ERRATA

KLAMATH RIVER BASELINE WATER QUALITY SAMPLING – 2013 ANNUAL REPORT–

Prepared for the KHSA Water Quality Monitoring Group

Prepared by
Watercourse Engineering, Inc.
January 11, 2018

Errata

In 2017 PacifiCorp completed a comprehensive quality control data review process for the data collected under Interim Measure 15. Several corrections were made to the 2013 dataset which required the following changes be made to the Klamath River Baseline Water Quality Sampling 2013 Annual Report. Tables and figures in this errata sheet replace tables and figures with the corresponding number (e.g., Errata Figure 4 replaces report Figure 4). Completely new tables and figures are given a new number that would place them in the correct location within the original report (e.g., Errata Figure 3-a would follow report Figure 3). Any changes to the text are referenced to page and paragraph and indicated in ~~strikeout~~ (old text) and underline (new text).

1. Public health data collected in 2013 has been added to the data files associated with this report, but was not added to, analyzed, or presented within the annual report itself. The entire Interim Measure 15 data set is available at: http://www.pacificorp.com/es/hydro/hl/kr.html.

2. Project sites were standardized (Errata Table 1-a).

Errata Table 1-a. Original 2013 Site IDs and Names and the corresponding Standardized Site IDs and Names.

Old Site ID and Name		Corresponding Standardized Site ID and Name	
KR2544	Link Dam (RM - 254.4)	KR25444	Link Dam (RM 254.44; Baseline)
KR2460	Keno Reservoir at Miller Island (RM - 234.9)	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)
KR2330	KR below Keno Dam (RM -233.4)	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)
KR2282	KR above J.C. Boyle Reservoir (RM-228.2)	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)
KR2260	J.C. Boyle Reservoir (RM-226.0)a	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)
KR2240	KR below J.C. Boyle Dam (RM-224.0)	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)
KR2195	KR below USGS Gage (RM-219.5)	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)
KR2064	KR near Stateline (RM-206.4)	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)
KR1990	Copco Reservoir (RM-199.0)b	KR19874	Copco Reservoir (RM 198.74; Baseline)
KR1950	KR below Copco Dam (RM-195.0)	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)
KR1920	Iron Gate Reservoir (RM-192.0)c	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)
KR1897	KR below Iron Gate Dam (RM-189.7)	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)
KR1560	KR at Walker Bridge (RM- 176.7)	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)
KR1285	KR below Seiad (RM - 128.5)	KR12850	Klamath River below Seiad (RM 128.5; Baseline)
KR1006	KR near Happy Camp (RM-93.5)	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)
KR0591	KR at Orleans (USGS) (RM-59.1)	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)
KR0435	KR at Weitchpec (RM-43.5)	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)
KR0385	KR below Trinity River (RM-38.5)	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)
KR0060	KR near Klamath (RM-6.0)	KR00600	Klamath River near Klamath (RM 6.0; Baseline)
KR0005	KR Estuary (RM-0.5)d	KR00050	Klamath River Estuary (RM 0.5; Baseline)
SHR00	Shasta River near mouth	SH00000	Shasta River near mouth (Baseline)
SCR00	Scott River near mouth	SC00000	Scott River near mouth (Baseline)
SAR00	Salmon River near mouth	SA00000	Salmon River near mouth (Baseline)
TRR00	Trinity River near mouth	TR00000	Trinity River near mouth (Baseline)

