Monitoring Program 2015 Final Annual Report Sacramento Municipal Utility District

Hydro License Implementation • June 2016 Upper American River Project FERC Project No. 2101





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2016 Annual Monitoring Report June 2016

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1.0 Introduction

This Monitoring Program Annual Report (Report) is being submitted to the Federal Energy Regulatory Commission (Commission) by the Sacramento Municipal Utility District (SMUD), in accordance with State Water Resources Control Board (SWRCB) Condition 8 of the 401 Water Quality Certification and U.S. Forest Service (USFS) 4(e) Condition 31(hereafter Conditions), located in Appendices A and B, respectively, of the Commission's Order Issuing New License (License). SWRCB 401Condition 8 states:

The Licensee shall prepare an annual report that fully describes the monitoring efforts of the previous calendar year, including the data collected and analysis of that data. The report shall be filed with the Commission by June 30 of each year for the preceding year. USFS, CDFW, USFWS, and the State Water Board shall have at least 30 days to review and comment on the draft report prior to filing with the Commission. The Licensee shall provide copies of the final annual report to USFS, CDFW, USFWS, and the Deputy Director.

And, USFS 4(e) Condition 31 states:

The licensee shall file with FERC by June 30 of each year an annual report fully describing the monitoring efforts of the previous calendar year. FS, CDFG, FWS, and SWRCB shall have at least 30 days to review and comment on the draft report prior to filing with FERC. The licensee shall provide copies of the annual report to FS, CDFG, FWS, and SWRCB.

Additionally, SWRCB Condition 10 requires SMUD to include a summary of the efforts made to pass large woody debris at several Project reservoirs in the Annual Monitoring Report.

SWRCB 401Condition 10 states:

The Licensee shall ensure that mobile instream large woody debris continues downstream beyond Robbs Peak Reservoir Dam, Junction Reservoir Dam, Camino Reservoir Dam, and Slab Creek Reservoir Dam. This requirement will not be in effect when access and working conditions are dangerous or unsafe. At a minimum, all sizes greater than both 20 centimeters wide and 12 meters in length shall be allowed to continue downstream beyond Robbs Peak Reservoir Dam, Junction Reservoir Dam, Camino Reservoir Dam, and Slab Creek Reservoir Dam. Smaller sizes are also allowed but are not required to be moved beyond these dams. To demonstrate compliance with this condition, the Licensee shall include in the annual monitoring report that is required in Condition 8 (Monitoring Program) a summary of the efforts made during the year to pass large woody debris below the dams.



Furthermore, Article 401(b) of the License requires SMUD to file the Annual Report with the Commission, along with any comments received by the Agencies during the review period, by June 30th of each year.

Finally, the preface to the Conditions states that:

For purposes of the ecological resources adaptive management program, each year is defined on a calendar year basis (i.e., January through December). This Monitoring Program covers monitoring to be conducted during all years until a new license is issued. Where years are specified, Year 1 is the first year during which all initial minimum streamflows required by the license are implemented by May 1.

All minimum streamflows required by the License were implemented in October 2014; therefore Year 1 as it pertains to the Monitoring Program was 2015. As such, only a few Plans required under the Conditions were approved and implemented in 2015. Of those, several were assigned specific reporting requirements and deadlines in lieu of this Report in the Commission's Order approving the Plan. These are noted in the summary presented in Section 2.0. For background, the 2015 water year type was classified as Critically Dry.

2.0 Monitoring Program Conditions

The following is a summary of the status of SMUD's resource Monitoring Program as described in the USFS 4(e) Condition 31 which also encompasses all those measures listed in SWRCB's 401 Condition 8.

2.1 Fish Populations

This Plan is still in development and is required to be filed with the Commission by November 23, 2016. However, the hardhead monitoring component is required to be implemented prior to this date (August – September 2016); as such a separate Plan has been developed for this resource and will be filed with the Commission following final agency approval . The first monitoring effort for the trout component of the Plan is not required until 2019.

2.2 Aquatic Macroinvertebrates

This Plan is still in development and is required to be filed with the Commission by November 23, 2016. The first monitoring effort is not required until 2019.

2.3 Amphibian and Aquatic Reptile Monitoring Plan

This Plan was approved by the Commission on May 19, 2016. Monitoring activities initiated in 2016. Results will be included in the 2016 Annual Report due to the Commission by June 30, 2017.



2.4 Mountain Yellow-legged Frog

This Plan is still in development and is required to be filed with the Commission by November 23, 2016. The first monitoring effort is not required until 2019.

2.5 Amphibians (Foothill Yellow-Legged Frog Flow Fluctuations)

This plan is incorporated in the Amphibian and Aquatic Reptile Monitoring Plan mentioned in Section 2.3.

2.6 Riparian Vegetation Monitoring

2.7 This Plan is still in development and is required to be filed with the Commission by November 23, 2016. The first monitoring effort is not required until 2019.

2.8 Algae Species Identification and Monitoring

Plan was approved by the Commission on December 18, 2015 and is scheduled for implementation in 2016. Results will be included in the 2016 Annual Report due to the Commission by June 30, 2017.

2.9 Geomorphology (Sensitive Site Investigation and Mitigation Plan Development)

This Plan was approved by the Commission on June 18, 2015 and implementation is ongoing. The Final Report is due to the Commission by October 1, 2016. Activities implemented in 2015 under the approved Plan included:

- Collected water-surface elevation hydrographs during snowmelt runoff.
- Conducted pre-test pulse flow release geomorphic and riparian vegetation monitoring at the sensitive sites, and erosion monitoring at the infrastructure evaluation sites with the objective of establishing baseline conditions.
- The development of a numerical hydraulic model to inform the maximum test pulse release volumes not expected to cause unintended impacts downstream.

2.10 Geomorphology (Continuing Evaluation of Representative Channel Areas)

This Plan is still in development and is required to be filed with the Commission by November 23, 2016. The first monitoring effort is not required until 2019.

2.11 Water Temperature



Plan was approved by the Commission on September 30, 2015 and monitoring was initiated in 2016. Results will be included in the 2016 Annual Report due to the Commission by June 30, 2017.

2.12 Water Quality

Plan was approved by the Commission on July 9, 2015. Monitoring for in-situ and bacterial elements was conducted in 2015 using the methods and protocols described in the approved Plan. A Report containing the data and analysis of that monitoring effort is attached in Appendix A.

2.13 Recreation Survey

Monitoring associated with the recreation survey is described in USFS 4(e) Condition No. 42. Survey planning and preparation is scheduled for 2019, monitoring in 2020. Results will be included in the 2020 Annual Report due to the Commission by June 30, 2021.

2.14 Robbs Peak Powerhouse Entrainment

This plan was approved on July 30, 2015 and monitoring is ongoing. The Final Report is due to the Commission by May 15, 2017. Activities implemented in 2015 under the approved Plan included:

- Fish capture and marking of trout (PIT tags) in the South Fork Rubicon River upstream of Robbs Peak Forebay.
- Installation of PIT tag antennas arrays for entrainment monitoring.
- Development of estimate of abundance from initial fish capture effort described above.

2.15 Bear Management

This Plan was filed with the Commission on May 21, 2015 and monitoring was initiated in 2016. Results will be included in the 2016 Annual Report due to the Commission by June 30, 2017.

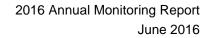
2.16 Bald Eagle Monitoring

This Plan was approved by the Commission on July 2, 2015 and monitoring is ongoing for the 2016 breeding season. Results will be included in the 2016 Annual Report due to the Commission by June 30, 2017.

2.17 Heritage Resource Monitoring

Monitoring and reporting associated with heritage resources is described in the Historic Properties Management Plan (HPMP). Monitoring associated with the HPMP was conducted in 2015 and will be included in a report(s) to be filed with the Commission upon completion and review by appropriate Parties. Activities implemented in 2015 under the approved Plan included:

- SMUD worked with an archeological contractor to develop a workplan to implement the HPMP.
- In consultation with the ENF and tribes, the workplan was approved.





- SMUD decided to evaluate as many sites as possible to reduce future monitoring obligations.
- 81 sites were monitored or evaluated in 2015.
- 5 separate reports are being prepared to document the results based on where the sites are located and whether they were monitored or evaluated.
- Draft reports will be circulated to appropriate Parties.

2.18 Reservoir Levels Evaluation

Monitoring associated with lake levels is described in USFS 4(e) Condition No. 49, and SWRCB 401 Condition 5. Five year results will be included in the 2018 Annual Report due to the Commission by June 30, 2019.

2.19 Review of Recreation Developments

Monitoring associated with the review of recreation developments is described in USFS Condition No. 44. Survey planning and preparation is scheduled for 2019, monitoring in 2020. Results will be included in the 2020 Annual Report due to the Commission by June 30, 2021.

2.20 Large Woody Debris

No large woody debris meeting the specifications described in SWRCB Condition 10 were observed in 2015. However, in anticipation of a spill event in February 2015, the log booms were removed at Slab Creek Reservoir, allowing for the passage of any woody debris accumulated on the reservoir. The log booms were restored shortly thereafter.

3.0 Frequency

The Monitoring Program covers monitoring to be conducted during all years until a new license is issued. Table 1 describes the monitoring frequencies for the first five years of the License. As noted, some monitoring activities have specific reporting requirements and deadlines in lieu of this Report.

	2015	2016	2017	2018	2019
License Monitoring Year	1	2	3	4	5
Trout Population Monitoring					Х
Hardhead Population Monitoring		Х	Х		Х

Table 1. Monitoring Program Frequency First Five Years.



Benthic Macroinvertebrate					х
Amphibian and Aquatic Reptile Monitoring		х	х	х	х
Mountain Yellow-legged Frog Monitoring					Х
Riparian Vegetation Monitoring					Х
Algae Species Identification and Monitoring		х			
Geomorphology (Sensitive Site Investigation and Mitigation Plan Development)	х	х			
Geomorphology (Continuing Evaluation of Representative Channel Areas)					х
Water Temperature		Х	Х	Х	Х
In Situ Water Quality	Х	х	Х	х	х
Bacteria Monitoring	Х	Х	Х	Х	Х
Metals bioaccumulation		х			
Water General Chemistry		х	Х		
Recreation Survey					х
Robbs Peak Powerhouse Entrainment	Х	х	Х		
Bear Management Monitoring		Х	Х	Х	Х
Bald Eagle Monitoring		х	х	х	х
Heritage Resource Monitoring	Х	х			Х
Reservoir Levels Evaluation					Х
Review of Recreation Developments					х
Bear Management Monitoring Bald Eagle Monitoring Heritage Resource Monitoring Reservoir Levels Evaluation		X X X	X		X X X

APPENDIX 1

2015 Water Quality Monitoring Report

Water Quality Monitoring Report

Sacramento Municipal Utility District

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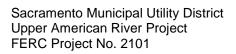
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Acronyms and Abbreviations

Acronym	Definition
CDFW	California Department of Fish and Wildlife
cm	centimeter
°C	degrees Celsius
FERC	Federal Energy Regulatory Commission
m	meter
MDL	Method Detection Limit
mg/L	milligram per liter
MPN	Most Probable Number
MRL	Method Reporting Limit
NTU	Nephelometric Turbidity Unit
SFAR	South Fork American River
SMUD	Sacramento Municipal Utility District
s.u.	standard unit of pH
SWRCB	State Water Resources Control Board
UARP	Upper American River Project
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 addresses monitoring set forth in Condition 8.J of Appendix A of the Order Issuing New License issued by the Federal Energy Regulatory Commission (FERC) on July 23, 2014 (FERC 2014) for the Upper American River Project (UARP; FERC Project 2101), owned and operated by the Sacramento Municipal Utility District (SMUD). Appendix A of the License contains the State Water Resources Control Board (SWRCB) Water Quality Certification, which was informed by the Relicensing Settlement Agreement article 1-5.10.

The UARP 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 has an authorized installed capacity of 637.3 megawatts (MW). The UARP also includes recreation facilities containing over 700 campsites, five boat ramps, hiking paths, and bicycle trails at the reservoirs.

Condition 8.J of Appendix A of the FERC license requires monitoring throughout the duration of the license term, with sampling frequency varying by water quality constituent. However, as described in Condition 8.J, the water quality monitoring plan may be modified pursuant to adaptive management program needs following review of results. Nevertheless, the sampling frequency over the first five years of the monitoring program is dictated by Condition 8.J and will, at a minimum, include annual sampling for *in situ* parameters and bacteria, and sampling for metals bioaccumulation and general chemistry in Years 2 and 3, respectively.

This report describes the results of the first year (2015) of water quality monitoring of basic *in situ* parameters and bacteria for the UARP. Results for the one-time sampling of general chemistry and metals bioaccumulation will be reported separately.

At the completion of the first five years of monitoring, SMUD will consult with the State Water Resources Control Board (SWRCB), Regional Water Quality Control Board (RWQCB), California Department of Fish and Wildlife (CDFW), U.S. Forest Service (USFS), and U.S. Bureau of Land Management (BLM) to determine if the results warrant modifying the water quality monitoring plan.

2.0 MONITORING OBJECTIVE

The objective of the 2015 monitoring program was to perform *in situ* water quality and bacteria monitoring in various reservoirs and stream reaches of the UARP, in order to



meet the objectives and rationale of the SWRCB Water Quality Certification Condition 8.J.

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.

3.0 STUDY AREA

The study area included project 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 Reservoir (30 acre-feet). [Note: Rockbound Lake, although associated with the UARP, is not included as a Project feature or within the FERC-defined UARP boundary.] The diverted stream reaches included in the monitoring program represented all streams and rivers downstream of project reservoirs (Figure 3-1).



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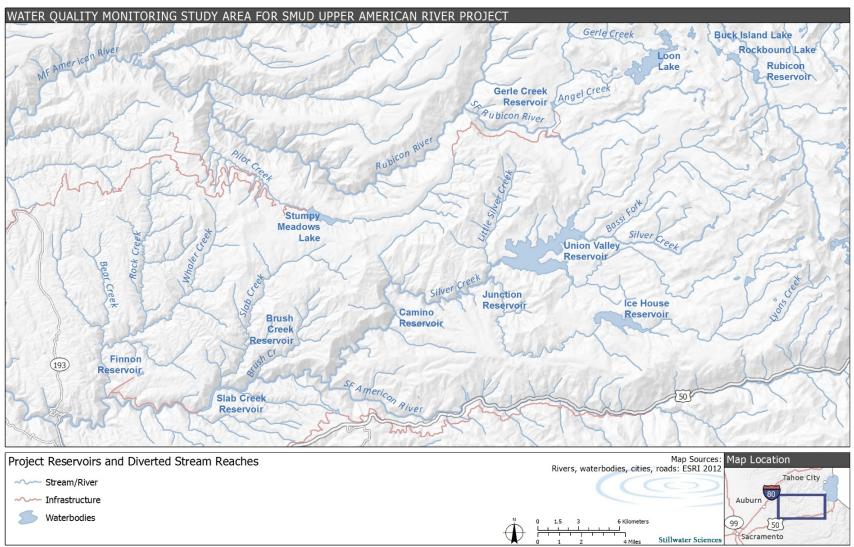


Figure 3-1. Study area for SMUD Upper American River Project in situ and bacteria monitoring.

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4.0 SAMPLING FREQUENCY AND LOCATIONS

Year 1 (2015) sampling frequency for *in situ* water quality was consistent with summer and fall monitoring periods designated in the Water Quality Monitoring Plan (SMUD 2015) (Table 4-1). Since the Water Quality Monitoring Plan was not approved until mid-2015, *in situ* winter and spring monitoring at all sites and Independence Day bacteria monitoring at UARP middle elevation sites were not conducted in 2015. Consistent with the SWRCB letter of July 15, 2015 (Appendix F), the full annual complement of required bacteria monitoring was conducted by sampling all UARP bacteria sites during the 30-day period surrounding Labor Day.

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Table 4-1. Sampling	g Frequency ic	or <i>in situ</i> water	Quality and Bacteria.	

Туре	2015 (Year 1) Frequency
In situ reservoir	Once in fall – October or November
<i>In situ</i> riverine	Once in summer – August Once in fall – November
Bacteria	5 samples within 30 days – around Labor Day

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 (SMUD 2015), *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 4-3).



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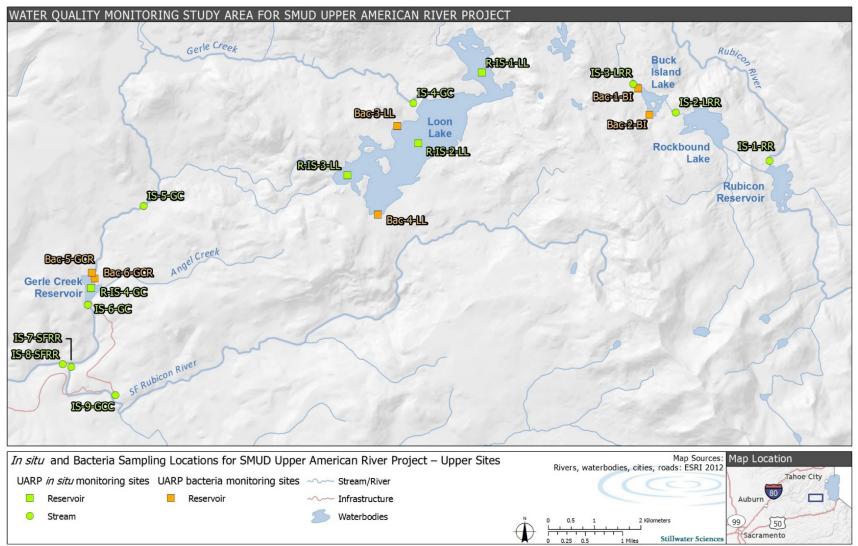


Figure 4-1. In situ and bacteria sampling locations for SMUD Upper American River Project – upper sites.

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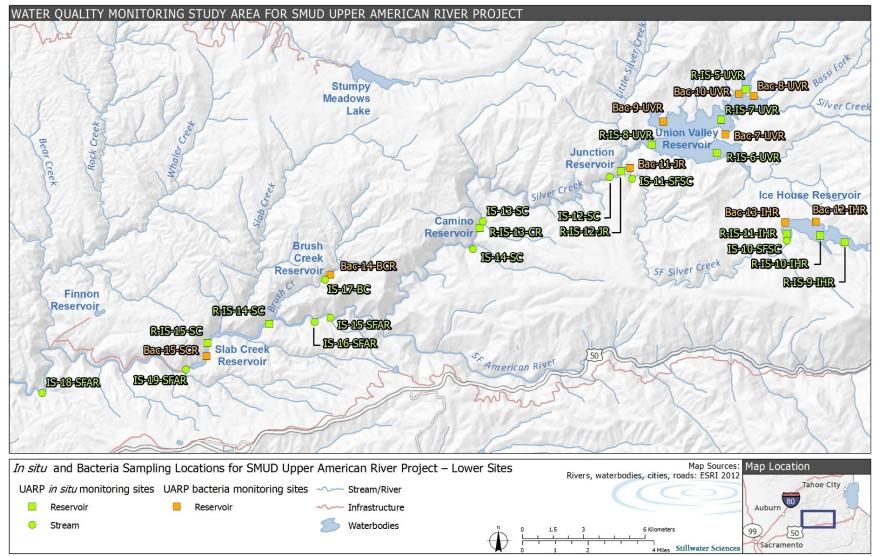


Figure 4-2. In situ and bacteria sampling locations for SMUD Upper American River Project - lower sites.



Reservoir Si	les.		
SMUD			2015
Site Name	Site ID	Location	Sample Date
R-4C	R-IS-1-LL	Loon Lake, upper reservoir (northeast body)	10/22
R-4B	R-IS-2-LL	Loon Lake, mid-reservoir (west body) ¹	10/22
R-4A	R-IS-3-LL	Loon Lake, near dam	10/19
R-5	R-IS-4-GC	Gerle Creek Reservoir, mid-lake	10/20
R-6C	R-IS-5-UVR	Union Valley Reservoir, Robbs PH tailrace zone	10/23
R-6D	R-IS-6-UVR	Union Valley Reservoir, Jones Fork Silver Creek arm	10/23
R-6B	R-IS-7-UVR	Union Valley Reservoir, mid-reservoir	10/23
R-6A	R-IS-8-UVR	Union Valley Reservoir, near dam	10/23
R-7C	R-IS-9-IHR	Ice House Reservoir, upper lake body	10/20
R-7B	R-IS-10-IHR	Ice House Reservoir, mid-reservoir	10/20
R-7A	R-IS-11-IHR	Ice House Reservoir, near dam	10/22
R-8	R-IS-12-JR	Junction Reservoir, mid-reservoir between arms	10/22
R-9	R-IS-13-CR	Camino Reservoir, mid-reservoir	11/9
R-11B	R-IS-14-SC	Slab Creek Reservoir, upper-reservoir	11/9
R-11A	R-IS-15-SC	Slab Creek Reservoir, mid-reservoir	11/9

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

¹ 2015 sample location was closer to shore than originally specified due to weather conditions (e.g., wind, waves).

SMUD Site			2015
Name	Site ID	Location	Sample Dates
2	IS-1-RR	Rubicon River outflow from Rubicon Reservoir	8/24, 11/5
5	IS-2-LRR	Little Rubicon River outflow from Rockbound Lake	8/24, 11/5
6	IS-3-LRR	Little Rubicon outflow from Buck Island Lake	8/24, 11/5
7	IS-4-GC	Gerle Creek outflow from Loon Lake	8/25, 11/4
14	IS-5-GC	Gerle Creek inflow to Gerle Creek Reservoir	8/25, 11/4
15	IS-6-GC	Gerle Creek outflow from Gerle Creek Reservoir	8/25, 11/4
18	IS-7-SFRR	S.F. Rubicon upstream of Gerle Creek confluence ¹	8/25, 11/4
19	IS-8-SFRR	S.F. Rubicon downstream of Gerle Creek confluence	8/25,11/4
16	IS-9-GCC	Gerle Creek Canal inflow to Robbs Forebay	8/25, 11/4
25	IS-10-SFSC	S.F. Silver Creek outflow from Ice House	8/25, 11/2
27	IS-11-SFSC	S.F. Silver Creek inflow to Junction Reservoir	8/26, 11/2
29	IS-12-SC	Silver Creek outflow from Junction Reservoir	8/26, 11/2
32	IS-13-SC	Silver Creek inflow to Camino Reservoir	8/26, 11/2
34	IS-14-SC	Silver Creek outflow from Camino Reservoir	8/26, 11/2
38	IS-15-SFAR	SFAR upstream of Camino Powerhouse	8/26, 11/2
41	IS-16-SFAR	SFAR downstream of Camino Powerhouse	8/27, 11/3
40	IS-17-BC	Brush Creek outflow from Brush Creek Reservoir	8/27, 11/3
60	IS-18-SFAR	SFAR upstream of White Rock Powerhouse	8/27, 11/3
43	IS-19-SFAR	SFAR downstream of Slab Creek Reservoir	8/27, 11/3

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

¹ This site was missed during the August and November 2015 sampling events.



SMUD Site Reservoir Name		Site ID	Location	2015 Sample Dates		
Buck Island	R-3B	Bac-1-Bl	On Northshore, near dam and OHV camping	9/2, 9/10, 9/17, 9/22, 9/30		
Reservoir (beach locations)	77	Bac-2-Bl	On south shore, near Rubicon Hiking Trail	9/2, 9/10, 9/17, 9/22, 9/30		
Loon Lake Reservoir	64	Bac-3-LL	West of main dam, near Red Fir Campground	9/2, 9/8, 9/14, 9/21, 9/29		
(beach locations)	65	Bac-4-LL	West of Loon Lake Campground, near boat launch	9/2, 9/8, 9/14, 9/21, 9/29		
Gerle Creek Reservoir	66	Bac-5-GCR	Near Gerle Creek Campground	9/2, 9/8, 9/14, 9/21, 9/29		
(beach locations)	67	Bac-6-GCR	Near Angel Creek picnic area	9/2, 9/8, 9/14, 9/21, 9/29		
	R-6H	Bac-7-UVR	At Fashoda Beach	9/2, 9/8, 9/14, 9/21, 9/29		
Union Valley	R-6E	Bac-8-UVR	Near Wench Creek Campground	9/2, 9/8, 9/14, 9/21, 9/30		
Reservoir (swim areas)	FC-2	Bac-9-UVR	Near Camino Cove Campground	9/2, 9/8, 9/16, 9/22, 9/30		
	R-6F	Bac-10-UVR	Near Yellowjacket Campground	9/2, 9/8, 9/14, 9/21, 9/29		
Other UARP Locations	R-8B	Bac-11-JR	Junction Reservoir, near boat launch	9/2, 9/8, 9/16, 9/22, 9/30		
lce House Reservoir	68	Bac-12-IHR	Northshore near private campground access	9/2, 9/10, 9/16, 9/22, 9/30		
(beach locations)	69	Bac-13-IHR	East of boat launch and picnic area	9/2, 9/10, 9/16, 9/22, 9/30		
Other UARP	R-10B	Bac-14-BCR	Brush Creek Reservoir, near boat launch	9/3, 9/10, 9/16, 9/23, 9/29		
locations	R-11C	Bac-15-SCR	Slab Creek Reservoir, near boat launch	9/2, 9/10, 9/16, 9/23, 10/1		

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

5.0 METHODS

5.1 IN SITU PARAMETERS

Reservoir *in situ* monitoring was conducted by watercraft to access mid-reservoir areas (Figure 5-1). A multi-probe Sonde (Yellow Stone 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).



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Figure 5-1. *In situ* sampling site at Camino Reservoir, mid-reservoir (R-IS-13-CR).

At each reservoir site, a vertical water column profile was collected for all *in situ* 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.

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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 no variability in parameter readings at each location.



Figure 5-2. In situ sampling site at Silver Creek outflow from Junction Reservoir (IS-12-SC).

For both reservoir and riverine *in situ* monitoring, Sonde calibration was conducted onsite 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 sampling was conducted in compliance with the final, approved Water Quality Monitoring Plan (SMUD 2015).



Table 5-1. In situ Water Quality Methods.

Parameter	Method	Units	MDL
Water temperature (YSI 6560 Sensor)	EPA 170.1	degrees Celsius (°C)	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

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 as designated in Table 4-4. 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. Bacteria Sampling Site at Camino Cove Campground (Bac-9-UVR).

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

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.



6.0 RESULTS

6.1 IN SITU PARAMETERS

6.1.1. <u>Riverine Sites</u>

In situ water quality data for UARP riverine sites are summarized in Table 6-1. Water temperatures ranged from 7.3 to 22.2 degrees Celsius (°C) during the August 2015 sampling event and were variable by site. Water temperatures were generally lower during the November 2015 event, ranging from 3.5 to 12.4°C and were also variable by site. pH at riverine sites ranged from 6.2 to 7.8 standard unit of pH (s.u.) during the August 2015 sampling event, with three exceedances of the Basin Plan instantaneous minimum water quality 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-1-RR (6.2 s.u.), IS-3-LRR (6.3 s.u.), and IS-10-SFSC (6.4 s.u.) (Table 6-1), which may be due to low buffering capacity characteristic of headwater reaches in granitic watersheds. Riverine pH ranged from 6.6 to 7.8 during the November 2015 event with no exceedances of the Basin Plan water quality objectives for pH.

During the August sampling event, riverine dissolved oxygen ranged from 7.0 to 10.3 milligram per liter (mg/L) (74 to 106% saturation), with no measurements falling below Basin Plan instantaneous minimum concentrations of 7.0 mg/L for cold freshwater habitat (COLD) and spawning (SPAWN) designated beneficial uses. Dissolved oxygen was similar during the November event, ranging from 7.4 to 10.4 mg/L (66 to 93% saturation) across all riverine sites, which is well above the minimum Basin Plan objectives.

Typical of granitic watersheds, conductivity at the riverine sites was low, ranging from 0 to 61 microsiemens per centimeter (uS/cm) during the August sampling event and from 5 to 57 uS/cm during the November event. August turbidity measurements were also low, ranging from 0.4 to 6.0 Nephelometric Turbidity Unit (NTU) with no particular spatial pattern. Background turbidity typically increases with increasing runoff, and this parameter was generally higher during the November sampling (1.2 to 295 NTU), which occurred 1-2 days following a storm event. November turbidity also tended to increase with distance downstream, with relatively higher turbidity occurring at the lower elevation sites (IS-13-SC, IS-15-SFAR, IS-16-SFAR) and the highest turbidity occurring at Brush Creek outflow from Brush Creek Reservoir (IS-17-BC). Overall, measured November riverine turbidity levels would not be expected to cause nuisance or adversely affect beneficial uses.



6.1.1. Reservoir Sites

In situ water quality data for UARP reservoir sites are presented in Figures 6-1 through 6-8 and Appendix A.

Loon Lake and Gerle Creek Reservoir water columns were well-mixed, exhibiting little variation with depth for water temperature (13 to 14°C), dissolved oxygen (7.5 to 8.5 mg/L), pH (6.3 to 7.8 s.u.), and turbidity (< 1 NTU). With the exception of pH values between 6.3 and 6.5 s.u. in the bottom waters of Loon Lake (Figure 6-1), there were no exceedances of Basin Plan water quality objectives. Shallow sites in the relatively larger and deeper Union Valley and Ice House reservoirs (R-IS-5-UVR, R-IS-10-IHR) were also well-mixed, exhibiting similar water temperature (15 to17°C), dissolved oxygen (7.5 to 8.5 mg/L), pH (5.6 to 7.8 s.u.), and turbidity (< 1 NTU) as those of Loon Lake and Gerle^oreek reservoirs, with the exception of slightly higher turbidity (2.2 NTU) near the bottom of Site R-IS-10-IHR. Deeper sites in Union Valley and Ice House reservoirs were stratified, with the thermocline between 13 and 20 m depth and dissolved oxygen decreasing into the hypolimnion. Dissolved oxygen in Union Valley Reservoir remained above 4 mg/L, while in Ice House Reservoir dissolved oxygen dropped to near zero near the bottom of Site R-IS-9-IHR (Figure 6-5). pH generally decreased slightly with depth in both reservoirs, with no exceedances of the Basin Plan instantaneous maximum pH objective (8.5 s.u.) and only occasional values below the instantaneous minimum (6.5 s.u.) in reservoir bottom waters.

