14.6	8.0	78	15 Q	6.6	1.3	
		7	14.6	7.9	78	15 Q	6.6	1.3	
		8	14.6	7.9	78	15 Q	6.6	1.3	
		9	14.6	7.9	78	15 Q	6.6	1.4	
		10	14.6	7.9	78	15 Q	6.6	1.3	
		11	14.6	7.9	78	17 Q	6.6	1.3	
		12	14.6	7.9	78	16 Q	6.6	1.3	
		13	14.6	7.9	77	14 Q	6.6	1.3	
		14	14.6	7.9	77	14 Q	6.6	1.3	
		15	14.6	7.9	78	14 Q	6.6	1.3	
		16	14.6	7.9	78	14 Q	6.6	1.4	
		17	14.6	7.9	78	14 Q	6.6	1.4	
		18	14.6	7.9	78	14 Q	6.6	1.4	
		19	14.6	7.9	78	14 Q	6.6	1.4	
		20	14.6	7.9	77	14 Q	6.6	1.4	
		21	14.6	7.8	77	14 Q	6.6	1.4	
		22	14.5	7.8	77	14 Q	6.6	1.3	
		23	14.5	7.8	76	14 Q	6.6	1.3	
		24	14.4	7.7	75	17 Q	6.6	1.3	
		25	14.2	7.8	76	16 Q	6.6	1.4	

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
		26	14.0	7.1	69	14 Q	6.5	1.2	
		27	13.9	6.9	57	14 Q	6.5	1.2	
		28	13.8	6.8	66	14 Q	6.5	1.3	
		29	13.5	6.8	65	16 Q	6.5	1.1	
		30	13.3	6.7	64	15 Q	6.4	1.2	
		31	13.2	6.7	66	14 Q	6.4	1.1	
		32	13.1	6.7	64	14 Q	6.4	1.2	
		33	13.0	6.7	64	14 Q	6.4	1.2	
		34	13.0	6.7	63	14 Q	6.4	1.2	
		35	12.8	6.6	62	16 Q	6.3	1.1	
		36	12.7	6.5	61	14 Q	6.3	1.1	
		37	12.6	6.5	61	14 Q	6.3	1.0	
		38	12.5	6.5	61	14 Q	6.3	1.1	
		39	12.5	6.7	63	14 Q	6.2	1.2	
		40	12.4	6.7	62	14 Q	6.2	1.0	
		41	12.2	6.6	61	14 Q	6.2	1.0	
		42	12.2	6.5	61	14 Q	6.1	1.0	
		43	12.1	6.5	60	14 Q	6.1	1.0	
		44	12.0	6.4	59	14 Q	6.0	1.0	
		45	11.9	6.4	60	17 Q	6.0	1.0	
		46	11.9	6.4	60	16 Q	6.0	1.0	
		47	11.7	6.4	59	14 Q	5.9	0.9	
		48	11.6	6.4	59	14 Q	6.0	1.0	
		49	11.6	6.3	58	14 Q	6.0	1.0	
		50	11.5	6.3	58	15 Q	6.0	1.0	
		51	11.6	6.3	57	14 Q	6.0	1.0	
		52	11.4	6.2	57	14 Q	6.0	0.9	
		53	11.3	6.1	56	14 Q	6.0	0.9	
		54	11.0	5.9	53	15 Q	5.9	183.0	

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
Ice House Reservoir									
R-IS-9-IHR	10/25	surface	12.4	9.0	84	16 Q	6.2	1.6	5.8
		1	12.5	8.7	81	13 Q	6.4	1.6	
		2	12.5	8.6	81	13 Q	6.5	1.4	
		3	12.5	8.6	80	12 Q	6.5	1.3	
		4	12.5	8.6	80	12 Q	6.5	1.3	
		5	12.5	8.6	80	12 Q	6.6	1.3	
		6	12.5	8.5	80	12 Q	6.6	1.4	
		7	12.5	8.5	80	12 Q	6.6	1.4	
		8	12.5	8.5	80	11 Q	6.6	1.3	
		9	12.5	8.5	80	11 Q	6.6	1.4	
		10	12.5	8.5	80	11 Q	6.6	1.3	
		11	12.5	8.5	80	11 Q	6.6	1.3	
		12	12.5	8.5	80	15 Q	6.6	1.3	
		13	12.4	8.5	79	11 Q	6.6	2.2	
		14	12.3	8.5	79	11 Q	6.6	1.4	
		15	12.3	8.4	78	11 Q	6.6	1.3	
		16	12.0	8.4	77	11 Q	6.6	1.3	
		17	11.5	8.3	76	11 Q	6.6	1.4	
		18	11.2	8.0	73	11 Q	6.5	1.5	
		19	10.8	7.6	68	11 Q	6.5	1.5	
		20	10.3	7.1	63	11 Q	6.4	13.2	
R-IS-10-IHR	10/27	surface	12.4	8.5	80	16 Q	6.4	1.0	5.2
		1	12.5	8.5	79	12 Q	6.5	1.4	
		2	12.5	8.7	81	12 Q	6.6	1.3	
		3	12.5	8.6	81	11 Q	6.6	1.3	
		4	12.5	8.6	80	11 Q	6.6	1.3	
		5	12.5	8.6	80	11 Q	6.6	1.3	

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
		6	12.5	8.5	80	11 Q	6.6	1.4	
		7	12.5	8.5	80	11 Q	6.6	1.3	
		8	12.5	8.5	80	11 Q	6.6	1.3	
		9	12.5	8.5	80	11 Q	6.6	1.3	
		10	12.5	8.5	80	10 Q	6.7	1.4	
		11	12.5	8.5	80	14 Q	6.6	1.4	
		12	12.5	8.5	80	10 Q	6.6	2.5	
		13	12.5	8.5	80	10 Q	6.7	1.5	
		14	12.5	8.5	80	10 Q	6.7	10.0	
R-IS-11-IHR	10/27	surface	12.5	9.0	84	15 Q	6.5	1.0	4.9
		1	12.6	9.0	81	11 Q	6.7	2.4	
		2	12.6	8.6	81	11 Q	6.7	1.4	
		3	12.6	8.6	80	10 Q	6.7	1.4	
		4	12.6	8.5	80	10 Q	6.7	1.4	
		5	12.6	8.5	80	10 Q	6.8	1.3	
		6	12.6	8.5	80	10 Q	6.7	1.3	
		7	12.6	8.5	80	10 Q	6.8	1.3	
		8	12.6	8.5	80	10 Q	6.8	1.3	
		9	12.6	8.5	80	10 Q	6.8	1.6	
		10	12.6	8.5	80	10 Q	6.7	1.3	
		11	12.6	8.5	80	14 Q	6.7	1.3	
		12	12.6	8.5	80	13 Q	6.7	1.3	
		13	12.5	8.4	79	10 Q	6.7	2.2	
		14	12.5	8.4	79	10 Q	6.7	1.4	
		15	12.5	8.3	78	10 Q	6.8	1.3	
		16	12.3	8.2	76	10 Q	6.8	1.3	
		17	11.3	7.8	70	10 Q	6.7	1.4	
		18	10.6	6.9	61	10 Q	6.6	1.5	
		19	10.3	6.4	57	10 Q	6.6	1.5	

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
		20	9.9	6.1	54	10 Q	6.5	1.6	
		21	9.5	5.8	50	11 Q	6.4	1.5	
		22	8.6	5.4	46	11 Q	6.3	1.4	
		23	8.2	5.0	42	15 Q	6.3	1.4	
		24	8.0	5.0	42	14 Q	6.2	1.4	
		25	7.9	4.6	39	11 Q	6.1	1.5	
		26	7.7	4.5	37	11 Q	6.0	1.4	
		27	7.7	4.4	37	11 Q	6.0	1.4	
		28	7.7	4.4	37	11 Q	6.0	1.5	
		29	7.6	4.3	36	11 Q	6.0	1.6	
		30	7.5	3.9	32	12 Q	6.0	1.9	
		31	7.4	3.5	29	12 Q	5.9	2.1	
		32	7.3	3.0	25	13 Q	5.9	2.5	
		33	7.2	2.3	19	14 Q	5.9	2.8	
		34	7.2	1.8	15	14 Q	5.8	3.1	
		35	7.2	1.7	14	17 Q	5.9	3.1	
		36	7.2	1.3	11	15 Q	5.8	6.0	

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
Junction Reservoir									
R-IS-12-JR	10/27	surface	11.3	9.3	85	20 Q	5.8	3.7	6.1
		1	11.3	9.5	87	18 Q	5.5	1.2	
		2	11.3	9.5	87	18 Q	5.5	1.1	
		3	11.3	9.5	87	17 Q	5.5	1.1	
		4	11.3	9.5	87	17 Q	5.5	1.1	
		5	11.3	9.5	87	17 Q	5.6	1.1	
		6	11.3	9.5	87	17 Q	5.6	1.1	
		7	11.3	9.5	87	17 Q	5.6	1.1	
		8	11.3	9.5	87	17 Q	5.7	1.1	
		9	11.2	9.5	87	17 Q	5.7	1.1	
		10	11.2	9.5	86	20 Q	5.7	1.1	
		11	11.2	9.5	86	19 Q	5.8	1.1	
		12	11.2	9.5	86	17 Q	5.8	1.3	
		13	11.2	9.4	86	17 Q	5.8	1.3	
		14	11.2	9.4	86	17 Q	5.8	1.1	
		15	11.2	9.4	86	17 Q	5.8	1.2	
		16	11.2	9.4	86	17 Q	5.8	1.1	
		17	11.1	9.4	86	17 Q	5.9	1.2	
		18	10.6	9.5	85	18 Q	5.9	1.2	
		19	10.2	9.5	84	18 Q	5.9	1.8	
		20	10.1	9.5	84	19 Q	5.9	103.8	
Camino Reservoir									
R-IS-13-CR	10/24	surface	11.0	10.5	95	17	6.6	0.7	4.9
		1	11.0	10.5	95	17	6.6	0.7	
		2	11.0	10.5	95	17	6.6	0.7	
		3	11.0	10.5	95	17	6.5	0.7	
		4	11.0	10.5	95	17	6.5	0.6	
		5	11.0	10.5	95	17	6.5	0.7	

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
		6	11.0	10.5	95	17	6.5	0.7	
Slab Creek Reservoir									
R-IS-14-SC	10/24	surface	11.1	10.3	94	25 Q	7.2	1.9	3.0
		1	11.1	10.8	98	25 Q	6.9	2.3	
		2	11.1	10.8	98	25 Q	6.9	2.5	
		3	11.1	10.8	99	25 Q	6.8	2.3	
		4	11.0	10.9	98	25 Q	6.8	2.4	
		5	11.0	10.8	98	26 Q	6.7	3.4	
S-15-SC	10/24	surface	12.7	10.0	94	28 Q	6.8	4.7	2.1
		1	12.6	9.9	93	28 Q	6.8	5.0	
		2	12.4	9.8	92	28 Q	6.8	5.1	
		3	12.2	9.7	90	28 Q	6.8	5.5	
		4	12.1	9.6	89	28 Q	6.8	5.7	
		5	12.0	9.6	89	28 Q	6.8	5.9	
		6	12.0	9.6	88	28 Q	6.8	6.1	
		7	11.9	9.5	88	28 Q	6.8	6.3	
		8	11.7	9.5	88	28 Q	6.8	9.5	
		9	11.6	9.6	89	28 Q	6.7	9.7	
		10	11.5	10.0	92	26 Q	6.7	12.2	
		11	11.5	10.1	93	26 Q	6.7	11.6	
		12	11.4	10.1	93	26 Q	6.7	9.3	
		13	11.3	10.2	94	26 Q	6.7	7.4	
		14	11.3	10.3	94	26 Q	6.7	7.3	
		15	11.3	10.3	94	25 Q	6.7	7.8	
		16	11.3	10.3	94	25 Q	6.7	7.2	
		17	11.2	10.3	94	25 Q	6.6	7.6	
		18	11.2	10.3	94	24 Q	6.6	7.6	
		19	11.2	10.3	94	24 Q	6.6	7.3	

Site ID	2016 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	pH (s.u.)	Turbidity (NTU)	Secchi disk (m)
		20	11.2	10.3	94	25 Q	6.5	7.3	
		21	11.2	10.3	94	24 Q	6.5	6.2	
		22	11.1	10.3	94	24 Q	6.5	6.0	
		23	11.1	10.3	93	24 Q	6.5	5.9	
		24	11.1	10.3	93	24 Q	6.5	5.4	
		25	11.1	10.3	93	24 Q	6.5	5.3	
		26	11.1	10.2	93	25 Q	6.5	4.9	
		27	11.1	10.2	93	25 Q	6.5	4.6	
		28	11.0	10.2	92	25 Q	6.6	4.8	
		29	11.0	10.2	92	24 Q	6.6	4.7	
		30	11.0	10.2	92	27 Q	6.6	4.3	
		31	11.0	10.2	92	26 Q	6.6	4.3	
		32	10.9	10.0	90	25 Q	6.6	4.8	
		33	10.9	9.7	87	27 Q	6.5	129.9	

°C = degrees Celsius
m = meter
mg/L = milligrams per liter
s.u = standard unit of pH
uS/cm = microsiemens per centimeter
NTU = Nephelometric Turbidity Unit
"Q" indicates data qualified based on post-sampling calibration check (see Appendix E).

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APPENDIX B
Bacteria Results for UARP Reservoir and Riverine Sites

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Table B-1. Bacteria (MPN/100mL) for UARP Sites During the 30-day Period Surrounding Independence Day.

Site ID	Sample 1		Sample 2		Sample 3		Sample 4		Sample 5		Fecal coliform geometric mean [1]	*E. coli* geometric mean [1]
	Fecal coliform	*E. coli*	Fecal coliform	*E. coli*	Fecal coliform	*E. coli*	Fecal coliform	*E. coli*	Fecal coliform	*E. coli*		
Bac-5-GCR	<1.8	3.1	17.0	18.5	11.0	<1	2.0	2.0	6.8	6.3	4.7	3.2
Bac-6-GCR	<1.8	<1	33.0	35.9	4.5	10.9	4.5	5.2	<1.8	<1	3.5	3.5
Bac-7-UVR	13.0	8.6	<1.8	<1	<1.8	<1	<1.8	<1	2.0	<1	1.8	0.9
Bac-8-UVR	<1.8	<1	<1.8	9.7	<1.8	<1	<1.8	<1	<1.8	<1	0.9	0.9
Bac-9-UVR	<1.8	<1	<1.8	1.0	2.0	1.0	4.5	2.0	2.0	<1	1.7	0.9
Bac-10-UVR	4.5	1.0	<1.8	3.0	<1.8	<1	<1.8	1.0	11.0	<1	2.0	0.9
Bac-11-JR	7.8	5.3	4.0	6.2	23.0	21.6	17.0	21.6	<1.8	8.6	6.4	10.6
Bac-12-IHR	<1.8	1.0	2.0	1.0	4.5	<1	<1.8	1.0	<1.8	<1	1.5	0.8
Bac-13-IHR	<1.8	<1	2.0	3.1	2.0	<1	4.5	<1	<1.8	2.0	1.7	1.0
Bac-14-BCR	2.0	<1	7.8	2.0	<1.8	<1	94.0	6.3	4.0	1.0	5.6	1.3
Bac-15-SCR	<1.8	<1	<1.8	1.0	17.0	12.0	49.0	2.0	4.5	2.0	5.0	1.9
MDL	1.8	1.0	1.8	1.0	1.8	1.0	1.8	1.0	1.8	1.0	–	–
MRL	1.8	1.0	1.8	1.0	1.8	1.0	1.8	1.0	1.8	1.0	–	–

[1] Individual results <MDL were treated as 0.5 x MDL for the geometric mean calculations.

MDL = method detection limit
MRL = method reporting limit

Table B-2. Bacteria (MPN/100mL) for UARP Sites During the 30-day Period Surrounding Labor Day.

Site ID	Sample 1		Sample 2		Sample 3		Sample 4		Sample 5		Fecal coliform geometric mean [1]	*E. coli* geometric mean [1]
	Fecal coliform	*E. coli*	Fecal coliform	*E. coli*	Fecal coliform	*E. coli*	Fecal coliform	*E. coli*	Fecal coliform	*E. coli*		
Bac-1-BI	<1.8	<1	<1.8	<1	<1.8	1.0	<1.8	<1	<1.8	<1	0.9	0.6
Bac-2-BI	<1.8	<1	<1.8	<1	<1.8	<1	<1.8	<1	<1.8	<1	0.9	0.5
Bac-3-LL	<1.8	<1	<1.8	<1	<1.8	<1	<1.8	<1	<1.8	<1	0.9	0.5
Bac-4-LL	<1.8	<1	<1.8	<1	2.0	<1	<1.8	<1	<1.8	<1	1.1	0.5
MDL	1.8	1.0	1.8	1.0	1.8	1.0	1.8	1.0	1.8	1.0	–	–
MRL	1.8	1.0	1.8	1.0	1.8	1.0	1.8	1.0	1.8	1.0	–	–

[1] Individual results <MDL were treated as 0.5 x MDL for the geometric mean calculations.

MDL = method detection limit
MRL = method reporting limit

APPENDIX C
Metals Bioaccumulation Results for UARP Reservoir Sites

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Table C-1. Fish tissue metals concentrations for UARP reservoirs.

Species Common Name	2016 Sampling Date	Fork Length (mm)	Weight (g)	Mercury (Hg)			% Moisture for Cu, Pb, Ag	Copper (Cu)		Lead (Pb)		Silver (Ag)	
				% Moisture	ug/g ww	ug/g dw		ug/g ww	ug/g dw	ug/g ww	ug/g dw	ug/g ww	ug/g dw
LOON LAKE (M-1-LL)													
Rainbow trout	8/30	198	170.0	80%	0.018	0.090	79%	0.14	0.69	< 0.002	< 0.01	< 0.003	< 0.02
		204	85.0	79%	0.014	0.068	79%	0.19	0.87	< 0.002	< 0.01	< 0.003	< 0.02
		370	610.0	77%	0.012	0.052	77%	0.15	0.64	< 0.002	< 0.01	< 0.003	< 0.02
		373	595.0	81%	0.017	0.089	77%	0.14	0.64	0.015	0.07	< 0.003	< 0.02
Brown trout	8/30	450	1,115.0	76%	**0.344**	1.440	75%	0.22	0.90	0.003	0.01	< 0.003	< 0.02
		436	900.0	77%	**0.206**	0.888	76%	0.17	0.70	< 0.002	< 0.01	< 0.003	< 0.02
		496	1,310.0	77%	**0.416**	1.790	76%	0.15	0.62	< 0.002	< 0.01	< 0.003	< 0.02
GERLE CREEK RESERVOIR (M-1-GCR)													
Brown trout	8/31	182	84.0	79%	0.062, 0.054	0.294, 0.256	77%	0.32	1.41	< 0.002	< 0.01	< 0.003	< 0.02
		300	305.0	77%	0.060	0.255	75%	0.27	1.10	< 0.002	< 0.01	< 0.003	< 0.02
		282	220.0	78%	0.058	0.264	77%	0.23	0.97	< 0.002	< 0.01	< 0.003	< 0.02
		312	305.0	78%	0.060	0.269	77%	0.24	1.03	0.004	0.02	< 0.003	< 0.02
		280	275.0	79%	**0.084**	0.394	78%	0.19	0.85	0.003	0.01	< 0.003	< 0.02
		300	290.0	78%	0.057	0.257	77%	0.16	0.71	0.011	0.05	< 0.003	< 0.02
		295	345.0	79%	0.041	0.192	78%	0.21	0.95	< 0.002	< 0.01	< 0.003	< 0.02
		283	365.0	78%	**0.073**	0.327	77%	0.27	1.13	< 0.002	< 0.01	< 0.003	< 0.02
		276	210.0	79%	**0.171**	0.799	78%	0.14	0.64	< 0.002	< 0.01	< 0.003	< 0.02
		266	195.0	78%	**0.088**	0.396	78%	0.14, 0.13	0.57, 0.64	< 0.002	< 0.01	< 0.003	< 0.02
		280	260.0	77%	0.069	0.297	76%	0.24	1.00	< 0.002	< 0.01	< 0.003	< 0.02
		254	215.0	78%	0.055	0.244	78%	0.21, 0.18	0.79, 0.92	< 0.002	< 0.01	< 0.003	< 0.02
		300	330.0	76%	0.047	0.196	75%	0.27	1.06	< 0.002	< 0.01	< 0.003	< 0.02
		225	129.0	79%	0.029	0.138	79%	0.15	0.71	< 0.002	< 0.01	< 0.003	< 0.02

Species Common Name	2016 Sampling Date	Fork Length (mm)	Weight (g)	Mercury (Hg)			% Moisture for Cu, Pb, Ag	Copper (Cu)		Lead (Pb)		Silver (Ag)	
				% Moisture	ug/g ww	ug/g dw		ug/g ww	ug/g dw	ug/g ww	ug/g dw	ug/g ww	ug/g dw
UNION VALLEY RESERVOIR (M-1-UVR)													
Smallmouth bass	8/30, 9/1	226	182.8	80%	**0.097**	0.474	79%	0.14	0.65	< 0.002	< 0.01	< 0.003	< 0.02
		172	75.4	80%	**0.076**	0.377	78%	0.20	0.91	0.004	0.02	< 0.003	< 0.02
		170	68.4	81%	**0.078**	0.407	79%	0.15	0.70	< 0.002	< 0.01	< 0.003	< 0.02
		382	935.0	78%	***0.713***	3.180	77%	0.15	0.63	< 0.002	< 0.01	< 0.003	< 0.02
		330	630.0	79%	**0.306**	1.460	77%	0.14	0.60	< 0.002	< 0.01	< 0.003	< 0.02
		275	310.0	81%	**0.150**	0.773	79%	0.18	0.83	< 0.002	< 0.01	< 0.003	< 0.02
		285	350.0	78%	**0.163**	0.748	78%	0.16	0.74	< 0.002	< 0.01	< 0.003	< 0.02
		240	220.0	80%	**0.171**	0.838	79%	0.12	0.58	< 0.002	< 0.01	< 0.003	< 0.02
		240	160.0	82%	**0.297**	1.660	82%	0.15	0.82	< 0.002	< 0.01	< 0.003	< 0.02
		205	120.0	79%	**0.137**	0.667	79%	0.16	0.74	< 0.002	< 0.01	< 0.003	< 0.02
Rainbow trout	8/31, 9/1	230	172.2	79%	0.017	0.081	78%	0.20	0.93	< 0.002	< 0.01	< 0.003	< 0.02
		253	155.3	77%	0.049	0.217	76%	0.25	1.04	0.011	0.05	< 0.003	< 0.02
		270	255.0	78%	0.016	0.073	77%	0.14	0.64	< 0.002	< 0.01	< 0.003	< 0.02
		275	650.0	77%	0.017	0.073	76%	0.16	0.65	< 0.002	< 0.01	< 0.003	< 0.02
		327	415.0	78%	0.021	0.094	76%	0.14	0.59	< 0.002	< 0.01	< 0.003	< 0.02
		330	355.0	78%	0.019	0.087	78%	0.19	0.84	< 0.002	< 0.01	< 0.003	< 0.02
		335	385.0	79%	0.013	0.063	78%	0.16	0.72	< 0.002	< 0.01	< 0.003	< 0.02
		360	675.0	78%	0.018	0.079	77%	0.21	0.93	< 0.002	< 0.01	< 0.003	< 0.02
		327	375.0	78%	0.012	0.053	77%	0.19	0.82	< 0.002	< 0.01	< 0.003	< 0.02
		330	555.0	77%	0.017	0.074	76%	0.21	0.85	< 0.002	< 0.01	< 0.003	< 0.02
		225	139.7	80%	0.016	0.080	78%	0.21	0.92	0.018	0.08	< 0.003	< 0.02
		315	380.0	78%	0.017	0.078	77%	0.15	0.63	< 0.002	< 0.01	< 0.003	< 0.02
		360	610.0	75%	0.018	0.073	75%	0.16	0.64	< 0.002	< 0.01	< 0.003	< 0.02
		306	330.0	78%	0.013	0.058	77%	0.21	0.92	< 0.002	< 0.01	< 0.003	< 0.02
		295	280.0	79%	0.013, 0.014	0.061, 0.066	78%	0.18	0.84	< 0.002	< 0.01	< 0.003	< 0.02
		350	480.0	80%	0.015	0.077	77%	0.15	0.64	< 0.002	< 0.01	< 0.003	< 0.02

Species Common Name	2016 Sampling Date	Fork Length (mm)	Weight (g)	Mercury (Hg)			% Moisture for Cu, Pb, Ag	Copper (Cu)		Lead (Pb)		Silver (Ag)	
				% Moisture	ug/g ww	ug/g dw		ug/g ww	ug/g dw	ug/g ww	ug/g dw	ug/g ww	ug/g dw
		333	405.0	78%	0.011	0.049	77%	0.22	0.93	< 0.002	< 0.01	< 0.003	< 0.02
		335	460.0	76%	0.015	0.062	75%	0.15	0.61	< 0.002	< 0.01	< 0.003	< 0.02
Kokanee	8/31, 9/1	211	113.0	73%	0.068	0.25	73%	0.27	1.01	< 0.002	< 0.01	< 0.003	< 0.02
		209	111.5	73%	**0.080**	0.298	72%	0.23	0.81	< 0.002	< 0.01	< 0.003	< 0.02
		211	115.5	73%	0.069	0.260	72%	0.26	0.94	< 0.002	< 0.01	< 0.003	< 0.02
		212	128.6	65%	**0.247**	0.700	69%	0.28	0.88	< 0.002	< 0.01	< 0.003	< 0.02
Brown trout	9/1	486	133.5	78%	**0.145**	0.656	77%	0.26	1.11	< 0.002	< 0.01	< 0.003	< 0.02
Lake trout	8/31	647	4,310.0	72%	**0.202**	0.714	71%	0.32	1.10	< 0.002	< 0.01	< 0.003	< 0.02
		508	1,580.0	78%	**0.128**	0.579	78%	0.21	0.93	0.017	0.07	< 0.003	< 0.02
		385	690.0	77%	**0.075**	0.333	74%	0.20	0.78	0.011	0.04	< 0.003	< 0.02
		364	545.0	76%	0.053	0.218	76%	0.22	0.92	< 0.002	< 0.01	< 0.003	< 0.02
		278	175.0	80%	**0.092**	0.451	79%	0.27	1.25	< 0.002	< 0.01	< 0.003	< 0.02
ICE HOUSE RESERVOIR (M-1-IHR)													
Rainbow trout	8/29	284	230.0	80%	0.041, 0.042	0.202, 0.207	79%	0.20	0.99	< 0.002	< 0.01	< 0.003	< 0.02
		264	180.0	79%	0.039	0.187	79%	0.21	0.96	< 0.002	< 0.01	< 0.003	< 0.02
		271	280.0	78%	0.013	0.059	78%	0.22	1.01	< 0.002	< 0.01	< 0.003	< 0.02
		273	210.0	79%	0.029	0.138	77%	0.21	0.91	< 0.002	< 0.01	< 0.003	< 0.02
		385	740.0	78%	0.013	0.060	76%	0.24	0.97	< 0.002	< 0.01	< 0.003	< 0.02
Brown trout	8/29	586	2,125.0	76%	**0.387**	1.640	76%	0.18	0.75	< 0.002	< 0.01	< 0.003	< 0.02
		440	1,290.0	76%	**0.255**	1.080	75%	0.19	0.75	0.015	0.06	< 0.003	< 0.02
		410	955.0	78%	***0.585***	2.610	77%	0.24	1.05	< 0.002	< 0.01	< 0.003	< 0.02

Species Common Name	2016 Sampling Date	Fork Length (mm)	Weight (g)	Mercury (Hg)			% Moisture for Cu, Pb, Ag	Copper (Cu)		Lead (Pb)		Silver (Ag)	
				% Moisture	ug/g ww	ug/g dw		ug/g ww	ug/g dw	ug/g ww	ug/g dw	ug/g ww	ug/g dw
CAMINO RESERVOIR (M-1-CR)													
Lahontan cutthroat trout	8/30	233	140.7	79%	0.045, 0.045	0.213, 0.211	78%	0.17	0.74	< 0.002	< 0.01	< 0.003	< 0.02
		225	112.6	80%	0.035	0.176	78%	0.16	0.78	< 0.002	< 0.01	< 0.003	< 0.02
		225	139.7	78%	0.029	0.134	77%	0.19	0.82	< 0.002	< 0.01	< 0.003	< 0.02
Brown trout	8/30	275	200.0	78%	0.038	0.174	77%	0.21	0.92	< 0.002	< 0.01	< 0.003	< 0.02
		245	165.0	77%	0.034	0.150	76%	0.15	0.61	< 0.002	< 0.01	< 0.003	< 0.02
		266	225.0	77%	0.038	0.166	76%	0.21	0.88	< 0.002	< 0.01	< 0.003	< 0.02
		247	180.0	77%	0.040	0.174	75%	0.27	1.10	< 0.002	< 0.01	< 0.003	< 0.02
		245	180.0	78%	0.042	0.189	77%	0.19	0.81	0.017	0.07	< 0.003	< 0.02
		247	180.0	77%	0.044, 0.044	0.195, 0.195	77%	0.22	0.95	< 0.002	< 0.01	< 0.003	< 0.02
		300	350.0	77%	**0.092**	0.407	76%	0.22	0.91	< 0.002	< 0.01	< 0.003	< 0.02
		278	250.0	78%	0.048	0.221	77%	0.22	0.97	< 0.002	< 0.01	< 0.003	< 0.02
		285	280.0	78%	0.064	0.286	77%	0.24	1.03	< 0.002	< 0.01	< 0.003	< 0.02
		305	340.0	78%	0.034	0.154	76%	0.23	0.98	< 0.002	< 0.01	< 0.003	< 0.02
SLAB CREEK RESERVOIR (M-1-1SCR)													
Rainbow trout	8/31	188	65.0	78%	0.033	0.149	77%	0.20	0.89	< 0.002	< 0.01	< 0.003	< 0.02
		173	60.0	77%	0.035	0.152	75%	0.30	1.23	0.005	0.02	< 0.003	< 0.02
		195	80.0	78%	0.025	0.112	76%	0.20	0.86	< 0.002	< 0.01	< 0.003	< 0.02
		249	180.0	78%	0.036	0.161	77%	0.26	1.12	< 0.002	< 0.01	< 0.003	< 0.02
Sacramento pikeminnow	8/31	461	970.0	77%	***0.516***	2.270	77%	0.14	0.60	< 0.002	< 0.01	< 0.003	< 0.02
		311	280.0	81%	**0.312, 0.320**	1.640, 1.680	79%	0.13	0.62	< 0.002	< 0.01	< 0.003	< 0.02
		296	235.0	82%	**0.276**	1.570	80%	0.13, 0.11	0.55, 0.66	< 0.002	< 0.01	< 0.003	< 0.02
		286	190.0	81%	**0.182**	0.937	78%	0.17	0.78	< 0.002	< 0.01	< 0.003	< 0.02
		238	120.0	79%	**0.125**	0.590	78%	0.16	0.73	< 0.002	< 0.01	< 0.003	< 0.02
		230	95.0	81%	**0.125**	0.647	79%	0.26	1.26	< 0.002	< 0.01	< 0.003	< 0.02
		201	75.0	79%	**0.155**	0.747	79%	0.18	0.86	< 0.002	< 0.01	< 0.003	< 0.02

Species Common Name	2016 Sampling Date	Fork Length (mm)	Weight (g)	Mercury (Hg)			% Moisture for Cu, Pb, Ag	Copper (Cu)		Lead (Pb)		Silver (Ag)	
				% Moisture	ug/g ww	ug/g dw		ug/g ww	ug/g dw	ug/g ww	ug/g dw	ug/g ww	ug/g dw
Brown trout	8/31	505	1,415.0	77%	**0.267**	1.180	76%	0.20	0.82	< 0.002	< 0.01	< 0.003	< 0.02
		386	605.0	77%	**0.124**	0.538	76%	0.21	0.89	< 0.002	< 0.01	< 0.003	< 0.02
		230	125.0	78%	0.046	0.211	78%	0.20	0.89	< 0.002	< 0.01	< 0.003	< 0.02
		241	145.0	77%	**0.406**	1.800	77%	0.21	0.90	< 0.002	< 0.01	< 0.003	< 0.02

ug/g= micrograms per gram
ww= wet weight
dw= dry weight
Bold indicates values that are greater than the Office of Environmental Health Hazard Assessment's (OEHHA's) Advisory Tissue Level (ATL) of 0.07 ug/g methylmercury wet weight (Klasing and Brodberg 2008).
Bold and italic indicates values that are greater than OEHHA's ATL of 0.44 ug/g wet weight (Klasing and Brodberg 2008).

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APPENDIX D
In situ Field Data Sheets

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Note: Datasheet format for 2016 changed after the February survey. Disregard conductivity (us/cm), turbidimeter, and Secchi disk results.