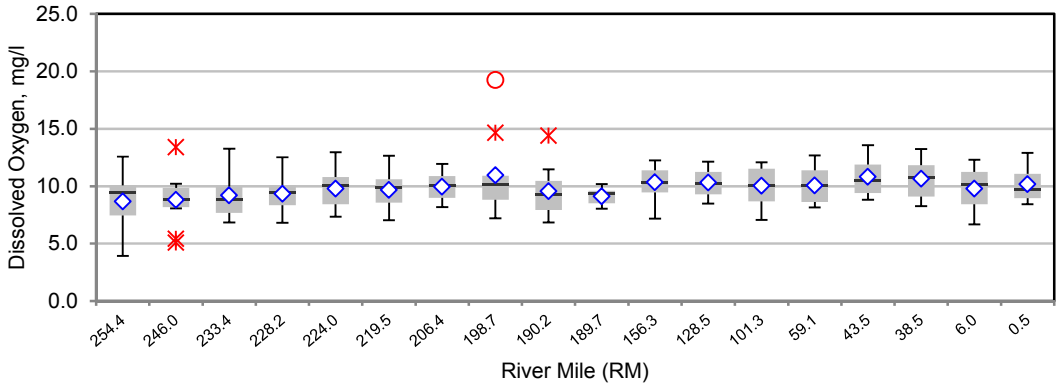
3. The original methods, MDLs and RLs listed in Table 2 did not present information for all constituents of interest in 2013, nor was the variability of the MDLs and RLs presented. The methods as well as the MDL and RL variation in 2013 are presented in Errata Table 2.

Errata Table 2. 2013 Laboratory methods, method detection limits (MDLs) and reporting limits (RLs). "na" indicates no limit available for a method.

		Basic			CH2MHill			Aquatic Research			CBL			EPA		
Constituent Name	ID	Method	MDL	RL	Method	MDL	RL	Method	MDL	RL	Method	MDL	RL	Method	MDL	RL
Alkalinity	ALKT	SM 2320B	1.0	5.0	EPA 310.1	na	5.0	SM 2320B	1	-	-	-	-	-	-	-
Carbon, Dissolved Organic Carbon	DOC	SM 5310C	0.2	0.5	SM 5310C	0.047 0.12	0.5 0.5	SM 5310B	0.25	-	-	-	-	-	-	-
Demand, Carbonaceous Biological Oxygen Demand	CBOD	SM 5210	3.0	3.0	SM 5210B	na	2.0	SM 5210B	2	-	-	-	-	-	-	-
Nitrogen, Ammonia	NH3	EPA 350.1	0.03	0.05	EPA 350.1	0.014	0.05	SM 4500NH3H	0.01	-	-	-	-	-	-	-
Nitrogen, Nitrate+Nitrite	NO3+NO2	EPA353.2	0.02	0.05	EPA353.2	0.0028 0.003	0.01 0.01	SM 4500NO3F	0.01	-	-	-	-	-	-	-
Nitrogen, Total Kjeldahl Nitrogen	TKN	EPA 351.2	0.1	0.2	-	-	-	EPA 351.1	0.2	-	-	-	-	-	-	-
Nitrogen, Total Nitrogen	TN	EPA 351.2	0.1	0.2	SM 4500-N C	0.062	0.2	SM 4500 NC	0.05	-	-	-	-	-	-	-
Phosphorus, Phosphate	OPO4	SM 4500P-E	0.005	0.01	EPA 365.1	0.0014	0.01	SM 4500PF	0.001	-	-	-	-	-	-	-
Phosphorus, Total Phosphorus	TP	SM 4500P-BE	0.02	0.05	EPA 365.4	0.022	0.05	SM 4500PF	0.002	-	-	-	-	-	-	-
Turbidity	TURB	-	-	-	SM 2130B	na	0.1	SM 2130B	0.1	-	-	-	-	-	-	-
Solids, Total Suspended Solids	TSS	SM 2540D	1.0	5.0	SM 2540D	0.6	5	SM 2540D	0.5	-	-	-	-	-	-	-
Solids, Volatile Suspended Solids	VSS	SM 2540D	1.0	5.0	EPA 160.4	na	5	SM 2540E	0.5	-	-	-	-	-	-	-
Algae, Chlorophyll-a	CHLA	SM 10200H	2.0	6.0	-	-	-	SM 10200H	0.1	-	EPA 445.0	0.68	na	-	-	-
Algae, Pheophytin	PHEO	SM 10200H	2.0	6.0	-	-	-	SM 10200H	0.1	-	EPA 445.0	0.68	na	-	-	-
Carbon, Particulate Carbon	PC	-	-	-	-	-	-	-	-	-	EPA 440.0	0.0633	na	-	-	-
Nitrogen, Particulate Nitrogen	PN	-	-	-	-	-	-	-	-	-	EPA 440.0	0.0105	na	-	-	-
Phosphorus, Particulate Phosphorus	PP	-	-	-	-	-	-	-	-	-	EPA 365.1, ASPILA	0.0021	na	-	-	-
Phosphorus, Particulate Inorganic Phosphorus	PIP	-	-	-	-	-	-	-	-	-	EPA 365.1, ASPILA	0.0021	na	-	-	-
Toxins, Microcystin	MYCN	-	-	-	-	-	-	-	-	-	-	-	-	ELISA	0.15	0.18