Junction Reservoir appeared to be weakly stratified with surface water temperatures at 9 to 10°C and bottom water temperatures at approximately 8°C. Dissolved oxygen and pH decreased with depth in Junction Reservoir from 8.9 mg/L at the surface to 6.4 mg/L in bottom waters, and 7.1 s.u. at the surface to 5.9 s.u. in bottom waters. Turbidity remained low and relatively consistent (\leq 1.0 NTU) throughout the water column in Junction Reservoir (Figure 6-7).

Slab Creek Reservoir and Camino Reservoir water columns were well-mixed, exhibiting little variation with depth for water temperature (7.1 to 11.4°C), dissolved oxygen (8.2 to 11.5 mg/L), and pH (6.0 to 7.6 s.u.) (Figures 6-7 and 6-8). With the exception of pH values between 6.0 and 6.5 in the bottom waters of Camino Reservoir, there were no exceedances of Basin Plan water quality objectives. Turbidity in Camino and Slab Creek reservoirs was slightly higher than that of other study reservoirs and variable with depth. In Camino Reservoir, turbidity ranged 3.0 to 6.0 NTU, with decreasing levels from 0 to 4 m depth and increasing levels below 4 m (Figure 6-7). The relatively higher turbidity at the surface of Camino Reservoir corresponded to higher riverine turbidity at Site IS-13-SC (71.5 NTU), just upstream of the reservoir. In Slab Creek Reservoir, turbidity increased with depth from 2.5 NTU at the surface to 6.9 NTU at 10 m, then decreased slightly to 5-6 NTU in deeper waters (Figure 6-8). The relatively higher turbidity in Slab Creek Reservoir corresponded to higher riverine turbidity at Site IS-17-BC (295.4 NTU) and Site IS-16-SFAR (35.3 NTU), located upstream of the reservoir. Both Camino and



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Slab Creek reservoirs and the aforementioned riverine sites are 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.



Table 6-1	. In situ water	quality	y for UARP	Riverine Sites.
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	2015 Sample	Water	рН	Dissolved	Dissolved	Conductivity				
Site ID	Date	Temperature (°C)	рп (s.u.)	Oxygen (mg/L)	Oxygen (% sat)	(uS/cm)	Turbidity (NTU)			
August 2015										
IS-1-RR	8/24	19.6	6.2	7.5	82	0	1.1			
IS-2-LRR	8/24	22.0	6.5	7.0	80	15	0.5			
IS-3-LRR	8/24	21.3	6.3	7.3	83	11	0.4			
IS-4-GC	8/25	12.8	7.1	8.6	82	10	0.9			
IS-5-GC	8/25	15.2	6.8	8.9	89	13	0.7			
IS-6-GC	8/25	17.6	7.0	7.8	82	15	0.7			
IS-9-GCC	8/25	21.0	7.3	8.2	92	17	0.5			
IS-8-SFRR	8/25	17.7	6.9	8.5	89	16	0.4			
IS-10-SFSC	8/25	7.3	6.4	8.9	74	8	6.0			
IS-11-SFSC	8/26	14.9	7.7	9.1	90	13	1.0			
IS-12-SC	8/26	9.5	6.8	10.0	88	10	0.6			
IS-13-SC	8/26	17.5	7.0	9.1	95	16	1.9			
IS-14-SC	8/26	12.3	6.7	10.3	96	11	0.8			
IS-15-SFAR	8/26	22.2	7.8	9.2	106	61	1.3			
IS-16-SFAR	8/27	21.6	7.6	8.9	101	29	1.1			
IS-17-BC	8/27	11.4	6.7	10.3	94	24	3.0			
IS-18-SFAR	8/27	19.0	7.1	9.8	106	22	1.2			
IS-19-SFAR	8/27	13.7	7.4	10.3	99	17	2.1			
			Nov	ember 2015						
IS-1-RR	11/5	3.5	7.8	10.1	76	5	2.3			
IS-2-LRR	11/5	6.1	7.8	10.0	81	5	1.2			
IS-3-LRR	11/5	8.9	7.4	9.6	83	6	1.4			
IS-4-GC	11/4	10.5	7.4	8.9	80	6	1.5			
IS-5-GC	11/4	3.8	7.2	9.7	74	10	1.6			
IS-6-GC	11/4	7.8	7.3	9.3	78	12	1.9			
IS-9-GCC	11/4	10.1	7.8	7.4	66	30	1.5			
IS-8-SFRR	11/4	5.8	7.0	10.2	81	12	1.7			
IS-10-SFSC	11/4	7.4	6.6	8.9	74	10	3.4			
IS-11-SFSC	11/2	7.8	7.1	9.7	82	12	2.5			
IS-12-SC	11/2	7.3	7.0	9.5	79	12	1.7			
IS-13-SC	11/2	9.3	6.9	10.0	87	18	71.5			

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Site ID	2015 Sample Date	Water Temperature (°C)	рН (s.u.)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	Turbidity (NTU)
IS-14-SC	11/2	8.7	6.9	10.0	86	10	3.3
IS-15-SFAR	11/2	11.1	7.0	9.9	90	57	12.6
IS-16-SFAR	11/3	9.1	7.3	10.4	90	55	35.3
IS-17-BC	11/3	12.4	7.7	9.5	89	38	295.4
IS-18-SFAR	11/3	11.9	7.3	10.0	93	35	9.5
IS-19-SFAR	11/3	11.4	7.6	9.8	90	21	10.0

= degrees Celsius °C

s.u = standard unit of pH mg/L = milligrams per liter

uS/cm = microsiemens per centimeter

NTU = Nephelometric Turbidity Unit



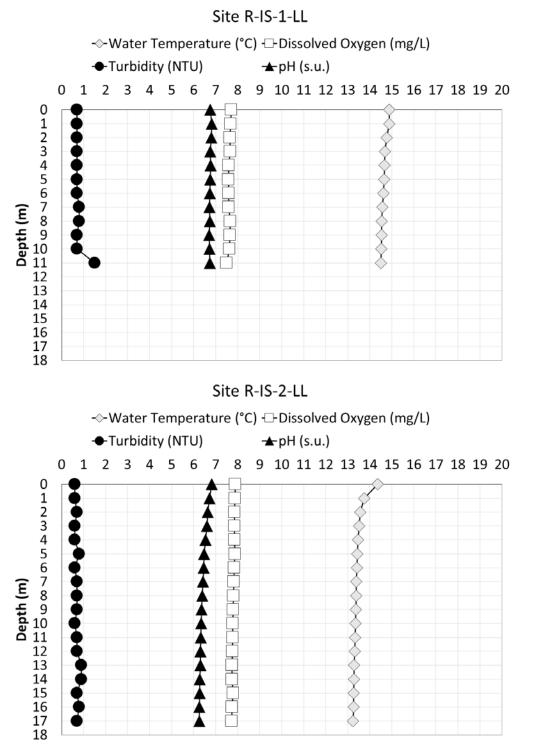


Figure 6-1. *In situ* water temperature, dissolved oxygen, turbidity, and pH at Loon Lake sites R-IS-1-LL (top) and R-IS-2-LL (bottom) during October/November 2015.



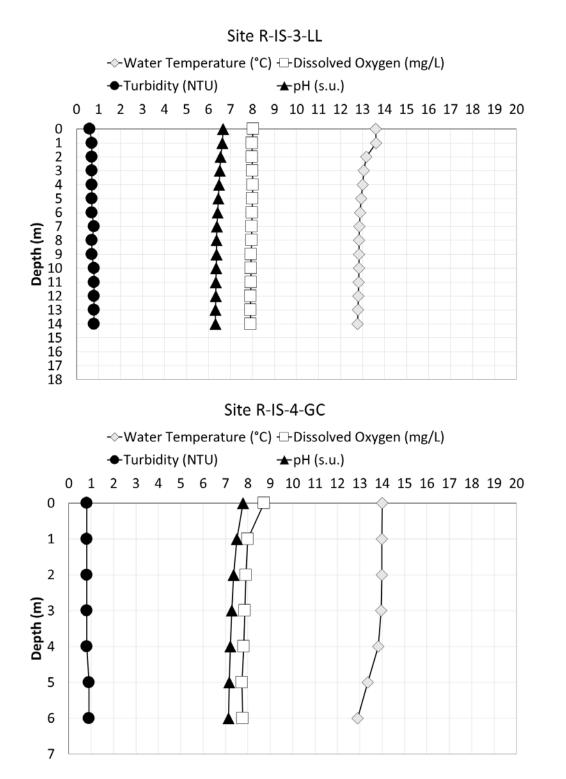


Figure 6-2. *In situ* water temperature, dissolved oxygen, turbidity, and pH at Loon Lake and Gerle Creek Reservoir sites R-IS-3-LL (top) and R-IS-4-GC (bottom) during October/November 2015.

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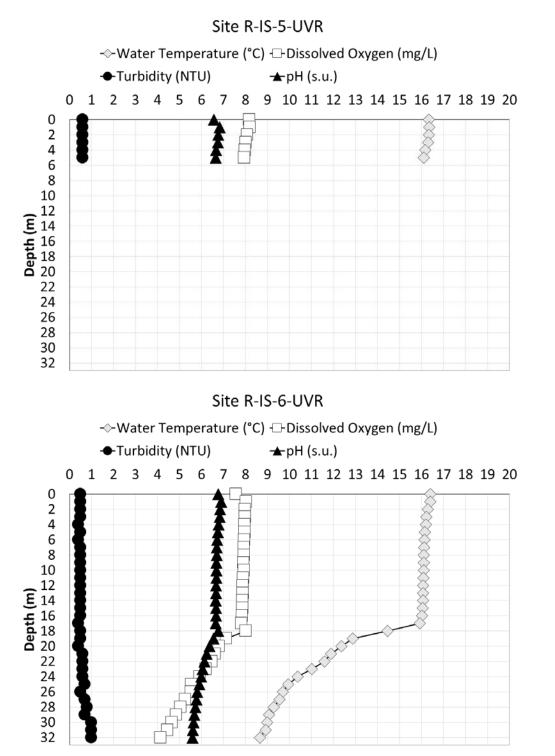


Figure 6-3. *In situ* water temperature, dissolved oxygen, turbidity, and pH at Union Valley Reservoir sites R-IS-5-UVR (top) and R-IS-6-UVR (bottom) during October/November 2015.



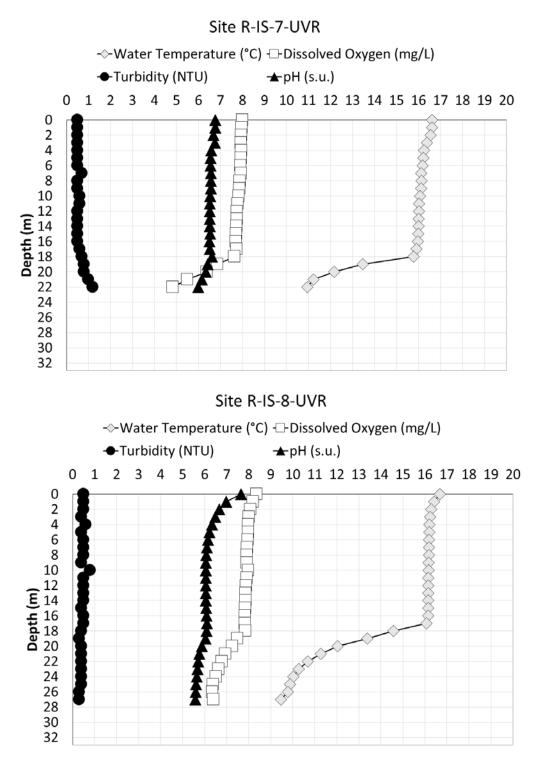


Figure 6-4. *In situ* water temperature, dissolved oxygen, turbidity, and pH at Union Valley Reservoir sites R-IS-7-UVR (top) and R-IS-8-UVR (bottom) during October/November 2015.

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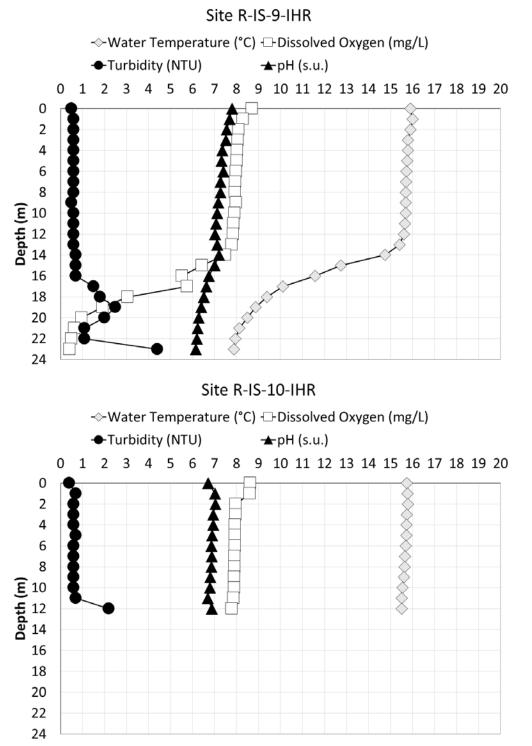


Figure 6-5. *In situ* water temperature, dissolved oxygen, turbidity, and pH at Ice House Reservoir sites R-IS-9-IHR (top) and R-IS-10-IHR (bottom) during October/November 2015.



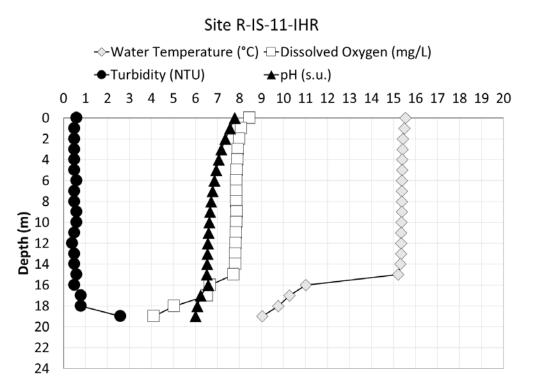


Figure 6-6. *In situ* water temperature, dissolved oxygen, turbidity, and pH at Ice House Reservoir Site R-IS-11-IHR during October/November 2015.



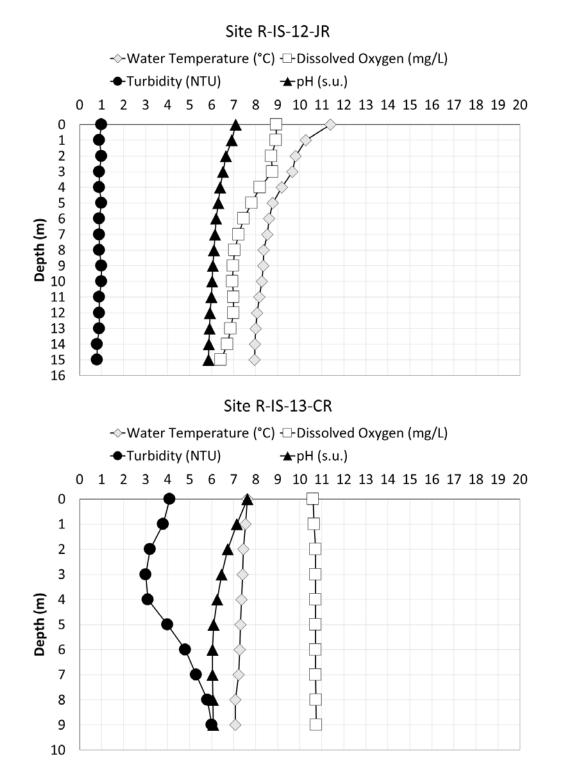


Figure 6-7. *In situ* water temperature, dissolved oxygen, turbidity, and pH at Junction and Camino reservoir sites R-IS-12-JR (top) and R-IS-13-CR (bottom) during October/November 2015.



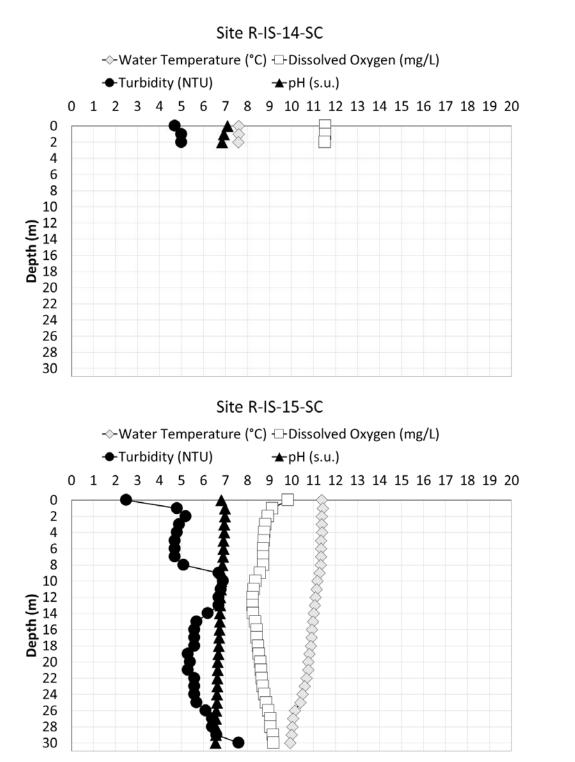


Figure 6-8. *In situ* water temperature, dissolved oxygen, turbidity, and pH at Slab Creek Reservoir sites R-IS-14-SC (top) and R-IS-15-SC (bottom) during October/November 2015.

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6.2 BACTERIA

Instantaneous fecal coliform counts ranged from less than the method detection limit (MDL) at 1.8 most probable number per 100 milliliters (MPN/100 mL) to 350 MPN/100 mL during the 2015 Labor Day sampling event (Appendix B, Table B-1). Overall, the geometric mean fecal coliform counts for the 2015 event ranged from 0.9 to 6.3 MPN/100 mL (Table 6-2), where results <MDL were treated as 0.5 x MDL for the calculation. The two lowest geometric mean fecal coliform counts (0.9 MPN/100 mL) occurred in Union Valley Reservoir (Bac-9-UVR) and Ice House Reservoir (Bac-12-IHR), while the highest geometric mean fecal coliform count (6.3 MPN/100 mL) occurred in Gerle Creek Reservoir (Bac-6-GCR). The highest count was well below the Basin Plan objective of 200 MPN/100 mL, as a geometric mean of 5 samples collected over 30 days, for the recreational water contact (REC-1) designated beneficial use. Further, none of the 2015 samples exceeded the instantaneous maximum Basin Plan objective of 400/100 mL.

Instantaneous *E. coli* counts ranged from less than the method detection limit (MDL) at 1 MPN/100 mL to 236 MPN/100 mL during the 2015 Labor Day sampling event (Appendix B, Table B-1). Overall, the geometric mean *E. coli* counts for the 2015 event ranged from 0.5 to 4.8 MPN/100 mL (Table 6-2), where results <MDL were treated as 0.5 x MDL for the calculation. The two lowest geometric mean *E. coli* counts (0.5 MPN/100 mL) occurred in Loon Lake (Bac-3-LL) and Ice House Reservoir (Bac-12-IHR), while the highest geometric mean *E. coli* count (4.8 MPN/100 mL) occurred in Slab Creek Reservoir (Bac-15-GCR). There is no Basin Plan numeric objective for *E. coli*.

Site ID	Fecal coliform geometric mean (MPN/100 mL)	<i>E. coli</i> geometric mean (MPN/100 mL)
Bac-1-BI	2.2	0.9 ¹
Bac-2-Bl	2.5	1.9
Bac-3-LL	1.5 ¹	0.5 ¹
Bac-4-LL	1.7 ¹	0.6 ¹
Bac-5-GCR	1.7 ¹	1.0
Bac-6-GCR	6.3	2.7
Bac-7-UVR	1.5 ¹	0.9 ¹
Bac-8-UVR	2.0	0.8 ¹
Bac-9-UVR	0.9 ¹	0.8 ¹
Bac-10-UVR	1.9	1.2
Bac-11-JR	2.2	1.1
Bac-12-IHR	0.9 ¹	0.5 ¹
Bac-13-IHR	1.5 ¹	1.0
Bac-14-BCR	2.8	2.3
Bac-15-SCR	2.2	4.8

Table 6-2. Bacteria counts for UARP sites.

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 <MDL were treated as $0.5 \times \text{MDL}$ for the geometric mean calculations.



7.0 CONCLUSIONS

Based on 2015 *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, with a small number of instances of pH measured below the Basin Plan instantaneous minimum objective (6.5 s.u.). Reservoir water quality was also generally good, with only occasional values measured below the Basin Plan instantaneous minimum objectives for dissolved oxygen (5 mg/L) and/or pH (6.5 s.u.) in the bottom waters of stratified reservoirs (i.e., Loon Lake, Union Valley Reservoir, Ice House Reservoir) and in well-mixed reservoirs (i.e., Camino Reservoir). Despite the occasional exceedances in some reservoir bottom waters, surfaces waters of the UARP study area consistently supported designated beneficial uses, including cold freshwater habitat (COLD), spawning (SPAWN), and recreational water contact (REC-1).



8.0 LITERATURE CITED

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APPENDIX A In situ Vertical Profile Data for UARP Reservoir Sites



Table A-1. In situ Vertical Profile Data for UARP Reservoir Sites.

Site ID	2015 Sample Date	Sample Depth (m)Water Temperature (°C)Dissolved Oxygen (mg/L)Dissolved 		Conductivity (uS/cm)	рН (s.u.)	Turbidity (NTU)	Secchi disk (m)		
				Loon	Lake				
		surface	14.9	7.7	76	7	6.8	0.7	
		1.0	14.9	7.7	76	7	6.8	0.7	
		2.0	14.8	7.6	75	7	6.8	0.7	
		3.0	14.7	7.7	75	7	6.8	0.7	
		4.0	14.7	7.6	75	7	6.8	0.7	
R-IS-1-LL	10/19	5.0	14.7	7.6	75	7	6.8	0.7	7.5
R-13-1-LL	10/19	6.0	14.6	7.6	75	7	6.7	0.7	7.5
		7.0	14.6	7.6	75	9	6.7	0.8	
		8.0	14.5	7.7	75	7	6.7	0.8	
		9.0	14.5	7.6	75	7	6.7	0.7	
		10.0	14.5	7.6	75	7	6.7	0.7	
		11.0	14.5	7.5	76	7	6.7	1.5	
		surface	14.4	7.9	77	7	6.8	0.6	
		1.0	13.7	7.9	6	7	6.7	0.6	
		2.0	13.6	7.9	76	7	6.6	0.7	
		3.0	13.5	7.9	75	7	6.6	0.6	
		4.0	13.5	7.9	75	8	6.5	0.6	
		5.0	13.4	7.9	76	7	6.5	0.8	
R-IS-2-LL	10/22	6.0	13.4	7.8	75	7	6.5	0.6	7.5
		7.0	13.4	7.8	75	7	6.4	0.7	
		8.0	13.4	7.8	75	7	6.4	0.7	
		9.0	13.4	7.8	75	7	6.4	0.7	
		10.0	13.4	7.8	74	7	6.3	0.6	
		11.0	13.3	7.8	74	7	6.3	0.7	
		12.0	13.3	7.8	74	7	6.3	0.7	



Site ID	2015 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	n Conductivity pH Tur) (uS/cm) (s.u.) (N		Turbidity (NTU)	Secchi disk (m)
		13.0	13.3	7.8	74	8	6.3	0.9	
		14.0	13.3	7.8	74	8	6.3	0.9	
R-IS-2-LL	10/22	15.0	13.3	7.8	74	7	6.3	0.7	7.5
		16.0	13.3	7.8	74	7	6.3	0.8	
		17.0	13.2	7.7	74	7	6.3	0.7	
		surface	13.6	8.0	77	7	6.7	0.6	
		1.0	13.6	8.0	77	7	6.6	0.7	
		2.0	13.2	8.0	76	7	6.6	0.7	
		3.0	13.1	8.0	76	7	6.5	0.7	
		4.0	13.0	8.0	76	8	6.5	0.7	
		5.0	12.9	8.0	76	7	6.5	0.7	
		6.0	12.9	8.0	76	7	6.4	0.7	
R-IS-3-LL	10/22	7.0	12.9	8.0	75	7	6.4	0.8	7.0
		8.0	12.9	8.0	75	7	6.4	0.7	
		9.0	12.9	7.9	75	7	6.4	0.7	
		10.0	12.9	7.9	75	7	6.4	0.8	
		11.0	12.8	7.9	75	7	6.3	0.8	
		12.0	12.8	7.9	75	7	6.3	0.8	
		13.0	12.8	7.9	75	8	6.3	0.8	
		14.0	12.8	7.9	75	7	6.3	0.8	
				Gerle Creel	< Reservoir				
		surface	14.0	8.7	80	16	7.8	0.8	
		1.0	14.0	8.0	78	16	7.5	0.8	
		2.0	14.0	7.9	77	16	7.4	0.8	
R-IS-4- GC	10/20	3.0	14.0	7.9	76	16	7.3	0.8	6.0
00		4.0	13.8	7.8	75	16	7.2	0.8	
		5.0	13.4	7.7	74	15	7.2	0.9]
		6.0	12.9	7.8	74	17	7.1	0.9	



Site ID	2015 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	рН (s.u.)	Turbidity (NTU)	Secchi disk (m)
				Union Valle	y Reservoir				
		surface	16.3	8.2	84	10	6.6	0.6	
		1.0	16.4	8.2	84	11	6.8	0.6	
R-IS-5-	10/23	2.0	16.3	8.1	82	11	6.8	0.6	6.5
UVR	10/23	3.0	16.3	8.0	82	11	6.7	0.6	0.5
		4.0	16.2	8.0	81	11	6.7	0.6	
		5.0	16.1	8.0	81	11	6.7	0.6	
		surface	16.4	7.6	77	11	6.8	0.5	
		1.0	16.4	8.0	82	11	6.9	0.5	
		2.0	16.3	8.0	81	11	6.8	0.5	
		3.0	16.2	8.0	81	11	6.8	0.5	
		4.0	16.2	8.0	81	11	6.8	0.4	
		5.0	16.2	8.0	81	11	6.8	0.5	
		6.0	16.1	8.0	81	11	6.7	0.4	
		7.0	16.1	7.9	81	11	6.7	0.5	
		8.0	16.1	7.9	80	11	6.7	0.5	
R-IS-6-	10/23	9.0	16.1	7.9	81	11	6.7	0.5	7.5
UVR	10/23	10.0	16.1	7.9	80	11	6.7	0.5	7.5
		11.0	16.1	7.9	80	11	6.7	0.5	
		12.0	16.1	7.9	80	11	6.7	0.5	
		13.0	16.1	7.9	80	11	7.7	0.5	
		14.0	16.1	7.9	80	11	6.6	0.5	
		15.0	16.1	7.9	80	11	6.7	0.5	
		16.0	16.0	7.9	79	11	6.7	0.5	
		17.0	15.9	7.8	79	11	6.7	0.4	
		18.0	14.5	8.0	79	12	6.8	0.5	
		19.0	12.9	7.1	67	10	6.6	0.5	



Site ID	2015 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	рН (s.u.)	Turbidity (NTU)	Secchi disk (m)
		20.0	12.4	6.8	63	10	6.4	0.4	
		21.0	11.9	6.6	61	10	6.2	0.6	
		22.0	11.6	6.5	59	10	6.1	0.6	
		23.0	11.0	6.2	56	10	6.1	0.6	
		24.0	10.4	5.9	53	10	6.0	0.6	
		25.0	10.0	5.6	49	10	5.9	0.7	
R-IS-6- UVR	10/23	26.0	9.7	5.5	49	10	5.8	0.5	7.5
UVIN		27.0	9.5	5.3	46	10	5.8	0.7	
		28.0	9.3	5.1	44	10	5.7	0.8	
		29.0	9.1	4.9	42	10	5.7	0.7	
		30.0	9.0	4.7	40	10	5.6	1.0	
		31.0	8.9	4.5	40	10	5.6	1.0	
		32.0	8.7	4.1	36	10	5.6	1.0	
		surface	16.6	8.0	82	11	6.8	0.5	
		1.0	16.6	8.0	82	11	6.8	0.5	
		2.0	16.6	8.0	81	11	6.7	0.5	
		3.0	16.4	7.9	81	11	6.7	0.5	
		4.0	16.3	8.0	81	11	6.6	0.5	
		5.0	16.2	7.9	81	11	6.6	0.5	
R-IS-7-		6.0	16.2	7.9	81	12	6.6	0.5	
UVR	10/23	7.0	16.1	7.9	81	12	6.6	0.7	7.0
OVIX		8.0	16.1	7.9	80	11	7.6	0.5	
		9.0	16.1	7.9	80	11	6.6	0.5	
		10.0	16.1	7.8	79	11	6.5	0.6	
		11.0	16.0	7.8	79	11	6.5	0.6	
		12.0	16.0	7.8	79	11	6.5	0.5	
		13.0	16.0	7.8	79	11	6.5	0.5	
		14.0	16.0	7.7	78	11	6.5	0.5	