Stillwater Sciences

SMUD In Situ Monitoring in the Upper American River Project and Chili Bar Project

Page 1 of 3

Instrument(s) used: YSI 6920 **Personnel:** KKC + BTH

Site Location: IS - 10 - SFSC UTM (NAD27):
Date: 2/8/2016 Time: 10:05 AM
Photos: Upstream - [redacted] - Downstream Weather: Sunny, Cool
Notes:

In situ

Temp	DO		Conductivity		pH	Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notes
(C)	(mg/l)	(%)	mS/cm	µS/cm		NTU	NTU	m	
3.58	10.89	82.1	0.015	9.0	5.46	[redacted]	—	0.5	Bottom

Site Location: IS-12-SC UTM (NAD27):
Date: 2/8/2016 Time: 10:50AM
Photos: [redacted] US - DS Weather: Sunny, Cool
Notes:

In situ

Temp	DO		Conductivity		pH	Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notes
(C)	(mg/l)	(%)	mS/cm	µS/cm		NTU	NTU	m	
3.15	10.58	79.0	0.021	12.0	6.78	0.6	—	0.25	Bottom

Site Location: IS - 11 - SFSC UTM (NAD27):
Date: 2/8/2016 Time: 11:10 AM
Photos: US - DS Weather: Sunny, Cool
Notes:

In situ

Temp	DO		Conductivity		pH	Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notes
(C)	(mg/l)	(%)	mS/cm	µS/cm		NTU	NTU	m	
4.71	10.9	82.2	0.025	16.0	6.67	0.1	—	0.5	Bottom

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

Instrument(s) used: YSI 6920 **Crew:** BTH + KKC

Site Location: IS-13-SC GPS:
Date: 2/8/2016 Time: 11:50 AM
Photos: US-DS Weather: Sunny, warm
Notes:

In situ

Temp	DO		Conductivity	Specific Conductance	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(mS/cm)	(s.u.)	(NTU)	
6.33	11.1	90.1	20.0	0.032	6.82	.8	secchi disk: .5 m bottom

Site Location: IS-14-SC GPS:
Date: 2/8/2016 Time: 12:20 PM
Photos: US-DS Weather: Sunny, warm
Notes:

In situ

Temp	DO		Conductivity	Specific Conductance	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(mS/cm)	(s.u.)	(NTU)	
6.66	10.78	88.4	34.0	0.053	6.96	.7	secchi disk: .25 m bottom

Site Location: IS-16-SFAR GPS:
Date: 2/8/2016 Time: 2:00 PM
Photos: US-DS Weather: Sunny, cool
Notes:

In situ

Temp	DO		Conductivity	Specific Conductance	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(mS/cm)	(s.u.)	(NTU)	
4.85	10.82	84.4	25.0	0.046	7.08	.9	secchi disk: 1.5 m bottom

Stillwater Sciences

SMUD In Situ Monitoring in the Upper American River Project and Chili Bar Project

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Instrument(S) used: YSI 6920 **Personnel:** BTH + KKC

Site Location: IS-18-SFAR UTM (NAD27):
Date: 2/8/2016 Time: 2:15PM
Photos: US-DS Weather: Sunny, Cool
Notes:

In situ

Temp	DO		Conductivity		pH	Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notes
(C)	(mg/l)	(%)	mS/cm	µS/cm		NTU	NTU	m	
6.20	11.46	92.8	0.099	64.0	6.96	1.1	—	1m	Bottom

Site Location: IS-17-BC UTM (NAD27):
Date: 2/8/2016 Time: 3:00PM
Photos: US-DS Weather: Sunny, Cool
Notes:

In situ

Temp	DO		Conductivity		pH	Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notes
(C)	(mg/l)	(%)	mS/cm	µS/cm		NTU	NTU	m	
7.06	10.75	88.7	0.043	28.0	6.85	46.0	—	0.1	Muddy, Choc Brown

Site Location: IS-19-SFAR UTM (NAD27):
Date: 2/8/2016 Time: 4:15PM
Photos: US-DS Weather: Sunny, Cool
Notes:

In situ

Temp	DO		Conductivity		pH	Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notes
(C)	(mg/l)	(%)	mS/cm	µS/cm		NTU	NTU	m	
4.99	11.56	90.9	0.056	34.0	7.07	4.9	—	0.5	Bottom

Note: Datasheet format for 2016 changed after the February survey. Disregard conductivity (µs/cm), turbidimeter, and secchi disk results.

Stillwater Sciences

SMUD In Situ Monitoring in the Upper American River Project and Chili Bar Project

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Instrument(S) used: YSI 6920 **Personnel:** BTH + KKC

Site Location: IS-6-GC UTM (NAD27):
Date: 2/9/16 Time: 11:38
Photos: us/ds Weather: sunny, warm 65°F
Notes:

In situ

Temp	DO		Conductivity		pH	Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notes
(C)	(mg/l)	(%)	mS/cm	µS/cm		NTU	NTU	m	
2.08	11.56	83.7	0.010	5	5.85	2.0	–	0.25	bottom

Site Location: IS-5-GCC UTM (NAD27):
Date: 2/9/16 Time: 12:12
Photos: us/ds Weather: sunny, warm
Notes:

In situ

Temp	DO		Conductivity		pH	Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notes
(C)	(mg/l)	(%)	mS/cm	µS/cm		NTU	NTU	m	
2.28	11.33	82.6	0.007	4	6.04	0.2	–	2 m	bottom

Site Location: IS-18-SFAR UTM (NAD27):
Date: 2/9/16 Time: 13:50
Photos: us/ds Weather: sunny, warm, 70°F
Notes:

In situ

Temp	DO		Conductivity		pH	Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notes
(C)	(mg/l)	(%)	mS/cm	µS/cm		NTU	NTU	m	
7.71	11.73	98.4	0.047	31	6.83	1.6	–	1.5m	bottom

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Date: 4/25/16
Time: 10:10 AM

Reservoir - Water Quality Vertical Profiles

Instrument used: YSI 6920
Water depth: 102 ft

Site Location: UARP - R-IS-9-IHR
Lat/Long (NAD83): _____

Secchi (ft): 18ft

Personnel: BTH + KKC

Site Notes: Cloudy, light snow, cold, slight breeze

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		10.19	10.04	89.3	0.01	6.70	0.2		
3.3	1	10.20	10.03	89.3	0.01	6.69	0.3		
6.6	2	10.03	10.05	89.4	0.01	6.69	0.3		
9.8	3	10.11	10.05	89.3	0.01	6.68	0.2		
13.1	4	10.02	10.05	89.1	0.01	6.64	0.2		
16.4	5	8.71	10.38	89.2	0.009	6.50	0.1		
19.7	6	7.50	10.65	88.8	0.008	6.37	0.2		
23.0	7	7.30	10.70	88.7	0.008	6.25	0.2		
26.2	8	6.52	10.87	88.4	0.008	6.23	0.2		
29.5	9	5.82	10.91	87.1	0.008	6.21	0.1		
32.8	10	5.69	10.89	86.8	0.008	6.19	0.1		
36.1	11	5.49	10.86	86.1	0.008	6.20	0.1		
39.4	12	5.44	10.84	85.7	0.008	6.21	0.1		
42.7	13	5.42	10.80	85.4	0.008	6.24	0.1		
45.9	14	5.36	10.76	84.9	0.008	6.25	0.0		
49.2	15	5.30	10.72	84.5	0.008	6.27	0.0		
52.5	16	5.25	10.67	84.1	0.008	6.32	0.2		
55.8	17	5.23	10.62	83.6	0.008	6.31	0.1		
59.1	18	5.14	10.59	83.2	0.008	6.31	0.0		
62.3	19	5.06	10.50	82.3	0.008	6.31	0.0		
65.6	20	4.99	10.44	81.6	0.008	6.32	0.0		
68.9	21	4.97	10.43	81.1	0.008	6.31	0.1		
72.2	22	4.95	10.33	80.8	0.008	6.29	0.0		
75.5	23	4.93	10.29	80.4	0.008	6.29	0.1		
78.7	24	4.92	10.25	80.0	0.008	6.32	0.1		
82.0	25	4.92	10.22	79.9	0.008	6.27	0.1		
85.3	26	4.92	10.20	79.7	0.008	6.30	0.0		
88.6	27	4.92	10.19	79.6	0.008	6.31	0.0		
91.9	28	4.92	10.19	79.6	0.008	6.32	0.1		
95.1	29	4.91	10.19	79.6	0.008	6.32	1.2		
98.4	30	4.91	10.15	79.3	0.008	6.31	2.6		
101.7	31	4.91	10.14	79.2	0.008	6.35	0.8		
105.0	32	4.91	10.13	79.1	0.008	6.38	1.4		
108.3	33	4.91	10.12	79.1	0.008	6.41	0.2		
111.5	34	4.91	10.12	79.0	0.008	6.35	0.3		
	35	4.91	10.04	78.4	0.008	6.39	1.7		

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

Date: 4/25/16
Time: 11:30 AM

Reservoir - Water Quality Vertical Profiles

Instrument used: 45169 20
Water depth: 56 ft

Site Location: UARP R-IS-10-IHR
Lat/Long (NAD83):

Secchi (ft): 18

Personnel: BTH + KKC

Site Notes: Snowing, Cold, windy

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		9.89	10.73	94.3	0.01	7.59	0.3		
3.3	1	9.93	10.42	92.1	0.01	7.42	0.3		
6.6	2	9.93	10.26	90.6	0.01	7.30	0.3		
9.8	3	9.82	10.24	90.3	0.009	7.27	0.4		
13.1	4	9.73	10.25	90.2	0.009	7.18	0.2		
16.4	5	9.72	10.23	90.0	0.009	7.16	0.3		
19.7	6	9.36	10.34	90.1	0.009	7.22	0.3		
23.0	7	9.09	10.39	90.0	0.009	7.06	0.4		
26.2	8	8.53	10.54	90.1	0.009	7.02	0.3		
29.5	9	7.67	10.70	89.6	0.008	6.95	0.2		
32.8	10	6.80	10.81	88.6	0.008	6.73	0.2		
36.1	11	6.56	10.86	88.4	0.008	6.63	0.1		
39.4	12	6.38	10.85	87.9	0.008	6.54	0.2		
42.7	13	6.01	10.84	87.1	0.008	6.53	0.1		
45.9	14	5.87	10.89	87.2	0.008	6.50	0.1		
49.2	15	5.77	10.78	86.0	0.008	6.45	0.1		
52.5	16	5.57	10.74	85.1	0.009	6.43	225.4		BOTTOM
55.8	17								
59.1	18								
62.3	19								
65.6	20								
68.9	21								
72.2	22								
75.5	23								
78.7	24								
82.0	25								
85.3	26								
88.6	27								
91.9	28								
95.1	29								
98.4	30								
101.7	31								
105.0	32								
108.3	33								
111.5	34								

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Date: 4/25/16
Time: 12:15 PM

Reservoir - Water Quality Vertical Profiles

Instrument used: 451 6920
Water depth: 85 ft
Secchi (ft): 18 ft

Site Location: UARP R-IS-11-IHR
Lat/Long (NAD83):

Personnel: BTH + KKC

Site Notes: Partly cloudy, cold, light breeze, lightly snowing

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		9.77	10.51	92.4	0.01	7.69	0.2		
3.3	1	9.72	10.29	90.5	0.01	7.44	0.2		
6.6	2	9.60	10.26	89.9	0.009	7.43	0.3		
9.8	3	9.53	10.24	89.8	0.009	7.31	0.2		
13.1	4	9.42	10.23	89.4	0.009	7.33	0.3		
16.4	5	9.20	10.28	89.4	0.009	7.24	0.3		
19.7	6	8.03	10.58	89.4	0.009	7.16	0.3		
23.0	7	7.28	10.84	90.0	0.009	7.14	0.2		
26.2	8	7.11	10.95	90.4	0.009	6.83	0.3		
29.5	9	6.77	11.01	90.2	0.009	6.73	0.2		
32.8	10	6.30	11.01	89.2	0.008	6.75	0.2		
36.1	11	5.92	10.97	87.9	0.008	6.64	0.1		
39.4	12	5.82	11.00	88.0	0.008	6.58	0.1		
42.7	13	5.76	10.84	86.5	0.008	6.52	0.1		
45.9	14	5.67	10.79	85.9	0.008	6.51	0.1		
49.2	15	5.52	10.76	85.3	0.008	6.55	0.1		
52.5	16	5.35	10.71	84.6	0.008	6.57	0.1		
55.8	17	5.24	10.62	83.6	0.008	6.52	0.0		
59.1	18	5.14	10.55	82.9	0.008	6.51	0.1		
62.3	19	5.05	10.47	82.0	0.008	6.52	0.1		
65.6	20	4.98	10.41	81.5	0.008	6.54	0.1		
68.9	21	4.89	10.44	81.5	0.008	6.54	0.1		
72.2	22	4.88	10.31	80.4	0.008	6.48	0.1		
75.5	23	4.86	10.28	80.2	0.008	6.46	0.0		
78.7	24	4.85	10.27	80.0	0.008	6.48	0.0		
82.0	25	4.85	10.24	79.9	0.008	6.49	304.2		BOTTOM
85.3	26								
88.6	27								
91.9	28								
95.1	29								
98.4	30								
101.7	31								
105.0	32								
108.3	33								
111.5	34								

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

Date: 4/25/16
Time: 2:45 PM

Reservoir - Water Quality Vertical Profiles

Instrument used: 451 6920
Site Location: UARP R-IS-12-JR
Water depth: 82 ft
Lat/Long (NAD83):
Secchi (ft): 18 ft

Personnel: BTH + KKC

Site Notes: Partly cloudy, Cold, very windy

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		7.78	10.70	90.3	0.012	6.24	0.1		
3.3	1	7.81	10.72	90.1	0.012	6.14	0.0		
6.6	2	7.74	10.70	89.7	0.012	6.10	0.0		
9.8	3	7.52	10.71	89.4	0.012	6.13	0.0		
13.1	4	7.01	10.77	88.7	0.011	6.09	0.0		
16.4	5	6.12	10.86	87.5	0.011	6.07	0.1		
19.7	6	5.85	10.90	87.1	0.011	6.06	0.0		
23.0	7	5.60	10.97	87.2	0.011	6.08	0.0		
26.2	8	5.55	10.96	87.0	0.010	6.04	0.0		
29.5	9	5.32	11.00	86.8	0.010	6.10	0.1		
32.8	10	5.26	11.02	86.9	0.010	6.11	0.1		
36.1	11	5.22	11.04	86.9	0.010	6.12	0.1		
39.4	12	5.20	11.05	87.0	0.010	6.13	0.1		
42.7	13	5.18	11.05	86.9	0.010	6.16	0.1		
45.9	14	5.16	11.06	86.9	0.010	6.18	0.1		
49.2	15	5.09	11.06	86.8	0.010	6.19	0.1		
52.5	16	5.08	11.07	86.9	0.010	6.21	0.1		
55.8	17	5.08	11.06	86.8	0.010	6.26	0.1		
59.1	18	5.06	11.07	86.8	0.010	6.28	0.1		
62.3	19	5.04	11.08	86.8	0.010	6.27	0.1		
65.6	20	5.04	11.07	86.7	0.010	6.20	0.1		
68.9	21	5.00	11.05	86.5	0.010	6.23	470.0		* Difference in depth due to drift
72.2	22								
75.5	23								
78.7	24								
82.0	25								
85.3	26								
88.6	27								
91.9	28								
95.1	29								
98.4	30								
101.7	31								
105.0	32								
108.3	33								
111.5	34								

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Date: 4/26/16
Time: 12:00 PM

Reservoir - Water Quality Vertical Profiles

Instrument used: YSI 6920
Water depth: 65 ft
Secchi (ft): 16 ft

Site Location: UARP-R-IS-5-UVR
Lat/Long (NAD83):

Personnel: KKC + BTH

Site Notes: Partly cloudy, slight breeze, cool

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		10.74	10.40	93.7	0.011	6.32	0.1		
3.3	1	10.73	10.37	93.5	0.011	6.36	0.1		PH #2 = 6.68
6.6	2	10.66	10.35	93.1	0.011	6.40	0.0		
9.8	3	10.31	10.35	92.2	0.010	6.51	0.1		
13.1	4	10.09	10.34	91.8	0.010	6.45	0.2		
16.4	5	9.90	10.38	91.8	0.010	6.41	0.1		PH #2 = 6.13
19.7	6	9.20	10.66	92.7	0.010	6.49	0.1		
23.0	7	8.85	10.67	92.0	0.010	6.36	0.0		
26.2	8	8.60	10.74	91.9	0.010	6.31	0.0		
29.5	9	8.37	10.77	91.7	0.010	6.18	0.0		
32.8	10	8.19	10.81	91.7	0.010	6.08	0.0		PH #2 = 6.16
36.1	11	8.11	10.83	91.6	0.010	6.04	0.0		
39.4	12	7.99	10.83	91.4	0.009	6.02	0.1		
42.7	13	7.87	10.89	91.6	0.009	6.00	0.1		
45.9	14	7.70	10.84	90.8	0.009	5.94	0.0		
49.2	15	7.50	10.84	90.3	0.009	5.96	0.0		PH #2=5.94
52.5	16	6.99	10.85	89.3	0.009	5.99	0.0		
55.8	17	6.34	10.83	87.6	0.009	6.04	0.1		
59.1	18	6.04	10.81	86.8	0.009	5.95	0.1		
62.3	19	5.90	10.77	86.2	0.009	5.90	0.1		
65.6	20	5.86	10.77	86.2	0.009	5.88	0.1		
68.9	21	5.85	10.58	84.5	0.009	5.88	741.3		BOTTOM
72.2	22								
75.5	23								
78.7	24								
82.0	25								
85.3	26								
88.6	27								
91.9	28								
95.1	29								
98.4	30								
101.7	31								
105.0	32								
108.3	33								
111.5	34								

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Date: 4/26/16
Time: 10:30 AM

Reservoir - Water Quality Vertical Profiles

Instrument used: YSI 6920
Site Location: UARP-R-IS-6-UVR #2
Water depth:
Lat/Long (NAD83):
Secchi (ft):
Personnel: BTH + KKC
Site Notes: Sunny, Cool, Calm

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		10.93	10.32	93.4	0.011	658	0.1		
3.3	1	10.42	10.54	94.2	0.011	6.65	0.1		PH #2 = 6.53
6.6	2	10.21	10.34	91.9	0.011	6.52	0.4		
9.8	3	10.03	10.33	91.5	0.011	6.51	0.3		
13.1	4	9.36	10.48	91.4	0.011	6.62	0.2		
16.4	5	8.85	10.61	91.5	0.010	6.53	0.2		PH #2 = 6.15
19.7	6	8.33	10.73	91.4	0.010	6.50	0.3		
23.0	7	8.20	10.79	91.5	0.010	6.33	0.2		
26.2	8	8.14	10.82	91.3	0.010	6.21	0.3		
29.5	9	8.05	10.76	90.9	0.010	6.12	0.2		
32.8	10	7.64	10.74	89.8	0.010	6.14	0.2		PH #2 = 6.23
36.1	11	7.26	10.67	88.4	0.010	6.17	0.1		
39.4	12	6.97	10.66	87.8	0.010	6.06	0.1		
42.7	13	6.77	10.64	87.2	0.009	6.01	0.1		
45.9	14	6.69	10.63	86.9	0.009	5.95	0.0		
49.2	15	6.58	10.68	87.0	0.009	5.92	0.1		PH #2 = 6.17
52.5	16	6.47	10.62	86.3	0.009	5.86	0.0		
55.8	17	6.35	10.63	86.1	0.009	5.86	0.0		
59.1	18	6.12	10.64	85.7	0.009	5.89	0.0		
62.3	19	6.04	10.61	85.3	0.009	5.88	0.1		
65.6	20	6.00	10.60	85.1	0.009	5.86	0.0		PH #2 = 6.08
68.9	21	5.93	10.59	84.8	0.010	5.86	0.1		
72.2	22	5.75	10.63	84.8	0.010	5.85	0.1		
75.5	23	5.57	10.58	84.0	0.010	5.81	0.0		
78.7	24	5.43	10.56	83.6	0.010	5.80	0.0		
82.0	25	5.40	10.52	83.2	0.010	5.79	0.0		PH #2 = 6.10
85.3	26	5.36	10.51	82.9	0.010	5.81	0.0		
88.6	27	5.27	10.49	82.7	0.010	5.82	0.0		
91.9	28	5.18	10.46	82.3	0.010	5.84	0.0		
95.1	29	5.17	10.46	82.3	0.010	5.86	0.0		
98.4	30	5.15	10.47	82.3	0.010	5.83	0.2		PH #2 = 6.18
101.7	31	5.10	10.41	81.7	0.010	5.78	0.1		
105.0	32	5.08	10.39	81.5	0.010	5.79	0.0		
108.3	33	5.06	10.38	81.4	0.010	5.81	0.1		
111.5	34	5.03	10.36	81.2	0.010	5.82	0.0		

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Reservoir - Water Quality Vertical Profiles

UARP-R-IS-6-OVR #2
4/26/16

Depth		Temp	DO		Conductivity	pH	Turbidity	Water Sample	Notes
(ft)	(m)	(°C)	(mg/L)	(%)	(µS/cm)	(s.u.)	(NTU)		
(CONTINUED)									
114.8	35	4.99	10.36	81.1	0.010	5.84	0.0		
118.1	36	4.96	10.34	80.9	0.010	5.85	0.0		
121.4	37	4.96	10.31	80.7	0.010	5.87	998.1		BOTTOM
124.7	38								
128.0	39								
131.2	40								
134.5	41								
137.8	42								
141.1	43								
144.4	44								
147.6	45								
150.9	46								
154.2	47								
157.5	48								
160.8	49								
164.0	50								
167.3	51								
170.6	52								
173.9	53								
177.2	54								
180.4	55								
183.7	56								
187.0	57								
190.3	58								
193.6	59								
196.8	60								
200.1	61								

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

Date: 4/26/16
Time: 12:45 PM

Reservoir - Water Quality Vertical Profiles

Instrument used: YSI 6920
Site Location: UARP-R-IS-7-UVR
Water depth: 165
Lat/Long (NAD83):
Secchi (ft): 19 ft

Personnel: KKC + BTH

Site Notes: Sunny, Cool, slight breeze

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		10.86	10.41	94.1	0.011	6.57	0.3		
3.3	1	10.72	10.39	93.7	0.011	6.67	0.3		PH #2 = 6.73
6.6	2	10.59	10.39	93.2	0.011	6.68	0.2		
9.8	3	10.46	10.38	92.7	0.010	6.72	0.3		
13.1	4	10.15	10.39	92.4	0.010	6.64	0.3		
16.4	5	10.05	10.43	92.5	0.010	6.56	0.1		PH #2 = 6.56
19.7	6	9.66	10.46	91.9	0.010	6.65	0.1		
23.0	7	9.50	10.52	92.1	0.010	6.50	0.1		
26.2	8	9.16	10.58	91.9	0.010	6.49	0.1		
29.5	9	8.87	10.62	91.6	0.010	6.48	0.1		
32.8	10	8.18	10.70	90.8	0.009	6.39	0.1		PH #2 = 6.41
36.1	11	7.63	10.78	96.2	0.009	6.25	0.0		
39.4	12	7.43	10.80	89.9	0.009	6.18	0.0		
42.7	13	7.12	10.82	89.4	0.009	6.16	0.0		
45.9	14	7.00	10.82	89.1	0.009	6.10	0.1		
49.2	15	6.90	10.83	88.9	0.009	6.07	0.1		PH #2 = 6.37
52.5	16	6.73	10.83	88.6	0.009	6.08	0.0		
55.8	17	6.32	10.84	87.7	0.009	6.04	0.0		
59.1	18	6.29	10.82	87.5	0.009	6.00	0.1		
62.3	19	6.25	10.80	87.2	0.009	6.01	0.0		
65.6	20	6.14	10.80	86.9	0.009	6.01	0.0		PH #2 = 6.03
68.9	21	6.02	10.78	86.6	0.009	6.02	0.0		
72.2	22	5.83	10.77	86.2	0.009	6.03	0.0		
75.5	23	5.68	10.75	85.7	0.009	6.03	0.1		
78.7	24	5.63	10.77	85.7	0.009	6.04	0.1		
82.0	25	5.55	10.70	84.9	0.009	6.02	0.0		PH #2 = 5.96
85.3	26	5.39	10.68	84.3	0.009	6.00	0.1		
88.6	27	5.33	10.63	83.9	0.009	5.99	0.1		
91.9	28	5.31	10.60	83.6	0.009	5.99	0.1		
95.1	29	5.30	10.57	83.4	0.009	6.00	0.0		
98.4	30	5.30	10.56	83.3	0.009	6.01	0.0		PH #2 = 6.00
101.7	31	5.27	10.56	83.2	0.009	6.01	0.1		
105.0	32	5.23	10.57	83.3	0.009	6.02	0.0		
108.3	33	5.16	10.50	82.5	0.009	5.95	0.1		
111.5	34	5.13	10.48	82.2	0.009	5.95	0.1		

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Stillwater Sciences

Reservoir - Water Quality Vertical Profiles

UARP-R-IS-7 - UVR

4/26/16

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
(CONTINUED)									
114.8	35	5.09	10.44	81.9	0.009	5.96	0.1		PH #2 = 5.96
118.1	36	5.08	10.42	81.8	0.009	5.98	0.1		
121.4	37	5.04	10.42	81.6	0.009	6.00	0.0		
124.7	38	5.00	10.41	81.4	0.009	6.01	0.0		
128.0	39	4.95	10.41	81.4	0.010	6.02	0.0		
131.2	40	4.94	10.38	81.1	0.010	5.94	0.0		PH #2 = 5.94
134.5	41	4.90	10.36	80.8	0.010	5.89	0.1		
137.8	42	4.88	10.33	80.6	0.010	5.89	0.0		
141.1	43	4.88	10.31	80.5	0.009	5.88	0.0		
144.4	44	4.88	10.31	80.4	0.009	5.89	01		
147.6	45	4.84	10.28	80.1	0.010	5.93	0.1		
150.9	46	4.83	10.26	80.0	0.010	5.89	201.8		Bottom
154.2	47								
157.5	48								
160.8	49								
164.0	50								
167.3	51								
170.6	52								
173.9	53								
177.2	54								
180.4	55								
183.7	56								
187.0	57								
190.3	58								
193.6	59								
196.8	60								
200.1	61								

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Original point = 258'

Date: 4/26/16
Time: 2:18 PM

Reservoir - Water Quality Vertical Profiles

Instrument used: YSI 6920
Water depth: 113 ft
Secchi (ft): 18 ft

Site Location: UARP - R - IS - 8
Lat/Long (NAD83): 105 0722307 4305289 - New Point

Personnel: KKC + BTH

Site Notes: Cloudy, cold, breezy

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		10.38	10.52	95.0	0.011	6.47	0.2		
3.3	1	10.37	10.50	93.8	0.011	6.53	0.2		PH #2 = 6.82
6.6	2	10.33	10.50	93.6	0.011	6.50	0.2		
9.8	3	10.33	10.53	93.0	0.011	6.58	0.2		
13.1	4	9.78	10.54	92.8	0.011	6.41	0.2		
16.4	5	9.73	10.54	92.7	0.011	6.39	0.2		PH #2 = 6.70
19.7	6	9.65	10.53	92.5	0.011	6.41	0.2		
23.0	7	9.59	10.53	92.3	0.011	6.38	0.3		
26.2	8	9.53	10.49	91.8	0.010	6.44	0.2		
29.5	9	8.07	10.69	90.4	0.010	6.75	0.1		
32.8	10	7.84	10.70	90.0	0.010	6.41	0.1		PH #2 = 5.98
36.1	11	7.53	10.77	89.9	0.010	6.20	0.0		
39.4	12	7.48	10.77	89.8	0.010	6.05	0.0		
42.7	13	7.27	10.77	89.3	0.010	6.02	0.1		
45.9	14	6.90	10.78	88.6	0.010	6.02	0.0		
49.2	15	6.82	10.77	88.3	0.010	5.97	0.1		PH #2 = 5.91
52.5	16	6.50	10.90	88.6	0.010	5.98	0.1		
55.8	17	6.35	10.75	87.1	0.010	5.92	0.0		
59.1	18	6.09	10.74	86.3	0.010	5.92	0.0		
62.3	19	5.93	10.72	85.8	0.010	5.90	0.0		
65.6	20	5.80	10.70	85.5	0.010	5.90	0.0		PH #2 = 5.99
68.9	21	5.74	10.69	85.2	0.010	5.90	0.0		
72.2	22	5.63	10.67	84.9	0.010	5.91	0.1		
75.5	23	5.56	10.67	84.7	0.010	5.92	0.1		
78.7	24	5.53	10.60	84.3	0.010	5.88	0.0		
82.0	25	5.51	10.62	84.2	0.010	5.86	0.0		PH #2 = 5.96
85.3	26	5.46	10.60	84.0	0.010	5.89	0.0		
88.6	27	5.42	10.59	83.8	0.010	5.91	0.0		
91.9	28	5.37	10.58	83.6	0.010	5.92	0.0		
95.1	29	5.33	10.58	83.5	0.010	5.94	0.1		
98.4	30	5.32	10.56	83.3	0.010	5.94	0.0		PH #2 = 5.95
101.7	31	5.31	10.55	83.3	0.010	5.96	0.0		
105.0	32	5.30	10.53	83.1	0.010	5.90	0.1		
108.3	33	5.27	10.52	82.9	0.010	5.88	472.3		BOTTOM
111.5	34								

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

Page 1 of 2

Date: 4/27/16
Time: 12:00 pm

Reservoir - Water Quality Vertical Profiles

Instrument used: YSI 6920
Water depth: 18.6 ft
Secchi (ft): 14 ft

Site Location: UARP-R-IS-14-SC
Lat/Long (NAD83):

Personnel: BTH + KKC

Site Notes: partly cloudy + windy + warm.

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		7.90	11.98	100.9	0.023	5.45	0.6		
3.3	1	7.77	12.00	100.8	0.023	5.52	0.7		PH #2 = 5.74
6.6	2	7.78	11.95	100.3	0.023	5.57	0.7		
9.8	3	7.81	11.97	100.4	0.023	5.57	0.7		
13.1	4	7.73	11.97	100.4	0.023	5.54	0.9		
16.4	5	7.70	11.98	100.4	0.023	5.55	0.7		PH#2 = 5.73
19.7	6	7.69	11.98	100.3	0.023	5.55	0.2		
23.0	7	7.66	11.99	100.3	0.023	5.58	0.1		
26.2	8	7.55	11.97	100.2	0.023	5.59	5.6		BOTTOM
29.5	9								
32.8	10								
36.1	11								
39.4	12								
42.7	13								
45.9	14								
49.2	15								
52.5	16								
55.8	17								
59.1	18								
62.3	19								
65.6	20								
68.9	21								
72.2	22								
75.5	23								
78.7	24								
82.0	25								
85.3	26								
88.6	27								
91.9	28								
95.1	29								
98.4	30								
101.7	31								
105.0	32								
108.3	33								
111.5	34								

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

Date: 4/27/16
Time: 1:10PM

Reservoir - Water Quality Vertical Profiles

Instrument used: YSI 6920
Site Location: UARP - R-IS-15-SC
Water depth: 84 ft
Lat/Long (NAD83):
Secchi (ft): 11 ft

Personnel: BTH + KKC

Site Notes: Sunny, Cool, windy

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		10.30	11.45	102.2	0.021	6.08	0.8		
3.3	1	10.28	11.49	102.4	0.021	6.06	0.9		
6.6	2	10.25	11.48	102.3	0.021	6.01	0.9		
9.8	3	9.62	11.51	101.2	0.021	6.07	0.9		
13.1	4	10.27	11.47	100.9	0.021	6.10	0.9		
16.4	5	9.98	11.45	102.1	0021	6.03	0.9		
19.7	6	8.98	11.53	101.0	0.021	5.98	1.1		
23.0	7	8.61	11.54	99.7	0.021	6.00	1.1		
26.2	8	8.50	11.53	101.1	0.021	5.95	1.1		
29.5	9	8.44	11.62	99.1	0.022	5.95	1.0		
32.8	10	8.37	11.64	99.1	0.022	5.82	1.0		
36.1	11	8.35	11.57	99.2	0.022	5.78	1.0		
39.4	12	8.29	11.68	99.4	0.022	5.77	1.1		
42.7	13	8.19	11.67	99.3	0.022	5.79	1.1		
45.9	14	8.16	11.65	98.8	0.021	5.85	1.0		
49.2	15	8.15	11.70	98.9	0.021	5.82	1.1		
52.5	16	8.12	11.70	99.3	0.021	5.78	1.0		
55.8	17	8.06	11.70	99.0	0.021	5.79	1.0		
59.1	18	8.05	11.71	99.0	0.020	5.77	1.1		
62.3	19	8.00	11.70	98.8	0.020	5.72	1.0		
65.6	20	8.00	11.70	98.8	0.020	5.76	1.1		
68.9	21	8.01	11.70	98.8	0.020	5.78	1.0		
72.2	22	8.00	11.69	98.8	0.020	5.83	1.1		
75.5	23	7.99	11.70	98.7	0.020	5.85	0.9		
78.7	24	7.98	11.68	98.7	0.020	5.83	0.9		
82.0	25	7.94	11.67	98.4	0.020	5.85	1.0		
85.3	26	7.93	11.67	98.4	0.020	5.85	1.0		
88.6	27	7.92	11.66	98.4	0.020	5.76	0.9		
91.9	28	7.91	11.65	97.9	0.020	5.86	1.0		
95.1	29	7.88	11.63	97.9	0.020	5.86	1.2		
98.4	30	7.83	11.60	97.5	0.021	5.86	1.3		
101.7	31	7.81	11.59	97.5	0.021	5.77	1.2		
105.0	32								
108.3	33								
111.5	34								

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

Page 1 of 1

Date: 4/28/16
Time: 12:00 PM

Reservoir - Water Quality Vertical Profiles

Instrument used: YSI 6920
Water depth: 30 ft
Secchi (ft): 25 ft

Site Location: UARP- R-IS-13-CR
Lat/Long (NAD83):

Personnel: KKC + BTH

Site Notes: Sunny, warm, Slight breeze.