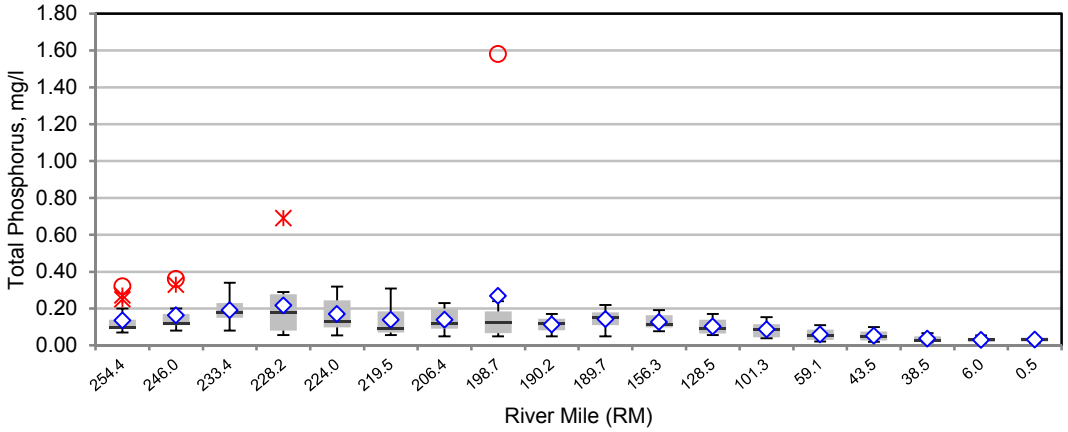
4. Because of the small sample size at each site during 2013, the boxplots presented in the annual report and this errata sheet may not be statistically robust and are included for illustration purposes only. For errata boxplot figures, sites with less than six points of data are no longer presented and the errata figure captions indicate those locations.

5. Erroneous dissolved oxygen data was corrected in the dataset; to reflect these changes, the mainstem dissolved oxygen boxplot in Figure 4 was revised and is presented below in Errata Figure 4.



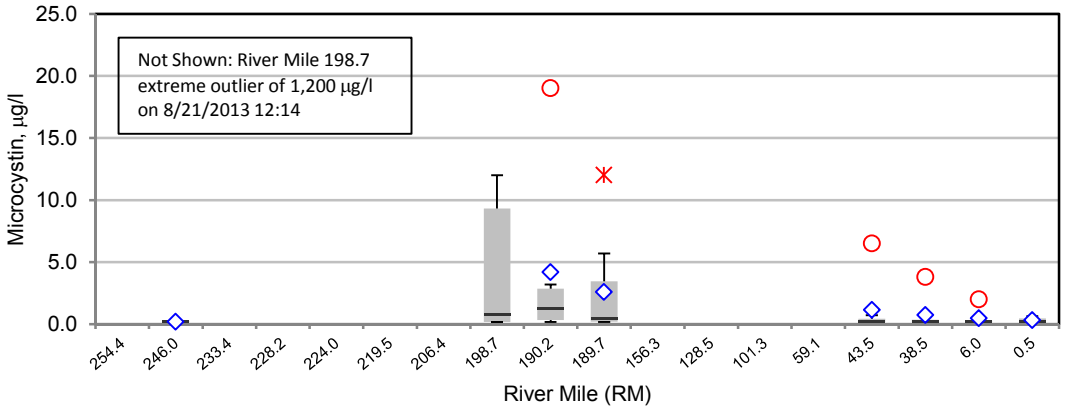
Errata Figure 4. Dissolved oxygen from Link River to the Klamath River Estuary with median (−), mean (◊), outliers(*), and extreme outliers (○) identified (February 2013 – December 2013). Note: Miller Island at Keno Reservoir (RM 246), Copco Reservoir (RM 199), and Iron Gate Reservoir (RM 192). River mile on x-axis not to scale.