Site ID	2015 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Oxygen (% sat)Conductivity (uS/cm)pH (s.u.)Turbidity (NTU)		Turbidity (NTU)	Secchi disk (m)	
		15.0	16.0	7.7	78	11	6.5	0.5	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	6.5	0.5							
		17.0	15.9	7.7	78	11	6.5	0.6	
	10/23	18.0	15.8	7.6	76	11	6.6	0.7	7.0
UVR	10/23	19.0	13.5	6.9	66	10	6.4	0.8	7.0
		20.0	12.2	6.4	58	9	6.3	0.8	
		21.0	11.2	5.5	49	9	6.2	1.0	
		22.0	11.0	4.8	43	10	6.0	1.2	
		surface	16.7	8.4	86	12	7.7	0.5	
		1.0	16.4	8.2	84	10	7.0	0.5	
		2.0	16.3	8.1	82	10	6.7	0.5	
		3.0	16.2	8.0	82	11	6.5	0.4	
		4.0	16.2	8.0	81	11	6.3	0.6	
		5.0	16.2	8.0	81	11	6.2	0.4	
			16.2		81	11	6.2	0.5	
		7.0	16.2	7.9	81	11	6.1	0.5	
		8.0	16.2	7.9	81	11	6.1	0.5	
R-IS-8-	10/23	9.0	16.2	7.9	81	13	6.1	0.4	8.0
UVR	10/23	10.0	16.2	8.0	81	11	6.1	0.8	0.0
		11.0	16.2	7.9	80	11	6.1	0.5	
		12.0	16.2	7.9	80	11	6.1	0.5	
		13.0	16.2	7.9	80	12	6.1	0.5	
		14.0	16.2	7.9	80	12	6.1	0.5	
		15.0	16.2	7.9	80	12	6.1	0.4	
		16.0	16.2	7.8	80	12	6.1	0.5	
		17.0	16.1	7.8	79	12	6.1	0.5	
		18.0	14.6	7.9	77	12	6.1	0.4	
		19.0	13.4	7.5	71	10	6.0	0.3	



Site ID	2015 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat) Conductivity (uS/cm) (s.u.)			Turbidity (NTU)	Secchi disk (m)					
		20.0	12.0	7.3	67	10	5.9	0.4						
		21.0	11.3	1.0	63	10	5.8	0.4						
		22.0	10.7	6.8	61	10	5.7	0.4						
R-IS-8-	10/23	23.0	10.3	6.6	59	9	5.7	0.4	8.0					
UVR	10/23	24.0	10.0	6.5	58	9	5.6	0.4	0.0					
		25.0	9.9	6.4	56	10	5.6	0.4						
		26.0	9.8	6.4	56	10	5.6	0.3						
		27.0	9.5	6.4	56	11	5.6	0.3						
				Ice House	Reservoir									
		surface	15.9	8.7	88	9	7.8	0.5						
		1.0	16.0	8.3	84	8	7.7	0.6						
		2.0	15.9	8.1	82	8	7.6	0.6						
		3.0	15.8	8.1	81	8	7.5	0.6						
					4.0	15.8	8.0	81	8	7.4	0.6			
		5.0	15.8	8.0	81	8	7.3	0.6						
		6.0	15.7	8.0	80	8	7.4	0.6						
		7.0	15.7	8.0	80	8	7.3	0.6						
		8.0	15.7	7.9	80	9	7.3	0.6						
R-IS-9- IHR	10/20	9.0	15.7	8.0	80	8	7.2	0.5	8.0					
		10.0	15.7	7.9	80	8	7.1	0.6						
	-	-	-		F	-	11.0	15.7	7.9	79	8	7.1	0.6	
				12.0	15.6	7.9	79	8	7.0	0.6				
		13.0	15.4	7.8	78	8	7.1	0.6						
		14.0	14.8	7.5	73	8	7.2	0.7						
		15.0	12.8	6.4	60	8	7.0	0.7						
		16.0	11.6	5.5	50	8	6.8	0.7						
		17.0	10.1	5.8	51	8	6.6	1.5						
l		18.0	9.4	3.1	26	8	6.5	1.8						



Site ID	2015 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	(uS/cm) (s.u.)		Secchi disk (m)
		19.0	8.9	1.9	16	11	6.4	2.5	
		20.0	8.5	1.0	8	12	6.3	2.0	
R-IS-9- IHR	10/20	21.0	8.1	0.6	5	15	6.2	1.1	8.0
		22.0	8.0	0.5	4	15	6.2	1.1	
		23.0	7.9	0.4	4	16	6.2	4.4	
		surface	15.7	8.6	87	9	6.7	0.4	
		1.0	15.8	8.6	81	8	7.0	0.7	
		2.0	15.8	8.0	80	8	7.0	0.6	
		3.0	15.8	8.0	80	8	6.9	0.6	
		4.0	15.7	7.9	80	8	7.0	0.6	
R-IS-10-		5.0	15.7	7.9	80	8	6.9	0.7	
IHR	10/20	6.0	15.7	7.9	80	8	6.9	0.6	8.0
		7.0	15.7	7.9	80	8	6.9	0.6	
		8.0	15.6	7.9	80	8	6.9	0.6	
		9.0	15.6	7.9	79	9	6.8	0.6	
		10.0	15.6	7.9	79	9	6.8	0.6	
		11.0	15.5	7.9	79	8	6.7	0.7	
		12.0	15.5	7.8	78	8	6.9	2.2	
		surface	15.5	8.5	85	9	7.8	0.6	
		1.0	15.5	8.1	81	8	7.6	0.5	
		2.0	15.4	8.0	80	8	7.4	0.5	
		3.0	15.4	7.9	79	8	7.2	0.5	
R-IS-11-	10/22	4.0	15.4	7.9	79	8	7.1	0.5	10.5
IHR	10/22	5.0	15.4	7.9	79	8	7.0	0.5	10.5
		6.0	15.4	7.9	79	8	6.9	0.6	
		7.0	15.4	7.9	79	9	6.8	0.5	
		8.0	15.4	7.9	79	9	6.7	0.5	
		9.0	15.4	7.9	79	8	6.7	0.6	



Site ID	2015 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	рН (s.u.)	Turbidity (NTU)	Secchi disk (m)
		10.0	15.4	7.9	79	8	6.6	0.6	
		11.0	15.3	7.9	78	8	6.6	0.5	
		12.0	15.3	7.8	78	8	6.6	0.4	
		13.0	15.3	7.8	78	8	6.6	0.5	
R-IS-11-	10/22	14.0	15.3	7.8	78	8	6.5	0.5	10.5
IHR	10/22	15.0	15.2	7.7	77	8	6.5	0.6	10.5
		16.0	11.0	6.7	59	7	6.6	0.5	
		17.0	10.3	6.5	58	7	6.2	0.8	
		18.0	9.8	5.0	43	8	6.1	0.8	
		19.0	9.0	4.1	35	8	6.0	2.6	
				Junction F	Reservoir				
		surface	11.4	8.9	82	10	7.1	1.0	
		1.0	10.3	8.9	79	10	6.9	0.9	
		2.0	9.8	8.7	77	11	6.6	1.0	
		3.0	9.7	8.8	77	10	6.5	0.9	
		4.0	9.2	8.2	71	10	6.4	0.9	
		5.0	8.8	7.8	67	9	6.3	1.0	
		6.0	8.6	7.5	64	9	6.2	0.9	
R-IS-12-	10/22	7.0	8.5	7.2	62	9	6.2	0.9	3.5
JR	10/22	8.0	8.4	7.0	60	9	6.1	0.9	5.5
		9.0	8.4	7.0	59	9	6.1	1.0	
		10.0	8.3	7.0	59	9	6.0	1.0	
		11.0	8.2	7.0	59	10	6.0	0.9	
		12.0	8.1	7.0	59	9	5.9	0.9	
		13.0	8.0	6.9	58	9	5.9	0.9	
		14.0	8.0	6.7	57	9	5.9	0.8	
		15.0	8.0	6.4	54	9	5.9	0.8	



Site ID	2015 Sample Date	Sample Depth (m)	Water Temperature (°C)	erature Oxygen Oxygen		Conductivity (uS/cm)	рН (s.u.)	Turbidity (NTU)	Secchi disk (m)
				Camino F	Reservoir				
		surface	7.6	10.6	89	9	7.6	4.1	
		1.0	7.5	10.7	89	9	7.1	3.8	
		2.0	7.4	10.7	89	9	6.7	3.2	
		3.0	7.4	10.7	89	9	6.5	3.0	
R-IS-13-	11/9	4.0	7.4	10.7	89	9	6.3	3.1	3.0
CR	11/9	5.0	7.3	10.7	89	9	6.1	4.0	3.0
		6.0	7.3	10.7	89	10	6.0	4.8	
		7.0	7.2	10.7	89	10	6.0	5.3	
		8.0	7.1	10.7	89	11	6.1	5.8	
		9.0	7.1	10.8	89	10	6.1	6.0	
				Slab Creek	Reservoir				
		surface	7.6	11.5	97	21	7.1	4.7	
R-IS-14- SC	11/9	1.0	7.6	11.5	97	21	6.9	5.0	2.5
30		2.0	7.6	11.5	96	21	6.9	5.0	
		surface	11.4	9.8	90	24	6.8	2.5	
		1.0	11.4	9.1	83	23	7.0	4.8	
		2.0	11.4	8.9	82	23	7.0	5.2	
		3.0	11.4	8.8	81	24	6.9	4.9	
		4.0	11.4	8.8	80	24	6.9	4.8	
R-IS-15-	11/9	5.0	11.4	8.8	80	24	6.9	4.7	2.0
SC	11/9	6.0	11.4	8.7	80	24	6.9	4.7	3.0
		7.0	11.4	8.7	80	25	6.9	4.7	
		8.0	11.3	8.7	80	25	6.9	5.1	7
		9.0	11.3	8.6	78	28	6.8	6.7	
		10.0	11.2	8.4	76	28	6.8	6.9	
		11.0	11.1	8.3	75	27	6.8	6.8	



Site ID	2015 Sample Date	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat)	Conductivity (uS/cm)	рН (s.u.)	Turbidity (NTU)	Secchi disk (m)
		12.0	11.1	8.3	75	26	6.8	6.7	
		13.0	11.1	8.2	75	26	6.8	6.7	
		14.0	11.0	8.3	75	25	6.8	6.2	
		15.0	8.0	8.4	76	24	6.8	5.7	
		16.0	10.9	8.4	76	26	6.7	8.6	
		17.0	10.9	8.4	76	24	6.7	5.6	
		18.0	10.9	8.5	77	24	6.7	5.6	
		19.0	10.8	8.5	77	24	6.7	5.3	
		20.0	10.8	8.6	78	24	6.7	5.4	
R-IS-15- SC	11/9	21.0	10.8	8.6	78	24	6.6	5.3	3.0
00		22.0	10.7	8.7	78	24	6.6	5.6	
		23.0	10.6	8.7	78	24	6.6	5.6	
		24.0	10.5	8.8	79	23	6.6	5.6	
		25.0	10.4	8.9	79	23	6.6	5.7	
		26.0	10.2	9.0	80	23	6.6	6.1	
		27.0	10.1	9.1	80	24	6.6	6.4	
		28.0	10.0	9.1	80	23	6.6	6.4	
		29.0	10.0	9.2	81	23	6.6	6.6	
		30.0	10.0	9.2	81	23	6.6	7.6	

°C = degrees Celsius

= meter m

mg/L = milligrams per liter s.u = standard unit of pH

uS/cm = microsiemens per centimeter

NTU = Nephelometric Turbidity Unit



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APPENDIX B Bacteria Results for UARP Reservoir and Riverine Sites



Table B-1. Bacteria (MPN/100mL) for UARP Sites.

	Samp	ole 1	Samp	ole 2	Samp	ole 3	Samp	le 4	Samp	le 5	Fecal	E. coli
Site ID	Fecal colifor m	E. coli	Fecal colifor m	E. coli	Fecal colifor m	E. coli	Fecal coliform	E. coli	Fecal coliform	E. coli	coliform geometric mean ¹	geometri c mean ¹
Bac-1-BI	4.0	<1.0	<1.8	2.0	<1.8	<1.0	7.8	1.0	2.0	1.0	2.2	0.9
Bac-2-BI	<1.8	<1.0	2.0	1.0	<1.8	1.0	70	25.3	<1.8	2.0	2.5	1.9
Bac-3-LL	2.0	<1.0	<1.8	<1.0	4.5	<1.0	<1.8	<1.0	<1.8	<1.0	1.5	0.5
Bac-4-LL	2.0	<1.0	<1.8	<1.0	4.0	<1.0	<1.8	<1.0	2.0	1.0	1.7	0.6
Bac-5- GCR	23	3.1	<1.8	1.0	<1.8	<1.0	<1.8	1.0	<1.8	<1.0	1.7	1.0
Bac-6- GCR	350	71.7	4.5	8.5	7.8	<1.0	<1.8	<1.0	<1.8	1.0	6.3	2.7
Bac-7- UVR	<1.8	<1.0	<1.8	<1.0	2.0	2.0	2.0	<1.0	2.0	2.0	1.5	0.9
Bac-8- UVR	<1.8	<1.0	<1.8	<1.0	11.0	1.0	<1.8	<1.0	4.5	2.0	2.0	0.8
Bac-9- UVR	<1.8	<1.0	<1.8	<1.0	<1.8	<1.0	<1.8	2.0	<1.8	1.0	0.9	0.8
Bac-10- UVR	<1.8	2.0	2.0	<1.0	<1.8	<1.0	<1.8	<1.0	17	11	1.9	1.2
Bac-11-JR	4.5	<1.0	<1.8	<1.0	2.0	1.0	<1.8	1.0	6.8	5.2	2.2	1.1
Bac-12- IHR	<1.8	<1.0	<1.8	<1.0	<1.8	<1.0	<1.8	<1.0	<1.8	<1.0	0.9	0.5
Bac-13- IHR	2.0	2.0	2.0	1.0	<1.8	1.0	2.0	<1.0	<1.8	1.0	1.5	1.0
Bac-14- BCR	<1.8	<1.0	<1.8	2.0	130	235.9	1.8	<1.0	<1.8	<1.0	2.8	2.3
Bac-15- SCR	<1.8	3.0	4.5	66.3	<1.8	1.0	17	6.3	<1.8	2.0	2.2	4.8
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.



APPENDIX C In situ Field Data Sheets

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nstrument	t(S) used:	YSI 69	20.41	bidimet	2r	Pers	ionnel: Christ	ina Bu	ck
Sitel	ocation	0.101.000	Quer A	Han 6	m. D. J K	C UTM (N	AD271: 0740	405/4	319347 (Rubi)
Date	8	24/15	ua)	D 1492	1+24	Time: 1 Weather	030	Jarm	isible flaw
Note	is: Law	Flow	Slow Mr	Ving, Ma	ny pool	s, chose p	lace with	MOST V	is ble flaw
-	-		-			n situ	Turbidity		
Temp (C)		00	-	luctivity	рН	Turbidity (YSI)	(Turbidimeter)	Secchi disk	Notes
	(mg/l)	(%) 74.6	mS/cm	μS/cm	/ 10	NTU	5.47	m botton	in pool ~ ZM deep
19.56	6.84		810.0	16	6.18	1.1		DOIM -	in poor ~ cm ceif
19.59	6.89	75.2	0.018	16	6.03	0.7	5.08		
		0 1	-164 2	6-10 Perk	-		67/1 A	4001	4319297 (1
Site L Date	^		OVIIIau	fram Rub	nver		AD27): 0140	10-1/	7319817 (1
	tos: 1494	1+149	5 (#	2463		Weather:	warm.s	unny	
Note	s: Tast	pr Flavor	ng, sha	Id beable	to acce	ers from	both side.	5	
-	1				/	n situ	Turbidity	Desert dist	
Temp	-		Cond	luctivity	рН	Turbidity (YSI)	(Turbidimeter)	Secchi disk	Notes
(0)	(mg/l)	(%)	m5/cm	μS/cm	1	NTU	NTU	m	
19.64	7.51	82.0	0.00	-					
		Tornas	0.00	D	6.16	1.1	1.79	botom	~IM in pool DS
			0.00	0	6.16	1.1	1. 19	botom	~lm in pool DS
			0.0	0	6.16	1.1	1. 19	botom	-Im in pool DS
		1 ::H= 0					105	0738-	161
Site L	ocation:	Little Ru HIID	abiwan ona	flow Lock	bound La	KC UTM (N	105 AD27):	0738-4320	161
Date Phot	ocation:	Little Ru 4/108	abiwan ona	flow Lock	bound La	KC UTM (N	105 AD27):	0738-4320	161
Date	ocation: a: 8/2 tos: as: 1/0	Little Ru 4/10 PTAN,	abiwan ona	flow Lock	bound La		105 AD27):	0738-4320	161
Date Phot	ocation: a: 8/2 tos: as: 1/0	Little Ru 4/10 Man,	abiwan ona	flow Lock	bound La) musch	KC UTM (N	105 AD27):	0738-4320	161
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Site Lo	ocation:		orly Cre	sk Reser	rvest-	UTM (N	AD27): 10 5	- <u>- 21 - 11</u>	12 4320543
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SMUD In Situ Monitoring in the Upper American River Stillwater Sciences Project and Chili Bar Project

Page 7 of 5

Instrument(S) used: 1516920 + MicwTPI turbidinder Personnel: Bruce Horsch, CHRISTIDA BUCK

Date Pho		- 25 - 7	015	1523 -1	Rubica 1524		15:00 (ber sum	222		WP. 112
Note	5	8 - 6	peol FRR	-te	,	In situ				
	1	0	1	uctivity	рН	Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notes	
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(C)	(mg/l)	(%)	mS/cm	μS/cm		NTU	NTU	m		

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Stillwater	Sciences	1	Pr	roject and	Chili Ba	ar Project			Page 3 of 5
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	220 .				10093-053-0-000)	Weather:	der su	***	
Notes	· 11	of c	Im			- 52 / 10 - 52 / 10			
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(C)	(mg/l)	(%)	mS/cm	µS/cm		NTU	NTU	m	
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28	L								
Site Lo	ocation:	Silve	- Creek	orthon	from	UTM (N	AD27): 10.5	071369	9 4299952
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· دعد -۳		- 30	*			n situ			

Turbidity (Turbidimeter) Temp DO Conductivity Turbidity (YSI) Socchi disk pH Notes (C) (mg/l) (%) ms/cm µS/cm NTU NTU m Le Hom 6.42 0.75 m 10.32 66.4 0.015)/ 6.72 0.8 12.31

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SMUD In Situ Monitoring in the Upper American River Project and Chili Bar Project (@) 25

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Stillwa	ter	Sci	епс	e

Instrument(S) used: _

Personnel: BRVCS HITCH

Photo Notes	S		-			Weather:	cher se	<u></u> 7	
¥IS	- 15-	· SFA	r *			n situ		-	200
	D	•	Condu	ictivity	pH	Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notos
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Notes						n situ			
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1.411							CONTRACTOR		

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Temp		DO	Cond	luctivity	рН	Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notas		
(C)	(ng/l)	(%)	m\$/cm	µ\$/cm		NTU	NTU	m	1		1464
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Date Phot Note	s:	27-20	dawns e,s	Cree k	Rever.	Time:	AD27): (0 5 12:43 242 Su			4293744
* 1	5 - 19	Ì- SF	AR *			n situ				
Temp	P	0	Cond	uctivity	рН	Turbidity (YSI)	Turbidity (Turbidimeter)	Socchi disk	Notes	61680
(C)	(mg/l)	(%)	mS/cm	µS/cm		NTU	NTU	m		
	1.000	98.8	0.021	17	7.36	7.1				bottom



) Sciences	SMUE			g in the l d Chili Ba	Jpper Amer r Project	ican River		Page <u>5</u> of <u>5</u>	_
nstrument					12	22 72 72 74796	onnel: <u>B7</u> 7-			-8
Site Lo Date: Photo Note:	os:	5FAR 27- 2	upstneon 015	n of W	i.da ha ?+	Z Time: /	AD27): 10 5 3:38 c lece se		2471 4292	.8년 - -
*Is	- 18	- 5	FAR +	*		n situ				
Temp	D	0	Condi	uctivity	рН	Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notes	
(C)	(mg/l)		mS/cm	µS/cm		NTU	NTU	m		
18.98	9.84	106.0	0.025	22_	7.13	1.2			0.25 m b	1ton
Site Le	ocation: _					UTM (N	AD27):			
Date: Photo Note:	os:					Time:				_
						n situ				
Temp	D	D	Condi	uctivity	Ha	Turbidity (YSI)	Turbidity (Turbidimotor)	Secchi disk	Notas	
(¢)	(mg/l)	(%)	ms/cm	µS/cm		NTU	NTU	m		12-12
		_								
							-			
		-								
Site Lo	ocation:					UTM (N	AD27):			
Date:										

						in situ			
Temp	D	0	Cond	luctivity	рH	Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notes
(C)	(mgЛ)	(%)	mS/Cm	<u>µS/</u> cm		UTN	NTU	m	
	$ \rightarrow $				s				

Date Phot Note	ios:				UTM (NAD27): Time: Weather:									
	2		50 5		5	In situ			•					
Temp	D	DO		uctivity	pH	Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notes					
(C)	(mg/i)	(%)	ms/cm	µ8/cm		NTU	NTU	m						



	t(S) used:	155	6920	_		Pers	ionnel: 674	Sma	a may Cabruls
Site L Date Phot	ocation:	IS . /3/2	- 20 - 4	if ar		UTM (N Time: Weather:	AD27): 10 5	29	9639 4293119
Note	s:								
	ha	alga							
	1	0	1		/	n situ	Turbidity		
Temp	-	DO	Cont	luctivity	рН	Turbidity (YSI)	(Turbidimeter)	Secchi disk	Notes
(C) 5.89	(mg/l) 986	(%)	ms/cm	μS/cm 23	6.63	NTU	NTU	m	Im botton
Site L	ocation:	IS-	21 - SF	FAR		UTM (N	AD27): 10 S	068	4030 429632
Date Phot		1/3/2	615			Time: Weather:	15:51 cher :5		4030 429632
Note	IS:	_	_					1	
2									
53	1900		1		/	n situ	Turbidity		1
Temp		DO	Conc	luctivity	рН	Turbidity (YSI)	(Turbidimeter)	Secchi disk	Notes
(C)	(mg/l)	(%)	m5/cm	μS/cm		NTU	NTU	m	
17.64	7.60	100.7	0.025	21	7.09	1.3			0.5 m 54m
_									
Site L Date Phot Note	os:	IS- 74/	22 - 5	FAR		UTM (N. Time: Weather:	AD27): 10 5 10:55 2022 5	06780 279	404 4299;10
Note	os:		22 - 5	FAR			AD27): 10 5 10:55 clice 5	06780 un n n	104 4299110
Phot Note	os: s: no c	Igne				n situ	Turbidity	[1
Note	os: s: no c			luctivity µS/cm				Secchi disk	1
Temp (C)	os:	1 cjae 00 (%)	Conc	luctivity		n situ Turbidity (YSI) NTU	Turbidity (Turbidimeter)	Secchi disk	
Temp (C)	os: s: 7	1 cj. r. e 00 (%) 100. 9	Conc mS/cm Ø.032	luctivity μS/cm 28	рн	n situ Turbidity (YSI) NTU Ø. (6	Turbidity (Turbidimeter) NTU	Secchi disk	Notes O.75 m battorn
Temp (C)	os: s: (mg/l) 9.69 ocation: os:	15,02 00 (%) 100.9	Conc mS/cm	luctivity μS/cm 28	рн	n situ Turbidity (YSI) NTU Ø. (6	Turbidity (Turbidimeter) NTU 	Secchi disk	Notes
Phot Note Y Temp (C) Y 7.33 Site L Date Phot Note	os: s: (mg/l) 9.69 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	1902 100 100.9 15- 74/2	Conc m5/cm 0.032 23 - 55 015	luctivity μS/cm 28	рн - 7.22	n situ Turbidity (YSI) NTU D. (G UTM (N. Time: Weather:	Turbidity (Turbidimeter) NTU 	Secchi disk m	Notes O.75 m battorn
Phot Note Y Temp (C) Y 7.33 Site L Date Phot Note	os: s: (mg/l) 9.69 0	15,02 00 (%) 100.9	Conc ms/cm 0.032	luctivity μS/cm 28	рн 7.22	n situ Turbidity (YSI) NTU D. (g UTM (N. Time:	Turbidity (Turbidimeter) NTU AD27): 105 15:30 24ex 5: Turbidity	Secchi disk m	Notes O.75 m battorn
Phot Note (C) (7.33 Site L Date Phot Note	os: s: (mg/l) 9.69 0	100 C (%) 100.9 15-74/2	Conc ms/cm 0.032	luctivity μS/cm 28	рн - 7.22	n situ Turbidity (YSI) NTU D. (G UTM (N Time: Weather: n situ	Turbidity (Turbidimeter) NTU AD27): 10 5 15 : 30 4 4 4 5	Secchi disk m	Notes O.75 m battorn



0	(com)							Page 1 of			
112	Stillwater Sciences Reservoir - Water Quality In situ Profiles							Da Tir	ate: 10/ me: 12:	19/15 30	
	Site UTN	e Location: 1 (NAD27):	R- ±s	-1 - LL 134275	5 4321	206	(2:m)	Wate	r depth:	7.5 m	
F	erson	inel: BRUC	E HITC	H KEL	E		Seconi.				
	croon										
Sit	e Note	es:	nay, C	p1, 5	light B	10070					
			2.		2						
	_										
Der	Depth Temp DO Conductivity						Turbidity	Water			
(ft)	(m)	(C)	(mg/l)	(%)	mS/cm	µS/cm	рН	NTU	Sample	Notes	
surfa		14.89	7.71		0.009		6.75	6.7			
3.3	1	14.88	7.67	75.9	0.009	7.0	6.82	0.7	1		
6.6	2	14.77		75.4		7.0	6.0C	0.7			
9.8	3	14.69		15.4		7.0	6.76	0.7			
13.1	4	14.67	7.59		0.009	7.0		0.7			
16.4	5	14.65	7.57	74.5				0.7			
19.7	6	14.62		74.6		11	6.73	0.7			
23.0	7	14.57	7.59	74.5		9.0		0.8			
26.2	8		7.60				6.73	0.8			
29.5	9	14.53			0.009		6-71	0.7			
32.8	10	14.52	7.63		0.009		1200				
36.1	11	14.51	7.50		0.009		6.73	1.5*		*Hit bottom	
39.4	12										
42.7	13							4			
45.9	14										
49.2	15										
52.5	16										
55.8	17		1								
59.1	18								-		
62.3	19								-		
65.6	20		_								
68.9	21										
72.2	22				-	-			-		
75.5	23	-					-				
78.7	24										
82.0 85.3	25		-						-		
85.3	20	1									
91.9	28										
95.1	29				-		1				
98.4	30										
101.7	31										
105.0	32										
108.3	33										
111.5	34										

March 2016 Draft Water Quality Monitoring Report



(0)		Page 1 of
Stillwater Sciences	Reservoir - Water Quality In situ Profiles	Date: 10/22/15 Time: 13(5
Site Location:	12-IS-2-LL 105 0732765 4319087 (==)3m	Nater depth: 60 ft
	TH, KKC	Secchi: 7.5 M
Site Notes: 5	onry, when Calm	

Dep	oth	Temp	D	C	Conduc	tivity		Turbidity	Water	Notes
(ft)	(m)	(C)	(mg/l)	(%)	mS/cm	μS/cm	pН	NTU	Sample	NOLES
surfa	ace	14.35	7.89	77.1	0.008	7.00	6.82	0.6		
3.3	1	13.74	7.87	75.9	0.008	7.00	6.72	0.6		
6.6	2	13.2	7.86	75.5	0.008	7.00	6.64	0.7		
9.8	3	13.51	7.86	75.4	0.009	7.00	6.60	0.6		
13.1	4	13.46	7.86	75.4	0.010	8.00	6.53	0.6		
16.4	5	13.43	7.88	75.5	D.009	7.00	6.48	0.8		
19.7	6	13.41	7.84	75.0	0.009	7.00	6.45	0.6		
23.0	7	13.39	7.82	74.8	0.009	7.00	6.42	0.7		
26.2	8	13.38	7.81	74.7	0.009	7.00	6.39	0.7		
29.5	9	13.37	7.79	74.6	0.009	7.00	6.36	0.7		
32.8	10	13.35	7.78	74.4	0.009	7.00	6.34	0.6		
36.1	11	13.34	רר.ר	74.3	0.009	7.00	6.32	0.7		
39.4	12	13.31	7.76	74.1	0.009	7.00	6.31	0.7		
42.7	13	13.29	7.75	74.0	0.010	8.00	6.30	0.9		
45.9	14	13.28	7.75	74.0	0.00	8.00	6.28	0.9		
49.2	15	13.20	7.79	74.3	0.009	7.00	6.27	0.7		
52.5	16	13.26	7.75	74.0	0.009	7.00	6.26	0.8		
55.8	17	13.24	7.73	73.7	0.009	7.00	6.26	0.7		
59.1	18		9							
62.3	19									
65.6	20									
68.9	21									
72.2	22								1.0	
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									



((3))	<i>3</i>	Page 1 of
Stillwater Sciences	Reservoir - Water Quality In situ Profiles	Date: 10/22/15 Time: 1330
Site Location: UTM (NAD27):	R-IS-3-U 55 6731660 4318947 (200).	Instrument used: <u>L920</u> Water depth: <u>51.64</u>
	TH, KKC	Secchi: 7 m
Site Notes:	y, warn, Calm	