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		6.13	11.98	96.5	0.011	4.41	0.2		
3.3	1	6.12	12.02	96.8	0.011	4.29	0.1		PH#2 = 4.58
6.6	2	6.12	12.02	96.9	0.011	4.24	0.1		
9.8	3	6.10	12.03	96.9	0.011	4.27	0.0		
13.1	4	6.10	12.03	96.8	0.011	4.26	0.0		
16.4	5	6.06	12.03	96.8	0.011	4.28	0.0		PH#2 = 4.51
19.7	6	6.06	12.02	96.7	0.011	4.28	0.0		
23.0	7	6.05	12.02	96.7	0.011	4.31	0.0		
26.2	8	6.05	12.02	96.7	0.011	4.33	0.0		
29.5	9	6.05	12.01	96.5	0.011	4.21	0.0		
32.8	10	6.06	12.01	96.6	0.011	4.26	424.7		BOTTOM
36.1	11								
39.4	12								
42.7	13								
45.9	14								
49.2	15								
52.5	16								
55.8	17								
59.1	18								
62.3	19								
65.6	20								
68.9	21								
72.2	22								
75.5	23								
78.7	24								
82.0	25								
85.3	26								
88.6	27								
91.9	28								
95.1	29								
98.4	30								
101.7	31								
105.0	32								
108.3	33								
111.5	34								

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

Instrument(s) used: YSI 6920 **Crew:** KKC + BTH

Site Location: IS-5-GC GPS:
Date: 5/1/2016 Time: 12:00 PM
Photos: Weather: Sunny, Warm
Notes:

In situ

Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Notes
6.67	10.56	86.1	0.008	5.64	0.0	

Site Location: IS-6-GC GPS:
Date: 5/1/2016 Time: 12:45 PM
Photos: Weather: Sunny, Warm, Breezy
Notes:

In situ

Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Notes
6.92	10.62	86.1	0.008	5.17	-0.2	QC Note: Negative turbidity value recorded as "0.0"

Site Location: IS-9-GCC GPS:
Date: 5/1/2016 Time: 1:00 PM
Photos: Weather: Sunny, Warm, Breezy
Notes:

In situ

Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Notes
7.96	10.71	90.4	0.008	5.00	-0.3	QC Note: negative turbidity value recorded as "0.0"

Site Location: IS-7-SFRR GPS: 10S 0725404 4314865 (7N)
Date: 5/1/2016 Time: 1:45 PM
Photos: Weather: Sunny, Warm, Breezy
Notes:

In situ

Temp	DO		Conductivity	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(s.u.)	(NTU)	QC Note:
8.56	10.09	86.5	0.010	5.32	-0.2	Negative turbidity value recorded as "0.0"

Site Location: IS-8-SFRR GPS:
Date: 5/1/2016 Time: 2:00 PM
Photos: Weather: Thunderstorms, Warm
Notes:

In situ

Temp	DO		Conductivity	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(s.u.)	(NTU)	QC Note:
8.29	10.42	88.6	0.010	5.53	-0.3	Negative turbidity value recorded as "0.0"

Site Location: IS-10-SFSC GPS:
Date: 5/2/16 Time: 10:00 AM
Photos: Weather: Sunny, Cool
Notes:

In situ

Temp	DO		Conductivity	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(s.u.)	(NTU)	
5.24	10.58	83.4	0.009	5.31	0.0	

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

Instrument(s) used: YSI 6920 **Crew:** BTH + KKC

Site Location: IS-11-SFSC GPS:
Date: 5/2/16 Time: 10:30 AM
Photos: Weather: Sunny, Cool, Calm
Notes:

In situ

Temp	DO		Conductivity	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(s.u.)	(NTU)	
6.75	10.91	89.4	0.013	5.48	0.3	

Site Location: IS-12-SC GPS:
Date: 5/2/16 Time: 10:45AM
Photos: Weather: Sunny, Cool
Notes:

In situ

Temp	DO		Conductivity	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(s.u.)	(NTU)	
5.88	11.11	89.1	0.011	5.55	0.0	

Site Location: IS-13-SC GPS:
Date: 5/2/16 Time: 11:45AM
Photos: Weather: Partly cloudy, Cool
Notes:

In situ

Temp	DO		Conductivity	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(s.u.)	(NTU)	
8.55	10.87	93.0	0.015	5.63	0.5	

Site Location: IS-14-SC
Date: 5/2/16
Photos:
Notes:
GPS:
Time: 12:15PM
Weather: Sunny, warm

In situ

Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Notes
7.74	11.23	94.3	0.014	5.79	0.2	

Site Location: IS-17-BC
Date: 5/3/16
Photos:
Notes:
GPS:
Time: 10:20AM
Weather: Sunny, cool, calm

In situ

Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Notes
10.07	10.35	91.9	0.024	5.12	20.1	

Site Location: IS-15-SFAR
Date: 5/3/16
Photos:
Notes:
GPS:
Time: 11:00 AM
Weather: Partly cloudy, warm, calm

In situ

Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Notes
9.17	11.40	99.0	0.025	5.54	2.6	

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

Instrument(s) used: YSI 6920 **Crew:** BTH + KKC

Site Location: IS-16-SFAR GPS:
Date: 5/3/16 Time: 11:15 AM
Photos: Weather: Partly cloudy, warm, calm
Notes:

In situ

Temp	DO		Conductivity	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(s.u.)	(NTU)	
7.88	12.6	102.4	0.018	5.94	1.2	

Site Location: IS-19-SFAR GPS:
Date: 5/3/16 Time: 12:00PM
Photos: Weather: Partly cloudy, warm, slight breeze
Notes:

In situ

Temp	DO		Conductivity	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(s.u.)	(NTU)	
8.93	11.37	98.2	0.022	5.95	1.1	

Site Location: IS-18-SFAR GPS:
Date: 5/3/16 Time: 1:00PM
Photos: Weather: Partly cloudy, warm
Notes:

In situ

Temp	DO		Conductivity	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(s.u.)	(NTU)	
11.45	11.03	101.2	0.029	6.02	0.6	

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

Page 1 of 1

Instrument(s) used: YSI 6920 **Crew:** BTH + KKC

Site Location: IS-4-GC GPS:
Date: 5/17/16 Time: 12:30 PM
Photos: Weather: Sunny, Very windy
Notes:

In situ

Temp	DO		Conductivity	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(s.u.)	(NTU)	
6.98	9.83	81.0	0.008	7.12	1.4	

Site Location: GPS:
Date: Time:
Photos: Weather:
Notes:

In situ

Temp	DO		Conductivity	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(s.u.)	(NTU)	

Site Location: GPS:
Date: Time:
Photos: Weather:
Notes:

In situ

Temp	DO		Conductivity	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(s.u.)	(NTU)	

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Date: 5/17/16
Time: 10:30 AM

Reservoir - Water Quality Vertical Profiles

Instrument used: YSI 6920
Water depth: 30ft
Secchi (ft): 19ft

Site Location: UARP - R - IS - 4 - 6C
Lat/Long (NAD83):

Personnel: KKC + BTH

Site Notes: Sunny, Cool, Windy

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		8.96	9.92	85.6	0.006	6.47	1.4		
3.3	1	8.95	9.87	85.3	0.006	6.31	1.1		
6.6	2	8.93	9.86	85.0	0.009	6.44	1.2		
9.8	3	8.64	9.88	84.7	0.006	6.56	1.2		
13.1	4	8.56	9.88	84.6	0.006	6.49	1.1		
16.4	5	8.56	9.87	84.3	0.006	6.50	1.2		
19.7	6	8.49	9.86	84.3	0.006	6.58	1.2		
23.0	7	8.48	9.85	84.2	0.006	6.59	1.2		
26.2	8	8.38	9.85	83.9	0.006	6.59	1.1		
29.5	9	8.36	9.84	83.8	0.007	6.63	2.8		BOTTOM
32.8	10								
36.1	11								
39.4	12								
42.7	13								
45.9	14								
49.2	15								
52.5	16								
55.8	17								
59.1	18								
62.3	19								
65.6	20								
68.9	21								
72.2	22								
75.5	23								
78.7	24								
82.0	25								
85.3	26								
88.6	27								
91.9	28								
95.1	29								
98.4	30								
101.7	31								
105.0	32								
108.3	33								
111.5	34								

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

Instrument(s) used: YSI 6920 **Crew:** BTH + KKC

Site Location: Rubicon Res IS-1-RR GPS:
Date: 8/23/16 Time: 8:15AM
Photos: Weather: Sunny, Cool
Notes:

In situ

Temp	DO		Conductivity	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(s.u.)	(NTU)	
20.23	6.73	74.3	0.015	6.83	0.9	

Site Location: IS-2-LRR GPS:
Date: 8/23/16 Time: 9:45AM
Photos: Weather: Sunny, Warm
Notes:

In situ

Temp	DO		Conductivity	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(s.u.)	(NTU)	
18.01	6.27	66.2	0.013	6.85	1.2	

Site Location: IS-3-LRR GPS:
Date: 8/23/16 Time: 12:00 PM
Photos: Weather:
Notes:

In situ

Temp	DO		Conductivity	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(s.u.)	(NTU)	
21.50	6.90	78.2	0.009	6.56	1.6	

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Instrument(s) used: 451 6920 **Crew:** KKC + BTH

Site Location: IS-5-GC GPS:
Date: 8/23/16 Time: 14:47
Photos: Weather: sunny, warm
Notes:

In situ

Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Notes
18.47	7.99	85.2	0.010 (8)	6.76	1.6	

Site Location: IS-6-GC GPS:
Date: 8/23/16 Time: 15:11
Photos: Weather: sunny, warm
Notes:

In situ

Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Notes
15.60	8.22	82.7	0.011 (9)	6.50	1.6	

Site Location: IS-4-GC GPS:
Date: 8/23/16 Time: 15:42
Photos: Weather: sunny, warm
Notes:

In situ

Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Notes
11.54	8.52	78.4	0.008 (6)	6.40	1.4	

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

Page 3 of 9

Instrument(s) used: YSI 6920 **Crew:** KRC + BTH

Site Location: IS-9-GCC GPS:
Date: 8/23/16 Time: 16:08
Photos: Weather: sunny, warm
Notes:

In situ

Temp	DO		Conductivity	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(s.u.)	(NTU)	
18.28	8.39	89.2	0.009 (3)	6.81	1.6	

Site Location: IS-7-SFRR GPS:
Date: 8/23/16 Time: 16:22
Photos: Weather: sunny, warm
Notes:

In situ

Temp	DO		Conductivity	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(s.u.)	(NTU)	
18.03	8.08	85.5	0.009 (3)	6.65	0.1	

Site Location: IS-8-SFRR GPS:
Date: 8/23/16 Time: 16:31
Photos: Weather: sunny, warm
Notes:

In situ

Temp	DO		Conductivity	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(s.u.)	(NTU)	
18.19	8.11	88.0	0.009	6.94	1.6	

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Instrument(s) used: 451 6920 **Crew:** KKC + BTH

Site Location: IS-19-SFAR GPS:
Date: 8/24/16 Time: 9:05AM
Photos: Weather: Sunny, Cool
Notes:

In situ

Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Notes
12.52	9.97	93.7	0.016	6.07	0.2	

Site Location: IS-18-SFAR GPS:
Date: 8/24/16 Time: 10:00AM
Photos: Weather: Sunny, Cool
Notes:

In situ

Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Notes
15.73	9.45	95.2	0.026	6.46	0.8	

Site Location: IS-20-SFAR GPS:
Date: 8/24/16 Time: 11:19
Photos: Weather: Sunny, hot
Notes:

In situ

Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Notes
14.71	10.21	100.7	0.018	6.65	0.0	

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

Instrument(s) used: YSI 6920 **Crew:** BTN + KKC

Site Location: IS-10-SFSC GPS:
Date: 8/25/16 Time: 14:36
Photos: Weather: sunny, warm
Notes:

In situ

Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Notes
7.36	9.86	81.8	0.012	6.41	1.4	

Site Location: GPS:
Date: Time:
Photos: Weather:
Notes:

In situ

Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Notes

Site Location: GPS:
Date: Time:
Photos: Weather:
Notes:

In situ

Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Notes

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

Instrument(s) used: YSI 6920 **Crew:** KKC + BTH

Site Location: IS-11-SFSC GPS:
Date: 8/26/16 Time: 10:20 AM
Photos: Weather: Sunny, Warm
Notes:

In situ

Temp	DO		Conductivity	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(s.u.)	(NTU)	
12.34	9.33	87.3	0.016	6.93	0.4	

Site Location: IS-12-SC GPS:
Date: 8/26/16 Time: 10:45 AM
Photos: Weather: Sunny, Warm
Notes:

In situ

Temp	DO		Conductivity	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(s.u.)	(NTU)	
9.15	9.63	83.6	0.014	6.42	0.6	

Site Location: IS-14-SC GPS:
Date: 8/26/16 Time: 11:50AM
Photos: Weather: Sunny, Warm
Notes:

In situ

Temp	DO		Conductivity	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(s.u.)	(NTU)	
10.99	10.23	92.7	0.020 (1?)	6.70	0.6	

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

Instrument(s) used: YSI 6920 **Crew:** KKC + BTH

Site Location: IS-13-SC GPS:
Date: 8/26/16 Time: 12:25 PM
Photos: Weather: Sunny, warm
Notes:

In situ

Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Notes
15.11	8.95	90.8	0.018 (14)	6.85	0.7	

Site Location: IS-16-SFAR GPS:
Date: 8/26/16 Time: 1:45 PM
Photos: Weather: Sunny, hot, windy
Notes:

In situ

Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Notes
12.09	10.47	97.4	0.019 (14)	6.66	0.7	

Site Location: IS-15-SFAR GPS:
Date: 8/26/16 Time: 14:01
Photos: Weather: Sunny, hot, windy
Notes:

In situ

Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Notes
19.02	8.97	96.8	0.052 (14)	7.12	1.2	

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Instrument(s) used: YSI 6920 **Crew:** KKC + BTH

Site Location: IS-17-BC GPS:
Date: 8/26/16 Time: 2:40 PM
Photos: Weather: Sunny, warm
Notes:

In situ

Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Notes
18.77	8.40	90.3	0.032 (29)	7.31	3.42	

Site Location: GPS:
Date: Time:
Photos: Weather:
Notes:

In situ

Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Notes

Site Location: GPS:
Date: Time:
Photos: Weather:
Notes:

In situ

Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	pH (s.u.)	Turbidity (NTU)	Notes

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Date: 10/24/16
Time: 2:20 PM

Reservoir - Water Quality Vertical Profiles

Site Location: R-IS-13-CR
Lat/Long (NAD83):

Instrument used: 6920
Water depth: 19.5

Secchi (ft): 16 ft

Personnel: KKC + BTH

Site Notes: Cloudy, Cool, Slight Breeze

Depth		Temp	DO		Conductivity	Specific Conductance	pH	Turbidity	Water Sample	Notes
(ft)	(m)	(°C)	(mg/L)	(%)	(µS/cm)	(mS/cm)	(s.u.)	(NTU)		
surface		11.00	10.49	95.1	13.0	0.017	6.63	0.7		
3.3	1	11.00	10.48	95.1	13.0	0.017	6.57	0.7		
6.6	2	11.00	10.48	95.1	13.0	0.017	6.55	0.7		
9.8	3	11.00	10.48	95.0	13.0	0.017	6.53	0.7		
13.1	4	10.99	10.48	95.0	12.0	0.017	6.51	0.6		
16.4	5	10.99	10.47	94.9	12.0	0.017	6.49	0.7		Bottom
19.7	6	10.99	10.46	94.9	12.0	0.017	6.47	0.7		BOTTOM
23.0	7									
26.2	8									
29.5	9									
32.8	10									
36.1	11									
39.4	12									
42.7	13									
45.9	14									
49.2	15									
52.5	16									
55.8	17									
59.1	18									
62.3	19									
65.6	20									
68.9	21									
72.2	22									
75.5	23									
78.7	24									
82.0	25									
85.3	26									
88.6	27									
91.9	28									
95.1	29									
98.4	30									
101.7	31									
105.0	32									
108.3	33									
111.5	34									

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

Date: 10/24/16
Time: 11:10 AM

Reservoir - Water Quality Vertical Profiles

Site Location: R-IS-14-SC
Lat/Long (NAD83):

Instrument used: 6920
Water depth: 17.7

Secchi (ft): 9ft

Personnel: BTH TKKC

Site Notes: Cloudy, Cool, Slight breeze

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	Specific Conductance (mS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		11.1	10.30	93.6	18.0	0.025	7.18	1.9		
3.3	1	11.06	10.80	98.1	18.0	0.025	6.90	2.3		
6.6	2	11.05	10.80	98.4	18.0	0.025	6.87	2.5		
9.8	3	11.05	10.80	98.5	18.0	0.025	6.84	2.3		
13.1	4	11.04	10.85	98.4	18.0	0.025	6.78	2.4		
16.4	5	11.03	10.83	98.2	19.0	0.026	6.70	3.4		
19.7	6									
23.0	7									
26.2	8									
29.5	9									
32.8	10									
36.1	11									
39.4	12									
42.7	13									
45.9	14									
49.2	15									
52.5	16									
55.8	17									
59.1	18									
62.3	19									
65.6	20									
68.9	21									
72.2	22									
75.5	23									
78.7	24									
82.0	25									
85.3	26									
88.6	27									
91.9	28									
95.1	29									
98.4	30									
101.7	31									
105.0	32									
108.3	33									
111.5	34									

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Date: 10/24/16
Time: 11:45AM

Reservoir - Water Quality Vertical Profiles

Instrument used: 6920
Water depth: 113 ft

Site Location: R-IS-15-SC
Lat/Long (NAD83): _____

Secchi (ft): 7 ft

Personnel: BTH + KKC

Site Notes: Cloudy, Cool, Slight breeze

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	Specific Conductance (mS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		12.74	9.98	94.1	22.0	0.028	6.81	4.7		
3.3	1	12.62	9.88	92.9	21.0	0.028	6.81	5.0		
6.6	2	12.37	9.81	91.6	21.0	0.028	6.80	5.1		
9.8	3	12.19	9.70	90.3	21.0	0.028	6.79	5.5		
13.1	4	12.08	9.61	89.2	21.0	0.028	6.77	5.7		
16.4	5	11.99	9.55	88.6	21.0	0.028	6.77	5.9		
19.7	6	11.95	9.57	88.1	21.0	0.028	6.77	6.1		
23.0	7	11.91	9.49	87.8	21.0	0.028	6.76	6.3		
26.2	8	11.70	9.53	87.9	21.0	0.028	6.77	9.5		
29.5	9	11.56	9.64	88.5	21.0	0.028	6.74	9.7		
32.8	10	11.50	9.95	91.5	19.0	0.026	6.72	12.2		
36.1	11	11.47	10.08	92.5	19.0	0.026	6.74	11.6		
39.4	12	11.44	10.13	92.8	19.0	0.026	6.74	9.3		
42.7	13	11.32	10.24	93.6	19.0	0.026	6.74	7.4		
45.9	14	11.32	10.28	94.0	19.0	0.026	6.73	7.3		
49.2	15	11.28	10.30	94.1	18.0	0.025	6.70	7.8		
52.5	16	11.26	10.32	94.2	19.0	0.025	6.65	7.2		
55.8	17	11.24	10.33	94.2	18.0	0.025	6.62	7.6		
59.1	18	11.23	10.32	94.1	18.0	0.024	6.58	7.6		
62.3	19	11.19	10.32	94.0	18.0	0.024	6.56	7.3		
65.6	20	11.17	10.32	93.9	19.0	0.025	6.54	7.3		
68.9	21	11.16	10.29	93.7	18.0	0.024	6.53	6.2		
72.2	22	11.13	10.28	93.5	18.0	0.024	6.53	6.0		
75.5	23	11.11	10.28	93.4	18.0	0.024	6.53	5.9		
78.7	24	11.10	10.27	93.4	18.0	0.024	6.53	5.4		
82.0	25	11.08	10.26	93.2	18.0	0.024	6.53	5.3		
85.3	26	11.06	10.23	92.9	18.0	0.025	6.54	4.9		
88.6	27	11.06	10.19	92.5	18.0	0.025	6.54	4.6		
91.9	28	11.04	10.18	92.4	18.0	0.025	6.55	4.8		
95.1	29	11.03	10.17	92.2	18.0	0.024	6.55	4.7		
98.4	30	11.00	10.16	92.1	18.0	0.027	6.56	4.3		
101.7	31	10.96	10.17	92.2	19.0	0.026	6.56	4.3		
105.0	32	10.91	9.99	90.2	18.0	0.025	6.55	4.8		
108.3	33	10.91	9.66	86.8	20.0	0.027	6.52	129.9		BOTTOM
111.5	34									

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Date: 10/25/2016
Time: 1048-1105

Reservoir - Water Quality Vertical Profiles

Instrument used: YSI 6920
Water depth: 27.6 ft

Site Location: R-IS-S-UVR
Lat/Long (NAD83):

Secchi (ft): 14

Personnel: BCR BTH

Site Notes:

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	Specific Conductance (mS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		14.56	8.89	87.4	14	0.016	6.22	1.8		
3.3	1	14.56	8.39	82.3	12	0.015	6.64	1.4		
6.6	2	14.50	8.38	82.3	12	0.015	6.64	1.4		
9.8	3	14.36	8.40	82.2	14	0.018	6.67	1.4		
13.1	4	14.29	8.43	82.3	12	0.015	6.66	1.4		
16.4	5	14.27	8.44	82.3	12	0.015	6.67	1.4		
19.7	6	14.23	8.43	82.3	12	0.015	6.70	1.5		
23.0	7	14.19	8.43	82.2	12	0.015	6.69	1.4		
26.2	8	13.71	8.46	81.4	13	0.016	6.67	4.3		Bottom
29.5	9									
32.8	10									
36.1	11									
39.4	12									
42.7	13									
45.9	14									
49.2	15									
52.5	16									
55.8	17									
59.1	18									
62.3	19									
65.6	20									
68.9	21									
72.2	22									
75.5	23									
78.7	24									
82.0	25									
85.3	26									
88.6	27									
91.9	28									
95.1	29									
98.4	30									
101.7	31									
105.0	32									
108.3	33									
111.5	34									

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Date: 10/25/2016
Time: 0942 - 1000

Reservoir - Water Quality Vertical Profiles

Site Location: R-IS-6-UVR
Lat/Long (NAD83):

Instrument used: YSI 6920
Water depth: 86 ft

Secchi (ft): 15

Personnel: BCR, BTH

Site Notes:

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	Specific Conductance (mS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		14.61	8.70	84.5	14	0.017	6.99	1.3		
3.3	1	14.65	8.17	80.4	13	0.016	6.34	1.2		
6.6	2	14.65	8.16	80.3	13	0.016	6.20	1.3		
9.8	3	14.64	8.13	80.0	13	0.016	6.08	1.3		
13.1	4	14.64	8.13	80.0	14	0.017	6.00	1.3		
16.4	5	14.64	8.09	79.6	12	0.015	5.97	1.3		
19.7	6	14.65	8.09	79.6	12	0.015	5.97	1.3		
23.0	7	14.64	8.09	79.6	12	0.015	5.97	1.3		
26.2	8	14.64	8.07	79.4	12	0.015	5.98	1.3		
29.5	9	14.64	8.05	79.2	12	0.015	5.99	1.3		
32.8	10	14.64	8.04	79.1	12	0.015	6.00	1.3		
36.1	11	14.64	8.03	79.0	12	0.015	6.02	1.3		
39.4	12	14.64	8.03	79.0	12	0.015	6.03	1.3		
42.7	13	14.64	8.03	79.0	13	0.017	6.06	1.3		
45.9	14	14.64	8.03	79.0	12	0.015	6.07	1.3		
49.2	15	14.64	8.02	78.9	12	0.015	6.08	1.3		
52.5	16	14.64	8.02	78.9	12	0.015	6.09	1.3		
55.8	17	14.64	8.00	78.8	12	0.015	6.11	1.4		
59.1	18	14.64	8.01	78.8	12	0.015	6.12	1.3		
62.3	19	14.63	7.99	78.7	12	0.015	6.14	1.3		
65.6	20	14.62	7.98	78.4	12	0.015	6.15	1.3		
68.9	21	14.59	7.91	77.7	12	0.015	6.16	1.3		
72.2	22	14.46	7.85	76.7	12	0.018	6.17	1.4		
75.5	23	14.10	7.92	77.0	14	0.017	6.18	1.4		
78.7	24	13.87	7.64	73.9	12	0.015	6.14	1.4		
82.0	25	13.83	7.61	73.3	12	0.016	6.10	1.4		
85.3	26	13.79	7.51	72.3	12	0.016	6.10	3.4		Bottom
88.6	27									
91.9	28									
95.1	29									
98.4	30									
101.7	31									
105.0	32									
108.3	33									
111.5	34									

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Reservoir - Water Quality Vertical Profiles

Date: 10/25/2016
Time: 1125 - 1143

Site Location: R-IS-7-UVR
Lat/Long (NAD83):

Instrument used: YSI 6920
Water depth: 95 ft

Personnel: BCR BTH

Secchi (ft): 13

Site Notes:

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	Specific Conductance (mS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		14.73	8.89	87.7	13	0.016	6.59	1.2		
3.3	1	14.73	8.33	82.1	13	0.016	6.71	1.3		
6.6	2	14.73	8.28	81.6	12	0.015	6.73	1.3		
9.8	3	14.70	8.24	81.2	12	0.015	6.75	1.4		
13.1	4	14.69	8.22	81.0	12	0.015	6.75	1.4		
16.4	5	14.69	8.21	80.9	12	0.015	6.74	1.4		
19.7	6	14.68	8.20	80.7	12	0.015	6.73	1.4		
23.0	7	14.68	8.19	80.7	12	0.015	6.73	1.3		
26.2	8	14.68	8.17	80.5	12	0.015	6.73	1.4		
29.5	9	14.68	8.17	80.4	12	0.014	6.72	1.4		
32.8	10	14.68	8.16	80.4	12	0.014	6.71	1.3		
36.1	11	14.68	8.16	80.3	13	0.015	6.72	1.3		
39.4	12	14.67	8.15	80.2	11	0.014	6.72	1.3		
42.7	13	14.66	8.15	80.2	12	0.014	6.70	1.3		
45.9	14	14.66	8.14	80.1	11	0.014	6.71	1.4		
49.2	15	14.66	8.13	80.1	11	0.014	6.70	1.4		
52.5	16	14.65	8.13	80.0	12	0.014	6.71	1.4		
55.8	17	14.65	8.12	79.9	11	0.014	6.71	1.4		
59.1	18	14.65	8.11	79.8	11	0.014	6.71	1.4		
62.3	19	14.64	8.10	79.7	11	0.014	6.72	1.4		
65.6	20	14.60	8.09	79.6	12	0.014	6.69	1.4		
68.9	21	14.56	8.08	79.2	12	0.015	6.70	1.4		
72.2	22	14.37	8.09	79.1	14	0.017	6.69	1.4		
75.5	23	14.16	7.97	77.5	12	0.015	6.68	1.4		
78.7	24	14.07	7.93	77.0	12	0.015	6.68	1.5		
82.0	25	13.98	7.89	76.5	12	0.015	6.66	1.5		
85.3	26	13.84	7.87	75.8	12	0.015	6.64	1.5		
88.6	27	13.58	7.81	74.9	11	0.015	6.63	1.6		
91.9	28	13.48	7.73	74.1	12	0.015	6.61	1.5		
95.1	29	13.39	7.67	73.3	12	0.015	6.60	1.5		
98.4	30	13.26	7.56	72.2	12	0.015	6.55	1.6		
101.7	31	13.17	7.54	71.8	14	0.018	6.56	1.6		
105.0	32	12.99	6.23	56.7	40	0.052	6.18	12.3		Bottom
108.3	33									
111.5	34									

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

Reservoir - Water Quality Vertical Profiles

Page 1 of 2

Date: 10/25/2016
Time: 1215-1249

Site Location: R-IS-8-4VR
Lat/Long (NAD83):

Instrument used: YSI 6920
Water depth: 255
Secchi (ft): 16

Personnel: BCR BTH

Site Notes: Alt secondary depth reading 188 ft

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	Specific Conductance (mS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		14.64	8.65	85.1	14	0.017	6.38	1.3		
3.3	1	14.64	8.65	85.1	13	0.016	6.55	1.3		
6.6	2	14.64	8.13	79.9	13	0.016	6.59	1.4		
9.8	3	14.61	8.06	79.2	13	0.016	6.60	1.3		
13.1	4	14.60	8.03	78.9	13	0.016	6.56	1.4		
16.4	5	14.59	8.00	78.6	12	0.015	6.58	1.3		
19.7	6	14.59	7.97	78.3	12	0.015	6.60	1.3		
23.0	7	14.59	7.94	78.0	12	0.015	6.58	1.3		
26.2	8	14.58	7.93	77.9	12	0.015	6.60	1.3		
29.5	9	14.58	7.91	77.8	12	0.015	6.60	1.4		
32.8	10	14.58	7.91	77.7	12	0.015	6.61	1.3		
36.1	11	14.58	7.91	77.6	12	0.017	6.61	1.3		
39.4	12	14.58	7.90	77.6	13	0.016	6.59	1.3		
42.7	13	14.58	7.88	77.4	12	0.014	6.58	1.3		
45.9	14	14.58	7.88	77.4	11	0.014	6.58	1.3		
49.2	15	14.58	7.91	77.7	11	0.014	6.60	1.3		
52.5	16	14.57	7.92	77.9	11	0.014	6.60	1.4		
55.8	17	14.57	7.93	77.9	11	0.014	6.60	1.4		
59.1	18	14.57	7.92	77.7	11	0.014	6.60	1.4		
62.3	19	14.57	7.90	77.6	11	0.014	6.60	1.4		
65.6	20	14.57	7.86	77.2	11	0.014	6.61	1.4		
68.9	21	14.56	7.84	77.0	11	0.014	6.61	1.4		
72.2	22	14.54	7.82	76.7	11	0.014	6.61	1.3		
75.5	23	14.52	7.77	76.1	11	0.014	6.60	1.3		
78.7	24	14.43	7.71	75.4	13	0.017	6.60	1.3		
82.0	25	14.21	7.76	75.6	13	0.016	6.56	1.4		
85.3	26	13.97	7.13	68.7	11	0.014	6.52	1.2		
88.6	27	13.91	6.93	56.9	11	0.014	6.51	1.2		
91.9	28	13.75	6.81	65.7	11	0.014	6.49	1.3		
95.1	29	13.52	6.75	64.7	12	0.016	6.47	1.1		
98.4	30	13.33	6.69	63.9	12	0.015	6.44	1.2		
101.7	31	13.16	6.68	63.6	11	0.014	6.43	1.1		
105.0	32	13.13	6.68	63.5	11	0.014	6.39	1.2		
108.3	33	13.03	6.64	63.5	11	0.014	6.38	1.2		
111.5	34	12.98	6.66	63.1	11	0.014	6.35	1.2		