6. Erroneous total phosphorus data was corrected in the dataset; to reflect these changes, the mainstem total phosphorus boxplot in Figure 7 was revised and is presented below in Errata Figure 7.



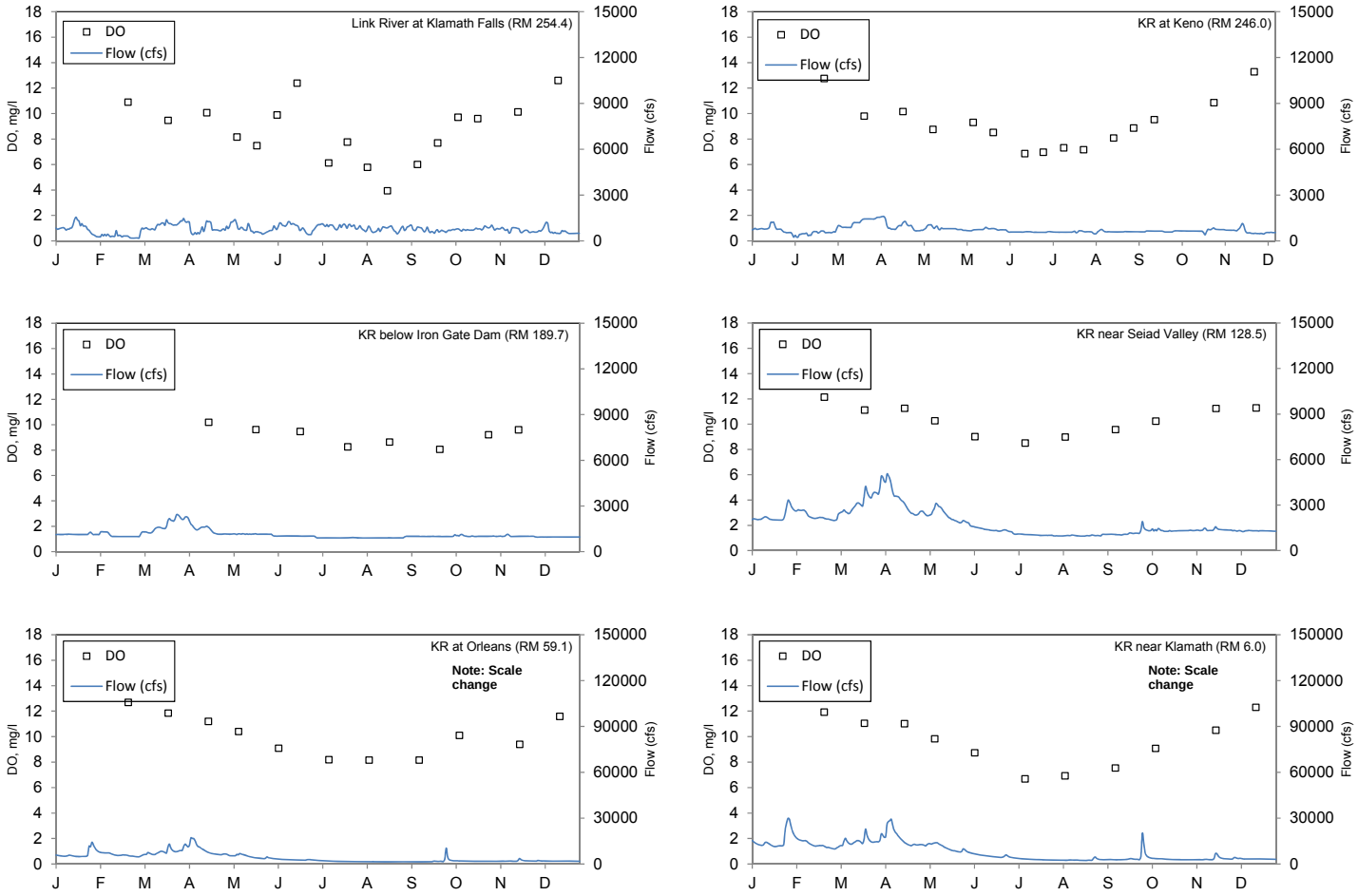
Errata Figure 7. Total phosphorus from Link River to the Klamath River Estuary with median (−), mean (◊), outliers (*), and extreme outliers (○) identified (February 2013 – December 2013). Note: Miller Island at Keno Reservoir (RM 246), Copco Reservoir (RM 199), and Iron Gate Reservoir (RM 192). River mile on x-axis not to scale.