Dep	oth	Temp	D	0	Conduc	ctivity		Turbidity	Water	Notes
(ft)	(m)	(C)	(mg/l)	(%)	m\$/cm	μS/cm	pH	NTU	Sample	NOLES
surf	ace	13.60	8.03	77.2	0.009	7.00	6.67	0.6		
3.3	1	13.62	7.99	76.8	0.009	7.00	-	0.7		6.63 = PH
6.6	2	13.18	7.99	76.1	0.009	7.00	6.55	0.7		
9.8	3	13.05	8.00	76.0	0.009	7.00	6.52	0.7		
13.1	4	13.00	8.01	76.0	0.010	8.00	6.49	0.7		
16.4	5	12.94	8.00	75.9	0.009	7.00	6.45	0.7		
19.7	6	12.90	7.99	75.7	0.009	7.00	6-42	0.7		
23.0	7	12.86	7.97	75.4	0.009	7.00	6.39	0.8		
26.2	8	12.85	7.96	75.3	0.009	7.00	6.37	0.7		
29.5	9	12.85	7.94	75.2	0.009	7.00	6.36	0.7		
32.8	10	12.85	7.94	75.1	0.009	7.00	6-35	0.8		
36.1	11	12.83	7.93	750	0.009	7.00	6.34	0.8		
39.4	12	12.81	7.92	74.8	0.009	7.00	6.34	0.8		
42.7	13	12.80	7.91	74.8	0.009	8.00	6.32	0.8		
45.9	14	12.78	7.92	74.8	0.009		6.32	0.8		
49.2	15									
52.5	16									
55.8	17									
59.1	18									
62.3	19									
65.6	20						1			
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	Reservoir - Water Quality In situ Profiles	Page <u>1</u> of Date: <u>10 20 15</u> Time: <u>13 45</u>
Site Location: UTM (NAD27):	R-IS-4-6C (inc.)	Water depth: 22.4 ft.
Personnel: BR	WEE HITCH, KELLEIGH CRO	Secchi: <u>6m.</u>
Site Notes: 50	NNY, COOL, WINDY	

Dep	oth	Temp	D	C	Conduc	tivity		Turbidity	Water	Notes
(ft)	(m)	(C)	(mg/l)	(%)	mS/cm	µS/cm	рН	NTU	Sample	Notes
surf	ace	14.00	8.72	80.1	0.021	0.0	7.79	0.8		
3.3	1	13.99	8.00	77.5	0.021	16.0	7.50	0.8		
6.6	2	13.98	7.92	76.8	0.021	16.0	7.36	0.8		
9.8	3	13.96	7.86	76.2	0.021	16.0	7.28	0.8		
13.1	4	13.82	7.81	75.0	0.021	16.0	7.21	0.8	-	
16.4	5	13.35	7.74	73.8	0.019		7.16	0.9	*	
19.7	6	12.90	7.76	73.5			7.13	0.9		
23.0	7									
26.2	8									
29.5	9									
32.8	10									
36.1	11									
39.4	12				1					
42.7	13				-		1			
45.9	14						1			
49.2	15	1								
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 Stillwater Sciences Reservoir - Water Quality In situ Profiles Site Location: <u><u><u>R-IS-5-004</u></u> UTM (NAD27): <u>10 5 0727189 4307401</u> (100) 3m</u>							D Ti Instrume Wate	Page 1 of 1 Date: $16 (23/15)$ Time: 1500 Instrument used: 6920 Water depth: 20.2 ft				
F		nnel:							Secchi:	6.5m			
Si	te Not	es: 📩	, Po	with ch	oudy, E	XEEZQ	8						
Dep	oth	Temp	D	D	Conduc	tivity		Turbidity	Water	Notes			
(ft)	(m)	(C)	(mg/l)	(%)	mS/cm	μS/cm	рН	NTU	Sample	Notes			
surf	ace	16.34	8.18	83.5	0.014	10.0	6.57	0.6					
3.3	1	16.35	8.19	83.5	0.013	11.0	6.83	0.6					
6.6	2	16.34	8.08	82.4	0.013	11.0	6.76	0.6					
9.8	3	16.31	8.01		0.013			0.6					
13.1	4	16.17	7.98	81.1	0.013	11.0	6.67	0.6					
16.4	5	16.10	7.95		0.013			0.6					
19.7	6												
23.0	7												
26.2	8						34						
29.5	9												
32.8	10												
36.1	11	1.0											
39.4	12												
42.7	13												
45.9	14	1000											
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

98.4 30 101.7 31

24

82.0 25

85.3 26

88.6 27

91.9 28 95.1 29

105.0 32

108.3 33

111.5 34



Stillw:	Sit UTM Persor	iences e Location: // (NAD27): nnel:(Reservoir - Water Quality In situ Profiles ion: <u>R-TS-6-UVR</u> 27): <u>105 0725572 4304448 (300) BTH + KKC Suppy, Warm (Slight breeze</u>						ate: me: nt used: er depth:	of l $\frac{6(23)}{15}$ 336 $\frac{6920}{16}$ 166 15 33 7.5
Dep		Temp	D		Conduc			Turbidity	Water Sample	Notes
(ft)	(m)	(C)	(mg/l)	(%)	mS/cm	μS/cm	pH	NTU		77.2
surfa 3.3	ace 1	16.41	7.57		0.014		6.77	0.5		77.3 = Do %
5.5 6.6	2	16.40	7.99		0.013		6.90	0.5		
9.8	3	16.20	7.98		0.013		6.83	0.5		
13.1	4	16.20	7.97		0.013		6.78	0.4		
16.4	5	16.60			0.013		6.75	0.5	-	
19.7	6	16.14	7.95		0.013		6.72	0.4		
23.0	7	16.12	7.94		0.014		6.70	0.5		
26.2	8	16.11			0.014		6.70	0.5		
29.5	9	16.11	7.92		0.015			0.5		
32.8	10	16.10			0.014		6.68	0.5		
36.1	11	16.09			0.014		6.68	0.5		ac change
39.4	12	16.08			0.014		6.66	0.5		field crew error
42.7	13	16.07			0.014	G-017		0.5		should have
45.9	14	16.07	7.87	and a state of the state	0.014		6.64	0.5		recorded 6.67
49.2	15	16.06	7.86	and a contraction	0.014	11.0	6.66	0.5		10
52.5	16	16.03	7.85		0.014		6.66	0.5		Mas
55.8	17	15.92			0.014			0.4		
59.1	18	14.46			0-015		6.77	0.5		
62.3	19	12.87					6.55	0.5		
65.6	20	12.36			0.013			0.4		
68.9	21	11.89			0.013			0.6		
72.2	22	11.59			0.013			0.6		
75.5	23	11.02	6.21	56.0	0.013	10.0	6.06	0.6		
78.7	24	10.37	5.92	52.5	0.013	10.0	5.99	0.6		
82.0	25		5.55	48.7	0.014	0.0	5.90	0.7		
85.3	26				0.013			0.5		
88.6	27	9.54			0.014			0.7		
91,9	28	9.28			0.014					
95.1	29				0.014					
98.4	30				0.014			and the second se		
101.7	31				0.014			1.0		
105.0	32	8.66	4.14	35.5	0.015	b.0	5.59	1.0		
108.3	33									
111.5	34									



								F	age 1	of
Stillwater Sciences					r - Water G situ Profile		D Ti	ate:(c me:(430	
	UTN Person	e Location: 1 (NAD27): inel:6	105 1 3TH +1	Krc	91 430	5624	('acu) 3 8	Wate	er depth:	6920 83 ff. 7.0 n
				-						
(ft)	pth (m)	Temp (C)	(mg/l)	(%)	Conduc mS/cm	μS/cm	рH	Turbidity	Water Sample	Notes
	face				00.000.000	11.0	6.76	0.5		
3.3	1	16.61	7.96	82.0	0.013		6.76	0.5		
6.6	2	16.55	7.95	Sec. 01-1	0.013		6.68	0.5		
9.8	3	16.39	7.94		0.013	11.0	6.74	0.5	-	
13.1	4	16.27	7.95	the second s	0.013			0.5		
16.4	5	16.22	7.94		0.013	1.0	6.55	0.5		
19.7	6	16.18	7.91		0.013		6.55	0.5		
23.0	7	16.13	7.93		0.015		6.57	0.7		
26.2	8	16.14	7.88		0.013		(7.57)	-0.5		- acchange: field
29.5	9	16.12	7.87		0.0B	11.0	6.56	0.5		Crewenner, should have
32.8	10	16.07	7.83		0.013		6.54	0.6		recorded 6.57
36.1	11	16.03	7.78		0.013		6.52	0.6		
39.4	12	16.03	7.76		0.013	11.0	6.52	0.5		MSS
42.7	13	16.01	7.75		0:013	11.0	6.52	0.5		
45.9	14	16.00	7.73				6.52	0.5		
49.2	15	15.99		100 C	0.013	100 C	6.53	0.5		
52.5	16	15.98	7.71		0.015	12.0	6.50	0.5		
55.8	17	15.91	7.73		0.015		and the second se	0.6		
59.1	18	15.78	7.63		0.013	11.0		0.7		
62.3	19	13.47			0.013		6.42	0.8		
65.6	20	12.16	6.38		0.DI2			0.8		1
58.9	21	11.23	5.50	and the second sec	0.013		1	1.0		
72.2	22	10.95	4.83		0.013		5.99	1.2		
75.5	23	10.10	10		5	10.0				
78.7	24					-				
82.0	25									
85.3	26									
88.6	27									
91.9	28									
95.1	29									
98.4	30									
01.7	31				-					
05.0	32									
00.0										
08.3	33									



illwater Sciences	Reservoir - Water Quality In situ Profiles	Date: 10/23/2015 Time: 1245
	R-IS-8-UNR 105 0722602 4304952 () 2m	Instrument used: 6920 Water depth: 97 ft Secchi: 8m
Site Notes: 5.	Day, Warm, Slight Breeze	

Dep	oth	Temp	DC	0	Conduc	tivity		Turbidity	Water	Notes
(ft)	(m)	(C)	(mg/l)	(%)	mS/cm	μS/cm	рН	NTU	Sample	INOLES
surfa	ace	16.68	8.36	85.9	0.014	12.0	7.65	0.5		
3.3	1	16.42	8.19	83.5	0.012	10.0	6.97	0.5		
6.6	2	16.28	8.08	82.3	0.012	10.0	6.67	0.5		
9.8	3	16.24	8.02	81.7	0.013	11.0	6.48	0.4		
13.1	4	16.21	7.99	81.3	0.013	11.0	6.33	0.6		
16.4	5	16.20	7.98	81.1	0.013	11.0	6.22	0.4		
19.7	6	16.19	7.96	80.9	0.013	11.0	6.15	0.5		
23.0	7	16.18	7.93	80.6	0.013	11.0	6.10	0.5		
26.2	8	16.18	7.92	80.5	0.013	11.0	6.07	0.5		
29.5	9	16.17	7.91	80.5	0.016	130	6.06	0.4		
32.8	10	16.17	7.99	81.1	0.014	11.0	6.06	0.8		
36.1	11	16.16	7.91	80.4	0.014	11.0	6.06	0.5		
39.4	12	16.16	7.89	80.1	0.014	11.0	6.06	0.5		
42.7	13	16.16	7.86	79.9	0.014	12.0	6.06	0.5		
45.9	14	16.16	7.86	79.8	0.014	12.0	6.06	0.5		
49.2	15	16.16	7.85	79.8	0.014	12.0	6.07	0.4		
52.5	16	16.15	7.84	79.7	0.014	12.0	6.08	0.5		
55.8	17	16.07	7.83	79.3	0.014	12.0	6.10	曲		0.5 = NTU
59.1	18	14.58	7.85	77.2	0.015	12.0	6.08	0.4		
62.3	19	13.39	7.99	71.1	0.013	0.0	6.03	0.3		
65.6	20	12.03	7.25	67.0	0.013	10.0	5.87	0.4		
68.9	21	11.27	6.95	63.2	0.013	6.0	5.76	0.4		
72.2	22	10.69	6.78	60.8	0.013	10.0	and the second se	0.4		
75.5	23	10.27	6.63	58.9	0.013	9.0	5.67	0.4		
78.7	24	10.03	6.52	57.6	6.013	9.0	5.64	0.4		
82.0	25	9.87	6.38	56.4	0.013	10.0	5.61	0.4		
85.3	26	9.78	6.35	55.9	0.014	10.0		0.3		
88.6	27	9.47	6.40	56.0	0.015	1	5.58	0.3		
91.9	28									
95.1	29									
98.4	30									
101.7	31									
105.0	32									
108.3	33									
111.5	34		1							



CCCD Stillwater Sciences	Reservoir - Water Quality In situ Profiles	Page 1 of Date: 10 20 /15 Time: 1600	
UTM (NAD27):	R-IS-9-IHR 105 073199 4300133 (m) 3m CEHITCH, KELLEIGH CREWE	Instrument used: 6920 Water depth: 74ff Secchi: 6 M	
Site Notes: Sur	NY, COOL, WINDY		_

Dep	th	Temp	D	C	Conduc	tivity		Turbidity	Water	Notes
(ft)	(m)	(C)	(mg/l)	(%)	mS/cm	μS/cm	pН	NTU	Sample	Notes
surfa	ace	15.91	8.70	88.0	0.04	9.0	7.80	0.5		
3.3	1	16.00	8.30	83.8	0.010	8.0	7.68	0.6		
6.6	2	15.91	8.10	81.7	0.00	8.0	7.55	0.6		
9.8	3	15.80	8.06	81.3	0.010	8.0	7.52	0.6		
13.1	4	15.79	8.04	81.0	0.00	8.0	7.35	0.6		
16.4	5	15.76	B.01	80.6	0.00	8.0	7.33	0.6		
19.7	6	15.72	7.99	80.3	0.010	8.0	7.40	0.6		
23.0	7	15.71	7.95	80.1	0.010	8.0	7.28	0.6		
26.2	8	15.70	7.93	79.8	0.012	9.0	7.27	0.6		
29.5	9	15.69	7.99	80.2	0.010	8.0	7.18	0.5		
32.8	10	15.69	7.92	79.7	0.000		7.13	0.6		
36.1	11	15.66	7.87	79.2	0.010	8.0	7.08	0.6		
39.4	12	15.61	7.85	7.80	0.010	8.0	7.03	0.6		
42.7	13		7.79	77.B	0.010	8.0	7.12	0.6		15.42°C
45.9	14	14.75	7.49	72.8	0.010	8.0	7.21	0.7	100	
49.2	15	12.75	6.44	59.5	0.00	8.0	7.01	0.7		
52.5	16	11.57	5.52	50.2	0.010		6.75	0.7		
55.8	17	10.11	5.75	50.9	0.012	8.0	6.63	1.5		
59.1	18	9.38	3.05	25.5	0.01	8.0	6.51	1.8		
62.3	19	8.88	1.92	15.5	0.016	11.0	6.40	2.5		
65.6	20	8.49	0.96	7.8	0.017	12.0	6.29	2.0		
68.9	21	8.13	0.64	5.3	0.022	15.0	6.24	1.1		
72.2	22	7.95	0.50	4.0	0.022	15.0	6.20	1.1		
75.5	23	1.89	0.42	3.5	0.023	16.0	6.15	4.4		
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									



tillwater Sciences	Reservoir - Water Quality	Data: 1 - 1 -
unwater Sciences	In situ Profiles	Date: 10 20/15 Time: 1630
		Instrument used: 6920
Site Location:	R-IS-10-IHR	Water depth: 434
01W (NAD27)	05 0730717 4300382 (and 21	n Secchi: 8 m
Personnel: BTH	, KKC	
Site Notes:	y cool, windy	

Dep	th	Temp	D	C	Conduc	tivity		Turbidity	Water	Notes
(ft)	(m)	(C)	(mg/l)	(%)	mS/cm	μS/cm	pН	NTU	Sample	INUICS
surfa	ace	15.74	8.62	86.9	0.04	9.0	6.72	0.4		
3.3	1	15.78	8.61	81.4	0.009	8.0	7.02	0.7		
6.6	2	15.79	7.97	80.4	0.00	8.0	7.04	0.6		
9.8	3	15.75	7.96	80.3	0.010	8.0	6.94	0.6		
13.1	4	15.73	7.94	80.0	0.00	8.0	6.95	0.6		
16.4	5	15.73	7.94	80.0	0.00	8.0	6.89	0.7		4
19.7	6	15.69	7.93	79.8	0.010	8.0	6.87	0.6		
23.0	7	15.66	7.92	79.7	0.010	8.0	6.88	0.6		
26.2	8	15.64	7.91	79.5	0.00	8.0	6.87	0.6		
29.5	9	15.61	7.90	79.3	0.010	9.0	6.82	0.6		
32.8	10	15.55	7.90	79.3	0.011	9.0	6.80	0.6		
36.1	11	15.52	7.86	78.7	0.010	8.0	6.69	0.7		
39.4	12	15.52	7.78	78.1	0.00		6.88	2.2		
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				1					
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									



		Page 1 of
Stillwater Sciences	Reservoir - Water Quality In situ Profiles	Date: $10(22/15)$ Time: 1100
Site Location: UTM (NAD27):	R-IS-11-IHR 105 0729245 4300772 3m	Water depth: 6920
	RUCE HITCH, KELLEIGH CROWE	Secchi: 10.5 m
Site Notes: 50	NNY WARM, CALM	

Dep	oth	Temp	D	C	Conduc	tivity		Turbidity	Water	Notes
(ft)	(m)	(C)	(mg/l)	(%)	mS/cm	μS/cm	рН	NTU	Sample	Notes
surf	ace	15.54	B.46	84.8	0.011	9.0	7.78	0.0		
3.3	1	15.50	8.08	80.9	0.009	8.0	7.57	0.5		
6.6	2	15.43	8.00	80.0	0.010	8.0	7.36	0.5		
9.8	3	15.41	7.94	79.4	0.010	8.0	7.18	0.5		
13.1	4	15.40	7.91	79.1	0.010	8.0	7.00	0.5		
16.4	5	15.39	7.89	78.9	0.010	8.0	695	0.5		
19.7	6	15.38	7.87	78.7	0.010	8.0	6.87	0.6	_	
23.0	7	15.38	7.80	78.4	0.011	9.0	6.78	0.5		
26.2	8	15.38	7.86	78.6	0.04	9.0	6.72	0.5		6
29.5	9	15.38	7.88	78.8	0.00	B.0	6.60	0.6		
32.8	10	15.37	7.86	78.6	0.00	8.0	6.63	0.6		
36.1	11	15.34	7.85	78.4	0.00	8.0	6.60	0.5		
39.4	12	15.34	7.83	78.Z	0.00	8.0	6.57	0.4		
42.7	13	15.34	7.82	78.2	0.00	8.0	6.55	0.5		
45.9	14	15.31	7.82	78.0	0.010	8.0	6.53	0.5		
49.2	15	15.21	7.74	76.7	0.010	8.0	6.52	0.6	-	
52.5	16	11.01	6.60	58.5	0.010	7.0	6.58	0.5		
55.8	17	10.27	6.54	58.2	0.012	7.0	6.23	0.8		
59.1	18	9.76	5.04	43.3	0.011	8.0	6.09	0.8		
62.3	19	9.03	4.11	35.0	0.01	8.0	6.00	d.5.0		
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	Reservoir - Water Quality In situ Profiles	Page <u>1</u> of <u>1</u> Date: <u>10 22 15</u> Time: <u>1545</u>
Site Location: UTM (NAD27): Personnel:	R-TS-12-JR 105 0721007 4303527 () 4M	Instrument used: <u>6920</u> Water depth: <u>53.4</u> Secchi: <u>3.5 m</u>
Site Notes:	any, warm, Calm	

Dep	oth	Temp	D	0	Conduc	tivity		Turbidity	Water	Notes
(ft)	(m)	(C)	(mg/l)	(%)	mS/cm	μS/cm	рН	NTU	Sample	10100
surfa	ace	11.40	8.94	81.8	0.014	10.0	7.10	1.0		
3.3	1	10.28	8.92	79.3	0.014	10.0	6.91	0.9		
6.6	2	9.81	8.71	76.7	0.014	11.0	6.64	1.0		
9.8	3	9.67	8.75	76.9	0.014	10.0	6.51	0.9		
13.1	4	9.19	8.20	71.0	0.014	10.0	6.39	0.9		
16.4	5	8.77	7.82	66.6	0.014	9.0	6.31	1.0		
19.7	6	8.61	7.45	63.6	0.014	9.0	6.20	0.9		
23.0	7	8.53	7.22	61.6	0.014	9.0	6.16	0.9		
26.2	8	8.36	7.04	59.9	0.014	9.0	6.10	0.9		
29.5	9	8.35	6.97	59.3	0.014	9.0	6.06	1.0		
32.8	10	8.28	6.95	59.1	0.013	9.0	6.02	1.0		
36.1	11	8.17	7.00	59.3	0.015	10.0	5.99	0.9		
39.4	12	8.07	6.99	59.0	0.013	9.0	5.93	0.9		
42.7	13	8.00	6.87	57.9	0.013	9.0	5.91	0.9		
45.9	14	7.96	6.72	56.5	0.013	9.0	5.88	0.8		
49.2	15	7.95	6.42	54.1	0.013	9.0	5.85	0.8		
52.5	16			- And -						
55.8	17									
59.1	18									
62.3	19									
65.6	20			-						
68.9	21									
72.2	22									
75.5	23	-								
78.7	24			1.00						
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	Reservoir - Water Quality In situ Profiles		Page <u>1</u> Date: <u> </u> Time: <u> 4</u>	of	
Site Location: UTM (NAD27): 10 Personnel: B7	L-IS-13-CR 507139834300697 (H+1KKC	sci) 15m	Instrument used: Water depth:	451 6920	
Site Notes: Head	in sain, cold				-
			Turkidite		

Dep	oth	Temp	D	0	Conduc	ctivity		Turbidity	Water	Notes
(ft)	(m)	(C)	(mg/l)	(%)	mS/cm	μ\$/cm	рН	NTU	Sample	Notes
surf	ace	7.62	10.61	88.8	0.014	9.0	7.62	4.1		
3.3	1	7.53	10.66	89.0	0 014	9.0	7.14	3.8		
6.6	2	7.44	10,71	89.2	0.014	9.0	6.73	3,2		
9.8	3	7.40	10.71	89.1	0,014	9.0	6.45	3.0		
13.1	4	7.36	10.71	89.0	0.014	9.0	6.25	3.1		
16.4	5	7.30	10.72	89.0	0.014	9.0	6.09	4.0		
19.7	6	7,28	10.72	88.9	0.014	10.0	6.04	4.8		
23.0	7	7.22	10.71	88.7	0.015	100	6.04	5.3		
26.2	8	7.08	10.74	88.6	0.017	Nico	6.05	5.8		
29.5	9	7.07	10.75	88.7	0.015	10.0	6.01	6.0		
32.8	10							-		1.516
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			2					-	
95.1	29									
98.4	30									
101.7	31									
105.0	32		-							
108.3	33									
111.5	34		1000							



	ater Sci				ir - Water G situ Profile			D	ate: <u>IL</u> me: <u>I</u>	19/15
	Person	e Location: 1 (NAD27): inel:37 es:	1+ + k	3-14 203913	- <u>SC</u> 42963	260	(Y :===)		ent used: er depth:	<u>1316920</u> 9.0ft. 2.5M
			gut in		ay, c	a y A				
Dep	oth	Temp	D	0	Conduc	ctivity		Turbidity	Water	
(ft)	(m)	(0)	(mg/l)	(%)	mS/cm	μS/cm	pН	NTU	Sample	Notes
surf	ace	7.61			0.031	21.0	7.10	4.7		
3.3	1	7.60			0.032			5.0		
6.6	2	7.59			0.032		6.85	5.0		
9.8	3									
13.1	4									
16.4	5									
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 15		-							
49.2	15								-	
52.5 55.8	10	-								
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									



water Sciences	Reservoir - Water Quality In situ Profiles	Date: 11/9/15 Time: 12:00
	2-15-15-50 SOTADBIO 4295323 (500)	Water depth: 105 Ft
Personnel: BTH	+ KKC	Secchi: 3 m
Site Notes:Atro	, COLD	-

Dep	oth	Temp	D	0	Condu	ctivity		Turbidity	Water	Notes
(ft)	(m)	(C)	(mg/l)	(%)	m5/cm	μS/cm	pН	NTU	Sample	Notes
surf	ace	11.38	9,84	90.1	0.033	24.0	6.81	2.5		
3.3	1	11.42	9.13	83.4	0.032	23.0	6.97	4.8		
6.6	2	11.38	8,93	81.6	0.032	23.0	6.98	5.2		
9.8	3	11,37	8.82	80.7	1.032	24.0	6.94	419		
13.1	4	11.36	8.18	80.2	0.632	24.0	6.94	4.8		
16.4	5	11.35	8.75	80.0	0.032	240	6.91	4.7		
19.7	6	11.35	8.72	79.8	0:032	24.0	6.91	4.7		
23.0	7	11.35	8.72	79.7	0.034	25.0	6,90	4.7		
26.2	8	11.33	8.72	79,7	0.034	25.0	6.87	5.1		
29.5	9	11.24	8.57	77.7	0.037	18.0	6.83	67		
32.8	10	11,18	8.37	76.2	0.037	28.0	6.81	6.9		
36.1	11	11.14	8.29	75.4	0.037	27.0	6.79	6.8		
39.4	12	11.10	8.25	75.0	0.036	26.0	6.77	6.7		
42.7	13	11.07	8,24	74.8	0.035	26.0	6.76	6.7		
45.9	14	1.62	8,27	75.1	0.034	25.0	6.75	6.2		N
49.2	15	1X	8.36	75.9	0.033	24.0	6.75	5.7		QC Check: water-knip
52.5	16	10,93	8.4B	76.3	0.035	26.0	6.73	8.6		not concert, field coen
55.8	17	10,91	8.43	76.3	1033	24.0	6.72	5.6		enor n185
59.1	18	10.89	8.49	76.8	0.033	24,0	6.69	5.6		should be 10.98%
62.3	19	10.91	8.53	77.0	0.033	24.0	6,68	5.3		
65.6	20	10.77	8.59	71.5	0.033	24.0	6.65	5.4		
68.9	21	10,76	8.62	17.8	0.033	24.0	6.64	5.3		
72.2	22	10.6B	8.65	77.9	0.033	24.0	6.63	5.6		
75.5	23	10.61	8.71	78.3	0.033	240	6.63	5.6		
78.7	24	10.51	8.7B	78.7	0.032	23.0	6.61	5.6		
82.0	25	10.40	8.85	7911	D.032	23.0	6.61	5.7		
85.3	26	10,16	8.96	79.9	0.032	23.0	6.58	611		
88.6	27	10.07	9.05	BOB	0.033	24.0	0.57	6.4		
91.9	28	10.04	9.05	80.3	0.032	23.0	6.57	1a.4		
95.1	29	10.01	9.17	81.2	0.032	23.0	6.56	6.6		
98.4	30	9.95	9.18	51.2	0.052	23.0	6.55	76		
101.7	31			_						
105.0	32									
108.3	33									
111.5	34									



nstrumen	t(S) used:	451 0	6920			Pers	sonnel: Bruc	5 HHC	н
Site I			11- SFSC			UTM (N	IAD27): N	14	
		12 115 N/ 4				Time:	10:45 AM	PAIN	OVERCAST, NO WIN
Note		147 .					TS 30	N,	0102(231, 100 pin
						In situ			
Temp		DO	Con	ductivity	рН	Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notes
(C)	(mg/l)	(%)	m\$/cm	µS/cm	- Pit	NTU	NTU	m	NOUSS
7.78	9.73	81.8	0.018	12	7.13	2.5		0.5m :	=7 bottom
Date	e: 14 tos:	12/15	5 - 12 - 3 5 A			UTM (N. Time: Weather:	AD27): N 11:14 am 36° Rai	IA N, OVER	CAST, NO WIND
	_					In situ			
Temp		DO	Cond	luctivity	рН	Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notes
(C)	(mg/l)	(%)	m5/cm	μS/cm		NTU	NTU	m	
7.34	9.52	79.0	0. 020	12	7.03	1.7		1.0m =	bottom
Site L Date Pho	C.							/ A \$ 22-5,07	SRCAST, NU WIND
Site L Date Pho Note	C.					UTM (N Time: Weather:		/ A \$ 2215,07	ERCAST, WWIND
Site L Date Pho Note	es:	xolate	brown -	right o	ster h	n situ			
Note		xolate	Cond	luctivity	ster h	n situ Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	
Note Temp (C)	es:	xolate 00 (%)	brown -	right o	pH	n situ	Turbidity		
Note Temp (C)	es: 	xolate 00 (%)	Cond m5/cm	luctivity µS/cm	pH	n situ Turbidity (YSI) NTU	Turbidity (Turbidimeter)	Secchi disk m	Notes lots of sediment
Note Temp (C) 7.34	25: (mg/l) 9.97 0.0cation: 5: 1 1 105: 1 1 105: 1 105:	(%) 87.0	Cond ms/cm 0.026	uctivity µS/cm [8	pH	n situ Turbidity (YSI) NTU 71.5	Turbidity (Turbidimeter) NTU AD27): <u>V (</u>	Secchi disk m Sim CO , 25 M	Notes lots of sediment
Temp (C) 7.34 Site L Date Phot	25: (mg/l) 9.97 0.0cation: 5: 1 1 105: 1 1 105: 1 105:	(%) 87.0	Cond ms/cm 0.026	uctivity µS/cm [8	рн (. 89	UTM (N/ Turbidity (YSI) NTU 71.5	Turbidity (Turbidimeter) NTU AD27): <u>V (</u> 13:15 38 DR.121	Secchi disk m Sim CO , 25 M	Notes lots of sodiment chocolate brown
Temp (C) 7.34 Site L Date Phot Note	25: (mg/l) 9.97 9.97 00cation: 2: 1 1 1 1 1 1 1 1 1 1 1 1 1	(%) 87.0	Cond ms/cm 0.026 - 14 - 5 5 2/A	uctivity µS/cm [8	рн (. 89	UTM (N/ Time: Weather:	Turbidity (Turbidimeter) NTU AD27): <u>V (</u>	Secchi disk m Sim CO , 25 M	Notes lots of sodiment chocolate brown
Temp (C) 9.34 Site L Date Phot Note	25: (mg/l) 9.97 9.97 00cation: 2: 1 1 1 1 1 1 1 1 1 1 1 1 1	20/24 (%) 87.0 25 12 1 19	Cond ms/cm 0.026 - 14 - 5 5 2/A	uctivity μS/cm [8 c	рн 6. 89	In situ Turbidity (YSI) NTU 71.5 UTM (N/ Time: Weather: n situ	Turbidity (Turbidimeter) NTU AD27): N (13:15 32 D(121 Turbidity	Secchi disk m Sm <0.25 M	Notes lots of sodiacat clocolate brown