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Stillwater Sciences

Reservoir - Water Quality Vertical Profiles

R-IS-8-4VR

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)		pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
(CONTINUED)										
114.8	35	12.76	6.57	62.0	12	0.016	6.34	1.1		
118.1	36	12.67	6.49	61.1	11	0.014	6.33	1.1		
121.4	37	12.58	6.48	60.8	11	0.014	6.28	1.0		
124.7	38	12.48	6.52	61.4	11	0.014	6.26	1.1		
128.0	39	12.49	6.69	62.7	11	0.014	6.22	1.2		
131.2	40	12.38	6.66	62.1	11	0.014	6.20	1.0		
134.5	41	12.22	6.56	61.1	10	0.014	6.16	1.0		
137.8	42	12.19	6.51	60.6	10	0.014	6.11	1.0		
141.1	43	12.06	6.45	59.8	10	0.014	6.05	1.0		
144.4	44	11.99	6.41	59.4	10	0.014	6.01	1.0		
147.6	45	11.94	6.42	59.5	12	0.017	5.97	1.0		
150.9	46	11.86	6.44	59.5	12	0.016	5.95	1.0		
154.2	47	11.73	6.42	59.1	10	0.014	5.94	0.9		
157.5	48	11.64	6.37	58.6	10	0.014	5.95	1.0		
160.8	49	11.61	6.34	58.2	10	0.014	5.95	1.0		
164.0	50	11.54	6.30	57.8	11	0.015	5.96	1.0		
167.3	51	11.45	6.27	57.4	11	0.014	5.96	1.0		
170.6	52	11.36	6.24	57.0	11	0.014	5.96	0.9		
173.9	53	11.33	6.14	56.0	10	0.014	5.96	0.9		
177.2	54	11.04	5.89	53.3	11	0.015	5.87	183.0		Bottom
180.4	55					0.0	5.			
183.7	56					0.0	5.			
187.0	57					0.0				
190.3	58					0.0				
193.6	59					0.0				
196.8	60					0.0				
200.1	61					0.0				
	62					0.0				
	63					0.0				
	64					0.0				
	65					0.0				
	66					0.0				
	67					0.0				
	68					0.0				
	69					0.0				

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Date: 10/26/2016
Time: 1020-1055

Reservoir - Water Quality Vertical Profiles

Instrument used: YSI 6920
Water depth: 71 Ft

Site Location: R-IS-1-LL
Lat/Long (NAD83):

Secchi (ft): 17

Personnel: BCR BTH

Site Notes: windy lots of drift

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	Specific Conductance (mS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		10.55	8.81	79.0	10	0.014	4.78	1.8		
3.3	1	10.55	8.71	78.1	9	0.013	4.81	1.8		
6.6	2	10.55	8.70	78.0	9	0.012	5.04	1.8		
9.8	3	10.54	8.69	77.9	8	0.011	5.16	1.9		
13.1	4	10.54	8.68	77.8	8	0.011	5.23	1.8		
16.4	5	10.54	8.67	77.8	8	0.011	5.33	1.9		
19.7	6	10.54	8.66	77.7	8	0.011	5.43	1.9		
23.0	7	10.53	8.65	77.6	8	0.011	5.55	1.9		
26.2	8	10.54	8.65	77.6	10	0.013	5.63	1.9		
29.5	9	10.52	8.68	77.7	7	0.009	6.32	1.9		
32.8	10	10.51	8.63	77.4	7	0.012	6.36	1.9		
36.1	11	10.51	8.63	77.3	7	0.009	6.35	2.1		
39.4	12	10.52	8.62	77.3	7	0.009	6.39	1.9		
42.7	13	10.51	8.61	77.2	6	0.009	6.41	1.9		
45.9	14	10.51	8.60	77.1	7	0.009	6.42	2.4		
49.2	15	10.48	8.59	77.0	7	0.009	6.46	1.9		
52.5	16	10.46	8.59	77.0	7	0.009	6.44	1.9		
55.8	17	10.43	8.57	76.7	6	0.009	6.48	1.9		
59.1	18	10.38	8.52	76.0	6	0.009	6.47	1.9		
62.3	19	10.17	8.54	75.6	6	0.008	6.48	3.1		
65.6	20	10.06	8.33	74.4	6	0.009	6.41	2.0		
68.9	21	9.83	8.26	72.8	7	0.009	6.37	2.1		
72.2	22	9.75	8.04	70.8	6	0.009	6.26	2.3		
75.5	23	9.74	7.95	70.0	6	0.009	6.13	2.7		
78.7	24	9.69	7.73	67.8	22	0.031	5.91	66.0		Bottom
82.0	25									
85.3	26									
88.6	27									
91.9	28									
95.1	29									
98.4	30									
101.7	31									
105.0	32									
108.3	33									
111.5	34									

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Date: 10/26/16
Time: 11:20 - 11:50

Reservoir - Water Quality Vertical Profiles

Site Location: R-IS-2-LL
Lat/Long (NAD83):

Instrument used: YSI-6920
Water depth: 115 ft

Secchi (ft): 12

Personnel: BCR BTH

Site Notes:

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	Specific Conductance (mS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		10.72	8.98	80.9	7	.009	6.34	2.5		
3.3	1	10.73	8.71	78.4	7	.009	6.47	1.9		
6.6	2	10.72	8.69	78.3	7	.009	6.50	1.9		
9.8	3	10.72	8.68	78.2	7	.009	6.45	1.8		
13.1	4	10.71	8.68	78.1	8	.009	6.48	2.3		
16.4	5	10.72	8.68	78.0	6	.009	6.51	1.9		
19.7	6	10.70	8.68	78.0	6	.009	6.53	1.9		
23.0	7	10.72	8.65	77.8	6	.009	6.53	1.9		
26.2	8	10.70	8.64	77.2	6	.009	6.54	1.9		
29.5	9	10.70	8.63	77.7	6	.009	6.55	1.9		
32.8	10	10.70	8.63	77.7	8	.011	6.54	2.1		
36.1	11	10.68	8.62	77.6	6	.009	6.55	1.9		
39.4	12	10.68	8.61	77.5	6	.009	6.56	1.9		
42.7	13	10.70	8.60	77.5	6	.009	6.55	1.9		
45.9	14	10.69	8.60	77.4	6	.009	6.59	1.9		
49.2	15	10.69	8.59	77.3	6	.009	6.57	1.9		
52.5	16	10.68	8.59	77.3	9	.012	6.54	1.9		
55.8	17	10.68	8.58	77.2	6	.009	6.57	1.9		
59.1	18	10.67	8.57	77.1	7	.009	6.58	1.9		
62.3	19	10.67	8.56	77.0	7	.009	6.58	1.9		
65.6	20	10.67	8.53	76.7	6	.009	6.60	1.9		
68.9	21	10.67	8.54	76.8	6	.008	6.59	3.1		
72.2	22	10.69	8.43	53.7	6	.009	6.55	2.2		
75.5	23	10.67	7.51	66.7	7	.009	6.53	3.0		
78.7	24	10.68	7.81	67.4	12	.018	6.35	43.2		
82.0	25									
85.3	26									
88.6	27									
91.9	28									
95.1	29									
98.4	30									
101.7	31									
105.0	32									
108.3	33									
111.5	34									

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Date: 10/26/2016
Time: 1215-1225

Reservoir - Water Quality Vertical Profiles

Instrument used: YSI 6920
Water depth: 42.5 ft

Site Location: R-IS-3-LL
Lat/Long (NAD83):

Secchi (ft): 24

Personnel: BCR BTH

Site Notes:

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	Specific Conductance (mS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		10.75	8.62	79.4	7	0.009	6.55	1.9		
3.3	1	10.74	8.7	78.4	7	0.009	6.56	1.9		
6.6	2	10.73	8.66	78.0	7	0.009	6.58	1.9		
9.8	3	10.72	8.64	77.8	7	0.009	6.60	1.9		
13.1	4	10.72	8.62	77.7	7	0.009	6.60	1.9		
16.4	5	10.70	8.60	77.4	7	0.009	6.58	1.8		
19.7	6	10.63	8.59	77.2	9	0.012	6.57	1.9		
23.0	7	10.62	8.59	77.2	8	0.011	6.55	2.2		
26.2	8	10.61	8.57	77.0	7	0.009	6.57	1.9		
29.5	9	10.60	8.56	76.9	7	0.009	6.60	1.9		
32.8	10	10.60	8.56	76.9	7	0.009	6.59	1.9		
36.1	11	10.60	8.55	76.7	7	0.009	6.58	2.0		
39.4	12	10.64	8.54	76.7	7	0.009	6.66	8.1		Bottom
42.7	13					0.0				
45.9	14									
49.2	15									
52.5	16									
55.8	17									
59.1	18									
62.3	19									
65.6	20									
68.9	21									
72.2	22									
75.5	23									
78.7	24									
82.0	25									
85.3	26									
88.6	27									
91.9	28									
95.1	29									
98.4	30									
101.7	31									
105.0	32									
108.3	33									
111.5	34									

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Reservoir - Water Quality Vertical Profiles

Date: 6/27/2016
Time: 1025-1035

Site Location: R-IS-9-IHR
Lat/Long (NAD83): _____

Instrument used: YSI 6920
Water depth: 63 ft

Secchi (ft): 19

Personnel: BCR BTH

Site Notes: _____

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	Specific Conductance (mS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		12.44	8.96	83.9	12	0.016	6.15	1.6		
3.3	1	12.46	8.67	81.2	10	0.013	6.40	1.6		
6.6	2	12.45	8.61	80.7	10	0.013	6.47	1.4		
9.8	3	12.46	8.58	80.4	9	0.012	6.49	1.3		
13.1	4	12.46	8.56	80.2	9	0.012	6.51	1.3		
16.4	5	12.46	8.55	80.1	9	0.012	6.55	1.3		
19.7	6	12.46	8.53	80.0	9	0.012	6.56	1.4		
23.0	7	12.46	8.52	79.8	9	0.012	6.56	1.4		
26.2	8	12.46	8.51	79.9	9	0.011	6.56	1.3		
29.5	9	12.45	8.51	79.8	9	0.011	6.57	1.4		
32.8	10	12.45	8.50	79.7	9	0.011	6.58	1.3		
36.1	11	12.45	8.49	79.6	9	0.011	6.57	1.3		
39.4	12	12.45	8.49	79.6	11	0.015	6.55	1.3		
42.7	13	12.43	8.50	79.4	8	0.011	6.61	2.2		
45.9	14	12.34	8.46	79.0	9	0.011	6.60	1.4		
49.2	15	12.13	8.41	78.2	8	0.011	6.59	1.3		
52.5	16	12.02	8.35	77.4	8	0.011	6.59	1.3		
55.8	17	11.54	8.25	75.5	8	0.011	6.58	1.4		
59.1	18	11.23	8.22	72.8	8	0.011	6.53	1.5		
62.3	19	10.79	7.60	68.2	8	0.011	6.48	1.5		
65.6	20	10.30	7.11	62.7	8	0.011	6.43	13.2		Bottom
68.9	21									
72.2	22									
75.5	23									
78.7	24									
82.0	25									
85.3	26									
88.6	27									
91.9	28									
95.1	29									
98.4	30									
101.7	31									
105.0	32									
108.3	33									
111.5	34									

Stillwater Sciences

SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Date: 10/27/2016
Time: 1050-1100

Reservoir - Water Quality Vertical Profiles

Site Location: R-IS-10 - HR
Lat/Long (NAD83): _____

Instrument used: YSI 6920
Water depth: 41.6 ft

Secchi (ft): 17

Personnel: BCR BTH

Site Notes: _____

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	Specific Conductance (mS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		12.41	8.49	79.5	12	0.016	6.44	1.0		
3.3	1	12.49	8.46	79.4	9	0.012	6.51	1.4		
6.6	2	12.50	8.64	81.0	9	0.012	6.57	1.3		
9.8	3	12.50	8.59	80.6	9	0.011	6.61	1.3		
13.1	4	12.51	8.57	80.4	9	0.011	6.61	1.3		
16.4	5	12.51	8.55	80.2	9	0.011	6.62	1.3		
19.7	6	12.51	8.54	80.1	9	0.011	6.63	1.4		
23.0	7	12.51	8.53	80.1	8	0.011	6.62	1.3		
26.2	8	12.51	8.53	80.0	8	0.011	6.62	1.3		
29.5	9	12.49	8.52	79.9	8	0.011	6.62	1.3		
32.8	10	12.50	8.51	79.9	8	0.010	6.67	1.4		
36.1	11	12.49	8.51	79.8	10	0.014	6.64	1.4		
39.4	12	12.49	8.51	79.8	10	0.010	6.61	2.5		
42.7	13	12.47	8.51	79.8	8	0.010	6.67	1.5		
45.9	14	12.48	8.49	79.5	8	0.010	6.66	10.0		Bottom
49.2	15									
52.5	16									
55.8	17									
59.1	18									
62.3	19									
65.6	20									
68.9	21									
72.2	22									
75.5	23									
78.7	24									
82.0	25									
85.3	26									
88.6	27									
91.9	28									
95.1	29									
98.4	30									
101.7	31									
105.0	32									
108.3	33									
111.5	34									

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SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Date: 10/27/2016
Time: 1115-1355

Reservoir - Water Quality Vertical Profiles

Instrument used: YSI 6920
Water depth: 105 FT

Site Location: R-JS-11-JMR
Lat/Long (NAD83):

Secchi (ft): 16

Personnel: BCR BTH

Site Notes:

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	Specific Conductance (mS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		12.51	8.99	84.4	11	0.015	6.50	1.0		
3.3	1	12.56	8.98	81.4	8	0.011	6.66	2.4		
6.6	2	12.56	8.59	80.7	8	0.011	6.72	1.4		
9.8	3	12.56	8.56	80.4	8	0.010	6.74	1.4		
13.1	4	12.56	8.53	80.1	8	0.010	6.73	1.4		
16.4	5	12.56	8.51	80.0	8	0.010	6.75	1.3		
19.7	6	12.56	8.50	79.8	8	0.010	6.74	1.3		
23.0	7	12.56	8.50	79.9	8	0.010	6.76	1.3		
26.2	8	12.55	8.48	79.7	8	0.010	6.75	1.3		
29.5	9	12.56	8.47	79.6	8	0.010	6.75	1.3		
32.8	10	12.55	8.47	79.5	8	0.010	6.73	1.3		
36.1	11	12.55	8.47	79.5	10	0.014	6.74	1.3		
39.4	12	12.55	8.46	79.5	10	0.013	6.71	1.3		
42.7	13	12.54	8.44	79.2	8	0.010	6.74	2.2		
45.9	14	12.51	8.40	78.8	8	0.010	6.73	1.4		
49.2	15	12.45	8.33	78.0	8	0.010	6.75	1.3		
52.5	16	12.26	8.21	76.4	8	0.010	6.75	1.3		
55.8	17	11.25	7.63	70.4	8	0.010	6.71	1.4		
59.1	18	10.57	6.92	61.2	7	0.010	6.62	1.5		
62.3	19	10.32	6.43	57.0	7	0.010	6.55	1.5		
65.6	20	9.87	6.10	53.5	7	0.010	6.648	1.6		
68.9	21	9.46	5.83	50.4	7	0.011	6.41	1.5		
72.2	22	8.64	5.41	45.8	8	0.041	6.34	1.4		
75.5	23	8.22	5.00	42.2	10	0.015	6.26	1.4		
78.7	24	7.98	5.01	42.3	9	0.014	6.18	1.4		
82.0	25	7.85	4.60	38.6	7	0.011	6.07	1.5		
85.3	26	7.74	4.47	37.3	8	0.011	5.97	1.4		
88.6	27	7.69	4.37	36.6	7	0.011	5.97	1.4		
91.9	28	7.65	4.39	36.7	8	0.011	5.98	1.5		
95.1	29	7.60	4.30	35.7	8	0.011	5.97	1.6		
98.4	30	7.48	3.90	32.0	8	0.012	5.95	1.4		
101.7	31	7.44	3.53	28.9	8	0.012	5.93	2.1		
105.0	32	7.32	3.01	24.5	9	0.013	5.91	2.5		
108.3	33	7.23	2.31	18.8	4	0.014	5.90	2.8		
111.5	34	7.20	1.83	15.0	9	0.014	5.89	3.1		
114.8	35	7.18	1.73	14.3	11	0.017	5.86	3.1		
114	36	7.16	1.30	10.7	10	0.015	5.83	5.8		Bottom

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SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Reservoir - Water Quality Vertical Profiles

Date: 10/27/2016
Time: 0849 - 0902

Site Location: R-IS-12-JR
Lat/Long (NAD83):

Instrument used: YSI-6920
Water depth: 53.1

Personnel: BCR BTH

Secchi (ft): 20

Site Notes:

Depth (ft)	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	Conductivity (µS/cm)	Specific Conductance (mS/cm)	pH (s.u.)	Turbidity (NTU)	Water Sample	Notes
surface		11.33	9.33	86.3	15	0.020	5.77	3.7		
3.3	1	11.32	9.52	87.0	13	0.018	5.49	1.2		
6.6	2	11.31	9.53	87.1	13	0.018	5.49	1.1		
9.8	3	11.31	9.54	87.1	13	0.017	5.47	1.1		
13.1	4	11.30	9.53	87.1	13	0.017	5.53	1.1		
16.4	5	11.30	9.53	87.0	13	0.017	5.56	1.1		
19.7	6	11.28	9.52	86.9	12	0.017	5.60	1.1		
23.0	7	11.27	9.51	86.8	12	0.017	5.63	1.1		
26.2	8	11.26	9.50	86.7	12	0.017	5.67	1.1		
29.5	9	11.23	9.49	86.5	12	0.017	5.70	1.1		
32.8	10	11.23	9.48	86.4	15	0.020	5.72	1.1		
36.1	11	11.21	9.48	86.4	14	0.019	5.76	1.1		
39.4	12	11.21	9.45	86.1	12	0.017	5.77	1.3		
42.7	13	11.21	9.44	86.0	13	0.017	5.80	1.3		
45.9	14	11.21	9.43	86.0	12	0.017	5.82	1.1		
49.2	15	11.21	9.42	85.8	12	0.017	5.83	1.2		
52.5	16	11.17	9.42	85.7	12	0.017	3.84	1.1		
55.8	17	11.08	9.41	85.5	12	0.017	5.86	1.2		
59.1	18	10.56	9.45	84.5	13	0.018	5.90	1.2		
62.3	19	10.24	9.46	84.2	13	0.018	5.94	1.8		
65.6	20	10.11	9.45	83.8	13	0.019	5.94	103.8		Bottom
68.9	21									
72.2	22									
75.5	23									
78.7	24									
82.0	25									
85.3	26									
88.6	27									
91.9	28									
95.1	29									
98.4	30									
101.7	31									
105.0	32									
108.3	33									
111.5	34									

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SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Instrument(s) used: YSI 6920 **Crew:** KKC + BCR

Site Location: IS-7-SFRR
Date: 11/7/16
Photos:
Notes:
GPS:
Time: 9:25 AM
Weather: Sunny, Cold

In situ

Temp	DO		Conductivity	Specific Conductance	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(mS/cm)	(s.u.)	(NTU)	
5.75	10.41	83.2	15.0	0.024	6.11	1.1	

Site Location: IS-8-SFRR
Date: 11/7/2016
Photos:
Notes:
GPS:
Time: 9:40 AM
Weather: Sunny, Cold

In situ

Temp	DO		Conductivity	Specific Conductance	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(mS/cm)	(s.u.)	(NTU)	
6.84	10.33	84.8	13	0.023	6.64	1.2	

Site Location: IS-9-GCC
Date: 11/7/2016
Photos:
Notes:
GPS:
Time: 10:00 AM
Weather: Sunny, Cool

In situ

Temp	DO		Conductivity	Specific Conductance	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(mS/cm)	(s.u.)	(NTU)	
6.53	9.87	80.4	34.0	0.052	6.68	1.0	

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Site Location: IS-5-GC
Date: 11/7/2016
Photos:
Notes:
GPS:
Time: 10:20 AM
Weather: Sunny, Cool

In situ

Temp	DO		Conductivity	Specific Conductance	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(mS/cm)	(s.u.)	(NTU)	
6.86	10.00	82.0	12.0	0.023	6.90	1.3	

Site Location: IS-4-GC
Date: 11/7/2016
Photos:
Notes:
GPS:
Time: 11:10 AM
Weather: Sunny, Cool

In situ

Temp	DO		Conductivity	Specific Conductance	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(mS/cm)	(s.u.)	(NTU)	
8.98	9.28	80.2	10.0	0.014	7.12	1.3	

Site Location: IS-1-RR
Date: 11/7/2016
Photos:
Notes:
GPS:
Time: 3:30 PM
Weather: Sunny, Cool

In situ

Temp	DO		Conductivity	Specific Conductance	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(mS/cm)	(s.u.)	(NTU)	
5.19	9.79	77.1	6.0	0.009	6.60	1.0	

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SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Instrument(s) used: YSI 6920 **Crew:** KKC + BCR

Site Location: IS-2-LRR
Date: 11/8/2016
Photos:
Notes:
GPS:
Time: 10:10 AM
Weather: Sunny, Cool

In situ

Temp	DO		Conductivity	Specific Conductance	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(mS/cm)	(s.u.)	(NTU)	
5.95	9.95	78.3	7.0	0.011	7.19	1.2	

Site Location: IS-3-LRR
Date: 11/8/2016
Photos:
Notes:
GPS:
Time: 11:00 AM
Weather: Sunny, Cool

In situ

Temp	DO		Conductivity	Specific Conductance	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(mS/cm)	(s.u.)	(NTU)	
6.55	9.93	81.0	5.0	0.008	6.73	1.1	

Site Location: IS-10-SFSC
Date: 11/9/16
Photos:
Notes:
GPS:
Time: 9:40 AM
Weather: Sunny, Cool

In situ

Temp	DO		Conductivity	Specific Conductance	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(mS/cm)	(s.u.)	(NTU)	
7.60	9.31	78.0	7.0	0.011	5.60	3.5	

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Site Location: IS - 11 - SFSC
Date: 11/9/2016
Photos:
Notes:
GPS:
Time: 10:20 AM
Weather: Sunny, Cool

In situ

Temp	DO		Conductivity	Specific Conductance	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(mS/cm)	(s.u.)	(NTU)	
5.29	10.61	84.0	10.0	0.016	6.05	2.5	

Site Location: IS - 12 - SC
Date: 11/9/2016
Photos:
Notes:
GPS:
Time: 10:40 AM
Weather: Sunny, Cool

In situ

Temp	DO		Conductivity	Specific Conductance	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(mS/cm)	(s.u.)	(NTU)	
8.58	9.87	84.5	8.0	0.011	6.00	2.7	

Site Location: IS - 13 - SC
Date: 11/9/2016
Photos:
Notes:
GPS:
Time: 12:40 PM
Weather: Sunny, Cool

In situ

Temp	DO		Conductivity	Specific Conductance	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(mS/cm)	(s.u.)	(NTU)	
9.47	10.40	91.0	12.0	0.018	6.90	3.1	

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SMUD *In situ* Monitoring in the Upper American River Project and Chili Bar Project

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Instrument(s) used: YSI 6920 **Crew:** KKC + BCR

Site Location: IS-14-SC
Date: 11/9/2016
Photos:
Notes:
GPS:
Time: 12:00 PM
Weather: Sunny, Cool

In situ

Temp	DO		Conductivity	Specific Conductance	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(mS/cm)	(s.u.)	(NTU)	
10.47	10.16	91.0	13.0	0.017	6.86	3.1	

Site Location: IS-15-SFAR
Date: 11/10/16
Photos:
Notes:
GPS:
Time: 9:10 AM
Weather: Clear, Cool

In situ

Temp	DO		Conductivity	Specific Conductance	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(mS/cm)	(s.u.)	(NTU)	
9.00	10.09	87.3	30.0	0.043	6.02	1.1	

Site Location: IS-16-SFAR
Date: 11/10/16
Photos:
Notes:
GPS:
Time: 9:30 AM
Weather: Clear, Cool

In situ

Temp	DO		Conductivity	Specific Conductance	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(mS/cm)	(s.u.)	(NTU)	
10.57	10.42	93.6	19.0	0.027	6.17	1.2	

Site Location: IS-17-BC
Date: 11/10/16
Photos:
Notes:
GPS:
Time: 10:00 AM
Weather: Sunny, Cool

In situ

Temp	DO		Conductivity	Specific Conductance	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(mS/cm)	(s.u.)	(NTU)	
11.59	9.95	91.4	22.0	0.030	6.27	39.6	Very turbid, brown water.

Site Location: IS-19-SFAR
Date: 11/10/16
Photos:
Notes:
GPS:
Time: 11:40 AM
Weather: Sunny, Cool

In situ

Temp	DO		Conductivity	Specific Conductance	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(mS/cm)	(s.u.)	(NTU)	
10.33	10.44	93.0	18.0	0.025	6.60	3.7	

Site Location: IS-18-SFAR
Date: 11/10/16
Photos:
Notes:
GPS:
Time: 12:40 PM
Weather: Sunny, Cool

In situ

Temp	DO		Conductivity	Specific Conductance	pH	Turbidity	Notes
(°C)	(mg/L)	(%)	(µS/cm)	(mS/cm)	(s.u.)	(NTU)	
11.10	10.81	98.5	31.0	0.042	6.81	1.9	

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APPENDIX E
In situ Field Calibration Sheets

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Water Quality YSI 6920 Sonde Calibration – Daily Use

Project: URRP & CB WQ MONITORING - RIVERINE IN SITU FEB 2016

Unit ID: YSI 6920

Sampling Event Date(s): 2/8 - 2/10/2016

PRE-SAMPLING CALIBRATION

Date and time 2/8/16 7:30 AM Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	19.49	1042	1,000	
Cond (uS/cm @ 25°C)	10,000	20.25	5,479	10,000	
DO (%)		20.20	89.0	87.9	
DO (mg/L)*		20.20	8.04	7.94	Check solubility table* @ 669.5 mmHg 7.9/8.0 mg/L
pH4	pH4	19.32	9.24	3.99	
pH 7	pH 7	18.95	6.81	7.00	
pH 10	pH 10	19.18	10.06	10.03	
Turbidity	12.7	19.75	13.2	12.7	
Turbidity					

POST-SAMPLING CALIBRATION CHECK

Date and time 2/8/16 6:00pm Name

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	MQO Code[1]	Notes
Cond (uS/cm @ 25°C)	1,000	20.89	1,800	Y	1,000	Q	
Cond (uS/cm @ 25°C)	10,000	20.84	9787	N		A	
DO (%)		21.21	87.4	N		A	
*DO (mg/L)		21.21	7.76	N		A	Check solubility table*
pH4	pH4	20.64	4.03	N		A	7.8 mg/L @ 669.7 mmHg
pH 7	pH 7	21.00	6.93	N		A	
pH 10	pH 10	20.99	9.99	N		A	
Turbidity	12.7	21.06	12.6	N		A	
Turbidity							

[1] See Table 1

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

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

Ver. 01/2016

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Water Quality YSI 6920 Sonde Calibration – Daily Use

Project: UARP & CB WQ MONITORING - RIVERINE IN SITU FEB 2016

Unit ID: YSI 6920

Sampling Event Date(s): 2/8 - 2/10/2016

PRE-SAMPLING CALIBRATION

Date and time 2/8/16 7:30 AM Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	19.49	1,042	1,000	
Cond (uS/cm @ 25°C)	10,000	20.25	5,479	10,000	
DO (%)		20.20	89.0	87.9	
DO (mg/L)*		20.20	8.04	7.94	Check solubility table* @ 669.5 mm Hg 7.9/8.0 mg/L
pH4	pH4	19.32	4.24	3.99	
pH 7	pH 7	18.95	6.81	7.00	
pH 10	pH 10	19.18	10.06	10.03	
Turbidity	12.7	19.75	13.2	12.7	
Turbidity					

POST-SAMPLING CALIBRATION CHECK

Date and time 2/9/16 18:00 Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	MQO Code[1]	Notes
Cond (uS/cm @ 25°C)	1,000	19.76	1,030	N		A	
Cond (uS/cm @ 25°C)	10,000	19.88	8723	N		A	
DO (%)		19.81		N		A	
*DO (mg/L)		19.81	7.91	N		A	Check solubility table*
pH4	pH4	20.03	4.04	N		A	@ 669.3 mm Hg 7.9 mg/L
pH 7	pH 7	20.09	6.97	N		A	
pH 10	pH 10	20.01	9.95	N		A	
Turbidity	12.7	20.03	12.6	N		A	
Turbidity							

[1] See Table 1

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

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

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Water Quality YSI 6920 Sonde Calibration – Daily Use

Project: SMUD UARP RESERVOIR WQ SURVEY

Unit ID: YSI 6920

Sampling Event Date(s): 4/25 - 4/28 2016

PRE-SAMPLING CALIBRATION

Date and time 4/24/16 14:50 Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	19.14	952	1,001	
Cond (uS/cm @ 25°C)	10,000	19.10	9731	10000	
DO (%)		19.46	97.0	95.7	
DO (mg/L)*		19.46	8.91	8.79	*Check solubility table** 727 mm Hg 8.7 mg/L
pH4	pH4	19.12	4.07	4.00	
pH 7	pH 7	18.77	6.48	7.00	
pH 10	pH 10	19.39	9.31	10.00	
Turbidity	12.7 NTU	19.25	12.9	12.7	
Turbidity					

POST-SAMPLING CALIBRATION CHECK

Date and time 4/25/16 15:50 Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	MQO Code[1]	Notes
Cond (uS/cm @ 25°C)	1,000	19.32	1011	No		ACCEPT	
Cond (uS/cm @ 25°C)	10,000	19.46	10110	NO		ACCEPT	
DO (%)		19.49	86.6	No		ACCEPT	642.3 mm/Hg
*DO (mg/L)		19.49	7.95	No		ACCEPT	*Check solubility table** 7.9 mg/L
pH4	pH 4	19.20	4.29	No		QUALIFY	
pH 7	pH 7	19.31	7.06	No		ACCEPT	
pH 10	pH 10	19.38	10.12	No		ACCEPT	
Turbidity	12.7	19.17	12.7	NO		ACCEPT	
Turbidity							

[1] See Table 1

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

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

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Water Quality YSI 6920 Sonde Calibration – Daily Use

Project: SMUD UARP RESERVOIR WQ SURVEY

Unit ID: YSI 6920

Sampling Event Date(s): 4/25 - 4/28 2016

PRE-SAMPLING CALIBRATION

Date and time 4/26/16 6:45 Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	20.23	1057	1000	
Cond (uS/cm @ 25°C)	10,000	20.28	9636	10000	
DO (%)		20.21	86.3	87.0	662.1 mm/Hg
DO (mg/L)*		20.21	7.83	7.84	*Check solubility table** 8
pH4	pH4	20.12	4.23	4.00	7.8 mg/L
pH 7	pH 7	20.21	7.89	7.00	
pH 10	pH 10	20.15	9.76	10.0	
Turbidity	12.7	20.19	12.9	12.7	
Turbidity					

POST-SAMPLING CALIBRATION CHECK

Date and time 4/26/16 18:00 Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	MQO Code[1]	Notes
Cond (uS/cm @ 25°C)	1,000	20.43	1077	NO		ACCEPT	
Cond (uS/cm @ 25°C)	10,000	20.65	10370	NO		ACCEPT	
DO (%)		20.40	84.8	NO		ACCEPT	663.4 mm/Hg
*DO (mg/L)		20.40	7.81	NO		ACCEPT	*Check solubility table**
pH4	pH 4	20.54	4.03	NO		ACCEPT	7.8 mg/L
pH 7	pH 7	20.90	7.09	NO		ACCEPT	
pH 10	pH 10	20.64	9.98	NO		ACCEPT	
Turbidity	12.7	20.56	12.7	NO		ACCEPT	
Turbidity							
[1] See Table 1							

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

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

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Water Quality YSI 6920 Sonde Calibration – Daily Use

Project: SMUD UARP RESERVOIR WQ SURVEY

Unit ID: YSI 6920

Sampling Event Date(s): 4/25 - 4/28 2016

PRE-SAMPLING CALIBRATION

Date and time 4/27/16 6:30 Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	20.70	1085	1000	
Cond (uS/cm @ 25°C)	10,000	20.15	9470	10000	
DO (%)		20.27	86.5	87.0	661.1 mm / Hg
DO (mg/L)*		20.27	7.82	7.85	*Check solubility table**
pH4	pH4	20.86	4.55	4.00	7.8 mg/L
pH 7	pH 7	20.77	7.59	7.00	
pH 10	pH 10	20.97	9.56	9.98	
Turbidity	12.7	20.64	12.8	12.7	
Turbidity					

POST-SAMPLING CALIBRATION CHECK

Date and time 4/27/16 19:00 Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	MQO Code[1]	Notes
Cond (uS/cm @ 25°C)	1,000	19.99	1024	NO		ACCEPT	
Cond (uS/cm @ 25°C)	10,000	20.69	10110	NO		ACCEPT	
DO (%)		20.14	87.2	NO		ACCEPT	659.6 mm/Hg
*DO (mg/L)		20.14	7.91	NO		ACCEPT	*Check solubility table**
pH4	pH 4	20.49	4.18	NO		ACCEPT	7.8 mg/L
pH 7	pH 7	18.77	7.16	NO		ACCEPT	
pH 10	pH 10	16.44	9.97	NO		ACCEPT	
Turbidity	12.7	20.47	12.8	NO		ACCEPT	
Turbidity							

[1] See Table 1

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

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

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Water Quality YSI 6920 Sonde Calibration – Daily Use