7. Missing microcystin data was added to the dataset and erroneous microcystin data was corrected in the dataset; to reflect these changes, the mainstem microcystin boxplot in Figure 8 was revised and is presented below in Errata Figure 8.



Errata Figure 8. Microcystin from Link River to the Klamath River Estuary with median (−), mean (◊), outliers (*), and extreme outliers (○) identified (February 2013 – December 2013). Note: Miller Island at Keno Reservoir (RM 246), Copco Reservoir (RM 199), and Iron Gate Reservoir (RM 192). River mile on x-axis not to scale. Note: No micocystin boxplots are included for River Mile 254.4, 233.4, 228.2, 224.0, 219.5, 206.4, 156.3, 128.5, 101.3 and 59.1 because there were fewer than six data points at each of these sites. Not shown: extreme outlier of 1,200 µg/l for River Mile 198.7.

8. Erroneous dissolved oxygen data was corrected in the dataset; to reflect these changes, the discrete dissolved oxygen and USGS flow graph in Figure 13 was revised and is presented below in Errata Figure 13.



Errata Figure13. 2013 Discrete dissolved oxygen (DO) and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers. Note the scale change for the secondary y-axis at Orleans and near Klamath mouth.

9. Missing microcystin data was added to the dataset; to reflect these changes, the microcystin and USGS flow graph in Figure 17 was revised and is presented below in Errata Figure 17.