Page 2 of 5 (0) SMUD In Situ Monitoring in the Upper American River Stillwater Sciences Project and Chili Bar Project Personnel: BRUCE HITCH Instrument(S) used: 151 6920 Site Location: <u>IS-15-SFAR</u> Date: <u>IM/2/15</u> Photos: <u>N/A</u> Notes: UTM (NAD27): NIA Time: 14:20 Weather: 46° KAIN, OVERCAST, NO WIND Notes: In situ Turbidity (Turbidimeter) Temp Turbidity (YSI) DO Conductivity Secchi disk pН Notes (0) (%) (mg/l) mS/cm NTU NTU µS/cm m 7.03 11.04 9.85 89.6 0.077 57 12.6 < 0.25

Date	c1	131	15			Time:	10:40		
Phot	os:	NIA				Weather:	44°, 6200	07. NO	WIND
Note	s: cho	colote	brown	Infter	main av	ent)			
						/			
					-	In situ	Turbidity	1	
Temp		00	Cond	uctivity		n situ Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	
Temp (C)	(mg/l)	00 (%)	Cond m5/cm	uctivity µS/cm	рН	1		Secchi disk	Notes

Date Phot		10/3					11:40		
Note		N)	~			vveatner:	445, FART	in clov	on, No W, ND
		ecel.A	bren.	~ lafe	-	event)			
				en s					
						In situ			
						in shu			
Temp	D	0	Condu	uctivity	рН	Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notes
Temp (C)	D (mg/l)	O (%)	Condu mS/cm	uctivity µS/cm			Turbidity (Turbidimeter) NTU	Secchi disk m	Notes

Date Pho Note	tos:	NIA	1.2		1	Weather:		TLY (10)	VOY, NO WIND
		ter we	s modera	tely cl	(h situ	event)		
Temp		DO	Conductivity		рН	Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notes
				Class	-	NTU	NTU	m	lious
(C)	(mg/l)	(%)	m\$/cm	μS/cm		HIG	1110		

March 2016 Draft Water Quality Monitoring Report



									* 5
(Ge	500	SMU) In Situ I	Annitoring	in the l	Jpper Amer	ican River		Page <u>3</u> of <u></u>
	Sciences			oject and			louir River		3 5
trument	(S) used:	451	6920	-		Pers	onnel: BT	H + KI	
Site L	ocation:	IS-	18- 5F	AR. HAN		UTM (N	AD27): 65 0	69264	0 4292674
Date Phot		3 15				Time: Weather:	13:40		ICIPE
Note		[A				vveatrier.	PARTLY CK	any, n	e wind SYPE
					_				
					1	n situ			
Temp		00	Cond	uctivity	pH	Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notes
(C)	(mg/l)	(%)	mS/cm	μS/cm	рн	NTU	NTU	m	
1.94	9.98	92.5	0.047	35.0	7.30	9.5		0.5	= Bottom
	-								
	ocation:	T5.	0 0			LITM /N	AD271- 11/0		
Sito				<u>cc</u>		Time:	AD27): N/A	1	
Site L		VIA				Weather:	SURDY,	clear,	Light wind 350
		VIA							0
Date	os:	VIA			_		0		
Date Phot	os:						0		
Date Phot	os:				1	n situ			
Date Phot	os: s:	00	Cond	uctivity			Turbidity (Turbidimeter)	Secchi disk	Notes
Date Phot Note	os: s:		Conda mS/cm	uctivity μS/cm	lı pH	n situ	Turbidity	Secchi disk	Notes
Date Phot Note	os:	DO (%)				n situ Turbidity (YSI)	Turbidity (Turbidimeter)		Notes

Photo Notes		18					sound .	Clear	light wind 37°F
	92					In situ			
Temp		00	Conductivity		pH	Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notes
(C)	(mg/l)	(%)	m\$/cm	μS/cm	- pit	NTU	NTU	m	Notes
7.83	9.30	78.2	0.018	12.0	7.31	1.9		0.5	= Bottom



	Sciences	SMUD			-	Jpper Amer Ir Project	ican River		Page <u>3</u> of <u>5</u> 4
strument	(S) used:	45	6920	2		Pers	onnel: BT	H+KI	ec.
Site L	ocation:	TS-	5-60	1		UTM (N	AD27): N/6	-	
Date	: <u> </u>	14/15	24			Time:	10:35		
Phot Note		A				Weather:	SURNY, C	lear, SI	ight breeze 38 F
NOLE	o								
						In situ			
Temp	D	0	Cond	luctivity	pH	pH Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notes
(C)	(mg/l)	(%)	m5/cm	μS/cm		NTU	NTU	m	
3.77	9.77	74.1	0.017	10.0	7.16	1.6		1.0	= Bottom
Site L Date	ocation:	IS- [4]15	4- 6C			UTM (N Weather:	AD27): N/A	1 (005. S	ilight breeze 30
Note	is:	115				- (1152.535.55)	Spragge		and the second
						In situ			
	p DO Conductivity					Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	
Temp	0	0	Sont		DH		1		Notes
Temp (C)	(mg/l)	(%)	mS/cm	μS/cm	pH	NTU	NTU	m	Notes



Stillwater strument		44	51 692	-0		Pers	onnel: BT	H + KK	c
	ocation: : <u> \</u> os: <u>N</u>	IS					AD27): N/	ik old, su	non
					1	In situ			
Temp	D	o	Cond	ductivity	pН	Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	Notes
(C)	(mg/l)	(%)	mS/cm	μS/cm		NTU	NTU	m	
0.09	10.01	Bo.b	0.006	5.0	7.7B	1.2		2m	=Bottom
Site L Date Phot Note		IS- 5/15 14	- 3 - L	RR		UTM (N/ Time: Weather:	AD27): NA 16:00 Subry, C	lear, C.	sld
	s:	IS- 5/15 A		R.R.		UTM (N. Time: Weather: In situ Turbidity (YSI)	Turbidity	Secchi disk	
Note	s:					n situ		_	Notes
Note Temp (C)	s:	0	Cont	ductivity		<i>n situ</i> Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	
Note Temp (C)	S: D 	0 {%)	Cone m5/cm	ductivity μS/cm	рн	n situ Turbidity (YSI) NTU	Turbidity (Turbidimeter)	Secchi disk	Notes
Note Temp (C)	S: D 	0 {%)	Cone m5/cm	ductivity μS/cm	рн	n situ Turbidity (YSI) NTU	Turbidity (Turbidimeter)	Secchi disk	Notes
Note	s: 	0 (%) 82.4	Conc mS/cm D-CO9	ductivity μS/cm (σ · Ο	рн 	In situ Turbidity (YSI) NTU (.4	Turbidity (Turbidimeter) NTU	Secchi disk m (.0	Notes = Bottom
Note	s: (mg/l) 9.58	0 (%) 82.4	Conc mS/cm D-CO9	ductivity μS/cm	рн 	n situ Turbidity (YSI) NTU (4	Turbidity (Turbidimeter) NTU	Secchi disk m (.0	Notes = Bottom
Note Temp (C) 3.85 Site L Date	s: (mg/l) 9.58 ocation:	0 (%) 82.4	Conc mS/cm D-CO9	ductivity μS/cm (σ · Ο	рн 	UTM (NJ Turbidity (YSI) NTU (.4) UTM (NJ Time:	Turbidity (Turbidimeter) NTU	Secchi disk m (.0	Notes = Bottom
Note Temp (C) 3.85 Site L Date Phot	s: (mg/l) 9.58 ocation:	0 (%) 82.4	Conc mS/cm D-CO9	ductivity μS/cm (σ · Ο	рн - 7. 44	UTM (NJ Turbidity (YSI) NTU (.4) UTM (NJ Time:	Turbidity (Turbidimeter) NTU AD27):	Secchi disk m (.0	Notes = Bottom
Note Temp (C) 8.55 Site L Date Phot	s: (mg/l) 9.58 0cation: os:	0 (%) 82.4	Conc ms/cm 0.009	ductivity μS/cm (σ · Ο	рн - 7. 44	UTM (N. Turbidity (YSI) NTU (4 UTM (N. Time: Weather:	Turbidity (Turbidimeter) NTU	Secchi disk m (.0	Notes = Bottom



Site L Date Phot Note	ocation:		6720	>		Pers	onnel: <u>BT</u>	H+KK	ic.
Phot		IS-	8-80	SERR.		UTM (N	AD27): 105	0725	526 4314742 slight breeze \$3
Note	OS: N	1A'				Weather:	SURNY, C	leas,	slight breeze 33
Hote	is:	pstreau	80				0		0
						In situ			
Temp		00	Conr	luctivity		Turbidity (YSI)	Turbidity (Turbidimeter)	Secchi disk	
(C)	(mg/l)	(%)	mS/cm	μS/cm	рН	NTU	NTU	m	Notes
5.77	6.15	81.0	0.018	12.0	6.96	1.7		2.5	= Bottom
Note	s:					-	. 0.	1-	0
		00	Cond	luctivity	1	n situ	Turbidity		ght breeze 37°F
Note Temp (C)			Cond mS/cm	luctivity µS/cm	pH	al and		Secchi disk	Notes
Temp (C)	(mg/l)	00 (%) 73.9				n situ Turbidity (YSI) NTU	Turbidity (Turbidimeter)	Secchi disk	Notes
Temp (C) 7.39 Site L Date Phot	(mg/l) 8.88 ocation:	(%) 73.9	ms/cm 0.015	μS/cm	pH	In situ Turbidity (YSI) NTU 3.4 UTM (N Time:	Turbidity (Turbidimeter)	Secchi disk m D.25	Notes = Bottom
Temp (C) 7.39 Site L Date	(mg/l) 8.88 ocation:	(%) 73.9 IS-	ms/cm 0.015	μS/cm	pH	In situ Turbidity (YSI) NTU 3.4 UTM (N Time:	Turbidity (Turbidimeter) NTU AD27): NA (3:45	Secchi disk m D.25	Notes = Bottom
Temp (C) 7.39 Site L Date Phot	(mg/l) 8.88 ocation:	(%) 73.9 IS-	ms/cm 0.015	μS/cm	рн 6.5-7	In situ Turbidity (YSI) NTU 3 . 4 UTM (N/ Time: Weather:	Turbidity (Turbidimeter) NTU AD27): NA (3:45	Secchi disk m D.25	Notes = Bottom
Temp (C) 7.39 Site L Date Phot	(mg/l) 8.88 ocation:	(%) 73.9 IS-	ms/cm 0.015	μS/cm	рн 6.5-7	In situ Turbidity (YSI) NTU 3.4 UTM (N Time:	Turbidity (Turbidimeter) NTU AD27): NA (3:45	Secchi disk m D.25	Notes = Bottom
Temp (C) 7.39 Site L Date Phot Note	(mg/l) 8.88 ocation:	(%) 73.9 IS- 5[15 A	ms/cm 0.015	μ\$/cm 10.0	рн 6.5-7	In situ Turbidity (YSI) NTU 3.4 UTM (N/ Time: Weather: In situ Turbidity (YSI) NTU	Turbidity (Turbidimeter) NTU AD27): N/A (3:45 Sunny, Cal	Secchi disk m D · 2 5	Notes
Temp (C) 7.39 Site L Date Phot Note	(mg/l) 8.88 ocation:	(%) 73.9 <u>IS-</u> 5[15 /A	ms/cm 0.015 - 1 - R	µS/cm	рн 6.5-7	In situ Turbidity (YSI) NTU 3 . 4 UTM (NU Time: Weather: In situ Turbidity (YSI)	Turbidity (Turbidimeter) NTU AD27): N/A (3:45 Suboy, Cal Turbidity (Turbidity (Turbidimeter)	Secchi disk	Notes = Bottom



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APPENDIX D In situ Field Calibration Sheets



(Stillwater Sciences

pgl of 2 Water Quality YSI 6920 Sonde Calibration - Daily Use

Project: SMUD WQ

Unit ID: 6920

Sampling Event Date(s): 824150NLY

Barometric Pressure

	PRE-SAMPLING	POST SAMPLING
Altitude (Aft):	ft	ft
Barometric Pressure (BPin):	in	in
Barometric Pressure (BP _{mmHg}) = BP _{in} x 25.4	mmHg	mmHg
Corrected BP (BP') = BP_{mmHg} - 2.5 x (A _{ft} /100)	mmHg	mmHg

INITIAL PRE-SAMPLING CALIBRATION 0.

Date and time	8/23	[15 @	21:00	Name CMB
---------------	------	-------	-------	----------

Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1,000	17.46	1049	1000	
Cond (uS/cm @ 25°C)	10,000	18.24	9871	9871	
DO (%)	ÓN	DAL 0	E SURV		
D0 (mg/L)*		DIAY OF	SURV		Check table*
pH4	pH4	17.71	-	3.9 D	OK
рН 7	pH 7	19.06	7.29	7.00	or
pH 10	pH 10	18.33	9.7698	349.92 /10.	00 of
Turbidity NTU	0				
Turbidity NTV	12.7	18.37	12.4	12.7 OK	
*DO Solubility Table:	Temp (°C)	D()mg/	/L	

Post - Turbidity meter: 1000wtv (reading= 1002); 10.0 WTv (reading= 10.04); 0.02 (reading=0.02) readings POST-SAMPLING CHECK & RECALIBRATION Date and time <u>B(24)15C1030</u> Name CMB

Parameter	Std.	Std.	y of sam Post-	1	Re-Cal.	Post-Cal	Notes
T urumeter	Value	Temp (°C)	Sampling Value ¹	~	Yes or No	Value	
Cond (uS/cm @ 25°C)							
Cond (uS/cm @ 25°C)							
DO (%)		21.62	80.4		21.64	82,2	625,2 MMH9
DO (mg/L)		21.42	7.07		21.64	7.24	Check table
pH4	pH4						
pH 7	pH 7	18.060	6.83				
pH 10	pH 10	12.72	10.08				
Turbidity			· ·				
Turbidity							
*DO Solubility Table: 1	emp (°C)	21.62	DO 7.2 1	ng/L	/		
✓ = Post Calibration o	r Sampli	ng value a	ccepted (Tab	le 1)			



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pg Lof 2

Date and time 928/15 C 1820 Name CHEISTINA BU Name CHRISTINA BUCK

Parameter	Std.	Std.	Post-		Re-Cal.	Post-Cal	Notes
	Value	Temp	Sampling	1	Yes	Value	ALLOK
		(°C)	Value	km	or No		1401-
Cond (uS/cm @ 25°C	1,000	24.47	MARA 0 99	ov.	NO		
Cond (uS/cm @ 25°C	10,000	25.04	0144 9.859	5 V	RECAL		
DO (%)		2.23.79	82.870		ON		628.5 Daro
DO (mg/L)		23.79	6.99	1	9/25/15		Check table
pH4	pH4	24.27	3.89	V,	1-21.5		
рН 7	pH 7	23.87	6.96	1			
pH 10	pH 10	23.58	9.97	1			
Turbidity	12.7	22.66	12.6	\checkmark	, V		
Turbidity					V		
*DO Solubility Table:	Temp (°	C).	DO	mg/	'L		

✓ = Post Calibration or Sampling value accepted (see Table 1 for MQOS) Turbidity Meter (1000NTU = 969.2); IONTV = 10.221; O.OLNTU = 0.33NTU) FIELD CALIBRATION CHECK/RECALIBRATION

Date

____ and time__

Parameter	Std. Value	Std. Temp (°C)	Post- Sampling Value ¹	~	Re-Cal. Yes or No	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)							
Cond (uS/cm @ 25°C)							
DO (%)							(52015 Bar
DO (mg/L)							Check table
pH4	pH4						
pH 7	pH 7						
pH 10	pH 10						
Turbidity			2				
Turbidity							
*DO Solubi	lity Table	e: Temp (°C)	DO_	mg/	/L	

✓ = Post Calibration or Sampling value accepted (see Table 1 for MQOs)

Notes:

1. *= DO std. Temp & Std Value are based on table to check if within range.

Table 1: Measurement Quality Objectives - comparisons are between post-sampling value and post-calibration value

Parameter	Units	Accept	Qualify	Reject
Temperature	°C	\leq 0.2	> 0.2 and ≤ 0.5	> 0.5
Dissolved oxygen	% saturation	≤5%	$>5\%$ and $\leq10\%$	> 10%
Conductivity ²	uS/cm	$\leq 5\%$	$>5\%$ and $\leq15\%$	> 15%
pН	s.u.	≤ 0.2	> 0.2 and ≤ 0.5	> 0.5
Turbidity	NTU	\leq 5%	$>$ 5% and $\leq 10\%$	> 10%



(com) pg __ of ___ Stillwater Sciences Water Quality YSI 6920 Sonde Calibration - Daily Use Project: UARP - WQ In Situ Riverine Unit ID: 151 6920 Sampling Event Date(s): 8-25 - 2015 **Barometric Pressure** PRE-SAMPLING POST SAMPLING Altitude (Aft): 1976 8 ft Barometric Pressure (BPin): in in Barometric Pressure (BP_{mmHg}) = BP_{in} x 25.4 624.7 mmHg mmHg Corrected BP (BP') = BP_{mmHg} - 2.5 x (A_{ft} /100) mmHg mmHg INITIAL PRE-SAMPLING CALIBRATION 9:05 AM Name BRUG HITCH, CHRISTINA BUCK Date and time 8/25/15 9:05 Am Parameter Std. Std. Pre-Cal Post-Cal Notes Value ** Temp Value Value (°C) SpCond Cond (uS/cm @ 25°C) 1000 16.07 0.997 1.001 10.01 Cond (uS/cm @ 25°C) 15.82 10000 DO (%) 13.78 82.2 82.3 8 Ang Check table* S. 2 D0 (mg/L)* 15. Z3 8.30 8.26 pH4 pH4 3.87 17.67 4.00 7.00 pH7 pH7 17.41 6.93 pH 10 pH 10-9.92 9.86 16.52 Turbidity 12.7 12.6 12.7 15.10 PEC POST 10.0NTV (10.13NTV) POST (10.0) Turbidity *DO Solubility Table: Temp (°C). DO 0.02NTN (0.01NTV) POJT (0.03) _mg/L 994.9 COONTL **POST-SAMPLING CHECK & RECALIBRATION** Date and time _ 8/26/15 Name BRICS HITCH CHRISTINA BUCK Parameter Std. Std. Post-Re-Cal. Post-Cal Notes Value Temp Sampling 1 Yes Value or No ** (°C) Value¹ 3 Cond (uS/cm @ 25°C) 24.17 9.870 10100 Cond (uS/cm @ 25°C) 600 23.02 1002 -No 651.7 DO (%) 23.45 \$ 89.5 France Check table

*D0 (mg/L) 7.497.15 4 pH4 pH4 25.25 4.04 ~ 1 pH7 pH7 25.65 7.00 pH 10 pH 10 ~ 25.01 10.00 Turbidity 12.6 22.83 13.4 YES Turbidity *DO Solubility Table: Temp (°C) <u>3.45</u> DO <u>7.1</u> mg/L ✓ = Post Calibration or Sampling value accepted (Table 1)

Sp Cond std units mS/cm; readings in mS/cm



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FIELD CALIBRATION CHECK/RECALIBRATION Date and time 8-27-20,5 16:00 Name Back Hirth

Parameter	Std. Value	Std. Temp (°C)	Post- Sampling Value	~	Re-Cal. Yes or No	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)							
Cond (uS/cm @ 25°C)							
DO (%)		22.20	89.9			88.6	
D0 (mg/L)		2第31	7.3%				Check table
pH4	pH4						
pH 7	pH 7						
pH 10	pH 10						9.9 8- 6
Turbidity							10 (NTL) (1000) (10
Turbidity			,				0.02 0.7 0.1
*DO Solubility Table:	Temp (°	C)	DO 613.	5 mg/	/L	100	

✓ = Post Calibration or Sampling value accepted (see Table 1 for MQOs)

FIELD CALIBRATION CHECK/RECALIBRATION Date 0-28-20-5 and time Bese North

Parameter	Std. Value	Std. Temp (°C)	Post- Sampling Value ¹	1	Re-Cal. Yes or No	Post-Cal Value	Notes	
Cond (uS/cm @ 25°C)	10000	26.99	9.90	/				
Cond (uS/cm @ 25°C)	1000	26.38	1007	1				
DO (%)		23.6	95.3	1			710. 3	3
D0 (mg/L)			8.08	1			Check tabl	e
pH4	pH4	26.69	4.07	1				
рН 7	pH 7	25.78	7.02	7			PRE	Post
pH 10	pH 10	25.57	9.97	1		060	100 %	945.1
Turbidity		24.74	12.5	1		10	0.98	10.0
Turbidity						0.02	0.01	0.02
*DO Solubi	lity Tabl	e: Temp (°C)	D0	mg/	/L		

✓ = Post Calibration or Sampling value accepted (see Table 1 for MQOs)

Notes:

1. *= DO std. Temp & Std Value are based on table to check if within range.

Table 1: Measurement Quality Objectives - comparisons are between post-sampling value and post-calibration
value

Parameter	Units Accept Qualify		Qualify	Reject
Temperature	°C	≤ 0.2	> 0.2 and ≤ 0.5	> 0.5
Dissolved oxygen	% saturation	≤ 5%	$>5\%$ and $\le10\%$	> 10%
Conductivity ²	uS/cm	\leq 5%	$>$ 5% and \leq 15%	> 15%
pH	s.u.	\leq 0.2	> 0.2 and ≤ 0.5	> 0.5
Turbidity	NTU	\leq 5%	$>5\%$ and $\le10\%$	> 10%



Stillwater Sciences		1020 6	/SI 6920 Son	de Ca	alibration –		<u>, /</u> of <u>3</u>
Project: VARP	Reservo	or Jusi	tv				
Unit ID: L	920						
			5.5				
Sampling Event Date	(s): 10	19 - 10	0/23				
Barometric Pressure							
Altinuda (A.)			PRE-S	AMP	And a state of the	POST SAMPL	
Altitude (A _{ft}):	00.1				ft		ft
Barometric Pressure (I		DD 25 4			in		in
Barometric Pressure (I Corrected BP (BP') = B			n	_	mmHg		mmHg
corrected br (br) = b	r mmHg * 2	$5 \times (A_{ft} / 100)$)		mmHg		mmHg
Date and time _ Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value		Post-Cal Value	Notes	
Cond (uS/cm @ 25°C)	10 000	19-36			10.00		
Cond (uS/cm @ 25°C)		19.8	\$8 0	57	10.00		
DO (%)	1000	16.38	80.5	100	1.00		
DO (mg/L)*		16.50				Check table* (03 5
pH4	pH4	18.94	4.04		3.98	-	
pH 7	pH 7	18.85			7.00		
pH 10	pH 10	19.36	2.81		10.00		
Turbidity	12.7	17.78			12.6		
Turbidity							
*DO Solubility Table:	Temp (°C)		DOr	ng/L	0. 2		
SpCond Std wits = M Date and time	10)20	POST-SAM 12:00	PLING CHEC	s = N K & F ne	BRVC5	h met	
Parameter	Std. Value ★★	Std. Temp (°C)	Post- Sampling Value ¹ ¥¥	1	Re-Cal. Yes or No	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1000	19.21	875	V			
Cond (uS/cm @ 25°C)	10000	17.43	8535 1	1			Q
DO (%)		15.	8.265	4			630.4
DO (mg/L)			83.42	~			Check table 🔗
pH4	pH4	18.17	4.36	7			
	pH 7	16.75	7.04	2			
рН 7		1.4	10.00	1			
рН 7 pH 10	pH 10	18.69		-			
рН 7	pH 10	12.57	12.2	7			



Stillwater Sciences	ne <u>10 / 2</u>		LIBRATION C				pg <u>∠</u> of <u>3</u>
Parameter	Std. Value 4 *	Std. Temp (°C)	Post- Sampling Value 券⊁	1	Re-Cal. Yes or No	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1000	70.31	.889	2			Q
Cond (uS/cm @ 25°C)	10 000	19.93	8.901	-			0
DO (%)		17.50	81.80	1			627.2
D0 (mg/L)			8.0	-			Check table 8.1
pH4	pH4	20.23	4.23	2			
pH 7	pH7	20.37	7.18	1			
pH 10	pH 10	19.95	10.07	-			
Turbidity	12.7	18.91	12.4	7			
Turbidity							
*DO Solubility Table:	Temn (%	")	DO	mg	/1		

✓ = Post Calibration or Sampling value accepted (see Table 1 for MQOs)

FIELD CALIBRATION CHECK/RECALIBRATION Date 10/23 10:00 and time BRuce UncH

Parameter	Std. Value ¥¥	Std. Temp (°C)	Post- Sampling Value ¹ XX	1	Re-Cal. Yes or No	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)	1000	18.40	859	1	4755		0
Cond (uS/cm @ 25°C)	10 000	18.42	8404	-			Q
DO (%)		\$ 17.5	83.7	-			641.9
D0 (mg/L)		17.5	8. 11	C			Check table 3. 👩
pH4	pH4	18.32	4-23	~			
рН 7	pH 7	17.92	7.24	1			
pH 10	pH 10	17.87	10.00	4			
Turbidity	12.7	17.47)2.)	1			
Turbidity							
*DO Solubi	lity Table	e: Temp (°C)	DO	mg	/L	

✓ = Post Calibration or Sampling value accepted (see Table 1 for MQOs)

Notes:

1. *= DO std. Temp & Std Value are based on table to check if within range.