Project: SMUD UARP RESERVOIR WQ SURVEY

Unit ID: YSI 6920

Sampling Event Date(s): 4/25 - 4/28/2016

PRE-SAMPLING CALIBRATION

Date and time 4/28/2016 7:00AM Name KELLEIGH CROWE

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	20.69	1,033	1,000	
Cond (uS/cm @ 25°C)	10,000	20.79	9,793	10,000	
DO (%)		20.20	86.9	86.7	659.6 mm/Hg
DO (mg/L)*		20.20	7.83	7.81	*Check solubility table** 7.8 mg/L
pH4	pH4	10.55	6.81	4.00	
pH 7	pH 7	20.01	5.62	6.99	
pH 10	pH 10	20.16	11.22	10.10	
Turbidity	12.7	20.72	12.7	12.7	
Turbidity					

POST-SAMPLING CALIBRATION CHECK

Date and time 4/28/2016 17:00 Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	MQO Code[1]	Notes
Cond (uS/cm @ 25°C)	1,000	17.16	972	NO		~~ACCEPT~~	QUALIFY
Cond (uS/cm @ 25°C)	10,000	19.17	9635	NO		ACCEPT	
DO (%)		18.75	96.2	NO		ACCEPT	726.1 mm/Hg
*DO (mg/L)		18.75	8.96	NO		ACCEPT	*Check solubility table**
pH4	pH 4	18.46	3.91	NO		ACCEPT	8.9 mg/L
pH 7	pH 7	16.84	6.95	NO		ACCEPT	
pH 10	pH 10	17.40	9.96	NO		ACCEPT	
Turbidity	12.7	19.66	12.7	NO		ACCEPT	
Turbidity							

[1] See Table 1

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

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

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Water Quality YSI 6920 Sonde Calibration – Daily Use

Project: SMUD UARP RIVERINE WQ SURVEY

Unit ID: YSI 6920

Sampling Event Date(s): 5/1 - 5/4/16

PRE-SAMPLING CALIBRATION

Date and time 5/1/16 8:00AM Name KELLEIGH CROWE

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	1888	1088	0990	
Cond (uS/cm @ 25°C)	10,000	18.70	8945	10,000	
DO (%)		18.[illegible]67	95.8	95.3	724.4 mm/Hg
DO (mg/L)*		18.67	8.85	8.92	*Check solubility table**
pH4	pH4	18.48	4.33	4.00	8.9 mg/L
pH 7	pH 7	18.79	6.97	7.00	
pH 10	pH 10	18.68	9.95	9.95	
Turbidity	12.7	18.78	12.7	12.7	
Turbidity					

POST-SAMPLING CALIBRATION CHECK

Date and time 5/1/16 18:00 Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	MQO Code[1]	Notes
Cond (uS/cm @ 25°C)	1,000	20.88	1032	No		Accept	
Cond (uS/cm @ 25°C)	10,000	21.10	10348	No		Accept	
DO (%)		20.20	87.4	No		Accept	6060.0 mm/Hg
*DO (mg/L)		20.20	7.90	No		Accept	*Check solubility table**
pH4	pH 4	20.71	3.92	No		Accept	7.8
pH 7	pH 7	20.68	6.86	No		Accept	
pH 10	pH 10	20.61	9.79	No		Accept	
Turbidity	12.7	20.81	12.8	No		Accept	
Turbidity							

[1] See Table 1

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

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

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Water Quality YSI 6920 Sonde Calibration – Daily Use

Project: SMUD UARP RIVERINE WQ SURVEY

Unit ID: YSI 6920

Sampling Event Date(s): 5/1 - 5/4/2016

PRE-SAMPLING CALIBRATION

Date and time 5/2/16 8:00 AM Name KELLEIGH CROWE

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	19.91	1,181	1,000	
Cond (uS/cm @ 25°C)	10,000	14.23	7788	10,000	
DO (%)		18.81	88.20	87.3	663.3 mm/Hg
DO (mg/L)*		18.81	8.21	8.13	*Check solubility table**
pH4	pH4	19.89	3.94	4.00	8.1 mg/L
pH 7	pH 7	19.95	6.99	7.00	
pH 10	pH 10	19.96	9.91	10.00	
Turbidity	12.7	19.64	12.7	12.7	
Turbidity					

POST-SAMPLING CALIBRATION CHECK

Date and time 5/2/16 5:30 PM Name KELLEIGH CROWE

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	MQO Code[1]	Notes
Cond (uS/cm @ 25°C)	1,000	21.94	1200	NO		QUALIFY	
Cond (uS/cm @ 25°C)	10,000	21.34	11250	NO		QUALIFY	
DO (%)		20.92	86.8	NO		ACCEPT	663.1 mm/Hg
*DO (mg/L)		20.92	7.75	NO		ACCEPT	*Check solubility table**
pH4	pH 4	22.47	3.74	NO		~~ACCEPT~~ QUALIFY	7.8 mg/L
pH 7	pH 7	22.23	6.77	NO		QUALIFY	
pH 10	pH 10	21.07	9.99	NO		ACCEPT	
Turbidity	12.7	21.27	12.6	NO		ACCEPT	
Turbidity							

[1] See Table 1

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

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

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Water Quality YSI 6920 Sonde Calibration – Daily Use

Project: SMUD UARP RIVERINE WQ SURVEY

Unit ID: YSI 6920

Sampling Event Date(s): 5/1 - 5/4/2016

PRE-SAMPLING CALIBRATION

Date and time 8:30AM 5/3/16 Name KELLEIGH CROWE

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	20.92	1,235	1000	
Cond (uS/cm @ 25°C)	10,000	20.84	9107	10,000	
DO (%)		20.96	87.3	87.2	662.8 mm/Hg
DO (mg/L)*		20.96	7.80	7.77	*Check solubility table* 8
pH4	pH4	20.90	4.23	3.99	7.7 mg/L
pH 7	pH 7	21.00	6.75	7.01	
pH 10	pH 10	21.09	10.28	10.05	
Turbidity	12.7	20.94	12.5	12.7	
Turbidity					

POST-SAMPLING CALIBRATION CHECK

Date and time 5/3/16 16:30 Name BRYCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	MQO Code[1]	Notes
Cond (uS/cm @ 25°C)	1,000	22.97	997			ACCEPT	
Cond (uS/cm @ 25°C)	10,000	23.15	10500			ACCEPT	
DO (%)		23.02	86.4			ACCEPT	662.2 mm Hg
*DO (mg/L)		23.02	7.40			ACCEPT	*Check solubility table* 8
pH4	pH 4	23.12	3.91			ACCEPT	7.5
pH 7	pH 7	23.02	7.08			ACCEPT	
pH 10	pH 10	23.06	10.20			ACCEPT	
Turbidity	12.7	23.52	12.9			ACCEPT	
Turbidity							

[1] See Table 1

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

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

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Water Quality YSI 6920 Sonde Calibration – Daily Use

Project: SMUD UARP RIVERINE + RESERVOIR WQ SURVEY

Unit ID: YSI 6920

Sampling Event Date(s): 5/17

PRE-SAMPLING CALIBRATION

Date and time 5/16/16 19:00 Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	25.31	1073	1000	
Cond (uS/cm @ 25°C)	10,000	25.82	9316	10001	
DO (%)		23.70	82.4	87.1	662.7 mm/Hg
DO (mg/L)*		23.70	6.96	7.35	*Check solubility table** 7.3 mg/L
pH4	pH4	24.82	4.20	4.00	
pH 7	pH 7	24.70	6.87	7.00	
pH 10	pH 10	25.54	10.45	10.02	
Turbidity	12.7	26.05	12.6	12.7	
Turbidity					

POST-SAMPLING CALIBRATION CHECK

Date and time 5/17/16 Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	MQO Code[1]	Notes
Cond (uS/cm @ 25°C)	1,000	24.17	1050			ACCEPT	
Cond (uS/cm @ 25°C)	10,000	24.26	10092			ACCEPT	
DO (%)		23.61	99.9			ACCEPT	759.5 mm Hg
*DO (mg/L)		23.61	8.47			ACCEPT	*Check solubility table**
pH4	pH 4	24.41	4.03			ACCEPT	8.5 mg/L
pH 7	pH 7	24.06	6.89			ACCEPT	
pH 10	pH 10	24.05	9.96			ACCEPT	
Turbidity	12.7	24.11	13.2			ACCEPT	
Turbidity							

[1] See Table 1

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

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

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Water Quality YSI 6920 Sonde Calibration – Daily Use

Project: SMUD UARP RIVERINE WQ - SURVEY

Unit ID: YSI 6920

Sampling Event Date(s): 5/1 - 5/4/2016

PRE-SAMPLING CALIBRATION

Date and time 5/4/16 8:00 Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	22.45	1111	1000	
Cond (uS/cm @ 25°C)	10,000	22.43	9302	10000	
DO (%)		22.13	86.7	86.9	600.1 mm Hg
DO (mg/L)*		22.13	7.57	7.57	*Check solubility table**
pH4	pH4	22.42	3.96	4.00	7.5 mg/L
pH 7	pH 7	22.36	7.03	7.00	
pH 10	pH 10	23.39	10.24	10.05	
Turbidity	12.7	22.30	12.5	12.7	
Turbidity					

POST-SAMPLING CALIBRATION CHECK

Date and time 5/4/16 15:00 Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	MQO Code[1]	Notes
Cond (uS/cm @ 25°C)	1,000	22.25	1050			ACCEPT	
Cond (uS/cm @ 25°C)	10,000	22.84	10047			ACCEPT	
DO (%)		21.85	95.3			ACCEPT	723.5 mm Hg
*DO (mg/L)		21.85	8.34			ACCEPT	*Check solubility table**
pH4	pH 4	22.09	3.97			ACCEPT	8.3 mg/L
pH 7	pH 7	21.87	7.17			ACCEPT	
pH 10	pH 10	21.75	10.17			ACCEPT	
Turbidity	12.7	22.74	13.1			ACCEPT	
Turbidity							

[1] See Table 1

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

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

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Water Quality YSI 6920 Sonde Calibration – Daily Use

Project: LARP WQ Summer 2016

Unit ID: YSI 6920

Sampling Event Date(s): 8/22 - 8/26

PRE-SAMPLING CALIBRATION

Date and time 8/24 07:00 Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	19.63	1127	1000	
Cond (uS/cm @ 25°C)	10,000	19.45	8898	10000	
DO (%)		19.20	98.3	98.5	
DO (mg/L)*		19.20	8.63	8.65	*Check solubility table**
pH4	pH4	19.62	3.92	4.00	
pH 7	pH 7	19.45	6.90	7.00	
pH 10	pH 10	19.72	10.04	10.00	
Turbidity	12.7	18.98	11.4	12.7	
Turbidity					

POST-SAMPLING CALIBRATION CHECK

Date and time 8/24 15:00 Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	MQO Code[1]	Notes
Cond (uS/cm @ 25°C)	1,000	24.00	1017	NO		A	
Cond (uS/cm @ 25°C)	10,000	23.95	9717	NO		A	
DO (%)		22.31	92.8	NO		A	711 mm/Hg
*DO (mg/L)		22.31	7.9	NO		A	*Check solubility table*
pH4	pH 4	24.04	3.91	NO		A	8.0 - 8.1
pH 7	pH 7	24.89	6.87	NO		A	
pH 10	pH 10	27.40	9.99	NO		A	
Turbidity	12.7	24.77	12.4	NO		A	
Turbidity							
[1] See Table 1							

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

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

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Water Quality YSI 6920 Sonde Calibration – Daily Use

Project: UARP + CHILI BAR WQ SUMMER 2016

Unit ID: YSI 6920

Sampling Event Date(s): 8/22 - 8/26

PRE-SAMPLING CALIBRATION

Date and time 8/25 07:00 Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	19.57	1103	1000	
Cond (uS/cm @ 25°C)	10,000	19.42	8701	9996	
DO (%)		18.36	92.8	92.9	
DO (mg/L)*		18.36	8.71	8.72	*Check solubility table**
pH4	pH4	19.67	3.98	4.00	
pH 7	pH 7	19.95	6.90	7.00	
pH 10	pH 10	19.40	10.11	10.00	
Turbidity	12.7	18.35	10.4	12.7	
Turbidity					

POST-SAMPLING CALIBRATION CHECK

Date and time 8/25 18:30 Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	MQO Code[1]	Notes
Cond (uS/cm @ 25°C)	1,000	21.77	1050	NO		A	
Cond (uS/cm @ 25°C)	10,000	21.92	9725	NO		A	
DO (%)		22.89	93.8	NO		A	707.5 mm/Hg
*DO (mg/L)		22.89	8.03	NO		A	*Check solubility table**
pH4	pH 4	21.77	3.94	NO		A	8.0 mg/L
pH 7	pH 7	21.53	6.89	NO		A	
pH 10	pH 10	21.81	9.93	NO		A	
Turbidity	12.7	23.91	13.2	NO		A	
Turbidity							

[1] See Table 1

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

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

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Water Quality YSI 6920 Sonde Calibration – Daily Use

Project: UARP + CHILI BAR WQ SUMMER 2016

Unit ID: YSI 6920

Sampling Event Date(s): 8/22 – 8/26

PRE-SAMPLING CALIBRATION

Date and time 8/26 07:00 Name KELLEIGH CROWE

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	19.18	1003	1000	
Cond (uS/cm @ 25°C)	10,000	18.65	8885	10,001	
DO (%)		18.17	93.4	92.9	
DO (mg/L)*		18.17	8.80	8.70	*Check solubility table**
pH4	pH4	18.78	3.99	4.00	
pH 7	pH 7	19.25	6.95	7.00	
pH 10	pH 10	18.91	10.05	10.00	
Turbidity	12.7	18.63	13.3	12.7	
Turbidity					

POST-SAMPLING CALIBRATION CHECK

Date and time 8/26 18:00 Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	MQO Code[1]	Notes
Cond (uS/cm @ 25°C)	1,000	25.88	1036	No		A	
Cond (uS/cm @ 25°C)	10,000	26.16	10357	No		A	
DO (%)		26.06	95.4	NO		A	727.3 mm HG
*DO (mg/L)		26.06	7.73	NO		A	*Check solubility table**
pH4	pH 4	26.58	4.09	NO		A	7.7 mg/L
pH 7	pH 7	26.30	6.96	NO		A	
pH 10	pH 10	26.57	9.94	No		A	
Turbidity	12.7	26.78	13.0	NO		A	
Turbidity							
[1] See Table 1							

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

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

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Water Quality YSI 6920 Sonde Calibration – Daily Use

Project: UARP RESERVOIR WQ FALL 2016

Unit ID: YSI 6920

Sampling Event Date(s): 10/23 – 10/27

PRE-SAMPLING CALIBRATION

Date and time 10/25 21:30 Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	23.40	1078	998	
Cond (uS/cm @ 25°C)	10,000	22.74	9021	9999	
DO (%)		20.34	91.9	95.2	707.5 mm/Hg
DO (mg/L)*		20.34	8.28	8.49	*Check solubility table** 8.4 mg/L
pH4	pH4	22.35	4.05	4.00	
pH 7	pH 7	22.42	6.96	7.00	
pH 10	pH 10	21.93	9.93	9.99	
Turbidity	12.7	21.40	12.5	12.7	
Turbidity					

POST-SAMPLING CALIBRATION CHECK

Date and time 10/24 16:30 Name KELLEIGH CROWE

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	MQO Code[1]	Notes
Cond (uS/cm @ 25°C)	1,000	19.47	1113	N		Q	
Cond (uS/cm @ 25°C)	10,000	19.50	9238	N		Q	
DO (%)		19.20	95.5	N		A	710.10 mm/Hg
*DO (mg/L)		19.20	8.82	N		A	*Check solubility table**
pH4	pH 4	19.75	3.96	N		A	8.6 mg/L
pH 7	pH 7	19.93	6.92	N		A	
pH 10	pH 10	19.84	9.95	N		A	
Turbidity	12.7	18.75	12.70	N		A	
Turbidity							

[1] See Table 1

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

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

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Water Quality YSI 6920 Sonde Calibration – Daily Use

Project: UARP RESERVOIR WQ FALL 2016

Unit ID: YSI 6920

Sampling Event Date(s): 10/23 – 10/27

PRE-SAMPLING CALIBRATION

Date and time 10/25 7:00 Name KELLEIGH CROWE

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	20.25	1043	1000	
Cond (uS/cm @ 25°C)	10,000	20.25	8245	10,006	
DO (%)		19.82	95.3	93.4	710.6 mm/Hg
DO (mg/L)*		19.82	8.67	8.50	*Check solubility table** 8.5 mg/L
pH4	pH4	20.51	4.00	4.00	
pH 7	pH 7	20.51	6.96	7.00	
pH 10	pH 10	20.73	10.12	10.02	
Turbidity	12.7	19.52	12.1	12.7	
Turbidity					

POST-SAMPLING CALIBRATION CHECK

Date and time 10/25 16:30 Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	MQO Code[1]	Notes
Cond (uS/cm @ 25°C)	1,000	19.24	1184	No		Q	
Cond (uS/cm @ 25°C)	10,000	19.10	9848	No		A	
DO (%)		18.02	93.7	NO		A	710.8 mm/Hg
*DO (mg/L)		18.02	8.86	NO		A	*Check solubility table**
pH4	pH 4	19.36	3.95	No		A	8.8 mg/L
pH 7	pH 7	19.68	6.92	NO		A	
pH 10	pH 10	19.53	9.95	No		A	
Turbidity	12.7	19.00	12.8	No		A	
Turbidity							
[1] See Table 1							

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

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

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Water Quality YSI 6920 Sonde Calibration – Daily Use

Project: UARP WQ RESERVOIR FALL 2016

Unit ID: YSI 6920

Sampling Event Date(s): 10/23 - 10/27

PRE-SAMPLING CALIBRATION

Date and time 10/26 6:30 Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	18.34	1001	1000	
Cond (uS/cm @ 25°C)	10,000	18.44	9481	10.000	
DO (%)		17.54	93.5	93.6	711.0 mm/Hg
DO (mg/L)*		17.54	8.92	8.92	*Check solubility table**
pH4	pH4	18.95	4.13	4.02	8.9 mg/L
pH 7	pH 7	19.23	6.86	7.00	
pH 10	pH 10	19.12	10.08	10.00	
Turbidity	12.7	18.24	13.0	12.7	
Turbidity					

POST-SAMPLING CALIBRATION CHECK

Date and time 10/26 18:15 Name BRUCE HITCH

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	MQO Code[1]	Notes
Cond (uS/cm @ 25°C)	1,000	17.98	1178	No		Q	
Cond (uS/cm @ 25°C)	10,000	18.01	9897	No		A	
DO (%)		17.37	98.9	NO		A	709.2 mm/Hg
*DO (mg/L)		17.37	8.99	NO		A	*Check solubility table**
pH4	pH 4	18.28	4.01	No		A	9.00 mg/L
pH 7	pH 7	18.33	6.91	No		A	
pH 10	pH 10	18.35	9.91	No		A	
Turbidity	12.7	17.58	13.5	No		Q	
Turbidity							

[1] See Table 1

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

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

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Water Quality YSI 6920 Sonde Calibration – Daily Use

Project: UARP WQ RESERVOIR FALL 2016

Unit ID: YSI 6920

Sampling Event Date(s): 10/24 - 10/27

PRE-SAMPLING CALIBRATION

Date and time 10/27 6:30 Name ALAN WITCH

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	18.54	1188	1000	
Cond (uS/cm @ 25°C)	10,000	18.29	8400	10000	
DO (%)		17.43	93.8	93.2	708.0 mm/Hg
DO (mg/L)*		17.43	8.98	8.92	*Check solubility table**
pH4	pH4	18.79	4.09	4.01	8.9 mg/L
pH 7	pH 7	19.00	7.02	7.00	
pH 10	pH 10	18.93	9.90	10.00	
Turbidity	12.7	17.48	13.4	12.7	
Turbidity					

POST-SAMPLING CALIBRATION CHECK

Date and time 10/27 17:30 Name ALAN WITCH

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	MQO Code[1]	Notes
Cond (uS/cm @ 25°C)	1,000	17.72	1157	NO		A	
Cond (uS/cm @ 25°C)	10,000	17.89	9772	NO		A	
DO (%)		19.24	96.5	NO		A	728.3 mm/Hg
*DO (mg/L)		19.24	8.89	NO		A	*Check solubility table**
pH4	pH 4	18.67	3.97	NO		A	8.8 mg/L
pH 7	pH 7	18.23	6.95	NO		A	
pH 10	pH 10	18.53	10.02	NO		A	
Turbidity	12.7	19.41	12.7	NO		A	
Turbidity							

[1] See Table 1

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

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

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Water Quality YSI 6920 Sonde Calibration – Daily Use

Project: UARP WQ RIVERINE FALL 2016

Unit ID: YSI 6920

Sampling Event Date(s): 11/7 - 11/11

PRE-SAMPLING CALIBRATION

Date and time 11/6 5:00 PM Name KELLEIGH CROWE.

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	17.29	879	1000	
Cond (uS/cm @ 25°C)	10,000	17.51	9171	10,002	
DO (%)		17.98	80.1	79.5	604.6 mm/Hg
DO (mg/L)*		17.98	7.59	7.50	*Check solubility table**
pH4	pH4	17.62	3.88	4.00	7.5 mg/L
pH 7	pH 7	15.95	7.03	7.00	
pH 10	pH 10	17.78	10.17	10.02	
Turbidity	12.7	17.99	12.7	12.7	
Turbidity					

POST-SAMPLING CALIBRATION CHECK

Date and time 11/8 4:00 PM Name KELLEIGH CROWE

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	MQO Code[1]	Notes
Cond (uS/cm @ 25°C)	1,000	16.65	1104	NO		Q	
Cond (uS/cm @ 25°C)	10,000	16.45	9890	NO		A	
DO (%)		19.65	93.1	NO		A	712.5 mm/Hg
*DO (mg/L)		19.65	8.49	NO		A	*Check solubility table**
pH4	pH 4	15.76	3.99	NO		A	8.5 mg/L
pH 7	pH 7	19.69	6.95	NO		A	
pH 10	pH 10	15.91	9.95	NO		A	
Turbidity	12.71	22.79	12.5	NO		A	
Turbidity							

[1] See Table 1

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

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

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Water Quality YSI 6920 Sonde Calibration – Daily Use

Project: UARP WQ RIVERINE FALL 2016

Unit ID: YSI 6920

Sampling Event Date(s): 11/7 - 11/11

PRE-SAMPLING CALIBRATION

Date and time 11/9 6:20 AM Name KELLEIGH CROWE

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	22.23	1227	1000	
Cond (uS/cm @ 25°C)	10,000	22.24	8930	10,000	
DO (%)		22.25	93.9	93.7	712.9 mm/Hg
DO (mg/L)*		22.25	8.16	8.15	*Check solubility table**
pH4	pH4	22.19	4.11	4.00	8.1 mg/L
pH 7	pH 7	22.28	6.90	7.00	
pH 10	pH 10	22.07	10.10	10.02	
Turbidity	12.7	22.52	11.3	12.7	
Turbidity					

POST-SAMPLING CALIBRATION CHECK

Date and time 11/9 3:25PM Name KELLEIGH CROWE

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	MQO Code[1]	Notes
Cond (uS/cm @ 25°C)	1,000	21.55	1107	NO		Q	
Cond (uS/cm @ 25°C)	10,000	21.92	9872	NO		A	
DO (%)		22.12	93.3	NO		A	711.9 mm/Hg
*DO (mg/L)		22.12	8.12	NO		A	*Check solubility table**
pH4	pH 4	21.24	3.95	NO		A	8.1 mg/L
pH 7	pH 7	21.55	6.91	NO		A	
pH 10	pH 10	21.73	9.94	NO		A	
Turbidity	12.7	22.02	12.6	NO		A	
Turbidity							
[1] See Table 1							

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

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

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Water Quality YSI 6920 Sonde Calibration – Daily Use

Project: UARP WQ RIVERINE FALL 2016

Unit ID: YSI 6920

Sampling Event Date(s): 11/7 - 11/11

PRE-SAMPLING CALIBRATION

Date and time 11/10 7:00 AM Name KELLEIGH CROWE

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	21.23	1072	1000	
Cond (uS/cm @ 25°C)	10,000	21.38	9018	10,000	
DO (%)		21.27	93.0	93.8	712.6 mm/Hg
DO (mg/L)*		21.27	8.23	8.28	*Check solubility table**
pH4	pH4	21.47	3.97	4.00	8.3 mg/L
pH 7	pH 7	21.51	6.96	7.00	
pH 10	pH 10	21.17	10.10	10.02	
Turbidity	12.7	21.37	14.4	12.7	
Turbidity					

POST-SAMPLING CALIBRATION CHECK

Date and time 11/10 5:30 PM Name KELLEIGH CROWE

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	MQO Code[1]	Notes
Cond (uS/cm @ 25°C)	1,000	21.41	1133	NO		Q	
Cond (uS/cm @ 25°C)	10,000	21.57	10,125	NO		A	
DO (%)		21.49	94.1	NO		A	711.9 mm/Hg
*DO (mg/L)		21.49	8.31	NO		A	*Check solubility table**
pH4	pH 4	21.43	4.00	NO		A	8.2 mg/L
pH 7	pH 7	21.67	6.96	NO		A	
pH 10	pH 10	21.57	9.99	NO		A	
Turbidity	12.7	21.49	12.9	NO		A	
Turbidity							

[1] See Table 1

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

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

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Water Quality YSI 6920 Sonde Calibration – Daily Use

Project: UARP WQ RIVERINE FALL 2016

Unit ID: YSI 6920

Sampling Event Date(s): 11/7 – 11/11

PRE-SAMPLING CALIBRATION

Date and time 11/11 6:10 AM Name KELLEIGH CROWE

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	20.91	1164	1000	
Cond (uS/cm @ 25°C)	10,000	20.63	8554	10,000	
DO (%)		20.56	93.9	93.6	711.6 mm/Hg
DO (mg/L)*		20.56	8.45	8.40	*Check solubility table**
pH4	pH4	21.01	4.03	4.00	8.4 mg/L
pH 7	pH 7	21.02	6.96	7.00	
pH 10	pH 10	20.85	10.16	10.02	
Turbidity	12.7	20.82	12.6	12.7	
Turbidity					

POST-SAMPLING CALIBRATION CHECK

Date and time 11/11 8:00 PM Name KELLEIGH CROWE

Parameter	Std. Value	Std. Temp (°C)	Post-Sampling Value	Re-Cal Yes or No?	Post-Cal Value	MQO Code[1]	Notes
Cond (uS/cm @ 25°C)	1,000	21.49	1175	NO		Q	
Cond (uS/cm @ 25°C)	10,000	21.43	10,034	NO		A	
DO (%)		20.93	100.6	NO		A	761.4 mm/Hg
*DO (mg/L)		20.93	8.97	NO		A	*Check solubility table**
pH4	pH 4	20.30	4.08	NO		A	8.9 mg/L
pH 7	pH 7	19.94	7.02	NO		A	
pH 10	pH 10	20.18	10.11	NO		A	
Turbidity	12.7	21.36	12.8	NO		A	
Turbidity							
[1] See Table 1							

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

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

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APPENDIX F
Analytical Laboratory Bacteria Reports

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CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

June 27, 2016

CLS Work Order #: CZF0774
COC #:

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

Project Name: SMUD In situ and Bac-T Monitoring

Enclosed are the results of analyses for samples received by the laboratory on 06/20/16 13:32. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

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

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZF0774
COC #:

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY CLS ID. NO. CZF0774 (of)

Report To:
Stillwater Sciences
2855 Telegraph Ave. Suite 400
Berkeley, CA 94705
Project Manager: Maia Singer maia@stillwatersci.com
Project Name: SMUD In situ and Bac-T Monitoring
Sampled By:
Job Description: Monitor seasonal bacteria levels in UARP reaches.
Site Location: UARP

Client Job Number: 500.20 Task 0120.00
Destination Laboratory: Rancho Cordova
[X] CLS (916) 638-7301, 3249 Fitzgerald Road, Rancho Cordova, CA 95742, www.californialab.com
[ ] OTHER

GEOTRACKER
EDF REPORT YES [X] NO [ ]
GLOBAL ID:
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	Fecal coliform-15 Tube	Fecal coliform-20 Tube	E. coli Quant-tray	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
6/20/16	10:30AM	BAC-12-IHR		Surface water			6	X		X				X	
6/20/16	10:45AM	BAC-13-IHR		Surface water			6	X		X				X	
6/20/16	10:22AM	BAC-14-BCR		Surface water			6	X		X				X	
6/20/16	12:05PM	BAC-15-SCR		Surface water			6	X		X				X	
				Surface water			6							X	
				Surface water			6							X	
				Surface water			6							X	INVOICE TO:
				Surface water			6							X	Stillwater Sciences
				Surface water			6							X	Same as above
				Surface water			6							X	
				Surface water			6							X	Project No. 500.20 Task 0120.00
				Surface water			6							X	QUOTE#

SUSPECTED CONSTITUENTS
SAMPLE RETENTION TIME
PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)= H_2SO_4

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	KELLEIGH CROWE STILLWATER SCIENCES	6/20/16 1:40 PM		

RECEIVED AT LAB BY: DATE/TIME: 6-20-16 1337 CONDITIONS/COMMENTS:
SHIPPED BY: [ ] FED EX [ ] UPS [ ] OTHER 02 AIR BILL #

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 www.californialab.com 916-638-7301 Fax: 916-638-4510

CALIFORNIA LABORATORY SERVICES

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZF0774
COC #:

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
BAC-12-IHR (CZF0774-01) Water Sampled: 06/20/16 10:30 Received: 06/20/16 13:32									
E. Coli	**1.0**	1.0	MPN/100 mL	1	CZ04412	06/20/16	06/21/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ04417	"	06/23/16	SM 9221	
BAC-13-IHR (CZF0774-02) Water Sampled: 06/20/16 10:45 Received: 06/20/16 13:32									
E. Coli	<1	1.0	MPN/100 mL	1	CZ04412	06/20/16	06/21/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ04417	"	06/23/16	SM 9221	
BAC-14-BCR (CZF0774-03) Water Sampled: 06/20/16 10:22 Received: 06/20/16 13:32									
E. Coli	<1	1.0	MPN/100 mL	1	CZ04412	06/20/16	06/21/16	SM9223	
Fecal Coliforms	**2.0**	1.8	"	"	CZ04417	"	06/23/16	SM 9221	
BAC-15-SCR (CZF0774-04) Water Sampled: 06/20/16 12:05 Received: 06/20/16 13:32									
E. Coli	<1	1.0	MPN/100 mL	1	CZ04412	06/20/16	06/21/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ04417	"	06/23/16	SM 9221	

CALIFORNIA LABORATORY SERVICES

Stillwater Sciences	Project: SMUD In situ and Bac-T Monitoring	
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0120.00	**CLS Work Order #: CZF0774**
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Notes and Definitions

BT-4a	<1.8
BT-4	<1
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 **www.californialab.com** **916-638-7301** **Fax: 916-638-4510**

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

June 28, 2016

CLS Work Order #: CZF0863
COC #:

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

Project Name: SMUD In situ and Bac-T Monitoring

Enclosed are the results of analyses for samples received by the laboratory on 06/21/16 13:46. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

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

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

Page 1 of 3 06/28/16 15:45

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZF0863
COC #:

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY **CLS ID. NO.** CZF0863 (of)

Report To:
Stillwater Sciences
2855 Telegraph Ave. Suite 400
Berkeley, CA 94705
Project Manager: Maia Singer maia@stillwatersci.com
Project Name: SMUD In situ and Bac-T Monitoring
Sampled By:
Job Description: Monitor seasonal bacteria levels in UARP reaches.
Site Location: UARP

Client Job Number: 500.20 Task 0120.00
Destination Laboratory: Rancho Cordova
[X] CLS (916) 638-7301, 3249 Fitzgerald Road, Rancho Cordova, CA 95742, www.californialab.com
[ ] OTHER

GEOTRACKER
EDF REPORT YES [X] NO [ ]
GLOBAL ID.
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	Fecal coliform-15 Tube	Fecal coliform-20 Tube	E. coli Quanti-tray				TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
6/21/16	10:29AM	BAC-5-GCR		Surface water			6	X			X						X	
6/21/16	10:48AM	BAC-6-GCR		Surface water			6	X			X						X	
6/21/16	12:05PM	BAC-7-UVR		Surface water			6			X	X						X	
6/21/16	12:00PM	BAC-8-UVR		Surface water			6			X	X						X	
6/21/16	11:00AM	BAC-9-UVR		Surface water			6			X	X						X	
6/21/16	11:16AM	BAC-10-UVR		Surface water			6			X	X						X	
6/21/16	10:30AM	BAC-11-JR		Surface water			6			X	X						X	INVOICE TO:
				Surface water			6										X	Stillwater Sciences
				Surface water			6										X	Same as above
				Surface water			6										X	
				Surface water			6										X	Project No. 500.20 Task 0120.00
				Surface water			6						-				X	QUOTE#

SUSPECTED CONSTITUENTS
SAMPLE RETENTION TIME
PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)= H_2SO_4

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	KELLEIGH CROWE STILLWATER SCIENCES	6/21/16 1:50 PM		
RECEIVED AT LAB BY:	DATE/TIME: 6-21-16 1346		CONDITIONS/COMMENTS:	(0.5°)