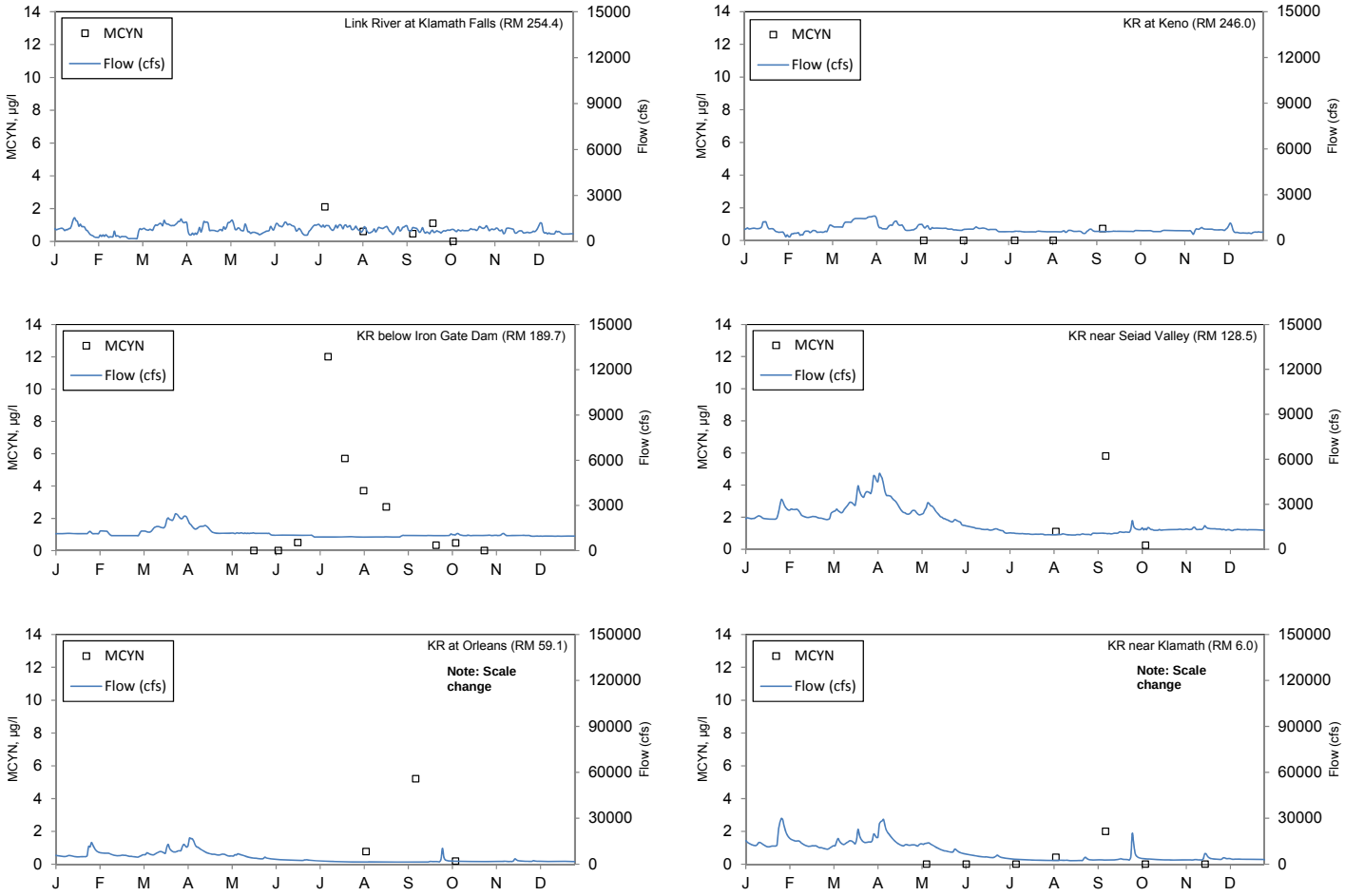


Figure 17. 2013 microcystin (MCYN) and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers. Only surface samples are taken in consideration. Non-detect values are presented as zeros. Note the scale change for the secondary y-axis at Orleans and Klamath.

10. The Appendix B 2013 KHSA dataset has been revised since the original 2013 Annual Report was completed. The revised dataset is presented in the table below in Errata Table B-1.

Errata Table B-1. 2013 KHSA dataset.