Table 1: Measurement Quality Objectives – comparisons are between post-sampling value and post-calibration value

Parameter	Units	Accept	Qualify	Reject
Temperature	°C	≤ 0.2	>0.2 and ≤0.5	> 0.5
Dissolved oxygen	% saturation	≤ 5%	> 5% and ≤ 10%	> 10%
Conductivity ²	uS/cm	≤ 5%	$> 5\%$ and $\le 15\%$	> 15%
pН	s.u.	≤ 0.2	> 0.2 and ≤ 0.5	> 0.5
Turbidity	NTU	$\leq 5\%$	$> 5\%$ and $\le 10\%$	> 10%

** Sp Cand Std units = uS/cm; YSI calibration readings = mS/cm



Project: UARP +	CB V	19 mor	n toring (n	20 Y OC	2015)	3.5.4	
Unit ID: 751 6			0				
Unit ID:							
Sampling Event Date(s): 10/	2 - 11/	7				
2 805							
Barometric Pressure	20-01-0-0-		000			DOCT OLIVER	
Altitude (A.).			PRE-S	АМР		POST SAMPL	
Altitude (Aft):	DD).				ft		ft
Barometric Pressure (H	And a state of the	00			in		in
Barometric Pressure (H					mmHg		mmHg
Corrected BP (BP') = B	mmHg = 2.3	$X(A_{ft}/10)$	0)		mmHg		mmHg
		INITIAI	PRE-SAMPLI	NGO	ALIBRATIC)N	
Date and time _	1/2 1	0:13 am	Name	13	RUCE 4	TRH	
Parameter	Std.	Std.	Pre-Cal		Post-Cal	Notes	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
	Value	Temp (°C)	Value 🔫	r	Value		
Cond (uS/cm @ 25°C)	1000	18.13	788 O.	987	15=1.004		
Cond (uS/cm @ 25°C)	10 000	17.42			9.991		
DO (%)	-	14:31 85.4		4	40.3 mm 4		
DO (mg/L)*		14.31 8.73 8.42 0		Check table*	8.6 mm 4		
pH4	pH4	17.98	4.34		4.00		
pH 7	pH 7	18.13	61880	.93	7.00		
pH 10	pH 10	17.95	9.97		10.00		
Turbidity	12.7	17.51	12.0		12.7		
Turbidity		11110					
*DO Solubility Table:				ng/L			
** Conductivity unit Date and time Parameter	in the second second	POST-SAM	IPLING CHECH	(& R ne1	Re-Cal.	FION Free H Post-Cal	Notes
	Value ★ ×	Temp (°C)	Sampling Value¹ ⊀★	1	Yes or No	Value	
Cond (uS/cm @ 25°C)	1000	16.85					Q
Cond (uS/cm @ 25°C)	10000	16. 59	10.07 75%	~			
DO (%)		16.93	3.17	>			218.3
DO (mg/L)		16.93	8.17	4			Check table 9
pH4	pH4	17.04	4.07	V			
pH 7	pH 7	17.06	7.08	1			
pH 10	pH 10	17.12	9.98	7			
	12.7	16.38	12.8	2			
Turbidity		and the second second	and the second				
			DO n	ng/L			

Ver, 8/2015



Stillwater Sciences Date and tim	ne <u>11/5</u>	FIELD CA	LIBRATION C	HECH ame_	K/RECALIE	RATION	pg 2 of 4
Parameter	Std. Value ⊀★	Std. Temp (°C)	Post- Sampling Value ¥¥	1	Re-Cal. Yes or No	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)		14.85	812 1.00	81	785		
Cond (uS/cm @ 25°C)	10 000	15.98	10.02	1			
DO (%)			93.5				725.5
DO (mg/L)		17.32	9.0	1			Check table 9.2
pH4	pH4	14.50	4.04	1			
pH 7	pH 7	14.74	7.07	7			
pH 10	pH 10	15.07	9.90	1			
Turbidity	12.7	16.80	13.5	1			
Turbidity							
*DO Solubility Table:	Temp (°	<i>;</i>).	DO	mg/	L		

✓ = Post Calibration or Sampling value accepted (see Table 1 for MQOs)

FIELD CALIBRATION CHECK/RECALIBRATION Date 11 1 5 6:50 and time Bruce Hire

××	Temp (°C)	Sampling Value ¹ **	1	Yes or No	Post-Cal Value	Notes
10000	16.64	9.978	1			
1000	15.87	865	V			Q
	17.42	93. 8	>			733.7
		8.98	U			Check table" 9.2
pH4	16.69	4.08	7			
pH7	14.43	7.05	7			
pH 10	16.23	7. 94	1			
12.7	18.20	12.9	1			
	ооо рН4 рН 7 рН 10 г. 7	0000 Jb. 64 1000 IS. 87 17.42 pH4 16.69 pH7 16.43 pH10 16.23 2.7 18.20	0000 16.64 9.978 1000 15.87 365 17.42 93.8 8.98 pH4 16.69 4.08 pH7 16.93 16.28 7.94	0000 16.64 9.978 1000 15.87 865 V 17.42 93.8 V 8.98 V pH4 16.69 4.08 V pH7 16.43 7.03 V pH10 16.28 9.94 V 2.7 18.20 12.9 V	0000 16.64 9.978 1 1000 15.87 865 1 17.42 93.8 1 8.98 1 1 001 16.69 4.08 1 001 16.43 7.05 1 001 16.28 9.94 1 001 16.28 9.94 1 001 16.28 12.9 1	0000 16.64 9.978 1 1000 15.87 365 1 17.42 93.8 1 8.98 1 001 16.69 1 001 16.43 7.03 1 001 16.28 9.94 1 001 18.20 12.9 1

*DO Solubility Table: Temp (°C)_____ DO ____mg/L
✓ = Post Calibration or Sampling value accepted (see Table 1 for MQOs)

* = Post calibration or sampling value accepted (see Table 1 for MQUS) # Conductivity units on YSI 6920 are ms/cm; \$ Cond Std units=uS/cm Notes:

1. *= DO std. Temp & Std Value are based on table to check if within range.

Table 1: Measurement Quality Objectives – comparisons are between post-sampling value and post-calibration value

Parameter	Units	Accept	Qualify	Reject
Temperature	°C	≤ 0.2	> 0.2 and ≤ 0.5	> 0.5
Dissolved oxygen	% saturation	$\leq 5\%$	$>$ 5% and \leq 10%	> 10%
Conductivity ²	uS/cm	≤ 5%	$> 5\%$ and $\le 15\%$	> 15%
pН	s.u.	≤ 0.2	>0.2 and ≤0.5	> 0.5
Turbidity	NTU	<u>≤</u> 5%	$>$ 5% and \leq 10%	> 10%



e_11]-						pg 🖗 of 🥰
Std. Value ⊮⊁	Std. Temp (°C)	Post- Sampling Value ★★	~	Re-Cal. Yes or No	Post-Cal Value	Notes
1000	18.77	1.033	7			
10.000	18.99	10.01	~			
	ARA	93.1				733.2
	19.5	8.65	1			Check table* 8.8
pH4	18.53	4.02	1			
pH 7	18.48	7.00	1			
pH 10		10.0)	Y			
12.7	18.72	12.8	1			
Temp (°	C)	DO	_mg/	/L		
or Samp	S/CM; 45	accepted (se	e Ta M M	ble 1 for M Ladings = V K/RECALIB	QOS) NS/CM RATION	
	Std. Value ★★ /000 10.000	e 11 7 9:50 Std. Std. Value Temp ★★ (°C) /000 /8.77 10.000 18.77 10.000 18.77 10.000 18.75 pH4 18.53 pH7 18.48 pH7 18.48 pH10 18.48 /2.7 18.72 Temp (°C). or Sampling value	$e - 11 7 $ θ : 50 m N Std. Std. Post- Value Temp Sampling χ * (°C) Value $\frac{\chi}{\chi}$ /000 /8.77 1.033 /0.001 18.77 10.01 /0.001 18.77 93.1 /19.5 8.45 pH4 18.53 4.02 pH7 18.48 10.01 /2.7 (8.72)2.8 Temp (°C) D0 D0 or Sampling value accepted (see 18.00	e 11 7 0:50 m Name_ Std. Std. Post- Value Temp Sampling ✓ ★★ (°C) Value ★★ /000 /8.77 /.033 ✓ 10.000 /8.77 /.000 ✓ 11.033 ✓ 11.030 ✓	$e 7 $ $\theta: 50 e_{h}$ Name $Beves Hr$ Std. Std. Post- Re-Cal. Value Temp Sampling \checkmark Yes $or No$ $\sqrt{000}$ $I8.77$ $I.033$ \checkmark Ves $or No$ $Io.coc$ $I8.77$ $I.033$ \checkmark Ves $or No$ $Io.coc$ $I8.77$ $I.033$ \checkmark $Io.coc$ $Ie.79$ $Io.coc$ $Ie.79$ $Io.coc$ $Io.coc$ $I8.77$ $I.033$ \checkmark $Io.coc$ $Ie.79$ $Io.coc$ $Ie.79$ $Io.coc$ $PH4$ $I8.53$ $Ie.occ$ \sim $Ie.79$ $Ie.70$ \sim $Ie.77$ $Ie.72$ <t< td=""><td>Std. Std. Post- Sampling Value Re-Cal. Ves or No Post-Cal Value \checkmark \land \land \lor \lor \lor \lor \lor \land \land \land \lor <</td></t<>	Std. Std. Post- Sampling Value Re-Cal. Ves or No Post-Cal Value \checkmark \land \land \lor \lor \lor \lor \lor \land \land \land \lor <

Parameter	Std. Value	Std. Temp (°C)	Post- Sampling Value ¹	1	Re-Cal. Yes or No	Post-Cal Value	Notes
Cond (uS/cm @ 25°C)							
Cond (uS/cm @ 25°C)							
DO (%)							
DO (mg/L)							Check table
pH4	pH4						
pH 7	pH 7						
pH 10	pH 10					10	
Turbidity							
Turbidity							
*DO Solubi	ility Tabl	e: Temp	(°C)	DO_	mg,	/L	

✓ = Post Calibration or Sampling value accepted (see Table 1 for MQOs)

Notes:

1. *= DO std. Temp & Std Value are based on table to check if within range.

Table 1: Measurement Quality Objectives - comparisons are between post-sampling value and post-calibration value

Parameter	Units	Accept	Qualify	Reject
Temperature	°C	≤ 0.2	≥ 0.2 and ≤ 0.5	> 0.5
Dissolved oxygen	% saturation	≤ 5%	$>5\%$ and $\le10\%$	> 10%
Conductivity ²	uS/cm	$\leq 5\%$	$>5\%$ and $\leq15\%$	> 15%
pН	s.u.	≤ 0.2	> 0.2 and ≤ 0.5	> 0.5
Turbidity	NTU	≤ 5%	$> 5\%$ and $\le 10\%$	> 10%



Project: UARP	CB R	ESERVAIR	NO MON	TO	2100 (20	15)			
Unit ID: <u>75</u> , 69	20				<u> </u>				
Sampling Event Date	(a) 11/5	- 11/a							
Sampning Event Date	(3).								
Barometric Pressure			DDD			DOCTORING			
Albin J. (A.)			PRE-S	AMP		POST SAMPL			
Altitude (A _{ft}):	00.1			_	ft		ft		
Barometric Pressure (I		00			in		in		
Barometric Pressure (I				_	mmHg		mmHg		
Corrected BP (BP') = B	PmmHg = 2.5	$X(A_{ft}/100)$)	_	mmHg		mmHg		
Parameter	Std. Value	Std. Temp (°C)	Pre-Cal Value			Notes			
Cond (uS/cm @ 25°C)	1.000	18.10	1.002		1.000				
Cond (uS/cm @ 25°C)	10.000	17.89	9.928		10.000	-			
DO (%)		18.26	92.7		95.6				
DO (mg/L)*			8.7		8.98	Check table" 727. 2 mm/ Ha			
pH4	pH4	18.09	4.13		4.00		0		
pH 7	pH 7	18.15	4.89		7.00				
pH 10	pH 10	18.11	9.98		10.00				
Turbidity	12.7	17.44	13.2		12.7				
Turbidity									
*DO Solubility Table:	Тетр (⁰ С)		D0n	ng/L					
Date and time		11:00	PLING CHECI		Kelleige	Crowe	Natar		
rarameter	Value	Std. Temp (°C)	Post- Sampling Value ¹	1	Re-Cal. Yes or No	Post-Cal Value	Notes		
Cond (uS/cm @ 25°C)	1,000	N.82	1.021	V					
Cond (uS/cm @ 25°C)	10,000	11.62	10.83	V					
DO (%)		12.02	10.41	V		-			
	-		96.4%	V			Check table* 10.4		
	pH4	11.72	4.00	V			733.6 mm		
pH4							a second s		
рН4 рН 7	pH 7	(1.49	6.96	V					
*DO (mg/L) pH4 pH 7 pH 10 Turbidity		(1.49 11.32 10.80	6.96 9.85 12.2	12					

Ver, 8/2015



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APPENDIX E Analytical Laboratory Bacteria Reports



CALIFORNIA LABORATORY SERVICES 3249 Fitzgerald Road Rancho Cordova, CA95742

September 09, 2015

CLS Work Order#: CYI0080 COC#:

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

Project Name: SMUD In situ and Bac-T Monitoring

Enclosed are the results of analyses for samples received by the laboratory on 09/01/15 16:43. 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

5 Telegraph Ave., Suite 400 reley, CA 94705				Project Number: [none] Project Manager: Maia Singer					In situ and Bac-T Monitoring CLS Work Order #: CY10080 ger COC #:							
C/	LIFORN	IA LABORATORY	ERVIC	ES CHAIN	OF CU	STODY		CLS	5 ID. 1	NO	CYIOO	80		_		(of
		Report To:		Client Job Number Destination Laboratory				AN	ANALYSIS REQUESTED GEOTR				(TRA	CKE	R	
285		Ave. Suite 400					PRESERVATIVES	Feca	Fecal	E. coli	EDI	REF	ORT		YES X INO	
	celey, CA 9	4705		3249	(916) 6 Fitzgerak	d Road		l coli	Fecal coliform-20 Tube				GLOBAL ID.			
Ma	ia Singer m	aia@stillwatersci.com		Ranc 9574	ho Cordo	va, CA	R	form	orm							
SM	t Name UD In situ	and Bac-T Monitoring		95/42 www.californialab.com				1-15	-20 T			FIELD CONDITIONS				
KK	ed By C + Bri	н						lube	ube					13		15
	Job Description Monitor seasonal bacteria levels in UARP and CB reaches.															
Site L	Site Location UARP											TURN. TIME			UND	SPECIAL INSTRUCTIONS
DAT	E TIME	SAMPLE	FIELD		CON	TAINER						1	2	3	5	2.
2000	201 - SC 2022	IDENTIFICATION	ID.	MATRIX	NO.	TYPE			_			-	<u>.</u>	С.,	- 20	
		WART-REIK- BART. 1		Surface water			6	X	-	×			_	_	X	
		WARP-RSVR- BACT-2		Surface water			6	X	-	X			_	_	X	
1/1/1	15 14:30	VARD - REVR -BONT - 3		Surface water		10	6	x	_	×	_		_	-	X	
1/1/	15 13:50	LARP-ROVR-BUT-4		Surface water			6	×	_	X			_	-	X	
2/11	ws 14:30	WARP-RSVR-BOOT-5		Surface water			6	X	-	x			_		X	
21.1	14:45	LARP . POVR - BET . 6		Surface water			6	×	-	Y				-	X	INVOICE TO:
			-	Surface water		-	6		_				_		X	
	1	· · · · · · · · · · · · · · · · · · ·		Surface water			6		_						X	Stillwater Sciences
	-			Surface water		_	6		-						X	Same as above
				Surface water			6		_						X	
			-	Surface water Surface water		-	6		_				_		x	Project No. 500.20 Ta: 0110.00
step	ECTED CONS	UUENIS-		surface water			6	SAM	PLERET	ENTI	ON TIME	PRE	SER	VAT	X VES ()	QUOTE# I) HCL (3) = COLD
atar	ECTED COAS							the second		10.01						2) HNO ₁ (4)= H2SO4
RELO	QUISHED BY	(Signature)	PRINT NAM	IE/COMPANY	1	DATE/TIME			RECEI	VED B	Y (Signature)				PRP	NT NAME/COMPANY
th	mit l	CAR SHILL	water S	aciences.	9	115										
For	DE	Kes Kes	leigh C			145					_					
REC	EIVED AT LA	AB BY: > HAA	9	DATE/TIME: 9	1-1-15	143	0	NDITI	ONS/CO	MM	INTS:					
-		T Cont				(0	1	8								

CA DOHS ELAP Accreditation/Registration Number 1233

3249 Fitzgerald Road Rancho Cordova, CA 95742

www.californialab.com

Fax: 916-638-4510

916-638-7301



California Laboratory Services

Page 2 of 3		09/09/15 12:13
Stillwater Sciences	Project: SMUD In situ and Bac-7	۲ Monitoring
2855 Telegraph Ave., Suite 400	Project Number: [none]	CLS Work Order #: CYI0080
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Microbiological Parameters by APHA Standard Methods

Analyte		orting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
UARP-RSVR-BacT-1 (CYI0080-01) Water	Sampled: 09/01/15 09:20	Rece	ived: 09/0	1/15 16:43					HT-1
E. Coli	2.0	1.8	MPN/100	1	CY06032	09/01/15	09/03/15	SM 9221	
Fecal Coliforms	4.0	1.8	mL	"					
UARP-RSVR-BacT-2 (CYI0080-02) Water	Sampled: 09/01/15 09:00	Rece	ived: 09/0	1/15 16:43					HT-1
E. Coli	<1.8	1.8	MPN/100	1	CY06032	09/01/15	09/03/15	SM 9221	
Fecal Coliforms	<1.8	1.8	mL "						
UARP-RSVR-BacT-3 (CYI0080-03) Water	Sampled: 09/01/15 14:30	Rece	ived: 09/0	1/15 16:43					
E. Coli	2.0	1.8	MPN/100	1	CY06032	09/01/15	09/03/15	SM 9221	
Fecal Coliforms	2.0	1.8	mL "						
UARP-RSVR-BacT-4 (CYI0080-04) Water	Sampled: 09/01/15 13:50	Rece	ived: 09/0	1/15 16:43					
E. Coli	2.0	1.8	MPN/100	1	CY06032	09/01/15	09/03/15	SM 9221	
Fecal Coliforms	2.0	1.8	mL "	н					
UARP-RSVR-BacT-5 (CYI0080-05) Water	Sampled: 09/01/15 14:30	Rece	ived: 09/0	1/15 16:43					
E. Coli	33	1.8	MPN/100	1	CY06032	09/01/15	09/03/15	SM 9221	
Fecal Coliforms	23	1.8	mL "			"			
UARP-RSVR-BacT-6 (CYI0080-06) Water	Sampled: 09/01/15 14:45	Rece	ived: 09/0	1/15 16:43					
E. Coli	350	1.8	MPN/100	1	CY06032	09/01/15	09/03/15	SM 9221	
Fecal Coliforms	350	1.8	mL "						

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916-638-7301 Fax: 916-638-4510



CALIFORNIA LABORATORY SERVICES

Page 3 c	of 3			09/09/15 12:1
2855 Te	er Sciences Iegraph Ave., Suite 400 y, CA 94705	Project: Project Number: Project Manager:	[none]	ac-T Monitoring CLS Work Order #: CYI0080 COC #:
		Notes and Defin	nitions	
HT-1	The sample was received outside of the	EPA recommended holding time.		
3T-4	<1.8			
ET	Analyte DETECTED			
D	Analyte NOT DETECTED at or above the re	porting limit (or method detection limit	when specified)	
R	Not Reported			
ry	Sample results reported on a dry weight basi	ŝ		
PD	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 10, 2015

CLS Work Order #: CYI0133 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 09/02/15 15:50. 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



$\mathbf{C}_{\text{ALIFORNIA}} \mathbf{L}_{\text{ABORATORY}} \mathbf{S}_{\text{ERVICES}}$

terScienc 'elegraph <i>I</i> ey, CA 94'	we, Sui	te 400		745 States 300	Project: SMUD In situ and Bac-T Project Number: S00.20 / Task 01 10.00 Project Manager: Maia Singer						C	- TL		Order	r #: CYI0133
CALI	FORNI	A LABORAT	ORY SERVI	CES CHAIN	OF CU	USTODY		CL	S ID. 1	NO	CYTOI	33			(of
-		Report To:		Clien	t Job Nun	ober		AN	ALYSI	S REC	UESTED	GEO	TRACE	CER	
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Project Na		aia@stillwatersci.c	2011	- 9574			RE	F.	m-	9		FIEL	D CON	DITION	S:
SMUE) In situ a	and Bac-T Monitor	ring	www.ca	ntormal	ab.com	ER	15.3	OT	2			la co	, 34	
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- Sine Covan	- or it d				00	NTAINER						T	MEIN	DAYS	INSTRUCTIONS
DATE	TIME	SAMPLE IDENTIFICAT		MATRIX	NO.	TYPE	V					1	2 3	5	
1/2/2015	11:30	Bac - 3-LL		Surface water			6	×		Y				x	
9/2/2015	10:50	3ac - 4 - 66		Surface water			6	×		X				x	
9/2/2015		Bac - 5 - 6		Surface water		_	6	×		×			-	X	1
9/2/2015		Bac - 6 - G	CR	Surface water		-	6	×	2	X			+	X	
9/2/2015	12:15	Bac - # 7- 1	UVR	Surface water Surface water	-		6		Y	×		-	+	X	
9/2/2015	11:45	Bar - B - UVR		Surface water	-		6		×	×			+	X	INVOICE TO:
9/2/015	13:20	Bac-9 - UVR		Surface water	-		6		×	×		+	+	x	Stillwater Sciences
		BAC -10- UN		Surface water	-	+	6		X	x		+	+	X	Same as above
1/2/015				Surface water			6		-	r +		+	+	x	
7/2/2015		BAC . 12 - 2		Surface water	-		6	××		X		+	+	x	Project No. 500.20 Tas
9/4/2015		BAC - 13 - 5		Surface water	-		-	×	-	×		++	+	-	0110.00 OUOTE#
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Aller	AG	e	Kelleigh Ci			7/2/15	-			_		_	-		
()	Se	00	Stilluster	- Sciences	Course a	3:50 PH					- C	<u>.</u>	_		
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and a second sec	ED BY:	FED EX		OTHER						AIR	BILL #		_		
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Page 2 of 4		09/10/15 15:02
Stillwater Sciences	Project: SMUD In situ and Bac-T Mo	onitoring
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0110.00	CLS Work Order #: CYI0133
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Microbiological Parameters by APHA Standard Methods

Analyte	Resul	Reporting t Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bac-3-LL (CYI0133-01) Water	Sampled: 09/02/15 11:30	Received: 09/02	/15 15:50						
E. Coli	<1	1.0	MPN/100	1	CY06074	09/02/15	09/03/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06079	09/02/15	09/05/15	SM 9221	
Bac-4-LL (CYI0133-02) Water	Sampled: 09/02/15 10:50	Received: 09/02	/15 15:50						
E. Coli	<1	1.0	MPN/100	1	CY06074	09/02/15	09/03/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06079	09/02/15	09/05/15	SM 9221	
Bac-5-GCR (CYI0133-03) Water	Sampled: 09/02/15 10:30	Received: 09/0	02/15 15:50						
E. Coli	3.1	1.0	MPN/100	1	CY06074	09/02/15	09/03/15	SM9223	
Fecal Coliforms	6.8	1.8	mL		CY06079	09/02/15	09/05/15	SM 9221	
Bac-6-GCR (CYI0133-04) Water	Sampled: 09/02/15 10:50	Received: 09/0	02/15 15:50	i i					
E. Coli	71.7	1.0	MPN/100	1	CY06074	09/02/15	09/03/15	SM9223	
Fecal Coliforms	220	1.8	mL "	10.	CY06079	09/02/15	09/05/15	SM 9221	
Bac-7-UVR (CYI0133-05) Water	Sampled: 09/02/15 12:15	Received: 09/0	02/15 15:50						
E. Coli	<1	1.0	MPN/100	1	CY06074	09/02/15	09/03/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06077	09/02/15	09/05/15	SM 9221	
Bac-8-UVR (CYI0133-06) Water	Sampled: 09/02/15 11:45	Received: 09/0	02/15 15:50						
E. Coli	<1	1.0	MPN/100	1	CY06074	09/02/15	09/03/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06077	09/02/15	09/05/15	SM 9221	
Bac-9-UVR (CYI0133-07) Water	Sampled: 09/02/15 13:20	Received: 09/0	02/15 15:50						
E. Coli	<1	1.0	MPN/100	1	CY06074	09/02/15	09/03/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "	н	CY06077	09/02/15	09/05/15	SM 9221	

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Page 3 of 4								09/10/1	5 15:02
Stillwater Sciences 2855 Telegraph Ave., Suite 400 Berkeley, CA 94705		Project	Manager:	500.20 / T Maia Sing			CLS Work Orde COC #:	r #: CYI0133	
	Microbiologi	cal Parame	ters by .	APHA	Standard	Method	ls		
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bac-10-UVR (CYI0133-08) Water	Sampled: 09/02/15 11:15	Received: 09/	02/15 15:5	0					
E. Coli	2.0	1.0	MPN/100	1	CY06074	09/02/15	09/03/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "	"	CY06077	09/02/15	09/05/15	SM 9221	
Bac-11-JR (CYI0133-09) Water	Sampled: 09/02/15 13:00 F	Received: 09/02	/15 15:50						
E. Coli	<1	1.0	MPN/100	1	CY06074	09/02/15	09/03/15	SM9223	
Fecal Coliforms	4.5	1.8	mL "	"	CY06077	09/02/15	09/05/15	SM 9221	
Bac-12-IHR (CYI0133-10) Water	Sampled: 09/02/15 12:40	Received: 09/0	2/15 15:50						
E. Coli	<1	1.0	MPN/100	1	CY06074	09/02/15	09/03/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06079	09/02/15	09/05/15	SM 9221	
Bac-13-IHR (CYI0133-11) Water	Sampled: 09/02/15 12:15	Received: 09/0	2/15 15:50						
E. Coli	2.0	1.0	MPN/100	1	CY06074	09/02/15	09/03/15	SM9223	
Fecal Coliforms	2.0	1.8	mL "		CY06079	09/02/15	09/05/15	SM 9221	
Bac-15-SCR (CYI0133-12) Water	Sampled: 09/02/15 13:15	Received: 09/0	2/15 15:50)					
E. Coli	3.0	1.0	MPN/100	1	CY06074	09/02/15	09/03/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "	"	CY06079	09/02/15	09/05/15	SM 9221	

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	er Sciences	Project:	SMUD In situ and Bac-T M				
	elegraph Ave., Suite 400 y, CA 94705		500.20 / Task 0110.00	CLS Work Order #: CYI0133 COC #:			
Derkele	y, CA 94703	Project Manager: M	viala singer	000 #.			
		Notes and Definit	tions				
T-4a	<1.8						
T-4	4						
ET	Analyte DETECTED						
D	Analyte NOT DETECTED at or above the r	eporting limit (or method detection limit wh	nen specified)				
R	Not Reported						
ry	Sample results reported on a dry weight bas	is					
PD	Relative Percent Difference						

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3249 Fitzgerald Road Rancho Cordova, CA95742

September 11, 2015

CLS Work Order#: CY10204 COC #: 164874

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 09/03/15 17:15. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

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

Sincerely,

James Liang, Ph.D. Laboratory Director



er Sciences legraph Ave. 7, CA 94705		100			Project M Project M	lumber	: A	0.20/	(Task		Bac-TMo D	(ST			ler#: CY1020	4
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Page 2 of 3			09/11/15 11:36							
Stillwater Sciences	Project:	SMUD In situ and Bac-T I	Monitoring							
2855 Telegraph Ave., Suite 400	Project Number:	500.20 / Task 0110.00	CLS Work Order #: CYI0204							
Berkeley, CA 94705	Project Manager:	Maia Singer	COC #: 164874							
Microbiological Parameters by APHA Standard Methods										

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bac-14-BCR (CYI0204-01) Water	Sampled: 09/03/15 10:30	Received: 09/	03/15 17:1	5					
E. Coli	<1	1.0	MPN/100 mL	1	CY06120	09/03/15	09/04/15	SM9223	
Fecal Coliforms	<1.8	1.8	"		CY06160	09/03/15	09/06/15	SM 9221	

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2855 Te	er Sciences Jegraph Ave., Suite 400 y, CA 94705	Project: SMUD In situ and Project Number: 500.20 / Task 0110.0 Project Manager: Maia Singer	
Durkut	,	Notes and Definitions	
3T-4a	<1.8		
3T-4	4		
ET	Analyte DETECTED		
D	Analyte NOT DETECTED at or above the	reporting limit (or method detection limit when specified)	
R	Not Reported		
ry	Sample results reported on a dry weight ba	sis	
PD	Relative Percent Difference		

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3249 Fitzgerald Road Rancho Cordova, CA 95742

September 15, 2015

CLS Work Order #: CYI0345 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 09/08/15 17:20. 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



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vater Science Telegraph A	- e	100		Project N	Project:					ic-T l	Monitoring	- C	71	- 0		#: CY10345	
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	Singer ma	aia@stillwatersci.com			Fitzgerald ho Cordov 2		PR	liforn	Fecal coliform-20 Tube		8						
Project 3		and Bac-T Monitoring			ifornialab	com	SE	E	20			FIE	LDC	OND	TIONS	ĸ	
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	1515:10	BAC-4-U	0	Surface water			6	X	-	X		-		-	X		
	\$15:00	BAC-3-LL	9 N	Surface water	-	-	6	X	-	X	-	-		-	x		
	514:15	BAC-6-GCR	-	Surface water	1		6		-	X		-	-	-	x		
	\$14:00	BAC-S-GCR	-	Surface water	-	-	6	X	-	X		-	-	-	x	INVOICE TO:	
	\$ 13:30	BAC-8-UNR		Surface water			6	+	X	E		-	-	-	x	Stillwater Sciences	
	6 12:15			Surface water		-	6	+				-	-	1	x	Same as above	
	511:25	BAC-9-UNE	-	Surface water	-	-	6	+	X	X		-		-	x		
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Stillwater Sciences			Project:	SMUD	In situ and Ba	c-T Monitor	ing		
2855 Telegraph Ave., Suite 400		Project			ask 0110.00		CLS Work Orde	r #: CY10345	
Berkeley, CA 94705			Manager:				COC #:		
1	Microbiological	Parame	ters hv	арна	Standard	Methods			
	Microbiological	1 al anix	urs by	AIIIA	Standard	Methods	,		
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Analyte				Dilution	Daten	repared	Analyzed	Memou	TAOLES
Bac-2-BI (CYI0345-01) Water Sampled		1							
E. Coli	<1	1.0	MPN/100 mL	1	CY06188	09/08/15	09/09/15	SM9223	
Fecal Coliforms	<1.8	1.8	"	"	CY06195	09/08/15	09/11/15	SM 9221	
Bac-1-BI (CYI0345-02) Water Sampled	: 09/08/15 11:10 Recei	ved: 09/08/	15 17:20						
E. Coli	<1	1.0	MPN/100	1	CY06188	09/08/15	09/09/15	SM9223	
			mL			09/08/15			
Secal Coliforms	<1.8	1.8			CY06195	09/08/15	09/11/15	SM 9221	
Bac-4-LL (CYI0345-03) Water Sampled	1: 09/08/15 15:10 Recei	ved: 09/08/	15 17:20						
E. Coli	<1	1.0	MPN/100	1	CY06188	09/08/15	09/09/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06195	09/08/15	09/11/15	SM 9221	
Bac-3-LL (CY10345-04) Water Sampled	00/00/15 15:00 Desci	and 00/00	15 17.20			07100.10			
and a sum water of the state strategy in the state	 Postantistementoetat. Remotese 	8 550 LES 019							
3. Coli	<1	1.0	MPN/100 mL	1	CY06188	09/08/15	09/09/15	SM9223	
Fecal Coliforms	<1.8	1.8			CY06195	09/08/15	09/11/15	SM 9221	
Bac-6-GCR (CYI0345-05) Water Sampl	ed: 09/08/15 14:15 Re	ceived: 09/0	08/15 17:20	i.					
E. Coli	8.5	1.0	MPN/100	1	CY06188	09/08/15	09/09/15	SM9223	
Fecal Coliforms	4.5	1.8	mL		CY06195	09/08/15	09/11/15	SM 9221	
					0100155	09/08/15	09/11/15	5M 9221	
Bac-5-GCR (CYI0345-06) Water Sampl	and an								
E. Coli	1.0	1.0	MPN/100 mL	1	CY06188	09/08/15	09/09/15	SM9223	
fecal Coliforms	<1.8	1.8	"		CY06195	09/08/15	09/11/15	SM 9221	
3ac-8-UVR (CYI0345-07) Water Sampl	ed: 09/08/15 13:30 Red	eived: 09/0	8/15 17:20						
3. Coli	<1	1.0	MPN/100	1	CY06188	09/08/15	09/09/15	SM9223	
			mL "						
Fecal Coliforms	<1.8	1.8			CY06196	09/08/15	09/11/15	SM 9221	