SHIPPED BY: [ ] FED EX [ ] UPS [ ] OTHER AIR BILL #

CA DOHS ELAP Accreditation/Registration Number 1233

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CALIFORNIA LABORATORY SERVICES

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZF0863
COC #:

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
BAC-5-GCR (CZF0863-01) Water Sampled: 06/21/16 10:29 Received: 06/21/16 13:46									
E. Coli	**3.1**	1.0	MPN/100 mL	1	CZ04464	06/21/16	06/22/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ04466	06/21/16	06/24/16	SM 9221	
BAC-6-GCR (CZF0863-02) Water Sampled: 06/21/16 10:48 Received: 06/21/16 13:46									
E. Coli	<1	1.0	MPN/100 mL	1	CZ04464	06/21/16	06/22/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ04466	06/21/16	06/24/16	SM 9221	
BAC-7-UVR (CZF0863-03) Water Sampled: 06/21/16 12:05 Received: 06/21/16 13:46									
E. Coli	**8.6**	1.0	MPN/100 mL	1	CZ04464	06/21/16	06/22/16	SM9223	
Fecal Coliforms	**13**	1.8	"	"	CZ04465	06/21/16	06/24/16	SM 9221	
BAC-8-UVR (CZF0863-04) Water Sampled: 06/21/16 12:00 Received: 06/21/16 13:46									
E. Coli	<1	1.0	MPN/100 mL	1	CZ04464	06/21/16	06/22/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ04465	06/21/16	06/24/16	SM 9221	
BAC-9-UVR (CZF0863-05) Water Sampled: 06/21/16 11:00 Received: 06/21/16 13:46									
E. Coli	<1	1.0	MPN/100 mL	1	CZ04464	06/21/16	06/22/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ04465	06/21/16	06/24/16	SM 9221	
BAC-10-UVR (CZF0863-06) Water Sampled: 06/21/16 11:16 Received: 06/21/16 13:46									
E. Coli	**1.0**	1.0	MPN/100 mL	1	CZ04464	06/21/16	06/22/16	SM9223	
Fecal Coliforms	**4.5**	1.8	"	"	CZ04465	06/21/16	06/24/16	SM 9221	
BAC-11-JR (CZF0863-07) Water Sampled: 06/21/16 10:30 Received: 06/21/16 13:46									
E. Coli	**5.3**	1.0	MPN/100 mL	1	CZ04464	06/21/16	06/22/16	SM9223	
Fecal Coliforms	**7.8**	1.8	"	"	CZ04465	06/21/16	06/24/16	SM 9221	

CALIFORNIA LABORATORY SERVICES

Stillwater Sciences	Project: SMUD In situ and Bac-T Monitoring	
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0120.00	**CLS Work Order #: CZF0863**
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Notes and Definitions

BT-4a	<1.8
BT-4	<1
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 **www.californialab.com** **916-638-7301** **Fax: 916-638-4510**

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

July 05, 2016

CLS Work Order #: CZF1118
COC #:

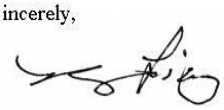
Maia Singer
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: SMUD In situ and Bac-T Monitoring

Enclosed are the results of analyses for samples received by the laboratory on 06/27/16 16:30. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

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

Sincerely,



James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

Page 1 of 3 07/05/16 12:01

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZF1118
COC #:

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY CLS ID. NO. CZF1118. (__ of __)

Report To:
Stillwater Sciences
2855 Telegraph Ave. Suite 400
Berkeley, CA 94705
Project Manager
Maia Singer maia@stillwatersci.com
Project Name
SMUD In situ and Bac-T Monitoring
Sampled By
Job Description
Monitor seasonal bacterin levels in UARP reaches.
Site Location UARP

Client Job Number
500.20 Task 0120.00
Destination Laboratory
Rancho Cordova
[X] CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA
95742
www.californialab.com
[ ] OTHER

GEOTRACKER
EDF REPORT YES [X] NO [ ]
GLOBAL ID.
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	ANALYSIS REQUESTED: Fecal coliform-15 Tube	Fecal coliforms-20 Tube	E. coli Quanti-tray	TURNAROUND TIME IN DAYS: 1	2	3	5	SPECIAL INSTRUCTIONS
6/27/16	2:45PM	BAC-12-IHR		Surface water			6	X		X				X	
6/27/16	2:30PM	BAC-13-IHR		Surface water			6	X		X				X	
6/27/16	2:30PM	BAC-14-BCR		Surface water			6	X		X				X	
6/27/16	1:30PM	BAC-15-SCR		Surface water			6	X		X				X	
				Surface water			6							X	
				Surface water			6							X	
				Surface water			6							X	INVOICE TO:
				Surface water			6							X	Stillwater Sciences
				Surface water			6							X	Same as above
				Surface water			6							X	
				Surface water			6							X	Project No. 500.20 Task 0120.00
				Surface water			6							X	QUOTE#

SUSPECTED CONSTITUENTS | SAMPLE RETENTION TIME | PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4) = H_2SO_4

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	KELLEIGH CROWE STILLWATER SCIENCES	6/27/16 4:30PM		
RECEIVED AT LAB BY:		DATE/TIME: 1630	CONDITIONS/COMMENTS: 2.2	

SHIPPED BY: [ ] FED EX [ ] UPS [ ] OTHER _____ AIR BILL # _____

CA DOHS ELAP Accreditation/Registration Number 1233

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CALIFORNIA LABORATORY SERVICES

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZF1118
COC #:

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
BAC-12-IHR (CZF1118-01) Water	**Sampled: 06/27/16 14:45**	**Received: 06/27/16 16:30**							
E. Coli	**1.0**	1.0	MPN/100 mL	1	CZ04625	06/27/16	06/28/16	SM9223	
Fecal Coliforms	**2.0**	1.8	"	"	CZ04626	06/27/16	06/30/16	SM 9221	
BAC-13-IHR (CZF1118-02) Water	**Sampled: 06/27/16 14:30**	**Received: 06/27/16 16:30**							
E. Coli	**3.1**	1.0	MPN/100 mL	1	CZ04625	06/27/16	06/28/16	SM9223	
Fecal Coliforms	**2.0**	1.8	"	"	CZ04626	06/27/16	06/30/16	SM 9221	
BAC-14-BCR (CZF1118-03) Water	**Sampled: 06/27/16 12:30**	**Received: 06/27/16 16:30**							
E. Coli	**2.0**	1.0	MPN/100 mL	1	CZ04625	06/27/16	06/28/16	SM9223	
Fecal Coliforms	**7.8**	1.8	"	"	CZ04626	06/27/16	06/30/16	SM 9221	
BAC-15-SCR (CZF1118-04) Water	**Sampled: 06/27/16 13:30**	**Received: 06/27/16 16:30**							
E. Coli	**1.0**	1.0	MPN/100 mL	1	CZ04625	06/27/16	06/28/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ04626	06/27/16	06/30/16	SM 9221	

CALIFORNIA LABORATORY SERVICES

Stillwater Sciences	Project: SMUD In situ and Bac-T Monitoring	
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0120.00	**CLS Work Order #: CZF1118**
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Notes and Definitions

BT-4	<1.8
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 **www.californialab.com** **916-638-7301** **Fax: 916-638-4510**

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

July 06, 2016

CLS Work Order #: CZF1160
COC #:

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

Project Name: SMUD In situ and Bac-T Monitoring

Enclosed are the results of analyses for samples received by the laboratory on 06/28/16 13:38. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

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

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

Page 1 of 3 07/06/16 13:50

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZF1160
COC #:

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY CLS ID. NO. CZF1160 (of)

Report To:
Stillwater Sciences
2855 Telegraph Ave. Suite 400
Berkeley, CA 94705
Project Manager
Maia Singer maia@stillwatersci.com
Project Name
SMUD In situ and Bac-T Monitoring
Sampled By
Job Description
Monitor seasonal bacteria levels in UARP reaches.
Site Location UARP

Client Job Number
500.20 Task 0120.00
Destination Laboratory
Rancho Cordova
[X] CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA
95742
www.californialab.com
[ ] OTHER

GEOTRACKER
EDF REPORT YES [X] NO [ ]
GLOBAL ID.
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	ANALYSIS REQUESTED: Fecal coliform-15 Tube	Fecal coliform-20 Tube	E. coli Quanti-tray	TURNAROUND TIME IN DAYS: 1	2	3	5	SPECIAL INSTRUCTIONS
6/28/16	9:30	BAC-5-GCR		Surface water			6	X		X				X	
6/28/16	9:40	BAC-6-GCR		Surface water			6	X		X				X	
6/28/16	10:25	BAC-7-UVR		Surface water			6		X	X				X	
6/28/16	10:05	BAC-8-UVR		Surface water			6		X	X				X	
6/28/16	11:20	BAC-9-UVR		Surface water			6		X	X				X	
6/28/16	10:45	BAC-10-UVR		Surface water			6		X	X				X	
6/28/16	11:45	BAC-11-JR		Surface water			6		X	X				X	
				Surface water			6							X	INVOICE TO:
				Surface water			6							X	Stillwater Sciences
				Surface water			6							X	Same as above
				Surface water			6							X	
				Surface water			6							X	Project No. 500.20 Task 0120.00
				Surface water			6							X	QUOTE#

SUSPECTED CONSTITUENTS
SAMPLE RETENTION TIME
PRESERVATIVES (1) HCL (3) = COLD (2) HNO_3 (4) = $H2SO4$

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	BRUCE HITCH STILLWATER SCIENCES	6/28/16 13:38		

RECEIVED AT LAB BY: DATE/TIME: 6.28.16 1338 CONDITIONS/COMMENTS: (0.7)
SHIPPED BY: [ ] FED EX [ ] UPS [ ] OTHER AIR BILL #

CALIFORNIA LABORATORY SERVICES

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZF1160
COC #:

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
BAC-5-GCR (CZF1160-01) Water Sampled: 06/28/16 09:30 Received: 06/28/16 13:38									
E. Coli	**18.5**	1.0	MPN/100 mL	1	CZ04652	06/28/16	06/29/16	SM9223	
Fecal Coliforms	**17**	1.8	"	"	CZ04655	"	07/01/16	SM 9221	
BAC-6-GCR (CZF1160-02) Water Sampled: 06/28/16 09:40 Received: 06/28/16 13:38									
E. Coli	**35.9**	1.0	MPN/100 mL	1	CZ04652	06/28/16	06/29/16	SM9223	
Fecal Coliforms	**33**	1.8	"	"	CZ04655	"	07/01/16	SM 9221	
BAC-7-UVR (CZF1160-03) Water Sampled: 06/28/16 10:25 Received: 06/28/16 13:38									
E. Coli	<1	1.0	MPN/100 mL	1	CZ04652	06/28/16	06/29/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ04656	"	07/01/16	SM 9221	
BAC-8-UVR (CZF1160-04) Water Sampled: 06/28/16 10:05 Received: 06/28/16 13:38									
E. Coli	**9.7**	1.0	MPN/100 mL	1	CZ04652	06/28/16	06/29/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ04656	"	07/01/16	SM 9221	
BAC-9-UVR (CZF1160-05) Water Sampled: 06/28/16 11:20 Received: 06/28/16 13:38									
E. Coli	**1.0**	1.0	MPN/100 mL	1	CZ04652	06/28/16	06/29/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ04656	"	07/01/16	SM 9221	
BAC-10-UVR (CZF1160-06) Water Sampled: 06/28/16 10:45 Received: 06/28/16 13:38									
E. Coli	**3.0**	1.0	MPN/100 mL	1	CZ04652	06/28/16	06/29/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ04656	"	07/01/16	SM 9221	
BAC-11-JR (CZF1160-07) Water Sampled: 06/28/16 11:45 Received: 06/28/16 13:38									
E. Coli	**6.2**	1.0	MPN/100 mL	1	CZ04652	06/28/16	06/29/16	SM9223	
Fecal Coliforms	**4.0**	1.8	"	"	CZ04656	"	07/01/16	SM 9221	

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 **www.californialab.com** **916-638-7301** **Fax: 916-638-4510**

CALIFORNIA LABORATORY SERVICES

Stillwater Sciences	Project: SMUD In situ and Bac-T Monitoring	
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0120.00	**CLS Work Order #: CZF1160**
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Notes and Definitions

BT-4a	<1.8
BT-4	<1
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

July 12, 2016

CLS Work Order #: CZG0101
COC #:

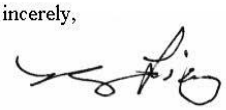
Maia Singer
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: SMUD In situ and Bac-T Monitoring

Enclosed are the results of analyses for samples received by the laboratory on 07/05/16 15:30. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

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

Sincerely,



James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

Page 1 of 3 07/12/16 12:39

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZG0101
COC #:

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY CLS ID. NO. CZG0101 (of)

Report To:	Client Job Number 500.20 Task 0120.00	ANALYSIS REQUESTED	GEOTRACKER
Stillwater Sciences 2855 Telegraph Ave. Suite 400 Berkeley, CA 94705	Destination Laboratory Rancho Cordova		EDF REPORT YES [X] NO
Project Manager: Maia Singer maia@stillwatersci.com	[X] CLS (916) 638-7301 3249 Fitzgerald Road Rancho Cordova, CA 95742 www.californialab.com		GLOBAL ID.
Project Name: SMUD In situ and Bac-T Monitoring	[ ] OTHER		FIELD CONDITIONS:
Sampled By			
Job Description: Monitor seasonal bacteria levels in UARP reaches.			
Site Location: UARP			TURNAROUND TIME IN DAYS: 1 2 3 5 — SPECIAL INSTRUCTIONS

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	Fecal coliform-15 Tube	Fecal coliform-20 Tube	E. coli Quanti-tray	1	2	3	5	SPECIAL INSTRUCTIONS
7/5/16	10:30	BAC-15-SCR		Surface water			6	X		X				X	
7/5/16	11:35	BAC-14-BCR		Surface water			6	X		X				X	
7/5/16	13:15	BAC-13-I4R		Surface water			6	X		X				X	
7/5/16	13:30	BAC-12-I4R		Surface water			6	X		X				X	
				Surface water			6							X	
				Surface water			6							X	
				Surface water			6							X	INVOICE TO:
				Surface water			6							X	Stillwater Sciences
				Surface water			6							X	Same as above
				Surface water			6							X	
				Surface water			6							X	Project No. 500.20 Task 0120.00
				Surface water			6							X	QUOTE#

SUSPECTED CONSTITUENTS — SAMPLE RETENTION TIME — PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4) = H_2SO_4

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	KELLEY CROKE STILLWATER SCIENCES	7/5/16 3:30PM		

RECEIVED AT LAB BY: DATE/TIME: 7-5-16 1532 CONDITIONS/COMMENTS:

SHIPPED BY: [ ] FED-EX [ ] UPS [ ] OTHER 09 AIR BILL #

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 www.californialab.com 916-638-7301 Fax: 916-638-4510

CALIFORNIA LABORATORY SERVICES

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZG0101
COC #:

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
BAC-15-SCR (CZG0101-01) Water Sampled: 07/05/16 10:30 Received: 07/05/16 15:30									
E. Coli	**12.0**	1.0	MPN/100 mL	1	CZ04828	07/05/16	07/06/16	SM9223	
Fecal Coliforms	**17**	1.8	"	"	CZ04831	07/05/16	07/08/16	SM 9221	
BAC-14-BCR (CZG0101-02) Water Sampled: 07/05/16 11:35 Received: 07/05/16 15:30									
E. Coli	<1	1.0	MPN/100 mL	1	CZ04828	07/05/16	07/06/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ04831	07/05/16	07/08/16	SM 9221	
BAC-13-IHR (CZG0101-03) Water Sampled: 07/05/16 13:15 Received: 07/05/16 15:30									
E. Coli	<1	1.0	MPN/100 mL	1	CZ04828	07/05/16	07/06/16	SM9223	
Fecal Coliforms	**2.0**	1.8	"	"	CZ04831	07/05/16	07/08/16	SM 9221	
BAC-12-IHR (CZG0101-04) Water Sampled: 07/05/16 13:30 Received: 07/05/16 15:30									
E. Coli	<1	1.0	MPN/100 mL	1	CZ04828	07/05/16	07/06/16	SM9223	
Fecal Coliforms	**4.5**	1.8	"	"	CZ04831	07/05/16	07/08/16	SM 9221	

CALIFORNIA LABORATORY SERVICES

Stillwater Sciences	Project: SMUD In situ and Bac-T Monitoring	
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0120.00	**CLS Work Order #: CZG0101**
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Notes and Definitions

BT-4a	<1.8
BT-4	<1
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 **www.californialab.com** **916-638-7301** **Fax: 916-638-4510**

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

July 13, 2016

CLS Work Order #: CZG0162
COC #:

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

Project Name: SMUD In situ and Bac-T Monitoring

Enclosed are the results of analyses for samples received by the laboratory on 07/06/16 13:20. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

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

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

Page 1 of 3 07/13/16 15:14

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZG0162
COC #:

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY CLS ID. NO. CZG0162 (of)

Report To:	Client Job Number 500.20 Task 0120.00
Stillwater Sciences 2855 Telegraph Ave. Suite 400 Berkeley, CA 94705	Destination Laboratory Rancho Cordova
Project Manager: Maia Singer maia@stillwatersci.com	[X] CLS (916) 638-7301 3249 Fitzgerald Road Rancho Cordova, CA 95742 www.californialab.com
Project Name: SMUD In situ and Bac-T Monitoring	[ ] OTHER
Sampled By:	
Job Description: Monitor seasonal bacteria levels in UARP reaches	
Site Location: UARP	

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	Fecal coliform-15 Tube	Fecal coliform-20 Tube	E. coli Quanti-tray	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
7/6/16	9:55AM	BAC-5-GCR		Surface water			6	X		X				X	
7/6/16	10:15AM	BAC-6-GCR		Surface water			6	X		X				X	
7/6/16	9:10AM	BAC-7-UVR		Surface water			6		X	X				X	
7/6/16	9:30AM	BAC-8-UVR		Surface water			6		X	X				X	
7/6/16	11:05AM	BAC-9-UVR		Surface water			6		X	X				X	
7/6/16	10:35AM	BAC-10-UVR		Surface water			6		X	X				X	
7/6/16	11:35AM	BAC-11-JR		Surface water			6		X	X				X	INVOICE TO:
				Surface water			6							X	Stillwater Sciences
				Surface water			6							X	Same as above
				Surface water			6							X	
				Surface water			6							X	Project No. 500.20 Task 0120.00
				Surface water			6							X	QUOTE#

ANALYSIS REQUESTED

GEOTRACKER
EDF REPORT YES [X] NO [ ]
GLOBAL ID.

FIELD CONDITIONS:

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4) = H_2SO_4

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	KELLEIGH CROWE STILLWATER SCIENCES	7/6/16 13:20		

RECEIVED AT LAB BY: DATE/TIME: 7/6/16 CONDITIONS/COMMENTS:

SHIPPED BY: [ ] FED EX [ ] UPS [ ] OTHER 1320 (12) AIR BILL #

CALIFORNIA LABORATORY SERVICES

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZG0162
COC #:

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
BAC-5-GCR (CZG0162-01) Water Sampled: 07/06/16 09:55 Received: 07/06/16 13:20									
E. Coli	<1	1.0	MPN/100 mL	1	CZ04845	07/06/16	07/07/16	SM9223	
Fecal Coliforms	**11**	1.8	"	"	CZ04853	"	07/09/16	SM 9221	
BAC-6-GCR (CZG0162-02) Water Sampled: 07/06/16 10:15 Received: 07/06/16 13:20									
E. Coli	**10.9**	1.0	MPN/100 mL	1	CZ04845	07/06/16	07/07/16	SM9223	
Fecal Coliforms	**4.5**	1.8	"	"	CZ04853	"	07/09/16	SM 9221	
BAC-7-UVR (CZG0162-03) Water Sampled: 07/06/16 09:10 Received: 07/06/16 13:20									
E. Coli	<1	1.0	MPN/100 mL	1	CZ04845	07/06/16	07/07/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ04854	"	07/09/16	SM 9221	
BAC-8-UVR (CZG0162-04) Water Sampled: 07/06/16 09:30 Received: 07/06/16 13:20									
E. Coli	<1	1.0	MPN/100 mL	1	CZ04845	07/06/16	07/07/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ04854	"	07/09/16	SM 9221	
BAC-9-UVR (CZG0162-05) Water Sampled: 07/06/16 11:05 Received: 07/06/16 13:20									
E. Coli	**1.0**	1.0	MPN/100 mL	1	CZ04845	07/06/16	07/07/16	SM9223	
Fecal Coliforms	**2.0**	1.8	"	"	CZ04854	"	07/09/16	SM 9221	
BAC-10-UVR (CZG0162-06) Water Sampled: 07/06/16 10:35 Received: 07/06/16 13:20									
E. Coli	<1	1.0	MPN/100 mL	1	CZ04845	07/06/16	07/07/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ04854	"	07/09/16	SM 9221	
BAC-11-JR (CZG0162-07) Water Sampled: 07/06/16 11:35 Received: 07/06/16 13:20									
E. Coli	**21.6**	1.0	MPN/100 mL	1	CZ04845	07/06/16	07/07/16	SM9223	
Fecal Coliforms	**23**	1.8	"	"	CZ04854	"	07/09/16	SM 9221	

CALIFORNIA LABORATORY SERVICES

Stillwater Sciences	Project: SMUD In situ and Bac-T Monitoring	
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0120.00	**CLS Work Order #: CZG0162**
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Notes and Definitions

BT-4a	<1.8
BT-4	<1
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 **www.californialab.com** **916-638-7301** **Fax: 916-638-4510**

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

July 18, 2016

CLS Work Order #: CZG0423
COC #:

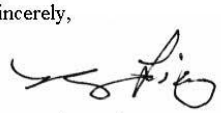
Maia Singer
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: SMUD In situ and Bac-T Monitoring

Enclosed are the results of analyses for samples received by the laboratory on 07/11/16 15:20. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

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

Sincerely,



James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

Page 1 of 3 07/18/16 11:46

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZG0423
COC #:

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY CLS ID. NO. CZG 0423 (of)

Report To:	Client Job Number 500.20 Task 0120.00
Stillwater Sciences 2855 Telegraph Ave. Suite 400 Berkeley, CA 94705	Destination Laboratory Rancho Cordova
Project Manager: Maia Singer maia@stillwatersci.com	[x] CLS (916) 638-7301 3249 Fitzgerald Road Rancho Cordova, CA 95742 www.californialab.com
Project Name: SMUD In situ and Bac-T Monitoring	[ ] OTHER
Sampled By	
Job Description: Monitor seasonal bacteria levels in UARP reaches	
Site Location: UARP	

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	Fecal coliform-15 Tube	Fecal coliform-20 Tube	E. coli Quanti-tray	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
7/11/16	13:20	BAC-12-IHR		Surface water			6	X		X				X	
7/11/16	13:35	BAC-13-IHR		Surface water			6	X		X				X	
7/11/16	12:00	BAC-14-BCR		Surface water			6	X		X				X	
7/11/16	10:50	BAC-15-SCR		Surface water			6	X		X				X	
				Surface water			6							X	
				Surface water			6							X	
				Surface water			6							X	INVOICE TO:
				Surface water			6							X	Stillwater Sciences
				Surface water			6							X	Same as above
				Surface water			6							X	
				Surface water			6							X	Project No. 500.20 Task 0120.00
				Surface water			6							X	QUOTE#

SUSPECTED CONSTITUENTS | SAMPLE RETENTION TIME | PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4) = H_2SO_4

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	BRUCE HITCH	7/11/16		
	STILLWATER SCIENCES	15:20		

RECEIVED AT LAB BY: DATE/TIME: 7-11-16 1527 CONDITIONS/COMMENTS:

SHIPPED BY: [ ] FED EX [ ] UPS [ ] OTHER AIR BILL #

CALIFORNIA LABORATORY SERVICES

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZG0423
COC #:

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
BAC-12-IHR (CZG0423-01) Water Sampled: 07/11/16 13:20 Received: 07/11/16 15:20									
E. Coli	**1.0**	1.0	MPN/100 mL	1	CZ04967	07/11/16	07/12/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ04969	"	07/14/16	SM 9221	
BAC-13-IHR (CZG0423-02) Water Sampled: 07/11/16 13:35 Received: 07/11/16 15:20									
E. Coli	<1	1.0	MPN/100 mL	1	CZ04967	07/11/16	07/12/16	SM9223	
Fecal Coliforms	**4.5**	1.8	"	"	CZ04969	"	07/14/16	SM 9221	
BAC-14-BCR (CZG0423-03) Water Sampled: 07/11/16 12:00 Received: 07/11/16 15:20									
E. Coli	**6.3**	1.0	MPN/100 mL	1	CZ04967	07/11/16	07/12/16	SM9223	
Fecal Coliforms	**94**	1.8	"	"	CZ04969	"	07/14/16	SM 9221	
BAC-15-SCR (CZG0423-04) Water Sampled: 07/11/16 10:50 Received: 07/11/16 15:20									
E. Coli	**2.0**	1.0	MPN/100 mL	1	CZ04967	07/11/16	07/12/16	SM9223	
Fecal Coliforms	**49**	1.8	"	"	CZ04969	"	07/14/16	SM 9221	

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 **www.californialab.com** **916-638-7301** **Fax: 916-638-4510**

CALIFORNIA LABORATORY SERVICES

Stillwater Sciences	Project: SMUD In situ and Bac-T Monitoring	
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0120.00	**CLS Work Order #: CZG0423**
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Notes and Definitions

BT-4a	<1.8
BT-4	<1
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 **www.californialab.com** **916-638-7301** **Fax: 916-638-4510**

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

July 19, 2016

CLS Work Order #: CZG0467
COC #:

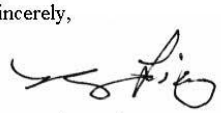
Maia Singer
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: SMUD In situ and Bac-T Monitoring

Enclosed are the results of analyses for samples received by the laboratory on 07/12/16 13:45. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

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

Sincerely,



James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

Page 1 of 3 07/19/16 12:42

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZG0467
COC #:

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY CLS ID. NO. CZG0467 (of)

Report To:
Stillwater Sciences
2855 Telegraph Ave. Suite 400
Berkeley, CA 94705
Project Manager: Maia Singer maia@stillwatersci.com
Project Name: SMUD In situ and Bac-T Monitoring
Sampled By:
Job Description: Monitor seasonal bacteria levels in UARP reaches
Site Location: UARP

Client Job Number: 500.20 Task 0120.00
Destination Laboratory: Rancho Cordova
[x] CLS (916) 638-7301, 3249 Fitzgerald Road, Rancho Cordova, CA 95742, www.californialab.com
[ ] OTHER

ANALYSIS REQUESTED

GEOTRACKER
EDF REPORT YES [x] NO [ ]
GLOBAL ID:
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	Fecal coliform-15 Tube	Fecal coliform-20 Tube	E. coli Quanti-tray	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
7/12/16	9:45AM	BAC-5-GCR		Surface water			6	X		X				X	
7/12/16	10:40AM	BAC-6-GCR		Surface water			6	X		X				X	
7/12/16	9:00AM	BAC-7-UVR		Surface water			6		X	X				X	
7/12/16	9:20AM	BAC-8-UVR		Surface water			6		X	X				X	
7/12/16	11:30AM	BAC-9-UVR		Surface water			6		X	X				X	
7/12/16	11:00AM	BAC-10-UVR		Surface water			6		X	X				X	
7/12/16	10:50AM	BAC-11-JR		Surface water			6		X	X				X	INVOICE TO:
				Surface water			6							X	Stillwater Sciences
				Surface water			6							X	Same as above
				Surface water			6							X	
				Surface water			6							X	Project No. 500.20 Task 0120.00
				Surface water			6							X	QUOTE#

SUSPECTED CONSTITUENTS | SAMPLE RETENTION TIME | PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4) = H_2SO_4

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	KELLEIGH CROWE STILLWATER SCIENCES	7/12/16 1:45 PM		
RECEIVED AT LAB BY:	DATE/TIME: 7/12/16 1345		CONDITIONS/COMMENTS: (0.6)	

SHIPPED BY: [ ] FED EX [ ] UPS [ ] OTHER AIR BILL #

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 www.californialab.com 916-638-7301 Fax: 916-638-4510

CALIFORNIA LABORATORY SERVICES

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZG0423
COC #:

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
BAC-12-IHR (CZG0423-01) Water Sampled: 07/11/16 13:20 Received: 07/11/16 15:20									
E. Coli	**1.0**	1.0	MPN/100 mL	1	CZ04967	07/11/16	07/12/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ04969	"	07/14/16	SM 9221	
BAC-13-IHR (CZG0423-02) Water Sampled: 07/11/16 13:35 Received: 07/11/16 15:20									
E. Coli	<1	1.0	MPN/100 mL	1	CZ04967	07/11/16	07/12/16	SM9223	
Fecal Coliforms	**4.5**	1.8	"	"	CZ04969	"	07/14/16	SM 9221	
BAC-14-BCR (CZG0423-03) Water Sampled: 07/11/16 12:00 Received: 07/11/16 15:20									
E. Coli	**6.3**	1.0	MPN/100 mL	1	CZ04967	07/11/16	07/12/16	SM9223	
Fecal Coliforms	**94**	1.8	"	"	CZ04969	"	07/14/16	SM 9221	
BAC-15-SCR (CZG0423-04) Water Sampled: 07/11/16 10:50 Received: 07/11/16 15:20									
E. Coli	**2.0**	1.0	MPN/100 mL	1	CZ04967	07/11/16	07/12/16	SM9223	
Fecal Coliforms	**49**	1.8	"	"	CZ04969	"	07/14/16	SM 9221	

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 **www.californialab.com** **916-638-7301** **Fax: 916-638-4510**

CALIFORNIA LABORATORY SERVICES

Stillwater Sciences	Project: SMUD In situ and Bac-T Monitoring	
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0120.00	**CLS Work Order #: CZG0423**
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Notes and Definitions

BT-4a	<1.8
BT-4	<1
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 **www.californialab.com** **916-638-7301** **Fax: 916-638-4510**

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

July 19, 2016

CLS Work Order #: CZG0467
COC #:

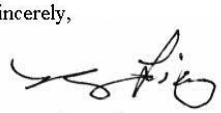
Maia Singer
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: SMUD In situ and Bac-T Monitoring

Enclosed are the results of analyses for samples received by the laboratory on 07/12/16 13:45. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

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

Sincerely,



James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

Page 1 of 3 07/19/16 12:42

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZG0467
COC #:

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY

CLS ID. NO. CZG0467 (of)

Report To: Stillwater Sciences, 2855 Telegraph Ave. Suite 400, Berkeley, CA 94705
Project Manager: Maia Singer maia@stillwatersci.com
Project Name: SMUD In situ and Bac-T Monitoring
Sampled By:
Job Description: Monitor seasonal bacteria levels in UARP reaches.
Site Location: UARP

Client Job Number: 500.20 Task 0120.00
Destination Laboratory: Rancho Cordova
[X] CLS (916) 638-7301, 3249 Fitzgerald Road, Rancho Cordova, CA 95742, www.californialab.com
[ ] OTHER

GEOTRACKER
EDF REPORT YES [X] NO [ ]
GLOBAL ID:
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	Fecal coliform-15 Tube	Fecal coliform-20 Tube	E. coli Quanti-tray	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
7/12/16	9:45AM	BAC-5-GCR		Surface water			6	X		X				X	
7/12/16	10:40AM	BAC-6-GCR		Surface water			6	X		X				X	
7/12/16	9:00AM	BAC-7-UVR		Surface water			6		X	X				X	
7/12/16	9:20AM	BAC-8-UVR		Surface water			6		X	X				X	
7/12/16	11:30AM	BAC-9-UVR		Surface water			6		X	X				X	
7/12/16	11:00AM	BAC-10-UVR		Surface water			6		X	X				X	
7/12/16	10:50AM	BAC-11-JR		Surface water			6		X	X				X	INVOICE TO:
				Surface water			6							X	Stillwater Sciences
				Surface water			6							X[1]	Same as above
				Surface water			6							X	
				Surface water			6							X	Project No. 500.20 Task 0120.00
				Surface water			6							X	QUOTE#

SUSPECTED CONSTITUENTS | SAMPLE RETENTION TIME | PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4) = H_2SO_4

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	KELLEIGH CROWE, STILLWATER SCIENCES	7/12/16 1:45 PM		
RECEIVED AT LAB BY:	DATE/TIME: 7/12/16 1345		CONDITIONS/COMMENTS: (0 6)	

SHIPPED BY: [ ] FED EX [ ] UPS [ ] OTHER _____ AIR BILL # _____

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 www.californialab.com 916-638-7301 Fax: 916-638-4510

CALIFORNIA LABORATORY SERVICES

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00 **CLS Work Order #: CZG0467**
Project Manager: Maia Singer COC #:

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
BAC-5-GCR (CZG0467-01) Water Sampled: 07/12/16 09:45 Received: 07/12/16 13:45									
E. Coli	**2.0**	1.0	MPN/100 mL	1	CZ05009	07/12/16	07/13/16	SM9223	
Fecal Coliforms	**2.0**	1.8	"	"	CZ05012	07/12/16	07/15/16	SM 9221	
BAC-6-GCR (CZG0467-02) Water Sampled: 07/12/16 10:40 Received: 07/12/16 13:45									
E. Coli	**5.2**	1.0	MPN/100 mL	1	CZ05009	07/12/16	07/13/16	SM9223	
Fecal Coliforms	**4.5**	1.8	"	"	CZ05012	07/12/16	07/15/16	SM 9221	
BAC-7-UVR (CZG0467-03) Water Sampled: 07/12/16 09:00 Received: 07/12/16 13:45									
E. Coli	<1	1.0	MPN/100 mL	1	CZ05009	07/12/16	07/13/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ05013	07/12/16	07/15/16	SM 9221	
BAC-8-UVR (CZG0467-04) Water Sampled: 07/12/16 09:20 Received: 07/12/16 13:45									
E. Coli	<1	1.0	MPN/100 mL	1	CZ05009	07/12/16	07/13/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ05013	07/12/16	07/15/16	SM 9221	
BAC-9-UVR (CZG0467-05) Water Sampled: 07/12/16 11:30 Received: 07/12/16 13:45									
E. Coli	**2.0**	1.0	MPN/100 mL	1	CZ05009	07/12/16	07/13/16	SM9223	
Fecal Coliforms	**4.5**	1.8	"	"	CZ05013	07/12/16	07/15/16	SM 9221	
BAC-10-UVR (CZG0467-06) Water Sampled: 07/12/16 11:00 Received: 07/12/16 13:45									
E. Coli	**1.0**	1.0	MPN/100 mL	1	CZ05009	07/12/16	07/13/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ05013	07/12/16	07/15/16	SM 9221	
BAC-11-JR (CZG0467-07) Water Sampled: 07/12/16 11:50 Received: 07/12/16 13:45									
E. Coli	**21.6**	1.0	MPN/100 mL	1	CZ05009	07/12/16	07/13/16	SM9223	
Fecal Coliforms	**17**	1.8	"	"	CZ05013	07/12/16	07/15/16	SM 9221	

CALIFORNIA LABORATORY SERVICES

Stillwater Sciences	Project: SMUD In situ and Bac-T Monitoring	
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0120.00	**CLS Work Order #: CZG0467**
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Notes and Definitions

BT-4a	<1.8
BT-4	<1
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 **www.californialab.com** **916-638-7301** **Fax: 916-638-4510**

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

July 25, 2016

CLS Work Order #: CZG0763
COC #:

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

Project Name: SMUD In situ and Bac-T Monitoring

Enclosed are the results of analyses for samples received by the laboratory on 07/18/16 16:10. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

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

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

Page 1 of 3 07/25/16 14:04

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZG0763
COC #:

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY CLS ID. NO. CZG0763 (1 of 1)

Report To:
Stillwater Sciences
2855 Telegraph Ave. Suite 400
Berkeley, CA 94705
Project Manager: Maia Singer maia@stillwatersci.com
Project Name: SMUD In situ and Bac-T Monitoring
Sampled By:
Job Description: Monitor seasonal bacteria levels in UARP reaches
Site Location: UARP

Client Job Number: 500.20 Task 0120.00
Destination Laboratory: Rancho Cordova
[X] CLS (916) 638-7301, 3249 Fitzgerald Road, Rancho Cordova, CA 95742, www.californialab.com
[ ] OTHER

ANALYSIS REQUESTED / PRESERVATIVES: Fecal coliform-15 Tube; Fecal coliform-20 Tube; E. coli Quanti-tray

GEOTRACKER
EDF REPORT: YES [X] NO [ ]
GLOBAL ID:
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	Fecal coliform-15 Tube	Fecal coliform-20 Tube	E. coli Quanti-tray	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
7/18/16	14:15	BAC-12-IHR		Surface water			6	X		X				X	
7/18/16	14:00	BAC-13-IHR		Surface water			6	X		X				X	
7/18/16	12:25	BAC-14-BCR		Surface water			6	X		X				X	
7/18/16	11:05	BAC-15-SCR		Surface water			6	X		X				X	
				Surface water			6							X	
				Surface water			6							X	
				Surface water			6							X	INVOICE TO:
				Surface water			6							X	Stillwater Sciences
				Surface water			6							X	Same as above
				Surface water			6							X	
				Surface water			6							X	Project No. 500.20 Task 0120.00
				Surface water			6							X	QUOTE#

SUSPECTED CONSTITUENTS
SAMPLE RETENTION TIME
PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4) = $H2SO4$

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	KELLEIGH CROWE	7/18/16		
	STILLWATER SCIENCES	4:10 PM		

RECEIVED AT LAB BY: DATE/TIME: 7/18/16 1610 CONDITIONS/COMMENTS: 1.9.