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
								C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l
KHSA2013-001	2/20/2013	9:45	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	3.92	7.55	130	10.89	18.0	<6.0	53	4.1		<3.0	0.38	0.42	0.237	1.1	1.6	<0.05	0.07			33	9.7	<5.0	
KHSA2013-007	3/20/2013	6:50	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	7.04	7.11	122	9.46	10.0	20.0	47	3.9	2.68	<3.0	0.15	0.33	0.419	0.4	0.8	<0.05	0.09			27	34.7	<5.0	
KHSA2013-013	4/16/2013	8:35	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	7.91	7.79	111	10.06	26.0	<6.0	48	3.7	3.11	<3.0	0.06	0.08	0.446	0.5	0.6	0.01	0.11			33	59.7	8.8	
KHSA2013-019	5/7/2013	8:20	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	14.25	7.5	112	8.14	10.0	<6.0	49	4		<3.0	0.05	0.06	0.365	0.6	0.65	0.02	0.08			13.5	9	<5.0	
KHSA2013-025	5/21/2013	6:40	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	15.81	8.04	114	7.47	8.0	<6.0	50	4.3	1.16	<3.0	<0.05	<0.05	0.172	0.5	0.5	0.036	0.1	0.051	0.0079	11.3	7.3	<5.0	
KHSA2013-029	6/4/2013	9:05	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	17.94	8.93	113	9.88	62.0	<6.0	51	4.7		<3.0	0.06	<0.05	0.605	1.2	1.2	0.016	0.14			13.3	15.8	7.3	
KHSA2013-035	6/18/2013	7:50	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	18.7	9.96	122	12.38	312.0	<6.0	52	5.4	11.1	19	<0.05	<0.05	2.26	2.2	2.2	<0.05	0.2	0.1719	0.1028	12.8	24	18.7	
KHSA2013-040	7/10/2013	7:00	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	22.6	9.75	116	6.11	211.0	<6.0	49	6.6		12	0.09	<0.05	1.56	3.1	3.09	0.113	0.25			12.8	13.3	9	2.1
KHSA2013-046	7/23/2013	8:00	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	23.79	9.7	115	7.75	320.0	<6.0	49	7.7		18	<0.05	<0.05		3.2	3.2	0.103	0.32			38.4	29.7	10.5	
KHSA2013-051	8/6/2013	8:50	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	22.29	9.51	111	5.76	294.0	10.0	51	7.7	10.9	18	0.17	0.08	2.39	3.1	3.14	0.047	0.27	0.2048	0.0864	32.3	29.7	11.3	0.6
KHSA2013-057	8/20/2013	8:20	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	21.74	7.42	123	3.93	6.0	<6.0	54	6.3	0.938	<3.0	0.17	0.5	0.155	1.2	1.73	0.051	0.12	0.0212	0.0125	8.14	<5.0	<5.0	
KHSA2013-062	9/10/2013	8:20	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	20.16	7.6	130	5.99	11.0	<6.0	55	5.3	1.23	<3.0	0.17	0.24	0.244	0.6	0.87	0.038	0.1	0.0252	0.0101	10.9	<5.0	<5.0	0.46
KHSA2013-068	9/24/2013	9:15	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	14.14	7.7	126	7.68	9.0	<6.0	55	5.1	1.12	<3.0	0.09	0.25	0.204	1	1.2	0.026	0.07	0.0224	0.0088	10.1	5.3	<5.0	1.1
KHSA2013-073	10/22/2013	7:30	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	10.48	7.53	129	9.59	11.0	<6.0	52	4.5			0.1	0.36	0.261	0.8	1.1	<0.05	0.1			20.6	15.8	<5.0	
KHSA2013-077	11/19/2013	9:40	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	4.73	7.68	126	10.11	13.1	5.3	51	4.3	2.47	<3.0	0.16	0.4	0.388	1	1.4	<0.05	0.1	0.0283	0.0046	29.7	32.5	5.5	
KHSA2013-083	12/17/2013	9:50	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	1.78	7.52	132	12.58	25.7	7.5	54	4.1	1.72	<3.0	0.21	0.44	0.266	0.8	1.29	<0.05	0.07	0.0231	0.0076	23.9	11	<5.0	
KR2541310	10/8/2013	14:15	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	10.41	7.99	128.3	9.7			51.5	4.62		<3.0	<0.05	0.25			1.74	0.013	0.098				21.6	<5.0	<0.18
KHSA2013-004	2/20/2013	7:35	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	2.66	7.64	203	9.93	14.0	20.0	80	4.1		<3.0	0.06	0.56	0.559	1.6	2.2	0.048	0.2			68.5	101	13	
KHSA2013-010	3/20/2013	9:25	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	6.87	7.58	156	8.86	19.0	16.0	60	4.2	3.59	4	0.14	0.39	0.536	0.9	1.3	<0.05	0.12			26.3	36.8	6	
KHSA2013-016	4/16/2013	6:35	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	8.62	7.48	134	9.77	24.0	6.0	56	3.8	2.03	<3.0	0.06	0.17	0.327	0.6	0.8	0.026	0.11			22.6	19.3	<5.0	
KHSA2013-022	5/7/2013	6:20	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	14.31	7.11	119	8.08	16.0	11.0	51	4.2		<3.0	0.11	0.1	0.242	0.8	0.92	0.047	0.11			13.9	14.2	<5.0	<0.18
KHSA2013-032	6/4/2013	7:55	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	17.69	8.65	123	10.21	53.0	<6.0	54	4.9		4	0.07	<0.05	0.626	0.9	0.92	0.061	0.14			9.32	10.2	<5.0	<0.18
KHSA2013-043	7/10/2013	9:25	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	24.6	9.48	122	5.43	183.0	<6.0	54	7.2		13	0.48	<0.05	1.66	2.9	2.91	0.111	0.33			12.2	13	10	<0.18