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Page 3 of 4	09/15/	/15 12:51
Stillwater Sciences	Project: SMUD In situ and Bac-T Monitoring	
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0110.00 CLS Work Order #: CY10345	
Berkeley, CA 94705	Project Manager: Maia Singer COC #:	
3.61		

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bac-7-UVR (CYI0345-08) Water	Sampled: 09/08/15 12:15	Received: 09/0	8/15 17:20	E.					
E. Coli	<1	1.0	MPN/100	1	CY06188	09/08/15	09/09/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "	"	CY06196	09/08/15	09/11/15	SM 9221	
Bac-9-UVR (CYI0345-09) Water	Sampled: 09/08/15 11:25	Received: 09/0	8/15 17:20						
E. Coli	<1	1.0	MPN/100	1	CY06188	09/08/15	09/09/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06196	09/08/15	09/11/15	SM 9221	
Bac-10-UVR (CYI0345-10) Water	Sampled: 09/08/15 12:50	Received: 09/	08/15 17:2	0					
E. Coli	<1	1.0	MPN/100	1	CY06188	09/08/15	09/09/15	SM9223	
Fecal Coliforms	2.0	1.8	mL "		CY06196	09/08/15	09/11/15	SM 9221	
Bac-11-JR (CYI0345-11) Water	Sampled: 09/08/15 11:00	Received: 09/08	/15 17:20						
E. Coli	<1	1.0	MPN/100	1	CY06188	09/08/15	09/09/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06196	09/08/15	09/11/15	SM 9221	

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Page 4 o	f 4			09/15/15 12:51				
2855 Tel	r Sciences legraph Ave., Suite 400 7, CA 94705	Project: Project Number: Project Manager:	500.20 / Task 0110.00	Aonitoring CLS Work Order #: CY10345 COC #:				
		Notes and Defin	itions					
BT-4a	<1.8							
BT-4	⊲							
DET	Analyte DETECTED							
ND.	Analyte NOT DETECTED at or above the repo	orting limit (or method detection limit	when specified)					
NR.	Not Reported							
lry	Sample results reported on a dry weight basis							
RPD	Relative Percent Difference							

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CALIFORNIA LABORATORY SERVICES 3249 Fitzgerald Road Rancho Cordova, CA 95742

September 17, 2015

CLS Work Order #: CYI0443 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 09/10/15 17:00. 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



egraph Ave , CA 94705		00		Project N Project M				:011	0.00			SW4	ork	OI	der #	¥: CYI0443
CALI	FORNI	A LABORATORY S	ERVIC	ES CHAIN	OF CUS	STODY		CLS	5 ID. 1	NO	CYIO.	44	3			(of
		Report To:		Client Job Number				AN	ALYSI	S RE	QUESTED	GEC	TRA	CKE	R	
2855 T		Ave. Suite 400		Destination Laboratory			E, coli Fecal Feca					EDF	REI	ORT		YES X N
Berkele	y, CA 94	1705		(916) 63			6	8			GLC	BA	. 1D.			
	inger ma	ia@stillwatersci.com			Fitzgerald ho Cordov 2		PR	liform	liform							
Project Na SMUE Sampled B	In situ a	nd Bac-T Monitoring		ifornialab ER	.com	PRESERVATIVES	Fecal coliform-15 Tube	Fecal coliform-20 Tube			FIELD CONDITIONS:					
Job Descrij Monitor se		ia levels in UARP and CB reaches.		Отн			IVES	ĕ	°							
Site Locati	m UARP		66											ARO IN D	UND AYS	SPECIAL INSTRUCTIONS
DATE	TIME	SAMPLE IDENTIFICATION	FIELD	-		AINER	v					1	2	3	5	
1.	10000		ID.	MATRIX	NO.	TYPE	1				_		-	-	x	
9/10/15	15:50	BAC-IS-SCR	-	Surface water Surface water	-		6	X	-	X			-	-	x	
2/0/15	13:00			Surface water		-	6	X	-	X	1 8 A.			-	x	
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1/10/15	11:05	BAC-2-BE	-	Surface water	-		6	5	-	3			-	-	x	-
	13:15	BAC-12-IHR BAC-1-BT		Surface water			6	ζ.	-	X			-	-	x	
dicto	0.20	BUC-I-BL	-	Surface water		-	6	1	-	14			1		x	INVOICE TO:
-	-			Surface water		-	6	+	-	+			17	-	x	Stillwater Sciences
				Surface water			6	+	-	H			1	-	x	Same as above
	-		-	Surface water	()		6	+	-	\square			Ċ.		x	
			-	Surface water	1	1	6			11			1		x	Project No. 500.20 T 0110.00
				Surface water			6	\square					T		x	QUOTER
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Page 2 of 3		09/17/15 13:10
Stillwater Sciences 2855 Telegraph Ave., Suite 400	Project: SMUD In situ and Bac-T M Project Number: 500.20 / Task 0110.00	Ionitoring CLS Work Order #: CY10443
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bac-15-SCR (CYI0443-01) Water	Sampled: 09/10/15 10:50	Received: 09/	10/15 17:0	0					
E. Coli	66.3	1.0	MPN/100	1	CY06256	09/10/15	09/11/15	SM9223	
Fecal Coliforms	4.5	1.8	mL "	"	CY06260	09/10/15	09/13/15	SM 9221	HT-1
Bac-13-IHR (CYI0443-02) Water	Sampled: 09/10/15 13:00	Received: 09/1	10/15 17:0	0					
E. Coli	1.0	1.0	MPN/100	1	CY06256	09/10/15	09/11/15	SM9223	
Fecal Coliforms	2.0	1.8	mL "	н	CY06260	09/10/15	09/13/15	SM 9221	
Bac-14-BCR (CYI0443-03) Water	Sampled: 09/10/15 14:30	Received: 09/	10/15 17:0	0					
E. Coli	2.0	1.0	MPN/100	1	CY06256	09/10/15	09/11/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "	"	CY06260	09/10/15	09/13/15	SM 9221	
Bac-2-BI (CYI0443-04) Water Sa	ampled: 09/10/15 11:05 Re	ceived: 09/10/1	15 17:00						
E. Coli	1.0	1.0	MPN/100	1	CY06256	09/10/15	09/11/15	SM9223	
Fecal Coliforms	2.0	1.8	mL "		CY06260	09/10/15	09/13/15	SM 9221	HT-B2
Bac-12-IHR (CYI0443-05) Water	Sampled: 09/10/15 13:15	Received: 09/	10/15 17:0	0					
E. Coli	<1	1.0	MPN/100	1	CY06256	09/10/15	09/11/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06260	09/10/15	09/13/15	SM 9221	
Bac-1-BI (CYI0443-06) Water Sa	ampled: 09/10/15 10:35 Re	ceived: 09/10/1	15 17:00						
E. Coli	2.0	1.0	MPN/100	1	CY06256	09/10/15	09/11/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06260	09/10/15	09/13/15	SM 9221	HT-1

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Page 3 o	f 3			09/17/15 13:10				
2855 Te	er Sciences legraph Ave., Suite 400 y, CA 94705	Project: Project Number: Project Manager:	SMUD In situ and Bac-T M 500.20 / Task 0110.00 Maia Singer	Monitoring CLS Work Order #: CYI0443 COC #:				
		Notes and Defin	itions					
HT-B2	The remaining holding time was less th outside the holding time.	an an hour when the sample was rec	eived at the laboratory. There	fore, it was analyzed				
HT-1	The sample was received outside of the	EPA recommended holding time.						
BT-4a	a <1.8							
BT-4	<1							
DET	Analyte DETECTED							
ND	Analyte NOT DETECTED at or above the re	porting limit (or method detection limit v	vhen specified)					
NR	Not Reported							
dry	Sample results reported on a dry weight basi	s						
RPD	Relative Percent Difference							

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CALIFORNIA LABORATORY SERVICES 3249 Fitzgerald Road Rancho Cordova, CA 95742

September 21, 2015

CLS Work Order #: CYI0560 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 09/14/15 16:26. 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



Felegraph ley, CA 94	Sec. 2.5704	ite 40	D		Project Number: 500.20 / Task 01 10.00 Project Manager: Maia Singer							5 We C #	ork C	nder	#: CYI0 <i>5</i> 60	
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		(C) -	Report To:		Client	Job Numb	er	Т	AN	ALYSI	REQU	ESTED	GEC	TRAC	KER	
28		raph .	Ave. Suite 400		Destination Laboratory				Feca	Fecal				REPO		YES X NO
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M	eet Manager aia Singe eet Name	er <u>ma</u>	ia@stillwatersci.com	ci.com 95742				PRE	liform-	iform-			FIE	D CON	DITION	(S:
SI		situ a	nd Bac-T Monitoring		www.californialab.com				Fecal coliform-15 Tube	Fecal coliform-20 Tube						
Job Mor	Description itor seasonal	bacteri	a levels in UARP and CB reaches.		OTHER					× °						
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			BAC-6-BELGCE		Surface water Surface water			6	X		X				X	
1/14			BAC-5-GCR	-	Surface water			6	X		X	-		2 2	X	
114	15 13	10	BAC-4-LL		Surface water	3		6	X	-	X	5 8		2 2	X	
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1119					Surface water	-	-	6	-	X	¥-			-	x	IS IN LO DORD TO D
平	15 13		BAC-10-UVR		Surface water		-	6	-	~	2				x	Stillwater Sciences
		-		-	Surface water			6	-						x	Same as above
		-		(*)	Surface water			6	-	-				1	x	
					Surface water			6	1					1	x	
		+			Surface water			6	-	-		-		-	x	
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Page 2 of 3		09/21/15 13:11
Stillwater Sciences	Project: SMUD In situ and Bac-T Monitoring	
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0110.00 CLS We	ork Order #: CYI0560
Berkeley, CA 94705	Project Manager: Maia Singer COC #:	

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bac-7-UVR (CYI0560-01) Water	Sampled: 09/14/15 14:55	Received: 09/1	4/15 16:26	2					
E. Coli	2.0	1.0	MPN/100	1	CY06338	09/14/15	09/15/15	SM9223	
Fecal Coliforms	2.0	1.8	mL "	"	CY06346		09/17/15	SM 9221	
Bac-6-GCR (CYI0560-02) Water	Sampled: 09/14/15 14:20	Received: 09/1	4/15 16:26	i					
E. Coli	<1	1.0	MPN/100	1	CY06338	09/14/15	09/15/15	SM9223	
Fecal Coliforms	7.8	1.8	mL "		CY06348		09/17/15	SM 9221	
Bac-5-GCR (CYI0560-03) Water	Sampled: 09/14/15 14:05	Received: 09/1	4/15 16:26	5					
E. Coli	<1	1.0	MPN/100	1	CY06338	09/14/15	09/15/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06348		09/17/15	SM 9221	
Bac-4-LL (CYI0560-04) Water	Sampled: 09/14/15 13:20 B	teceived: 09/14/	15 16:26						
E. Coli	<1	1.0	MPN/100	1	CY06338	09/14/15	09/15/15	SM9223	
Fecal Coliforms	4.0	1.8	mL "		CY06348		09/17/15	SM 9221	
Bac-3-LL (CYI0560-05) Water	Sampled: 09/14/15 12:45 B	teceived: 09/14/	15 16:26						
E. Coli	<1	1.0	MPN/100	1	CY06338	09/14/15	09/15/15	SM9223	
Fecal Coliforms	4.5	1.8	mL "		CY06348		09/17/15	SM 9221	
Bac-8-UVR (CYI0560-06) Water	Sampled: 09/14/15 11:30	Received: 09/1	4/15 16:26						
E. Coli	1.0	1.0	MPN/100	1	CY06338	09/14/15	09/15/15	SM9223	
Fecal Coliforms	11	1.8	mL "		CY06346		09/17/15	SM 9221	
Bac-10-UVR (CYI0560-07) Water	Sampled: 09/14/15 11:00	Received: 09/	14/15 16:2	.6					
E. Coli	<1	1.0	MPN/100	1	CY06338	09/14/15	09/15/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06346		09/17/15	SM 9221	

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Page 3 o	of 3			09/21/15 13:11				
2855 Te	er Sciences Jegraph Ave., Suite 400 y, CA 94705	Project: Project Number: Project Manager:	500.20 / Task 0110.00	Aonitoring CLS Work Order #: CY10560 COC #:				
		Notes and Defin	itions					
BT-4a	<1.8							
BT-4	4							
DET	Analyte DETECTED							
ND	Analyte NOT DETECTED at or above the reporti	ng 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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CALIFORNIA LABORATORY SERVICES 3249 Fitzgerald Road Rancho Cordova, CA 95742

September 23, 2015

CLS Work Order #: CYI0684 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 09/16/15 15:40. 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



ater Scienc Felegraph # ley, CA 94'	we, Suit	≥400		2012년 2012년	Number:	500.20 / Maia Sin	Tas	k 01		BC-1				k Oı	der :	#: CYI0684	
CAL	IFORNI	A LABORATO	RY S ERVIC	ES CHAIN	OF CUS	TODY	2	CLS	S ID.	NO.	CYTO	08	4			(of	
		Report To:		Client	Job Numbe	a		AN.	ALYSI	S RI	QUESTED	GEC)TR/	ACKE	R		
2855	ater Scien Felegraph ev, CA 9	Ave. Suite 400		Destination Laboratory				Fecal	Fecal	E. coli				PORT		YES X NO	
Project N	larager Singer <u>m</u>	aia@stillwatersci.co	<u>m</u>	3249 Rancl 9574;	CLS (916) 638-7301 3249 Fitzgerald Road Rancho Cordova, CA 95742 www.californialah.com OTHER			coliform	Fecal coliform-20 Tube					AL ID.		s	
Sampled	D In situ : ^{By}	and Bac-T Monitorii	ng	95742 www.californialab.com				-15 Tube	-20 Tube				and the	SheD		73	
Job Desci Monitor s	iption casoral bacter	ia levels in UARP and CB rea	ches.														
Site Loca	tion UARP	0												NAROUND E IN DAYS		SPECIAL INSTRUCTIONS	
DATE	TIME	SAMPLE IDENTIFICATIO	N FIELD	MATRIX	CONT. NO.	AINER	v					1	2	3	5		
9/16/18	11:15	Bac-9-UVR		Surface water			6		×						x		
9/14/15	11:51	Bac - 11 - JR		Surface water			6		X						x		
9/14/1	10:19	Bac-12-IHR	£	Surface water			6	X		X					x		
9/14/1	\$ 9:50	Bac - 13 - IH	2	Surface water			6	X	_	X			-	-	X		
9/14/1	\$ 13:25	Bac - 14 - Be	R	Surface water			6	×	_	Х		-	_	-	x		
9/14/14	13:30	Bac - 15 - 5C	R	Surface water Surface water	;		6	X	-	X		-	_	-	X	INVOICE TO:	
-	-			Surface water			6			-			-	-	X	Stillwater Sciences	
-	-			Surface water			6	\vdash		+		-	-	-	X	Same as above	
	-			Surface water			6	\vdash		+			-	-	X	And the second s	
				Surface water			6								x	Project No. 500.20 Tas 0110.00	
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Page 2 of 3		09/23/15 10:01
Stillwater Sciences 2855 Telegraph Ave., Suite 400	Project: SMUD In situ and Bac-T M Project Number: 500.20 / Task 0110.00	fonitoring CLS Work Order #: CY10684
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bac-9-UVR (CYI0684-01) Water	Sampled: 09/16/15 11:15	Received: 09/1	6/15 15:40	0					
E. Coli	<1	1.0	MPN/100	1	CY06404	09/16/15	09/17/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06400	09/16/15	09/19/15	SM 9221	
Bac-11-JR (CY10684-02) Water	Sampled: 09/16/15 11:51	Received: 09/16	/15 15:40						
E. Coli	1.0	1.0	MPN/100	1	CY06404	09/16/15	09/17/15	SM9223	
Fecal Coliforms	2.0	1.8	mL "		CY06400	09/16/15	09/19/15	SM 9221	
Bac-12-IHR (CYI0684-03) Water	Sampled: 09/16/15 10:19	Received: 09/1	16/15 15:40)					
E. Coli	<1	1.0	MPN/100	1	CY06404	09/16/15	09/17/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06401	09/16/15	09/19/15	SM 9221	
Bac-13-IHR (CYI0684-04) Water	Sampled: 09/16/15 09:50	Received: 09/	6/15 15:40	0					
E. Coli	1.0	1.0	MPN/100	1	CY06404	09/16/15	09/17/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06401	09/16/15	09/19/15	SM 9221	
Bac-14-BCR (CYI0684-05) Water	Sampled: 09/16/15 13:25	Received: 09/	16/15 15:4	0					
E. Coli	235.9	1.0	MPN/100	1	CY06404	09/16/15	09/17/15	SM9223	
Fecal Coliforms	130	1.8	mL		CY06401	09/16/15	09/19/15	SM 9221	
Bac-15-SCR (CYI0684-06) Water	Sampled: 09/16/15 13:30	Received: 09/	16/15 15:4	0					
E. Coli	1.0	1.0	MPN/100	1	CY06404	09/16/15	09/17/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06401	09/16/15	09/19/15	SM 9221	

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Page 3 o	of 3			09/23/15 10:01			
2855 Te	er Sciences legraph Ave., Suite 400 y, CA 94705	Project: Project Number: Project Manager:	500.20 / Task 0110.00	Aonitoring CLS Work Order #: CY10684 COC #:			
		Notes and Defin	itions				
BT-4a	<1.8						
BT-4	4 <1						
DET	Analyte DETECTED						
ND	Analyte NOT DETECTED at or above the report	ting limit (or method detection limit	when specified)				
NR	Not Reported						
iry	Sample results reported on a dry weight basis						
RPD	Relative Percent Difference						

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CALIFORNIA LABORATORY SERVICES 3249 Fitzgerald Road Rancho Cordova, CA 95742

September 24, 2015

CLS Work Order #: CYI0737 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 09/17/15 15:35. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

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

Sincerely,

James Liang, Ph.D. Laboratory Director



$\mathbf{C}_{\text{ALIFORNIA}} \mathbf{L}_{\text{ABORATORY}} \mathbf{S}_{\text{ERVICES}}$

legraph Ave , 7, CA 94705	Suite 40	0		Project I Project N		500.20 / Maia Si			.0.00	0.00	20040		. S W C #		Orde	r #: CYI0737			
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	1.0	Report To:		Clien	t Job Numb	xer		ANA	LYSI	SRE	QUES	TED	GEO	RACK	ER				
1.	Stillwater Sciences 2855 Telegraph Ave. Suite 400 Backelau, CA 04705			Destina	tion Labori	Nory	PRESERVATIVES	Fec	Fecal coliform-20 Tube	E coli		Π		REPOR		YES X 🛛 NO			
Berkele	erkeley, CA 94705			X CLS	6 (916) 6	38-7301		al c	1 co	-			GLO	BAL ID	Ē.				
	Project Manager			3249	Fitzgerale ho Corde			life	life										
Maia S Project Na		iia@stillwatersci.c	om	- 9574		ra, c.r.	R	m	E.				LIE .	a case	DITION	16			
		und Bac-T Monitor	ing	www.ca	lifornialal	b.com	SEF	-15	20				CIEL	CON	DITION	9			
Sampled B				□ OTHER			NA	Tu	Tub										
Job Descrip	nion		North Control of Contr				TIVE	be	č										
		ia levels in UARP and CB n	aches.	-			S												
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atitie	10:20	Bac-2-B1		Surface water	-	-	6	<u>~</u>	+	A	-	+ +	+	+	x				
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1000				Surface water			6		1				+		x	Stillwater Sciences			
				Surface water	-		6								x	Same as above			
				Surface water			6								X				
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RELINGO				HE/COMPANY	1	DATE/TIME			RECEP	VED F	W (Signa	ture)	2	T		INT NAME/COMPANY			
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104	Stillwate				S I	15:35													
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Page 2 of 3		09/24/15 10:11
Stillwater Sciences	Project: SMUD In situ and Bac-T N	Ionitoring
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0110.00	CLS Work Order #: CYI0737
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Microbiological Parameters by APHA Standard Methods

Analyte	Res	Reporting alt Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bac-1-BI (CYI0737-01) Water	Sampled: 09/17/15 09:20	Received: 09/17/2	15 15:35						
E. Coli	<1	1.0	MPN/100	1	CY06446	09/17/15	09/18/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "	"	CY06442	09/17/15	09/20/15	SM 9221	
Bac-2-BI (CYI0737-02) Water	Sampled: 09/17/15 10:20	Received: 09/17/	15 15:35						
E. Coli	1.0	1.0	MPN/100	1	CY06446	09/17/15	09/18/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06442	09/17/15	09/20/15	SM 9221	

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Page 3 o	of 3			09/24/15 10:11						
2855 Te	er Sciences legraph Ave., Suite 400 y, CA 94705	Project Number:	Project: SMUD In situ and Bac-T Monitoring Project Number: 500.20 / Task 0110.00 CLS Work Order Project Manager: Maia Singer COC #:							
		Notes and Defin	iitions							
BT-4a	<1.8									
BT-4	↓ <1									
DET	Analyte DETECTED									
ND	Analyte NOT DETECTED at or above the report	ing 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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CALIFORNIA LABORATORY SERVICES 3249 Fitzgerald Road Rancho Cordova, CA 95742

September 28, 2015

CLS Work Order #: CYI0875 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 09/21/15 16:48. 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



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terScienc elegraph ey, CA 94	Ave,	Suite 4	00		Project N	lumber	: SMUI : 500.207 : Maia Sir	Tasl	k 01 1		0.0290	C	- T		k Oı	nler	#: CYI0875	
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	Report To:				Client	Job Num	ber		ANA	LYSI	S REQU	UESTED	GE	OTRA	CKER	6		
			Sciences graph Ave. Suite 400			Destination Laboratory				Fecal coliform-20 Tube	E. coli	Π	ED	FREP	ORT		YES X D NO	
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			aia@stillwatersci.com		9574	2		R	m	-me			Lite.	inc	MDET	TONS		
	ject Nat MUD		and Bac-T Monitoring		www.cal	iforniala	b.com	SEP	-1s	20			FIE	ab et	AND I	NONS:		
		pled By			🗌 🗆 отн	FD		XA	2	Tub								
tob	Descrip	stion		1.5.				Fecal coliform-15 Tube PRESERVATIVES	K									
		sensenal bacteria levels in UARP and CB reaches.																
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9-2	4.16	11:30	Bac-5-GCR	-	Surface water		-	6	7	+	J		-		+	x		
9-	21-15	11:49	Bac-6- GCR	-	Surface water			6	X	X	X	++-	-	-	-	x		
9-	4-15	12:25	Bac-10-UVR	-	Surface water	-	-	6	-	1	X				+	x		
4-7	21-15	14:00	Bac-8-UVR Bac-7-UVR		Surface water	-		6	+	X				-	+	X	INVOICE TO:	
4-1	4-12	14.00	pac-1-UVK	1	Surface water	100	-	6	+	10	12	++-			+	x	Stillwater Sciences	
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Page 2 of 3		09/28/15 14:33
Stillwater Sciences	Project: SMUD In situ and Bac-T Monitoring	
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0110.00 CLS Work O	rder #: CYI0875
Berkeley, CA 94705	Project Manager: Maia Singer COC #:	

Microbiological Parameters by APHA Standard Methods

Analyte	Resu	Reporting It Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bac-3-LL (CY10875-01) Water 5	Sampled: 09/21/15 10:40	Received: 09/21	/15 16:48						
E. Coli	<1	1.0	MPN/100	1	CY06513	09/21/15	09/22/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06505	09/21/15	09/28/15	SM 9221	
Bac-4-LL (CY10875-02) Water 5	Sampled: 09/21/15 10:55	Received: 09/21	/15 16:48						
E. Coli	<1	1.0	MPN/100	1	CY06513	09/21/15	09/22/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "	**	CY06505	09/21/15	09/28/15	SM 9221	
Bac-5-GCR (CYI0875-03) Water	Sampled: 09/21/15 11:3	Received: 09/2	21/15 16:48						
E. Coli	1.0	1.0	MPN/100	1	CY06513	09/21/15	09/22/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06505	09/21/15	09/28/15	SM 9221	
Bac-6-GCR (CYI0875-04) Water	Sampled: 09/21/15 11:49	Received: 09/2	21/15 16:48						
E. Coli	<1	1.0	MPN/100	1	CY06513	09/21/15	09/22/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "	н	CY06505	09/21/15	09/28/15	SM 9221	
Bac-10-UVR (CYI0875-05) Water	Sampled: 09/21/15 12:2	25 Received: 09	/21/15 16:4	8					
E. Coli	<1	1.0	MPN/100	1	CY06513	09/21/15	09/22/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06504	09/21/15	09/24/15	SM 9221	
Bac-8-UVR (CYI0875-06) Water	Sampled: 09/21/15 14:00	Received: 09/2	21/15 16:48	C.					
E. Coli	<1	1.0	MPN/100	1	CY06513	09/21/15	09/22/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06504	09/21/15	09/24/15	SM 9221	
Bac-7-UVR (CYI0875-07) Water	Sampled: 09/21/15 14:50	Received: 09/2	21/15 16:48						
E. Coli	<1	1.0	MPN/100	1	CY06513	09/21/15	09/22/15	SM9223	
Fecal Coliforms	2.0	1.8	mL "		CY06504	09/21/15	09/24/15	SM 9221	

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age 3 o	r Sciences	Deciset	SMUD In gitu and Pag T M	09/28/15 14:33							
2855 Tel	legraph Ave., Suite 400 r, CA 94705		Project: SMUD In situ and Bac-T Monitoring Project Number: 500.20 / Task 0110.00 Project Manager: Maia Singer COC #:								
		Notes and Defin	itions								
T-4a	<1.8										
T-4	4										
ET	Analyte DETECTED										
D	Analyte NOT DETECTED at or above the re	porting limit (or method detection limit v	when specified)								
R	Not Reported										
У	Sample results reported on a dry weight bas	s									
PD	Relative Percent Difference										

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CALIFORNIA LABORATORY SERVICES 3249 Fitzgerald Road Rancho Cordova, CA95742

September 29, 2015

CLS Work Order#: CYI0936 COC#:

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

Project Name: SMUD In situ and Bac-T Monitoring

Enclosed are the results of analyses for samples received by the laboratory on 09/22/15 17:30. 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



5 Telegraph :eley, CA 94	0.000	uite 400			Project Nu Project Ma		500.2077 Maia Sin		011	0.00		1963163		. s w C #		k Os	rder	#: CY10936
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			Report To:		Clien	t Job Nu	uber	Г	AN.	ALYS	IS RE	QUES	TED	GEC	TR/	CKE	R	
		uter Scier Felegraph	nces h Ave. Suite 400		Destina	tion Lab	aratory	PRESERVATIVES	Fec	Fecal coliform-20 Tube	E. coli		Τ	EDF	REF	ORT		YES X NO
	Berkei	cy, CA 9	4705				638-7301	1	alco	co	-			GLG	BAL	.1D.		
	Project M						ald Road Iova, CA		life	lifo								
	Mata Project N		aia@stillwatersei.o	com	9574	12	1992	REC	m-	m-				PIEL	DC	ONDI	e v	
	SMU	D In situ	and Bac-T Monito	ring	www.californialab.com			SER	IS 7	T 02				1000				
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			Bac-13 . Il		Surface water	<u> </u>		6	x	-	×		+			-	x	
q	12/12/201	10'00	Bec - 1-8.	Z.	Surface water		-	6	x	-	Ŷ	-	+			-	X	
9	122/200	61:20	Bac - 2 - B	T	Surface writer			6	×	-	×		Т				х	
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		an mê	14 million - 14 mi		Surface water			6									x	Stillwater Sciences
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Page 2 of 3		09/29/15 10:43
Stillwater Sciences	Project: SMUD In situ and Bac-T M	
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0110.00	CLS Work Order #: CYI0936
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bac-9-UVR (CYI0936-01) Water	Sampled: 09/22/15 16:00	Received: 09/2	2/15 17:30						
E. Coli	2.0	1.0	MPN/100	1	CY06545	09/22/15	09/23/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06551	09/22/15	09/25/15	SM 9221	
Bac-11-JR (CYI0936-02) Water Sampled: 09/22/15 15:30 Received: 09/22/15 17:30									
E. Coli	1.0	1.0	MPN/100	1	CY06545	09/22/15	09/23/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "	н	CY06551	09/22/15	09/25/15	SM 9221	
Bac-12-IHR (CYI0936-03) Water Sampled: 09/22/15 14:45 Received: 09/22/15 17:30									
E. Coli	<1	1.0	MPN/100	1	CY06545	09/22/15	09/23/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "	н	CY06548	09/22/15	09/25/15	SM 9221	
Bac-13-IHR (CY10936-04) Wate	r Sampled: 09/22/15 14:30	Received: 09/2	2/15 17:30						
E. Coli	<1	1.0	MPN/100	1	CY06545	09/22/15	09/23/15	SM9223	
Fecal Coliforms	2.0	1.8	mL "		CY06548	09/22/15	09/25/15	SM 9221	
Bac-1-BI (CY10936-05) Water Sampled: 09/22/15 10:00 Received: 09/22/15 17:30									
E. Coli	1.0	1.0	MPN/100	1	CY06545	09/22/15	09/23/15	SM9223	
Fecal Coliforms	7.8	1.8	mL "		CY06548	09/22/15	09/25/15	SM 9221	HT-
Bac-2-BI (CY10936-06) Water Sampled: 09/22/15 09:30 Received: 09/22/15 17:30									
E. Coli	25.3	1.0	MPN/100	1	CY06545	09/22/15	09/23/15	SM9223	
Fecal Coliforms	70	1.8	mL "		CY06548	09/22/15	09/25/15	SM 9221	HT-