SHIPPED BY: [ ] FED EX [ ] UPS [ ] OTHER AIR BILL #

CA DOHS ELAP Accreditation/Registration Number 1233

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CALIFORNIA LABORATORY SERVICES

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZG0763
COC #:

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
BAC-12-IHR (CZG0763-01) Water Sampled: 07/18/16 14:15 Received: 07/18/16 16:10									
E. Coli	<1	1.0	MPN/100 mL	1	CZ05154	07/18/16	07/19/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ05156	"	07/21/16	SM 9221	
BAC-13-IHR (CZG0763-02) Water Sampled: 07/18/16 14:00 Received: 07/18/16 16:10									
E. Coli	**2.0**	1.0	MPN/100 mL	1	CZ05154	07/18/16	07/19/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ05156	"	07/21/16	SM 9221	
BAC-14-BCR (CZG0763-03) Water Sampled: 07/18/16 12:25 Received: 07/18/16 16:10									
E. Coli	**1.0**	1.0	MPN/100 mL	1	CZ05154	07/18/16	07/19/16	SM9223	
Fecal Coliforms	**4.0**	1.8	"	"	CZ05156	"	07/21/16	SM 9221	
BAC-15-SCR (CZG0763-04) Water Sampled: 07/18/16 11:05 Received: 07/18/16 16:10									
E. Coli	**2.0**	1.0	MPN/100 mL	1	CZ05154	07/18/16	07/19/16	SM9223	
Fecal Coliforms	**4.5**	1.8	"	"	CZ05156	"	07/21/16	SM 9221	

CA DOHS ELAP Accreditation/Registration Number 1233

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CALIFORNIA LABORATORY SERVICES

Stillwater Sciences	Project: SMUD In situ and Bac-T Monitoring	
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0120.00	**CLS Work Order #: CZG0763**
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Notes and Definitions

BT-4a	<1.8
BT-4	<1
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CA DOHS ELAP Accreditation/Registration Number 1233

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CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

July 26, 2016

CLS Work Order #: CZG0800
COC #:

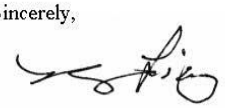
Maia Singer
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: SMUD In situ and Bac-T Monitoring

Enclosed are the results of analyses for samples received by the laboratory on 07/19/16 13:30. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

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

Sincerely,



James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

Page 1 of 3 07/26/16 12:38

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZG0800
COC #:

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY CLS ID. NO. CZG 0800 (of)

Report To: Stillwater Sciences, 2855 Telegraph Ave. Suite 400, Berkeley, CA 94705
Project Manager: Maia Singer maia@stillwatersci.com
Project Name: SMUD In situ and Bac-T Monitoring
Sampled By:
Job Description: Monitor seasonal bacteria levels in UARP reaches.
Site Location: UARP

Client Job Number: 500.20 Task 0120.00
Destination Laboratory: Rancho Cordova
[X] CLS (916) 638-7301, 3249 Fitzgerald Road, Rancho Cordova, CA 95742, www.californialab.com
[ ] OTHER

ANALYSIS REQUESTED

GEOTRACKER
EDF REPORT YES [X] NO [ ]
GLOBAL ID.
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	Fecal coliform-15 Tube	Fecal coliform-20 Tube	E. coli Quanti-tray	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
7/19/16	9:50AM	BAC-5-GCR		Surface water			6	X		X				X	
7/19/16	10:15AM	BAC-6-GCR		Surface water			6	X		X				X	
7/19/16	8:50AM	BAC-7-UVR		Surface water			6		X	X				X	
7/19/16	9:15AM	BAC-8-UVR		Surface water			6		X	X				X	
7/19/16	11:05AM	BAC-9-UVR		Surface water			6		X	X				X	
7/19/16	10:40AM	BAC-10-UVR		Surface water			6		X	X				X	
7/19/16	11:40AM	BAC-11-JR		Surface water			6		X	X				X	INVOICE TO:
				Surface water			6							X	Stillwater Sciences
				Surface water			6							X	Same as above
				Surface water			6							X	
				Surface water			6							X	Project No. 500.20 Task 0120.00
				Surface water			6							X	QUOTE#

SUSPECTED CONSTITUENTS
SAMPLE RETENTION TIME
PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4) = $H2SO_4$

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	KELLEIGH CROWE	7/19/16		
	STILLWATER SCIENCES	1:30 PM		

RECEIVED AT LAB BY: DATE/TIME: 7/19/16 1330 CONDITIONS/COMMENTS: 2.1.

SHIPPED BY: [ ] FED EX [ ] UPS [ ] OTHER AIR BILL #

CALIFORNIA LABORATORY SERVICES

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZG0800
COC #:

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
BAC-5-GCR (CZG0800-01) Water Sampled: 07/19/16 09:50 Received: 07/19/16 13:30									
E. Coli	**6.3**	1.0	MPN/100 mL	1	CZ05194	07/19/16	07/20/16	SM9223	
Fecal Coliforms	**6.8**	1.8	"	"	CZ05196	"	07/22/16	SM 9221	
BAC-6-GCR (CZG0800-02) Water Sampled: 07/19/16 10:15 Received: 07/19/16 13:30									
E. Coli	<1	1.0	MPN/100 mL	1	CZ05194	07/19/16	07/20/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ05196	"	07/22/16	SM 9221	
BAC-7-UVR (CZG0800-03) Water Sampled: 07/19/16 08:50 Received: 07/19/16 13:30									
E. Coli	<1	1.0	MPN/100 mL	1	CZ05194	07/19/16	07/20/16	SM9223	
Fecal Coliforms	**2.0**	1.8	"	"	CZ05195	"	07/22/16	SM 9221	
BAC-8-UVR (CZG0800-04) Water Sampled: 07/19/16 09:15 Received: 07/19/16 13:30									
E. Coli	<1	1.0	MPN/100 mL	1	CZ05194	07/19/16	07/20/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ05195	"	07/22/16	SM 9221	
BAC-9-UVR (CZG0800-05) Water Sampled: 07/19/16 11:05 Received: 07/19/16 13:30									
E. Coli	<1	1.0	MPN/100 mL	1	CZ05194	07/19/16	07/20/16	SM9223	
Fecal Coliforms	**2.0**	1.8	"	"	CZ05195	"	07/22/16	SM 9221	
BAC-10-UVR (CZG0800-06) Water Sampled: 07/19/16 10:40 Received: 07/19/16 13:30									
E. Coli	<1	1.0	MPN/100 mL	1	CZ05194	07/19/16	07/20/16	SM9223	
Fecal Coliforms	**11**	1.8	"	"	CZ05195	"	07/22/16	SM 9221	
BAC-11-JR (CZG0800-07) Water Sampled: 07/19/16 11:40 Received: 07/19/16 13:30									
E. Coli	**8.6**	1.0	MPN/100 mL	1	CZ05194	07/19/16	07/20/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ05195	"	07/22/16	SM 9221	

CALIFORNIA LABORATORY SERVICES

Stillwater Sciences	Project: SMUD In situ and Bac-T Monitoring	
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0120.00	**CLS Work Order #: CZG0800**
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Notes and Definitions

BT-4a	<1.8
BT-4	<1
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 **www.californialab.com** **916-638-7301** **Fax: 916-638-4510**

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

August 30, 2016

CLS Work Order #: CZH1100
COC #:

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

Project Name: SMUD In situ and Bac-T Monitoring

Enclosed are the results of analyses for samples received by the laboratory on 08/23/16 16:00. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

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

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

Page 1 of 3 08/30/16 12:40

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZH1100
COC #:

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY CLS ID. NO. CZH1100 (of)

Report To:
Stillwater Sciences
2855 Telegraph Ave. Suite 400
Berkeley, CA 94705
Project Manager: Maia Singer maia@stillwatersci.com
Project Name: SMUD In situ and Bac-T Monitoring
Sampled By:
Job Description: Monitor seasonal bacteria levels in UARP reaches
Site Location: UARP

Client Job Number: 500.20 Task 0120.00
Destination Laboratory: Rancho Cordova
[X] CLS (916) 638-7301, 3249 Fitzgerald Road, Rancho Cordova, CA 95742, www.californialab.com
[ ] OTHER

ANALYSIS REQUESTED — PRESERVATIVES: Fecal coliform-15 Tube; Fecal coliform-20 Tube; E. coli Quanti-tray

GEOTRACKER
EDF REPORT YES [X] NO [ ]
GLOBAL ID:
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	▼	Fecal coliform-15 Tube	Fecal coliform-20 Tube	E. coli Quanti-tray	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
8/23/16	11:00AM	BAC-1-BI		Surface water			6	X		X				X	
8/23/16	12:05PM	BAC-2-BI		Surface water			6	X		X				X	
8/23/16	2:20PM	BAC-3-LL		Surface water			6	X		X				X	
8/23/16	1:55PM	BAC-4-LL		Surface water			6	X		X				X	
				Surface water			6							X	
				Surface water			6							X	
				Surface water			6							X	INVOICE TO:
				Surface water			6							X	Stillwater Sciences
				Surface water			6							X	Same as above
				Surface water			6							X	
				Surface water			6							X	Project No. 500.20 Task 0120.00
				Surface water			6							X	QUOTE#

SUSPECTED CONSTITUENTS
SAMPLE RETENTION TIME
PRESERVATIVES (1) HCL (2) HNO3 (3) = COLD (4) = H2SO4

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	KELLEIGH CROWE STILLWATER SCIENCES	8/23/16 4:00PM		

RECEIVED AT LAB BY: GS — DATE/TIME: 8/23/16 1600 — CONDITIONS/COMMENTS: 2.0°C

SHIPPED BY: [ ] FED EX [ ] UPS [ ] OTHER _____ AIR BILL # _____

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 www.californialab.com 916-638-7301 Fax: 916-638-4510

CALIFORNIA LABORATORY SERVICES

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZH1100
COC #:

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
BAC-1-BI (CZH1100-01) Water Sampled: 08/23/16 11:00 Received: 08/23/16 16:00									
E. Coli	<1	1.0	MPN/100 mL	1	CZ06144	08/23/16	08/24/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ06145	"	08/26/16	SM 9221	
BAC-2-BI (CZH1100-02) Water Sampled: 08/23/16 12:05 Received: 08/23/16 16:00									
E. Coli	<1	1.0	MPN/100 mL	1	CZ06144	08/23/16	08/24/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ06145	"	08/26/16	SM 9221	
BAC-3-LL (CZH1100-03) Water Sampled: 08/23/16 14:20 Received: 08/23/16 16:00									
E. Coli	<1	1.0	MPN/100 mL	1	CZ06144	08/23/16	08/24/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ06145	"	08/26/16	SM 9221	
BAC-4-LL (CZH1100-04) Water Sampled: 08/23/16 13:55 Received: 08/23/16 16:00									
E. Coli	<1	1.0	MPN/100 mL	1	CZ06144	08/23/16	08/24/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ06145	"	08/26/16	SM 9221	

CALIFORNIA LABORATORY SERVICES

Stillwater Sciences	Project: SMUD In situ and Bac-T Monitoring	
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0120.00	**CLS Work Order #: CZH1100**
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Notes and Definitions

BT-4a	<1.8
BT-4	<1
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 **www.californialab.com** **916-638-7301** **Fax: 916-638-4510**

CALIFORNIA LABORATORY SERVICES
3249 Fitzgerald Road Rancho Cordova, CA 95742

September 07, 2016

CLS Work Order #: CZH1347
COC #:

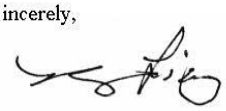
Maia Singer
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: SMUD In situ and Bac-T Monitoring

Enclosed are the results of analyses for samples received by the laboratory on 08/30/16 16:19. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

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

Sincerely,



James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

Page 1 of 3 09/07/16 13:42

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZH1347
COC #:

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY CLS ID. NO. CZH1347 (of)

Report To:
Stillwater Sciences
2855 Telegraph Ave. Suite 400
Berkeley, CA 94705
Project Manager: Maia Singer maia@stillwatersci.com
Project Name: SMUD In situ and Bac-T Monitoring
Sampled By:
Job Description: Monitor seasonal bacteria levels in UARP reaches.
Site Location: UARP

Client Job Number: 500.20 Task 0120.00
Destination Laboratory: Rancho Cordova
[X] CLS (916) 638-7301, 3249 Fitzgerald Road, Rancho Cordova, CA 95742, www.californialab.com
[ ] OTHER

GEOTRACKER
EDF REPORT YES [X] NO [ ]
GLOBAL ID:
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES ▼	ANALYSIS REQUESTED: Fecal coliform-15 Tube	Fecal coliform-20 Tube	E. coli Quanti-tray	TURNAROUND TIME IN DAYS: 1	2	3	5	SPECIAL INSTRUCTIONS
8/30/16	10:00	BAC-1-BI		Surface water			6	X		X				X	
8/30/16	10:30	BAC-2-BI		Surface water			6	X		X				X	
8/30/16	14:00	BAC-3-LL		Surface water			6	X		X				X	
8/30/16	13:45	BAC-4-LL		Surface water			6	X		X				X	
				Surface water			6							X	
				Surface water			6							X	
				Surface water			6							X	INVOICE TO:
				Surface water			6							X	Stillwater Sciences
				Surface water			6							X	Same as above
				Surface water			6							X	
				Surface water			6							X	Project No. 500.20 Task 0120.00
				Surface water			6							X	QUOTE#

SUSPECTED CONSTITUENTS
SAMPLE RETENTION TIME
PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4) = H_2SO_4

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	BRUCE HITE	8/30/16		
	STILLWATER SCIENCES	16:30		

RECEIVED AT LAB BY: DATE/TIME: 8/30/16 1619 CONDITIONS/COMMENTS: 4.7

SHIPPED BY: [ ] FED EX [ ] UPS [ ] OTHER AIR BILL #

CALIFORNIA LABORATORY SERVICES

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZH1347
COC #:

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
BAC-1-BI (CZH1347-01) Water Sampled: 08/30/16 10:00 Received: 08/30/16 16:19									
E. Coli	<1	1.0	MPN/100 mL	1	CZ06341	08/30/16	08/31/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ06337	"	09/02/16	SM 9221	
BAC-2-BI (CZH1347-02) Water Sampled: 08/30/16 10:30 Received: 08/30/16 16:19									
E. Coli	<1	1.0	MPN/100 mL	1	CZ06341	08/30/16	08/31/16	SM9223	
Fecal Coliforms	**4.5**	1.8	"	"	CZ06337	"	09/02/16	SM 9221	
BAC-3-LL (CZH1347-03) Water Sampled: 08/30/16 14:00 Received: 08/30/16 16:19									
E. Coli	<1	1.0	MPN/100 mL	1	CZ06341	08/30/16	08/31/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ06337	"	09/02/16	SM 9221	
BAC-4-LL (CZH1347-04) Water Sampled: 08/30/16 13:45 Received: 08/30/16 16:19									
E. Coli	<1	1.0	MPN/100 mL	1	CZ06341	08/30/16	08/31/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ06337	"	09/02/16	SM 9221	

CALIFORNIA LABORATORY SERVICES

Stillwater Sciences	Project: SMUD In situ and Bac-T Monitoring	
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0120.00	**CLS Work Order #: CZH1347**
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Notes and Definitions

BT-4a	<1.8
BT-4	<1
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 **www.californialab.com** **916-638-7301** **Fax: 916-638-4510**

CALIFORNIA LABORATORY SERVICES
3249 Fitzgerald Road Rancho Cordova, CA 95742

September 13, 2016

CLS Work Order #: CZI0188
COC #:

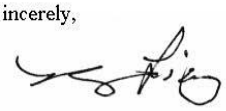
Maia Singer
Stillwater Sciences
2855 Telegraph Ave., Suite 400
Berkeley, CA 94705

Project Name: SMUD In situ and Bac-T Monitoring

Enclosed are the results of analyses for samples received by the laboratory on 09/06/16 16:30. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

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

Sincerely,



James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

Page 1 of 3 09/13/16 13:30

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZI0188
COC #:

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY CLS ID. NO. CZI0188 (of)

Report To:
Stillwater Sciences
2855 Telegraph Ave. Suite 400
Berkeley, CA 94705
Project Manager
Maia Singer maia@stillwatersci.com
Project Name
SMUD In situ and Bac-T Monitoring
Sampled By
Job Description
Monitor seasonal bacteria levels in UARP reaches.
Site Location UARP

Client Job Number
500.20 Task 0120.00
Destination Laboratory
Rancho Cordova

[x] CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA
95742
www.californialab.com

[ ] OTHER

ANALYSIS REQUESTED

GEOTRACKER
EDF REPORT YES [x] NO [ ]
GLOBAL ID.
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	Fecal coliform-15 Tube	Fecal coliform-20 Tube	E. coli Quanti-tray	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
9/6/16	10:00	UARP - BAC - 1 - B1		Surface water			6	x		x				x	
9/6/16	10:20	UARP - BAC - 2 - B1		Surface water			6	x		x				x	
9/6/16	14:08	UARP - BAC - 3 - LL		Surface water			6	x		x				x	
9/6/16	13:52	UARP - BAC - 4 - LL		Surface water			6	x		x				x	
				Surface water			6							x	
				Surface water			6							x	
				Surface water			6							x	INVOICE TO:
				Surface water			6							x	Stillwater Sciences
				Surface water			6							x	Same as above
				Surface water			6							x	
				Surface water			6							x	Project No. 500.20 Task 0120.00
				Surface water			6							x	QUOTE#

SUSPECTED CONSTITUENTS | SAMPLE RETENTION TIME | PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4) = $H2SO4$

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	BRUCE HOTCH	9/6/16		
	STILLWATER SCIENCES	16:36		

RECEIVED AT LAB BY: DATE/TIME: 1630. 9.6.16 CONDITIONS/COMMENTS: (1.5)

SHIPPED BY: [ ] FED EX [ ] UPS [ ] OTHER AIR BILL #

CALIFORNIA LABORATORY SERVICES

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZI0188
COC #:

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
VARP-BAC-1-B1 (CZI0188-01) Water	**Sampled: 09/06/16 10:00**	**Received: 09/06/16 16:30**							
E. Coli	**1.0**	1.0	MPN/100 mL	1	CZ06505	09/06/16	09/07/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ06507	"	09/09/16	SM 9221	A-COM
VARP-BAC-2-B1 (CZI0188-02) Water	**Sampled: 09/06/16 10:20**	**Received: 09/06/16 16:30**							
E. Coli	<1	1.0	MPN/100 mL	1	CZ06505	09/06/16	09/07/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ06507	"	09/09/16	SM 9221	
VARP-BAC-3-LL (CZI0188-03) Water	**Sampled: 09/06/16 14:08**	**Received: 09/06/16 16:30**							
E. Coli	<1	1.0	MPN/100 mL	1	CZ06505	09/06/16	09/07/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ06507	"	09/09/16	SM 9221	
VARP-BAC-4-LL (CZI0188-04) Water	**Sampled: 09/06/16 13:52**	**Received: 09/06/16 16:30**							
E. Coli	<1	1.0	MPN/100 mL	1	CZ06505	09/06/16	09/07/16	SM9223	
Fecal Coliforms	**2.0**	1.8	"	"	CZ06507	"	09/09/16	SM 9221	

CALIFORNIA LABORATORY SERVICES

Stillwater Sciences	Project: SMUD In situ and Bac-T Monitoring	
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0120.00	**CLS Work Order #: CZI0188**
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Notes and Definitions

BT-4a	<1.8
BT-4	<1
A-COM	Setup one-minute outside of recommended holding time.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 **www.californialab.com** **916-638-7301** **Fax: 916-638-4510**

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

September 21, 2016

CLS Work Order #: CZI0576
COC #:

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

Project Name: SMUD In situ and Bac-T Monitoring

Enclosed are the results of analyses for samples received by the laboratory on 09/14/16 15:30. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

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

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

Page 1 of 4 09/21/16 15:23

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZI0576
COC #:

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY

CLS ID. NO. CZI0576 (of)

Report To:
Stillwater Sciences
2855 Telegraph Ave. Suite 400
Berkeley, CA 94705
Project Manager
Maia Singer maia@stillwatersci.com
Project Name
SMUD In situ and Bac-T Monitoring
Sampled By
Job Description
Monitor seasonal bacteria levels in UARP reaches.
Site Location UARP

Client Job Number
500.20 Task 0120.00
Destination Laboratory
Rancho Cordova
[X] CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA
95742
www.californialab.com
[ ] OTHER

ANALYSIS REQUESTED
PRESERVATIVES
Fecal coliform-15 Tube
Fecal coliform-20 Tube
E. coli Quanti-ray

GEOTRACKER
EDF REPORT YES [X] NO [ ]
GLOBAL ID.
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	Fecal coliform-15 Tube	Fecal coliform-20 Tube	E. coli Quanti-ray	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
9/14	9:05	BAC - 1 - B1		Surface water			6	X		X				X	
9/14	9:30	BAC - 2 - B1		Surface water			6	X		X				X	
9/14	13:25	BAC - 3 - LL		Surface water			6	X		X				X	
9/14	13:10	BAC - 4 - LL		Surface water			6	X		X				X	
				Surface water			6							X	
				Surface water			6							X	
				Surface water			6							X	
				Surface water			6							X	INVOICE TO:
				Surface water			6							X	Stillwater Sciences
				Surface water			6							X	Same as above
				Surface water			6							X	
				Surface water			6							X	Project No. 500.20 Task 0120.00
				Surface water			6							X	QUOTE#

SUSPECTED CONSTITUENTS
SAMPLE RETENTION TIME
PRESERVATIVES (1) HCL (3) = COLD (2) HNO$_3$ (4)= H2SO4

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	BRUCE HITCH	9/14		
	STILLWATER SCIENCES	15:30		

RECEIVED AT LAB BY: DATE/TIME: 9/14/16 1530. CONDITIONS/COMMENTS: (3-2)

SHIPPED BY: [ ] FED EX [ ] UPS [ ] OTHER AIR BILL #

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 www.californialab.com 916-638-7301 Fax: 916-638-4510

CALIFORNIA LABORATORY SERVICES

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZI0576
COC #:

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
BAC-1-BI (CZI0576-01) Water Sampled: 09/14/16 09:05 Received: 09/14/16 15:30									
E. Coli	<1	1.0	MPN/100 mL	1	CZ06744	09/14/16	09/16/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ06748	09/14/16	09/17/16	SM 9221	A-COM
BAC-2-BI (CZI0576-02) Water Sampled: 09/14/16 09:30 Received: 09/14/16 15:30									
E. Coli	<1	1.0	MPN/100 mL	1	CZ06744	09/14/16	09/16/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ06748	09/14/16	09/17/16	SM 9221	A-COMa
BAC-3-LL (CZI0576-03) Water Sampled: 09/14/16 13:25 Received: 09/14/16 15:30									
E. Coli	<1	1.0	MPN/100 mL	1	CZ06744	09/14/16	09/16/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ06748	09/14/16	09/17/16	SM 9221	
BAC-4-LL (CZI0576-04) Water Sampled: 09/14/16 13:10 Received: 09/14/16 15:30									
E. Coli	<1	1.0	MPN/100 mL	1	CZ06744	09/14/16	09/16/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ06748	09/14/16	09/17/16	SM 9221	

CALIFORNIA LABORATORY SERVICES

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZI0576
COC #:

Microbiological Parameters by APHA Standard Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CZ06744 - General										
Blank (CZ06744-BLK1)				Prepared: 09/15/16 Analyzed: 09/16/16						
Total Coliforms	ND	1.0	MPN/100 mL							
E. Coli	ND	1.0	"							

CALIFORNIA LABORATORY SERVICES

Stillwater Sciences	Project: SMUD In situ and Bac-T Monitoring	
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0120.00	**CLS Work Order #: CZI0576**
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Notes and Definitions

BT-4a	<1.8
BT-4	<1
A-COMa	Prepared one-minute outside of hold time.
A-COM	Prepared 26-minutes outside of hold time.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 **www.californialab.com** **916-638-7301** **Fax: 916-638-4510**

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

September 27, 2016

CLS Work Order #: CZI0814
COC #:

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

Project Name: SMUD In situ and Bac-T Monitoring

Enclosed are the results of analyses for samples received by the laboratory on 09/20/16 16:07. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

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

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

Page 1 of 3 09/27/16 11:57

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZI0814
COC #:

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY

CLS ID. NO. CZI0814 (of)

Report To:
Stillwater Sciences
2855 Telegraph Ave. Suite 400
Berkeley, CA 94705
Project Manager
Maia Singer maia@stillwatersci.com
Project Name
SMUD In situ and Bac-T Monitoring
Sampled By
Job Description
Monitor seasonal bacteria levels in UARP reaches.
Site Location UARP

Client Job Number
500.20 Task 0120.00
Destination Laboratory
Rancho Cordova
[X] CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA
95742
www.californialab.com
[ ] OTHER

GEOTRACKER
EDF REPORT YES [X] NO [ ]
GLOBAL ID.
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	Fecal coliform-15 Tube	Fecal coliform-20 Tube	E. coli Quanti-tray	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
9/20	9:45	BAC-1-B1		Surface water			6	X		X				X	
9/20	9:20	BAC-2-B1		Surface water			6	X		X				X	
9/20	13:40	BAC-3-LL		Surface water			6	X		X				X	
9/20	13:20	BAC-4-LL		Surface water			6	X		X				X	
				Surface water			6							X	
				Surface water			6							X	
				Surface water			6							X	INVOICE TO:
				Surface water			6							X	Stillwater Sciences
				Surface water			6							X	Same as above
				Surface water			6							X	
				Surface water			6							X	Project No. 500.20 Task 0120.00
				Surface water			6							X	QUOTE#

SUSPECTED CONSTITUENTS | SAMPLE RETENTION TIME | PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)= H_2SO_4

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	BRUCE KITCH	9/20		
	STILLWATER SCIENCES	16:07		

RECEIVED AT LAB BY: DATE/TIME: 1601 9-20-16 CONDITIONS/COMMENTS: (0-3)

SHIPPED BY: [ ] FED EX [ ] UPS [ ] OTHER AIR BILL #

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 www.californialab.com 916-638-7301 Fax: 916-638-4510

CALIFORNIA LABORATORY SERVICES

 09/27/16 11:57

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

Project: SMUD In situ and Bac-T Monitoring
Project Number: 500.20 / Task 0120.00
Project Manager: Maia Singer

CLS Work Order #: CZI0814
COC #:

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
BAC-1-B1 (CZI0814-01) Water Sampled: 09/20/16 09:45 Received: 09/20/16 16:07									
E. Coli	<1.0	1.0	MPN/100 mL	1	CZ06906	09/20/16	09/21/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ06912	"	09/23/16	SM 9221	
BAC-2-B1 (CZI0814-02) Water Sampled: 09/20/16 09:20 Received: 09/20/16 16:07									
E. Coli	<1.0	1.0	MPN/100 mL	1	CZ06906	09/20/16	09/21/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ06912	"	09/23/16	SM 9221	
BAC-3-LL (CZI0814-03) Water Sampled: 09/20/16 13:40 Received: 09/20/16 16:07									
E. Coli	<1.0	1.0	MPN/100 mL	1	CZ06906	09/20/16	09/21/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ06912	"	09/23/16	SM 9221	
BAC-4-LL (CZI0814-04) Water Sampled: 09/20/16 13:20 Received: 09/20/16 16:07									
E. Coli	<1.0	1.0	MPN/100 mL	1	CZ06906	09/20/16	09/21/16	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CZ06912	"	09/23/16	SM 9221	

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742 **www.californialab.com** **916-638-7301** **Fax: 916-638-4510**

CALIFORNIA LABORATORY SERVICES

Stillwater Sciences	Project: SMUD In situ and Bac-T Monitoring	
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0120.00	**CLS Work Order #: CZI0814**
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Notes and Definitions

BT-4a	<1.8
BT-4	<1.0
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

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APPENDIX G
Field Collection Methods for Metals Bioaccumulation Sampling

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Cruise Report for the Water Quality Monitoring Plan for the Upper American River Project (UARP)/FERC Project No. 2101 Sacramento Municipal Utility District (SMUD)

Sampling Dates: August 29 – September 1, 2016

Written by: April Sjoboen Guimaraes
California Department of Fish and Wildlife (CDFW)/Marine Pollution Studies Laboratories (MPSL) at Moss Landing Marine Laboratories

1.0 Introduction

This work was performed for the Sacramento Municipal Utility District (SMUD) as part of their relicensing requirements through the Water Quality Monitoring Plan for the Upper American River Project (UARP)/FERC Project No. 2101.

The UARP is situated within El Dorado and Sacramento counties in the basin of the American River and consists of eleven reservoirs and eight powerhouses. Operated by SMUD, it is a 688-megawatt hydroelectric system capable of generating enough electricity to meet about 20 percent of customer demand. It covers over 6400 acres in the El Dorado National Forest and land administered by the Bureau of Land Management, and receives runoff from approximately 674 square miles. The UARP also has extensive recreational facilities at many of the reservoirs.

The UARP water quality plan includes monitoring of the following: 1) basic *in situ* parameters, 2) general water chemistry, 3) bacteria, and 4) metals bioaccumulation. The portion of this plan detailed below only describes the activities in Part 4: the bioaccumulation of metals in fish.

2.0 Cruise Report

2.1 Objectives

The objectives were to collect designated sportfish species as identified by the SMUD Water Quality Monitoring Plan (May 2015). We targeted the following primary fish species at all lakes: brown trout (*Salmo trutta*), smallmouth bass (*Micropterus dolomieu*), rainbow trout (*Oncorhynchus mykiss*) and Sacramento pikeminnow (*Ptychocheilus grandis*). In some cases, other fish species were collected. A minimum of three individuals from each species were sampled from each lake, non-size specific. If hardhead were seen, they were returned unharmed to the reservoir.

Sample sites were reached by boating and fish were collected by gill nets and electro-shocking boats.

2.2 MPSL/CDFW Sampling personnel

William Jakl	Crew Lead
Stephen Martenuk	Crew Lead
John Negrey	Research Tech
April Guimaraes	Research Tech

2.3 Authorization to collect samples

All sampling personnel are MPSL staff contracted through San Jose State University Research Foundation (SJSURF) and the California Department of Fish and Wildlife (CDFW) to conduct the sample collection activities listed herein.

2.4 Station selection

The study area includes seven project reservoirs and diverted stream reaches. Reservoirs included in the fish monitoring program include Chili Bar, Loon Lake, Gerle Creek, Ice House, Union Valley, Camino, and Slab Creek.

Fish tissues were sampled to assess potential bioaccumulation of metals in resident fish within these reservoirs in accordance with protocols of the State Water Quality Control Board (SWRCB) Surface Water Ambient Monitoring Program (SWAMP). Fish collection was conducted using gill nets and electro-fishing boats; techniques approved by the CDFW.

2.5 Summary of types of samples authorized to be collected

One to five species of sport fish were collected to better determine contamination risks at the chosen lakes. Target species included brown trout (*Salmo trutta*), smallmouth bass (*Micropterus dolomieu*), rainbow trout (*Oncorhynchus mykiss*) and Sacramento pikeminnow (*Ptychocheilus grandis*). An attempt was made to collect a minimum of three fish per species. Physical parameters were collected for each individual fish, which included: weight, total length, fork length and presence of any abnormalities. Each sport fish was individually tagged, wrapped in aluminum foil, placed in a labeled zipper-closure bag and stored on dry ice for the duration of the trip.

At the MPSL/CDFW lab, samples were stored in a freezer until they were processed for authorized analysis, per appropriate SOP's. Analysis authorization dictates tissue analysis (QA/QC requirements-preservatives, dissecting, cooling, etc.).

2.6 Discussion

A total of seven lakes were sampled: Camino Reservoir, Chili Bar Reservoir, Gerle Creek Reservoir, Ice House Reservoir, Loon Lake, Slab Creek Reservoir and Union Valley Reservoir. Due

to the lake size, Union Valley Reservoir was divided into two separate locations and sampled on multiple days. Relative locations of the water bodies are shown in Figure 1. The collections were done over a period of four consecutive days: August 29 through September 1, 2016.

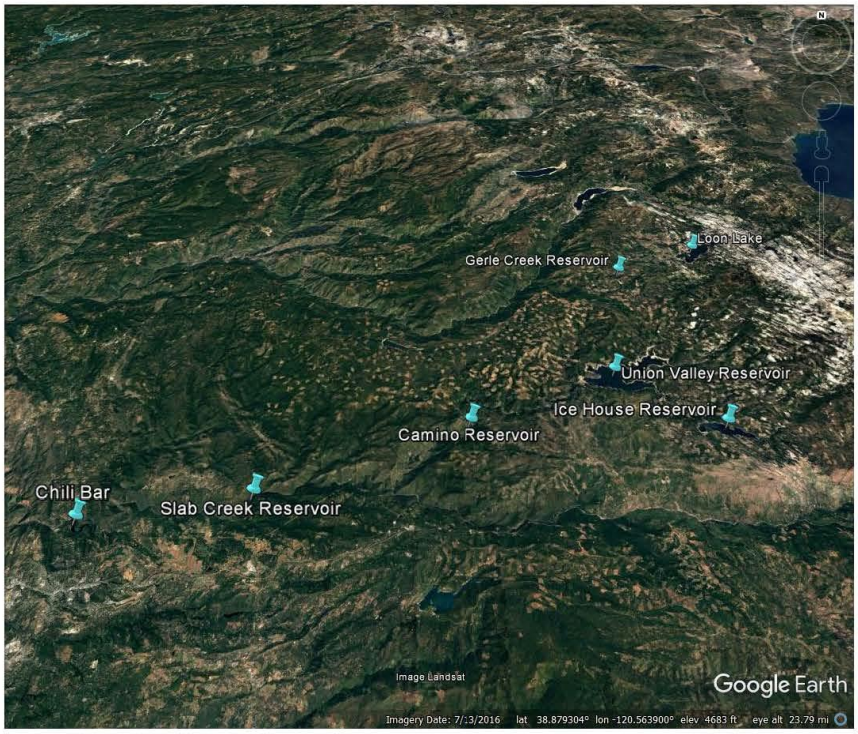

Figure 1. Overview of lakes sampled.

2.7 Results

A summary of the number of fish samples collected from the seven water bodies are in Table 1.

Two CDFW/MPSL teams sampled the lakes and reservoirs. More detail regarding maps of the sampling effort for each water body, the sampling crew, station name, date, species collected and total length, are linked to Table 2.7.1 below.

Table 1. Fish Collection Summary

	Rainbow Trout	Brown Trout	Lahontan Cutthroat	Smallmouth Bass	Kokanee	Mackinaw	Sacramento Pike Minnow
Camino Reservoir		10	3				
Chili Bar Reservoir	5	3					5
Gerle Creek Reservoir		14					
Ice House Reservoir	5	3					
Loon Lake	4	3					
Slab Creek Reservoir	4	4					7
Union Valley Reservoir Location 1	10			3	1	5	
Union Valley Reservoir Location 2	8	1		7	3		

2.7.1 Table of Contents for SMUD Fish Study

Camino Reservoir

Figure 2. Camino Reservoir sampling locations.

Collection Method: Electro-fisher boat, gill net
Date(s) of Collection: August 30, 2016
Sample Effort: 0900 – 1230 (3.5 hours)
Samplers: William Jakl and April Guimaraes

Sportfish Species TL (mm)									
Lahontan Cutthroat (*Oncorhynchus clarki henshawi*)									
			240	242	246				
Brown Trout (*Salmo trutta*)									
255	262	263	265	280	290	293	299	315	320

Comments: The sampling vessel was launched from the bank. The whole lake was sampled several times using the electro-fisher boat. All fish sampled are from gill nets.

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Chili Bar Reservoir

Figure 3. Chili Bar Reservoir sampling locations.

Collection Method: Electro-fisher boat, gill net
Date(s) of Collection: August 29, 2016
Sample Effort: 1120 - 1630 (5.2 hours)
Samplers: William Jakl and April Guimaraes

Sportfish Species TL (mm)				
Brown Trout (*Salmo trutta*)				
	425	465	509	
Rainbow Trout (*Oncorhynchus mykiss*)				
215	245	257	272	360
Sacramento Pikeminnow (*Ptychocheilus grandis*)				
185	196	197	221	230

Comments: The sampling vessel was launched from the main launch ramp. One brown trout was collected in the gill nets, the other specimens were collected using the electro-fisher boat.

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Gerle Creek Reservoir

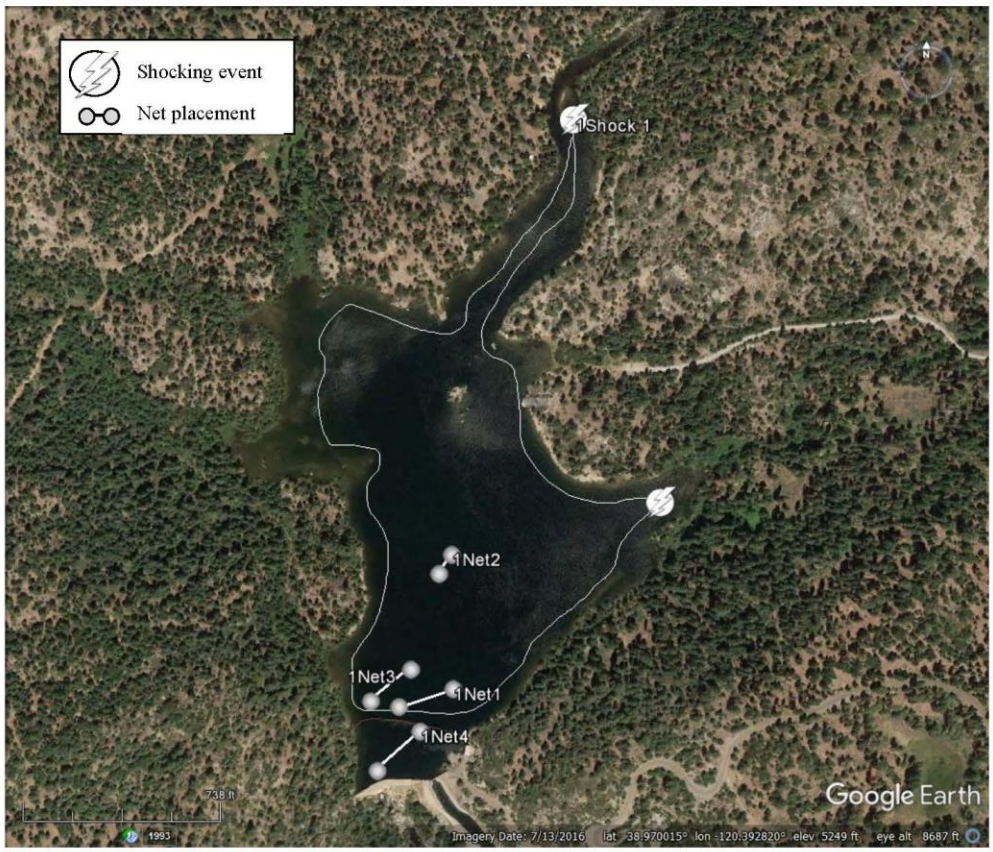

Figure 4. Gerle Creek Reservoir sampling locations.

Collection Method: Electro-fisher boat, gill net
Date(s) of Collection: August 31, 2016
Sample Effort: 0830 - 1315 (4.75 hours)
Samplers: William Jakl and April Guimaraes

Sportfish Species TL (mm)					
Brown Trout (*Salmon trutta*)					
194	230	239	277	285	293
294	295	305	315	315	317

Comments: The sampling vessel was launched from the gravel launch ramp. Six of the fourteen specimens collected were done so via gill net. The entire lake was electro-fished.

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Ice House Reservoir

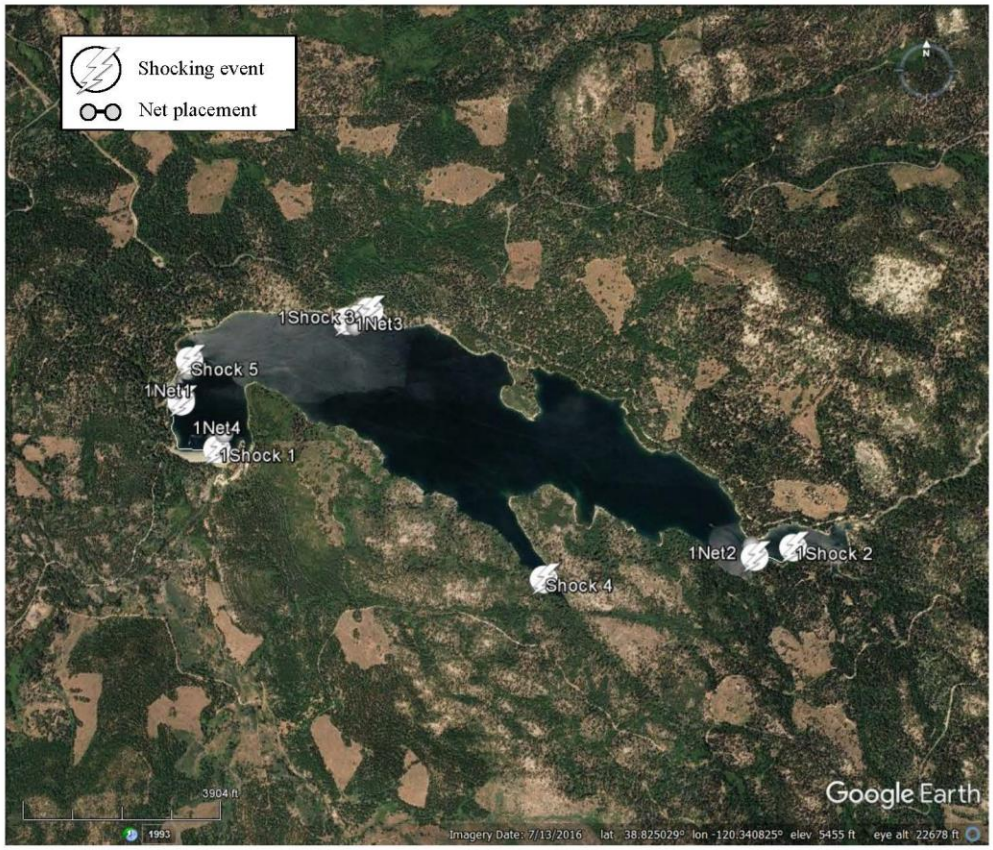

Figure 5a. Ice House Reservoir sampling locations.

Collection Method: Electro-fisher boat, gill net
Date(s) of Collection: August 29, 2016
Sample Effort: 1300 - 1845 (5.75 hours)
Samplers: John Negrey and Stephen Martenuk

Figure 5b. Ice House Reservoir sampling locations.

Figure 5c. Ice House Reservoir sampling locations.

Figure 5d. Ice House Reservoir sampling locations.

Sportfish Species TL (mm)				
Rainbow Trout (*Oncorhynchus mykis* s)				
276	283	286	295	395
Brown Trout (*Salmo trutta*)				
	428	457	602	

Comments: The sampling vessel was launched from the main launch ramp. Four rainbow trout were caught via gill net, the remainder via the electro-fisher boat. The electro-fisher boat was only able to output 2 amps throughout the sampling effort.

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Loon Lake

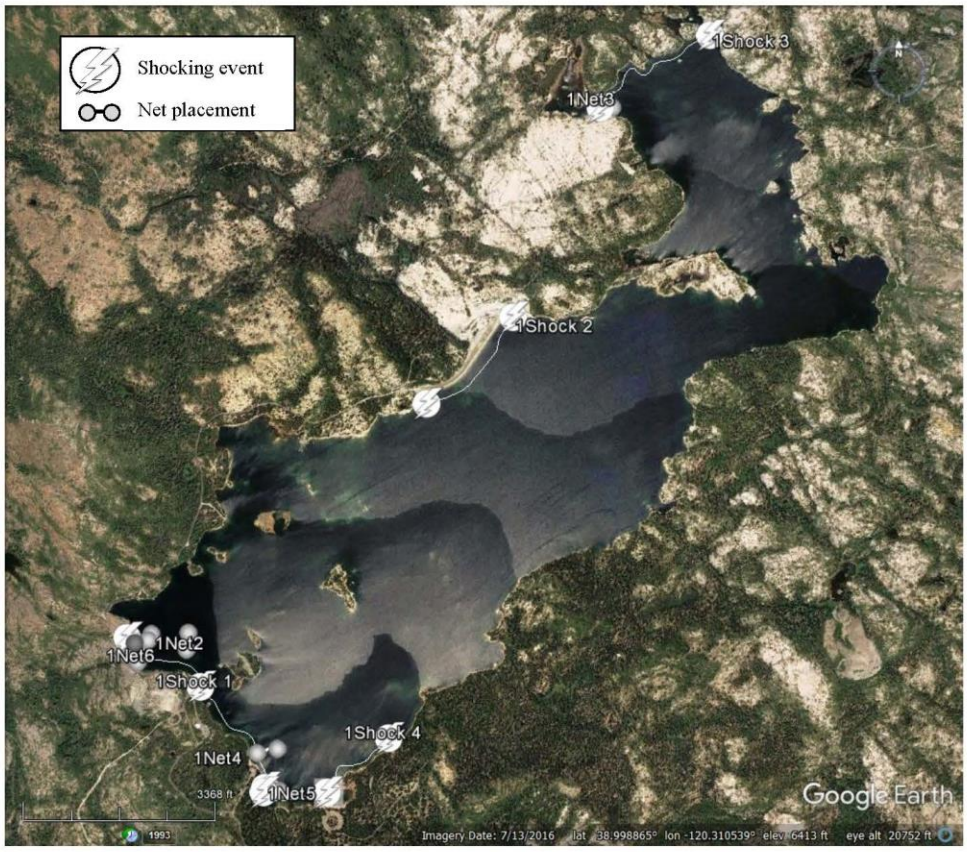

Figure 6a. Loon Lake sampling locations.

Collection Method: Electro-fisher boat, gill net
Date(s) of Collection: August 30, 2016
Sample Effort: 0915 – 1730 (8.25 hours)
Samplers: John Negrey and Stephen Martenuk

Figure 6b. Loon Lake sampling locations.

Sportfish Species TL (mm)				
Rainbow Trout (*Oncorhynchus mykiss*)				
209	211	374	381	
Brown Trout (*Salmo trutta*)				
	442	461	504	

Comments: The sampling vessel was launched from the main launch ramp. Two rainbow trout were collected via electro-fishing, the remainder of the samples by gill nets.

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Slab Creek Reservoir

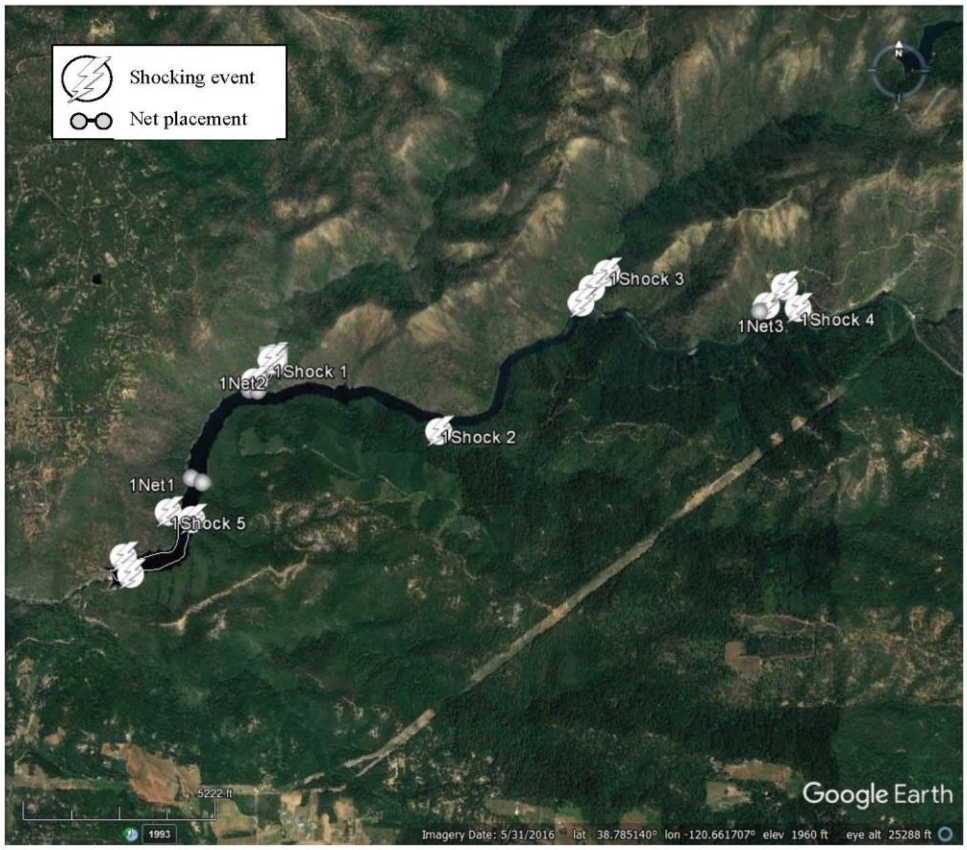

Figure 7a. Slab Creek Reservoir sampling locations.

Collection Method: Electro-fisher boat, gill net
Date(s) of Collection: August 31, 2016
Sample Effort: 0745 – 1630 (8.75 hours)
Samplers: John Negrey and Stephen Martenuk

Figure 7b. Slab Creek Reservoir sampling locations.

Figure 7c. Slab Creek Reservoir sampling locations.

Sportfish Species TL (mm)						
Sacramento Pikeminnow (*Ptychocheilus grandis*)						
219	251	259	309	314	334	481
Rainbow Trout (*Oncorhynchus mykiss*)						
	184	201	206	262		
Brown Trout (*Salmo trutta*)						
	230	241	386	505		

Comments: The sampling vessel was launched from the main launch ramp. Suckers and hardhead were also seen. One pikeminnow and one brown trout were caught in the gill nets, the remainder of the samples were collected electro-fishing.

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Union Valley Reservoir

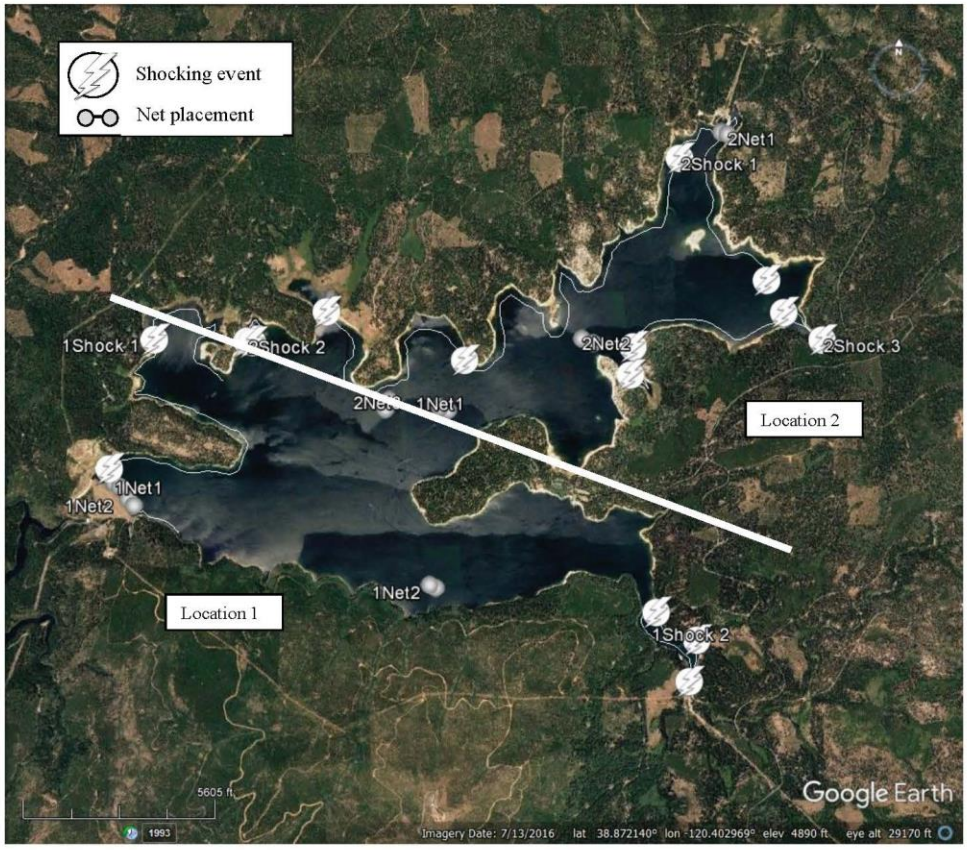

Figure 8a. Union Valley Reservoir sampling locations.

Collection Method: Electro-fisher boat, gill net
Date(s) of Collection: August 30 & 31, September 1, 2016
Sample Effort: 1345 – 1800, 1515 – 1800, 0830 – 1830, 0730 – 1100 (20.5 hours)
Samplers: William Jakl, April Guimaraes, John Negrey and Stephen Martenuk

Figure 8b. Union Valley Reservoir Location 1 sampling locations.

Sportfish Species TL (mm)									
Smallmouth Bass (*Micropterus dolomieu*)									
				180	184	240			
Rainbow Trout (*Oncorhynchus mykiss*)									
240	270	280	335	340	340	350	355	372	382
Lake Trout (*Salvelinus namaycush*)									
			308	400	420	553	710		
Kokanee (*Oncorhynchus nerka*)									
					234				

Comments: The sampling vessel was launched from the launch ramp by the dam and the Sunset launch ramp. The site was visited a total of three separate days. Multiple gill nets were left overnight. Specimens were collected using both gill nets and electro-fishing.

Figure 8c. Union Valley Reservoir Location 2 sampling locations.

Collection Method: Electro-fisher boat, gill net
Date(s) of Collection: September 1, 2016
Sample Effort: 0830 – 1830 (10 hours)
Samplers: Stephen Martenuk and April Guimaraes

Sportfish Species TL (mm)							
Brown Trout (*Salmo trutta*)							
			505				
Rainbow Trout (*Oncorhynchus mykiss*)							
231	304	305	315	325	345	348	370
Kokanee (*Oncorhynchus nerka*)							
		230	234	234			
Smallmouth Bass (*Micropterus dolomieu*)							
215	254	255	287	303	349	402	

Comments: The sampling vessel was launched from the Yellowjacket boat ramp. Specimens were collected using both gill nets and electro-fishing.

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APPENDIX H
QA/QC Summaries for Metals Bioaccumulation Sampling

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Marine Pollution Studies Laboratories
Moss Landing Marine Laboratories
7544 Sandholdt Road
Moss Landing, CA 95039

Project Manager:	Autumn Bonnema
Phone:	831-771-4175
Fax:	831-633-0805
e-mail:	bonnema@mlml.calstate.edu

Project Name:	SMUD_FERC_2016	**Matrix:**	Tissue
Parameter:	Total mercury	**Report Date:**	11/7/16

QA/QC SUMMARY

SAMPLE CUSTODY

One hundred and eight tissue samples were collected August 29-September 1, 2016 and were received in good condition on September 2, 2016. Cooler temperature at the time samples were received was -20°C. Samples were stored at -20°C before and after analysis.

QA/QC DATA QUALITY OBJECTIVES (DQO)

Analyte	Reference Method	Range of Recovery	Relative Precision	Detection Limit	Reporting Limit
Hg	EPA 7473	±25%	±25%	0.004 µg/g $_{wet}$ 0.016 µg/g $_{dry}$	0.012 µg/g $_{wet}$ 0.047 µg/g $_{dry}$

METHOD

Samples were analyzed using EPA 7473: Mercury in Solids and Solutions by Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry.

HOLDING TIME

Samples were analyzed October 10 through November 01, 2016. Samples were analyzed within the EPA holding time of 1 year from collection.

CALIBRATION VERIFICATION

Initial Calibration Verification (ICV) and all Continuing Calibration Verification (CCV) were within DQO of ±20%.

DETECTION LIMIT

All detection limits listed in the table above were achieved.

METHOD BLANKS

Three method blanks were analyzed with each batch samples. All blanks were below detection limits. Sample results are not blank corrected.

REPLICATES

One pair of analytical duplicates selected at random was analyzed with each batch of samples. All RPDs met the DQO of ±25%.

MATRIX SPIKES

One matrix spike/matrix spike duplicate (MS/MSD) pair was analyzed with each batch of samples. All recoveries and RPD's were calculated using the mass of Hg on a wet weight basis. All recoveries and RPDs met the DQO of ±25%

CERTIFIED REFERENCE MATERIAL

One CRM DORM-4 was analyzed with each batch of samples. The percent moisture of CRM DORM-4 at the time of analysis was 4.96 and 3.20. Percent moisture of CRM DORM-4 was recorded on 9/2/16 and 10/7/16, respectively. Percent recovery met the DQO of ±25%.

COMMENTS

The MDL study was conducted using chicken, known to be clean for Mercury, and calculated on a dry weight basis. The wet weight MDL and RL are calculated using the chicken percent moisture, however the wet weight sample results are converted using the percent moisture of each sample.

REFERENCES

US Environmental Protection Agency Method 7473. 1998. Mercury in Solids and Solutions by Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry. US Environmental Protection Agency, Washington, DC.

Marine Pollution Studies Laboratories
Moss Landing Marine Laboratories
7544 Sandholdt Road
Moss Landing, CA 95039

Project Manager:	Autumn Bonnema
Phone:	831-771-4175
Fax:	831-633-0805
e-mail:	bonnema@mlml.calstate.edu

Project Name:	SMUD_FERC_2016	**Matrix:**	Tissue
Parameter:	Metals	**Report Date:**	19 January 2017

QA/QC SUMMARY

SAMPLE CUSTODY

One hundred and eight tissue samples were collected August 29-September 1, 2016 and were received in good condition on September 2, 2016. Cooler temperature at the time samples were received was -20°C. Samples were stored at -20°C before and after analysis.

QA/QC DATA QUALITY OBJECTIVES (DQO)

Analyte	Reference Method	Range of Recovery	Relative Precision	Detection Limit	Reporting Limit
Ag	EPA 200.8	±25%	±25%	0.003 µg/g $_{wet}$ 0.02 µg/g $_{dry}$	0.010 µg/g $_{wet}$ 0.06 µg/g $_{dry}$
Cu	EPA 200.8	±25%	±25%	0.06 µg/g $_{wet}$ 0.34 µg/g $_{dry}$	0.02 µg/g $_{wet}$ 1.00 µg/g $_{dry}$
Pb	EPA 200.8	±25%	±25%	0.002 µg/g $_{wet}$ 0.01 µg/g $_{dry}$	0.005 µg/g $_{wet}$ 0.03 µg/g $_{dry}$

METHOD

Samples were analyzed using digested using EPA 3052 (Modified): Microwave Assisted Acid Digestion of Siliceous and Organically Based Matrices, and analyzed using EPA 200.8: Determination of Trace Elements in Ambient Waters and Wastes by ICP-MS.

HOLDING TIME

Samples were digested 12- 18 December 2016 and analyzed 20 December 2016 through 17 January 2017. Samples were analyzed within the EPA holding time of 1 year from collection.

CALIBRATION VERIFICATION

Initial Calibration Verification (ICV) and all Continuing Calibration Verification (CCV) were within DQO of ±20%.

DETECTION LIMIT

All detection limits listed in the table above were achieved.

METHOD BLANKS

Three method blanks were analyzed with each batch samples. All blanks were below detection limits. Sample results are not blank corrected.

REPLICATES

One pair of analytical duplicates selected at random was analyzed with each batch of samples. All RPDs met the DQO of ±25%.

MATRIX SPIKES

One matrix spike/matrix spike duplicate (MS/MSD) pair was analyzed with each batch of samples. All recoveries and RPDs met the DQO of ±25%

CERTIFIED REFERENCE MATERIAL

One CRM DORM-4 or 2976 was analyzed with each batch of samples. The percent moisture of CRM DORM-4 and 2976 were at the time of analysis was 4.52 and 4.59, respectively. Percent moistures for CRMs were recorded on 8 December 2016.

The certified value for Ag is below the Reporting Limit (RL) therefore a Laboratory Control Spike (LCS) was used instead. There is no percent moisture associated with LCS.

Percent recoveries met the DQO of ±25%.

COMMENTS

The MDL study was conducted using chicken, known to be clean for metals, and calculated on a dry weight basis. The wet weight MDL and RL are calculated using the chicken percent moisture, however the wet weight sample results are converted using the percent moisture of each sample.

REFERENCES

US Environmental Protection Agency Method 3052. 1996. Microwave Assisted Acid Digestion of Siliceous and Organically Based Matrices. US Environmental Protection Agency, Washington, DC.

Modifications to EPA 3052

US Environmental Protection Agency Method 200.8 Rev 5.4. 1994. Determination of Trace Elements in Ambient Waters and Wastes by Inductively Coupled Plasma- Mass Spectrometry. US Environmental Protection Agency, Washington, DC.