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Page 3 d	of 3		09/29/15 10:43
2855 Te	er Sciences elegraph Ave., Suite 400 y, CA 94705	Project: SMUD In situ and Bac Project Number: 500.20 / Task 0110.00 Project Manager: Maia Singer	c-T Monitoring CLS Work Order #: CY10936 COC #:
		Notes and Definitions	
HT-1	The sample was received outside of the El	A recommended holding time.	
BT-4a	<1.8		
3T-4	4		
DET	Analyte DETECTED		
ND	Analyte NOT DETECTED at or above the repo	ting limit (or method detection limit when specified)	
NR	Not Reported		
iry	Sample results reported on a dry weight basis		
RPD	Relative Percent Difference		

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CALIFORNIA LABORATORY SERVICES 3249 Fitzgerald Road Rancho Cordova, CA 95742

September 30, 2015

CLS Work Order #: CYI1003 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 09/23/15 15:10. 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

aterScier Felegraph ley, CA 9	Ave, S	uite 400				Project Nu Project Ma	mber: 1	00.20/*	Task			c-T l		7		Ond	ler #	4: CYI1003
	CAL	IFORNI	а Гавон	RATORY	SERVIC	ES CHAIN	OF CUS	TODY		CLS	S ID.	NO.	CYJ		D3			(of
			Report 7	ſo:		Client	Client Job Number			ANALYSIS REQU				GE	OTRAC	KER		
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Page 2 of 3		09/30/15 12:55
Stillwater Sciences	Project: SMUD In situ and Bac-T M	Ionitoring
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0110.00	CLS Work Order #: CYI1003
Berkeley, CA 94705	Project Manager: Maia Singer	COC #:

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bac-14-BCR (CYI1003-01) Water	Sampled: 09/23/15 10:15	Received: 09/	23/15 15:1	0					
E. Coli	<1.8	1.0	MPN/100	1	CY06583	09/23/15	09/24/15	SM9223	
Fecal Coliforms	1.8	1.8	mL "		CY06591	09/23/15	09/26/15	SM 9221	
Bac-15-SCR (CYI1003-02) Water	Sampled: 09/23/15 11:00	Received: 09/2	23/15 15:1	0					
E. Coli	6.3	1.0	MPN/100	1	CY06583	09/23/15	09/24/15	SM9223	
Fecal Coliforms	17	1.8	mL "		CY06591	09/23/15	09/26/15	SM 9221	

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Page 3 d	of 3			09/30/15 12:55
2855 Te	er Sciences elegraph Ave., Suite 400 vy, CA 94705	Project: Project Number: Project Manager:	500.20 / Task 0110.00	Monitoring CLS Work Order #: CY11003 COC #:
		Notes and Defir	iitions	
BT-4	<1.8			
DET	Analyte DETECTED			
ND.	Analyte NOT DETECTED at or above the report	ting limit (or method detection limit	when specified)	
VR	Not Reported			
lry	Sample results reported on a dry weight basis			
PD	Relative Percent Difference			

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CALIFORNIA LABORATORY SERVICES 3249 Fitzgerald Road Rancho Cordova, CA95742

October 06, 2015

CLS Work Order #: CYI1269 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 09/29/15 17:00. 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

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CALIFORNIA LABORATORY SERVICES

S Telegrap keley, CA i		Sui	te 400				Project Number: 500.20 / Task 01 10.00 Project Manager: Maia Singer								LS V		k0	nder	#: CYI1269
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			Scient	ces Ave. Suite 400			Destinat	atory		T	T	Feea	E, coli	Π	EI	HF RE	PORT	t.	YES X NO
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		a Sin	iger ma	ia@stillwatersci.co	m		3249 Ranci 95742	PR	liform	liform									
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	Job Description Menitor scasonal bacteria levels in UARP and CB reaches.											ĕ							
	Site Location UARP					_									ARO IN D		SPECIAL INSTRUCTIONS		
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Page 2 of 3	10/06/15 12:41	
Stillwater Sciences	Project: SMUD In situ and Bac-T Monitoring	
2855 Telegraph Ave., Suite 400	Project Number: 500.20 / Task 0110.00 CLS Work Order #: CYI1269	
Berkeley, CA 94705	Project Manager: Maia Singer COC #:	

Microbiological Parameters by APHA Standard Methods

Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sampled: 09/29/15 15:30	Received: 09/	29/15 17:0	0					
<1	1.0		1	CY06748	09/29/15	09/30/15	SM9223	
<1.8	1.8	mL "	**	CY06753	09/29/15	10/02/15	SM 9221	
Sampled: 09/29/15 14:05	Received: 09/	29/15 17:0	0					
11.0	1.0		1	CY06748	09/29/15	09/30/15	SM9223	
17	1.8	mL "	**	CY06754	09/29/15	10/02/15	SM 9221	
ampled: 09/29/15 12:10	Received: 09/2	9/15 17:00	0					
2.0	1.0		1	CY06748	09/29/15	09/30/15	SM9223	
2.0	1.8	mL	н	CY06754	09/29/15	10/02/15	SM 9221	
ampled: 09/29/15 09:15	Received: 09/2	9/15 17:00						
<1	1.0		1	CY06748	09/29/15	09/30/15	SM9223	
<1.8	1.8	mL "		CY06753	09/29/15	10/02/15	SM 9221	HT-1
npled: 09/29/15 10:14 Re	eceived: 09/29/	15 17:00						
<1	1.0		1	CY06748	09/29/15	09/30/15	SM9223	
<1.8	1.8	mL "		CY06753	09/29/15	10/02/15	SM 9221	HT-1
npled: 09/29/15 10:45 Re	eceived: 09/29/	15 17:00						
1.0	1.0	MPN/100	1	CY06748	09/29/15	09/30/15	SM9223	
2.0	1.8	mL "		CY06753	09/29/15	10/02/15	SM 9221	HT-1
2.0 ampled: 09/29/15 09:35		"		CY06753	09/29/15	10/02/15	SM 9221	HT-1
		"		CY06753 CY06748	09/29/15	10/02/15 09/30/15	SM 9221 SM9223	HT-1
	Sampled: 09/29/15 15:30 <1 <1.8 Sampled: 09/29/15 14:05 11.0 17 ampled: 09/29/15 12:10 2.0 2.0 2.0 2.0 3 ampled: 09/29/15 09:15 <1 <1.8 npled: 09/29/15 10:14 Re <1.8 npled: 09/29/15 10:15 Re	Sampled: 09/29/15 15:30 Received: 09/ <1 1.0 <1.8 1.8 Sampled: 09/29/15 14:05 Received: 09/ 11.0 1.0 17 1.8 ampled: 09/29/15 12:10 Received: 09/2 2.0 1.0 2.0 1.8 ampled: 09/29/15 09:15 Received: 09/2 <1 1.0 <1 1.0 <1.8 1.8 ampled: 09/29/15 10:14 Received: 09/29/ <1 1.0 <1 1.0 <1 1.0 <1 1.0 <1 1.0 <1 1.0 <1 1.0 <1 1.0 <1 1.0 <1 1.0 <1 1.0 <1 1.0 <1 1.0 <1 1.0 <1.8 1.8 ampled: 09/29/15 10:14 Received: 09/29/ <1 1.0 <2.8 1.8 ampled: 09/29/15 10:15 Received: 09/29/	Sampled: 09/29/15 15:30 Received: 09/29/15 17:00 <1	Sampled: 09/29/15 15:30 Received: 09/29/15 17:00 <1	Sampled: 09/29/15 15:30 Received: 09/29/15 17:00 <1	Sampled: 09/29/15 15:30 Received: 09/29/15 17:00 <1	Sampled: 09/29/15 15:30 Received: 09/29/15 17:00 <1	Sampled: 09/29/15 15:30 Received: 09/29/15 17:00 <1

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California Laboratory Services

Stillwate	er Sciences	Project: SMUD In situ and	d Bac-T Monitoring
	elegraph Ave., Suite 400	Project Number: 500.20 / Task 0110	
Berkele	y, CA 94705	Project Manager: Maia Singer	COC #:
		Notes and Definitions	
T-1	The sample was received outside of the E	PA recommended holding time.	
T-4a	<1.8		
T-4	4		
ET	Analyte DETECTED		
D	Analyte NOT DETECTED at or above the rep	orting limit (or method detection limit when specified)	
R	Not Reported		
у	Sample results reported on a dry weight basis		
PD	Relative Percent Difference		

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CALIFORNIA LABORATORY SERVICES 3249 Fitzgerald Road Rancho Cordova, CA 95742

October 07, 2015

CLS Work Order #: CYI1317 COC #: 164883

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 09/30/15 16:25. 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

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Page 2 of 3			10/07/15 14:19
the state of the s	Project: Project Number: Project Manager:	500.20 / Task 0110.00	oring CLS Work Order #: CYI1317 COC #: 164883

Microbiological Parameters by APHA Standard Methods

Analyte	Res	Reporting alt Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bac-1-BI (CYI1317-01) Water Sa	ampled: 09/30/15 09:23	Received: 09/30/	15 16:25						
E. Coli	1.0	1.0	MPN/100) 1	CY06782	09/30/15	10/01/15	SM9223	
Fecal Coliforms	2.0	1.8	mL	"	CY06786	09/30/15	10/03/15	SM 9221	HT-1
Bac-2-BI (CYI1317-02) Water Sa	ampled: 09/30/15 09:10	Received: 09/30/	15 16:25						
E. Coli	2.0	1.0	MPN/100) 1	CY06782	09/30/15	10/01/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "	н	CY06786	09/30/15	10/03/15	SM 9221	HT-1
Bac-9-UVR (CYI1317-03) Water	Sampled: 09/30/15 13:4	0 Received: 09/	30/15 16:25	5					
E. Coli	1.0	1.0	MPN/100) 1	CY06782	09/30/15	10/01/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06785	09/30/15	10/03/15	SM 9221	
Bac-11-JR (CYI1317-04) Water	Sampled: 09/30/15 12:30	Received: 09/3	0/15 16:25						
E. Coli	5.2	1.0	MPN/100) 1	CY06782	09/30/15	10/01/15	SM9223	
Fecal Coliforms	6.8	1.8	mL "		CY06785	09/30/15	10/03/15	SM 9221	
Bac-13-IHR (CYI1317-05) Water	Sampled: 09/30/15 14:0	9 Received: 09/	30/15 16:2:	5					
E. Coli	1.0	1.0	MPN/100) 1	CY06782	09/30/15	10/01/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06786	09/30/15	10/03/15	SM 9221	
Bac-12-IHR (CYI1317-06) Water	Sampled: 09/30/15 14:2	27 Received: 09/	30/15 16:2:	5					
E. Coli	<1	1.0	MPN/100	1	CY06782	09/30/15	10/01/15	SM9223	
Fecal Coliforms	<1.8	1.8	mL "		CY06786	09/30/15	10/03/15	SM 9221	
Bac-8-UVR (CYI1317-07) Water	Sampled: 09/30/15 13:4	5 Received: 09/.	30/15 16:25	5					
E. Coli	2.0	1.0	MPN/100	1	CY06782	09/30/15	10/01/15	SM9223	
Fecal Coliforms	4.5	1.8	mL "		CY06785	09/30/15	10/03/15	SM 9221	

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Page 3 of 3 10/07/15 14:19								
2855 Te	ter Sciences elegraph Ave., Suite 400 ey, CA 94705	Project: SMUD In situ and Bac Project Number: 500.20 / Task 0110.00 Project Manager: Maia Singer	T Monitoring CLS Work Order #: CYI1317 COC #: 164883					
Notes and Definitions								
HT-1	The sample was received outside of the EPA	recommended holding time.						
BT-4a	<1.8							
BT-4	4							
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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Sacramento Municipal Utility District Upper American River Project FERC Project No. 2101

APPENDIX F Correspondence Regarding Bacterial Sampling



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June 2016 Water Quality Monitoring Report



EDMUND G. BROWN JR.

MATTHEW RODRIQUEZ SECRETARY FOR ENVIRONMENTAL PROTECTION

State Water Resources Control Board

AUG 2 1 2015

Mr. Darold Perry Supervisor, Hydro License Implementation Sacramento Municipal Utility District P.O. Box 1500 Pollock Pines, CA 95726-1500

Dear Mr. Perry:

APPROVAL OF MONITORING LOCATIONS UNDER ALTERNATIVE MONITORING SCHEDULE AND UPDATED SAMPLING METHODS FOR WATER QUALITY MONITORING PLAN; UPPER AMERICAN RIVER HYDROELECTRIC PROJECT, FEDERAL ENERGY REGULATORY COMMISSION PROJECT NO. 2101; EL DORADO AND SACRAMENTO COUNTIES

On August 7, 2015, the Sacramento Municipal Utility District (SMUD) submitted an email to the State Water Resources Control Board (State Water Board), Deputy Director of Water Rights (Deputy Director) requesting approval of proposed bacterial monitoring locations for the Upper American River Hydroelectric Project (UARP). On August 14, 2015, SMUD submitted an email to the Deputy Director requesting approval to update the fecal coliform and *E. coli* sampling methods. Each of these requests is discussed in more detail below.

Bacterial Monitoring Locations

Per Condition 8.J. of the State Water Board water quality certification (certification) for the UARP, SMUD is required to consult with specified agencies¹ to determine proposed monitoring locations for each sampling year. The proposed monitoring locations must be submitted to the Deputy Director for review and approval no later than May 31. The required consultation and submission deadline was missed and SMUD was unable to obtain a contractor in time for the Independence Day holiday sampling outlined in the Water Quality Monitoring Plan (WQ Plan) approved by the Deputy Director on March 24, 2015. On July 15, 2015, the Deputy Director approved an alternative sampling schedule that combined the previously scheduled Independence Day monitoring with the proposed Labor Day monitoring. On August 7, 2015, SMUD provided the specified agencies with the proposed bacterial monitoring locations and requested comments regarding their adequacy. No comments were received by SMUD staff from the specified agencies. However, on August 12, 2015, State Water Board staff received an email from the United States Forest Service staff-stating staff had no concerns with the proposed locations.

FELICIA MARCUS, CHAIR | THOMAS HOWARD, EXECUTIVE DIRECTOR

¹ Specified agencies include the <u>State Water Board</u>, United States Forest Service, California Department of Fish and Wildlife, United States Fish and Wildlife Service, and Central Valley Regional Water Quality Control Board.

State Water Board staff reviewed the proposed monitoring locations and finds that they meet the requirements of certification Condition 8.J. and the alternative sampling schedule approved by the Deputy Director on July 15, 2015. State Water Board staff finds that the locations proposed by SMUD are acceptable locations to conduct bacterial sampling.

Update Fecal Coliform and E. coli Sampling Methods and Other WQ Plan Revisions

The UARP WQ Plan outlines the methods that will be used to sample and detect bacteria. On August 4, 2015, SMUD informed State Water Board staff that the fecal coliform and E. coli sampling method outlined in the WQ Plan incorrectly listed the total coliform method. In order to correct this mistake, SMUD proposed to replace United States Environmental Protection Agency (USEPA) method SM 9222B (sampling method for detection of total coliform) with USEPA methods SM 9221E (detection sampling method for of fecal coliform) and SM 9223B (sampling method for E. coli). State Water Board staff consulted with staff from the Office of Information Management and Analysis staff at the State Water Board and staff from the Surface Water Ambient Monitoring Program (SWAMP) staff at the Central Valley Regional Water Quality Control Board. The proposed alternate methods (SM 9221E and SM 9223B) are acceptable USEPA approved methods for the detection of fecal coliform and E. coli. During consultation with SWAMP staff, it was determined that the 24-hour maximum hold time for bacterial samples outlined in the WQ Plan is incorrect and should be changed to an eight-hour maximum hold time. State Water Board staff submitted an email to SMUD on August 10, 2015, that stated that stating the proposed alternate sampling methods were acceptable. SMUD staff was notified that as a condition of approval, the WQ Plan must be modified to reflect the changes described in this letter and a copy of the modified WQ Plan needed to be submitted to the State Water Board prior to the upcoming Labor Day holiday sampling period. State Water Board staff has reviewed the modified WQ Plan submitted by SMUD on August 14, 2015, and finds it is acceptable.

I hereby approve the proposed bacterial monitoring locations and the modified WQ Plan (dated August 14, 2015), including updates to the fecal coliform and *E. coli* sampling method and the maximum hold time for bacterial samples. If bacterial testing results indicate an exceedance of the water quality objective for bacteria outlined in the *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins*, Central Valley Regional Water Quality Control Board and State Water Board staffs shall be notified as soon as possible and no later than 48 hours following receipt of testing results that indicate an exceedance.

If you have questions regarding this letter, please contact Mr. Michael Maher, UARP Manager, by phone at: (916) 341-5408 or by email at: Michael.Maher@waterboards.ca.gov. Written correspondence should be directed to:

State Water Resources Control Board Division of Water Rights Water Quality Certification Program Attention: Michael Maher P.O. Box 2000 Sacramento, CA 95812-2000

Sincerely,

M 22/

Barbara Evoy, Deputy Director Division of Water Rights

cc: Please see next page.

cc: Ms. Kimberly D. Bose, Secretary Federal Energy Regulatory Commission 888 First Street, NE Washington, D.C. 20426

> Ms. Anna Ewing California Department of Fish and Wildlife North Central Region 1701 Nimbus Road, Suite A Rancho Cordova, CA 95670

Mr. Adam Laputz Central Valley Regional Water Quality Control Board 11020 Sun Center Drive, Suite 200 Rancho Cordova, CA 95670 Ms. Beth Livingston United States Forest Service 100 Forni Road Placerville, CA 95667

Ms. Alison Willy U.S. Fish and Wildlife Service Bay Delta Fish and Wildlife Office 650 Capitol Mall, Room 8-300 Sacramento, CA 95814

Powering forward. Together.



August 07, 2015 DPG 15-216

Barbara Evoy, Deputy Director Division of Water Rights State Water Resources Control Board 1001 I Street, 14th Floor Sacramento, CA 95814

SUBJECT: Notification of 2015 Bacterial Monitoring Locations for the Upper American River Hydroelectric Project, FERC Project No. 2101

Dear Ms. Evoy:

Condition 8.J, Water Quality Monitoring Plan (Plan), of the State Water Resources Control Board (SWRCB) Section 401 Water Quality Certification for the Upper American River Project (UARP), located in Appendix A of the Federal Energy Regulatory Commission's (Commission) Order Issuing New License for the UARP, dated July 23, 2014, requires the Sacramento Municipal Utility District (SMUD) to provide the Deputy Director with the proposed annual bacterial sampling locations for review and approval by May 31 of each year. Given the Commission's May 23, 2015 filing deadline for the Plan and the resultant lack of Commission approval, SMUD was not able to begin monitoring, let alone propose any monitoring locations, by the May 31 date.

On July 9, 2015 the Commission approved SMUD's Plan. On July 15, 2015, the SWRCB issued SMUD a letter (enclosed) providing an alternative monitoring and consultation schedule for 2015, extending the consultation date to August 7, 2015 for Deputy Director approval of the 2015 monitoring locations. Below are the proposed 2015 locations for bacterial monitoring in the UARP under SMUD's approved Plan.

- Union Valley Reservoir (4 annually rotating stations)
 - o At Fashoda Beach
 - Near Camino Cove Campground
 - Near Yellowjacket Campground
 - Near Wench Creek Campground
- Buck Island Reservoir
 - o On northshore, near dam and OHV camping
 - o On southshore, near Rubicon Hiking Trail
- Loon Lake Reservoir
 - West of main dam, near Red Fir Campground
 - West of Loon Lake Campground, near boat launch
- Gerle Creek Reservoir
 - o Near Gerle Creek Campground
 - Near Angel Creek picnic area

- Ice House Reservoir
 - o Northshore near private campground access
 - o East of boat launch and picnic area
- Other UARP Locations
 - o Junction Reservoir, near boat launch
 - o Brush Creek Reservoir, near boat launch
 - o Slab Creek Reservoir, near boat launch

If you have any questions, please contact me at (530) 647-5010 or Darold.Perry@smud.org.

Sincerely

Darold Perry, Supervisor Hydro License Implementation

DP/ap

Enclosures:

SWRCB Letter for Alternative Monitoring and Consultation Schedule for Water Quality Monitoring Plan; FERC Project No. 2101

Electronic Cc:

Michael Maher Environmental Scientist State Water Resources Control Board 1001 I Street Sacramento, CA 95814



EDMUND G. BROWN JR. GOVERNOR

MATTHE SECRETAR ENVIRONM

MATTHEW RODRIQUEZ SECRETARY FOR ENVIRONMENTAL PROTECTION

State Water Resources Control Board

JUL 1 5 2015

Mr. Darold Perry Supervisor, Hydro License Implementation Sacramento Municipal Utility District P.O. Box 1500 Pollock Pines, CA 95726-1500

Dear Mr. Perry:

ALTERNATIVE MONITORING AND CONSULTATION SCHEDULE FOR WATER QUALITY MONITORING PLAN; UPPER AMERICAN RIVER HYDROELECTRIC PROJECT, FEDERAL ENERGY REGULATORY COMMISSION PROJECT NO. 2101; EL DORADO AND SACRAMENTO COUNTIES

Thank you for contacting State Water Resources Control Board (State Water Board) staff regarding the need to modify the 2015 bacterial monitoring and consultation schedule for the Upper American River Hydroelectric Project (Project). I understand that on June 24, 2015, you notified State Water Board staff that the May 31 deadline for consultation (per Condition 8.J of the Project water quality certification) was missed and the scheduled Independence Day monitoring events were no longer possible because the Sacramento Municipal Utility District (SMUD) was unable to obtain a contractor in time to complete this monitoring. Condition 8.J. of the Project water quality certification (certification) requires development of a Water Quality Monitoring Plan (WQ Plan) and submission of a list of proposed bacterial sampling locations developed in consultation with the agencies¹ by May 31 of each designated sampling year. Condition 8.J of the Project certification also requires bacterial monitoring to be performed during the 30-day period that spans either the Independence Day holiday or the Labor Day holiday.

In the WQ Plan developed by SMUD and approved by the Deputy Director of Water Rights (Deputy Director) on March 24, 2015, SMUD proposed bacterial monitoring of the middle elevation portion of the Project during the Independence Day holiday and monitoring of the upper elevation portion of the Project during the Labor Day holiday. To enable the full annual complement of bacterial monitoring required in the certification and the WQ Plan, the bacterial monitoring proposed for the Independence Day period should be performed concurrently with the bacterial monitoring proposed for the Labor Day period. In addition, SMUD shall provide the Deputy Director with the proposed bacterial sampling locations for review and approval no later than August 7, 2015. The regular schedule for bacterial monitoring over both the Independence Day and Labor Day holidays, as outlined in the WQ Plan, shall resume in 2016 and continue throughout the term of the license and any extensions, unless otherwise approved by the Deputy Director.

¹ Agencies refer to the United States Forest Service, California Department of Fish and Wildlife, State Water Board, United States Fish and Wildlife Service, and the Central Valley Regional Water Quality Control Board.

FELICIA MARCUS, CHAIR | THOMAS HOWARD, EXECUTIVE DIRECTOR

^{1001 |} Street, Sacramento, CA 95814 | Mailing Address: P.O. Box 100, Sacramento, Ca 95812-0100 | www.waterboards.ca.gov

State Water Resources Control Board Division of Water Rights Water Quality Certification Program Attention: Michael Maher P.O. Box 2000 Sacramento, CA 95812-2000

Sincerely,

Barbara Evoy, Deputy Director Division of Water Rights

cc: Ms. Kimberly D. Bose, Secretary Federal Energy Regulatory Commission 888 First Street, NE Washington, D.C. 20426

> Ms. Anna Ewing California Department of Fish and Wildlife North Central Region 1701 Nimbus Road, Suite A Rancho Cordova, CA 95670

Mr. Adam Laputz Central Valley Water Regional Quality Control Board 11020 Sun Center Drive, Suite 200 Rancho Cordova, CA 95670 Ms. Deborah Giglio U.S. Fish and Wildlife Service 2800 Cottage Way, W-2605 Sacramento, CA 95825

Ms. Beth Livingston United States Forest Service 100 Forni Road Placerville, CA 95667

Comments: (2016 Annual Report -Monitoring Program)

#	Page	Par.	Review	Comment	Agency	
1	N/A			The report should be expanded to include the following: - A summary of meetings and site visits that occurred during the year (including discussion of major topics and objectives). - A summary of the findings for each monitoring element (introduction, methods, results, and conclusions). This should be more concise than the full reports provided in an appendix or reference section. - A summary of hydrology and water year type to provide context for the monitoring efforts. - A summary of any proposed changes in project operations.	USFS	-Not requ rega Annu has 401(-Not mon Appe unne -Incl the F woul 401(
2	2-4			The status summary for each item should directly state whether or not any monitoring was conducted in 2015 and clearly indicate whether or not each report will be submitted for agency review at a future date. Ex: Riparian Vegetation Monitoring- Plan is still in development. Required to be filed with the Commission by November 23, 2016. No monitoring was conducted in 2015. A final report will be submitted for review at a future date. If any monitoring was conducted, details discussing field visits, monitoring efforts, discussions/changes in protocol, findings, and preliminary analysis/trends, etc. should be included (even if the monitoring is ongoing). There should be additional discussion provided for Gerle Creek SSIMP, Water Quality, Bacteria Monitoring, Robbs Peak Powerhouse Entrainment, Heritage Resources, and Large Woody Debris, and possibly any others that were approved in 2015 or prior and had implementation in 2015.	USFS	Add acti app in th
3	5			Table 1. Monitoring Program Frequency First Five Year – This table indicates that Geomorphology Monitoring (Sensitive Site Investigation and Mitigation Plan Development) was conducted in 2015. Details on the monitoring that occurred should be provided or an explanation provided as to why the monitoring did not occur.		See

Response

ot included. SMUD does not have a quirement to hold or report on any meetings parding the Monitoring Program outside of the nual Review of Ecological Conditions, which is a separate reporting requirement in Aricle 1(a) of the License.

ot included. A summary of findings for each nitoring element in addition to those in the pendix would be redundant and add necessarily to the volume of this Report.

cluded the water year type for context.

here were no proposed changes to operation of Project in 2015, though if there were, those uld be reported as described in Articles 1(b)(c)(d) of the License.

Iditional language was added to identify general stiviteis conducted in 2015 under the respective proved Plans. Any additional information noted the comment will be included in the final Report for each respective Plan.

e comment above.

Comments: (2016 Annual Report -Monitoring Program)

#	Page	Par.	Review	Comment	Agency	
4	N/A (Appe ndix 1)			Will the draft Water Quality Monitoring Report be finalized in the Final Monitoring Program Annual Report?	USFS	Yes
5	1 & 2 (Appe ndix 1)			The Introduction and Background section should also mention the USFS recommended condition, Settlement Agreement article, and developed UARP Water Quality Monitoring Plan.	USFS	The no c mer USF 10(a the rem not this
6	4 (Appe ndix 1)	1		Recommend adding to the second sentence that winter (Jan-Feb) in-situ monitoring at riverine sites was also not conducted and clarifying which "middle elevation" sites are being referred to in this sentence. What is significant about "middle elevation" sites? Please provide a copy of the SWRCB July 2015 letter referred to in this paragraph.	USFS	The mer wou Day year App atta
7	8 (Appe ndix 1)	Table 4-4		The UARP Water Quality Monitoring Plan calls for the addition of "three other selected stations" (pg. 12) for bacterial sampling, but only two "[o]ther UARP locations" are mentioned in Table 4-4. Please clarify why a third site was not monitored and discuss agency consultation relevant to the selection of these sites.	USFS	All ti cons as p SWI thes the prop Wat

es. es. es. es. e Settlement Agreement was added but there is a corresponding FPA 4(e) Condition. As entioned, Condition 31 was submitted by the SFS as a recommendation pursuant to Section (a) of the FPA, acknowledging the jurisdiction of e SWRCB for this resource. As such, it was moved from Appendix B of the License, and is at cited in the document located in Appendix A of is Report.

he lack of in-situ monitoring during winter is now entioned. "Middle elevation" sites are those that ould normally be sampled around Independence ay; these were sampled around labor day this ar. A copy of the letter is now contained in the opendix F of the Water Quality Monitoring Report tached as Appendix A to this Report.

three were mentioned in Table 4-4. Agency nsultation occurred via e-mail on August 7, 2015 part of the site proposal to the Deputy Director, VRCB. As mentioned in the SWRCB approval of ese sites, the only response received was from e USFS stating it had no concerns with the posed locations (see Appendix F of 2015 ater Quality Monitoring Report).