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
								C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l
KHSA2013-054	8/6/2013	6:35	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	22.38	9.13	122	5.07	290.0	29.0	55	8.7	11.9	18	0.45	<0.05	2.65	3.8	3.75	0.056	0.36			25.1	21.7	14.3	0.26
KHSA2013-065	9/10/2013	9:40	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	21.42	8.19	137	8.97	52.0	12.0	56	5.6	3.03	4	0.1	0.12	0.52	0.5	0.64	<0.05	0.11			15	6.5	<5.0	0.28
KHSA2013-080	11/19/2013	11:00	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	5.67	7.51	136	8.88	11.9	4.5	52	4.3	1.28	<3.0	0.14	0.49	0.203	0.8	1.3	0.014	0.08			20.9	10.3	<5.0	
KHSA2013-086	12/17/2013	11:35	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	0.48	7.76	156	13.39	22.2	5.7	62	4.2	3.06	<3.0	0.13	0.52	0.489	0.9	1.39	<0.05	0.09			22	16.3	5	
KR2461310	10/8/2013	14:55	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	12.67	7.99	156.1	8.3			62.1	4.81		<3.0	<0.05	0.29			1.33	0.04	0.14				<5.0	<5.0	<0.18
KBK1310	10/8/2013	16:25	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	11.13	8.4	173.9	9.52			70.3	5.12		2.7	<0.05	0.19			1.38	0.02	0.15				13.1	<5.0	
KHSA2013-005	2/20/2013	8:35	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	2.81	7.63	327	12.74	19.0	12.0	112	6.9		3	0.43	0.72	0.447	1.4	2.2	0.067	0.19			30.6	36	6.5	
KHSA2013-011	3/20/2013	8:30	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	8	7.57	218	9.78	24.0	16.0	80	6.3	3.95	<3.0	0.19	0.39	0.612	1	1.4	0.026	0.18			36.8	51.8	7.4	
KHSA2013-017	4/16/2013	7:45	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	8.84	7.55	206	10.14	18.0	6.0	72	5.6	2.42	<3.0	0.12	0.28	0.344	0.8	1.08	0.051	0.15			25.5	28.3	5.6	
KHSA2013-023	5/7/2013	7:35	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	14.76	7.32	146	8.74	10.0	9.0	60	5.4		<3.0	0.09	0.1	0.22	0.8	0.86	0.098	0.15			16	17.5	<5.0	<0.18
KHSA2013-033	6/4/2013	7:00	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	17.95	8.22	296	9.29	8.0	<6.0	107	9.1		<3.0	0.18	<0.05	0.322	1.2	1.2	0.123	0.19			4.99	<5.0	<5.0	<0.18
KHSA2013-038	6/18/2013	7:00	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	18.46	9.39	154	8.51			63			5	0.16	<0.05		1.5	1.5	0.124	0.23			8.03			
KHSA2013-044	7/10/2013	8:25	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	23.48	8.93	163	6.85	19.0	<6.0	68	9		3	0.47	<0.05	0.898	2.4	2.35	0.229	0.34			4.63	<5.0	<5.0	<0.18
KHSA2013-049	7/23/2013	7:10	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	23.33	8.78	148	6.95			63			5	0.57	<0.05		2.7	2.7	0.1	0.29			5.37			
KHSA2013-055	8/6/2013	10:30	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	21.65	8.04	153	7.3	44.0	25.0	67	8.6	3.66	4	1.06	<0.05	0.737	3.1	3.15	0.15	0.3	0.0878	0.0389	6.55	6.7	5.3	<0.18
KHSA2013-060	8/20/2013	7:05	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	21.47	7.81	153	7.15			65			4	1.04	<0.05		2.8	2.81	0.1	0.23			5.53			
KHSA2013-066	9/10/2013	7:10	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	20.3	7.81	165	8.07	15.0	24.0	68	7	2.05	4	0.26	<0.05	0.387	0.9	0.91	0.032	0.17	0.0845	0.0337	11.7	6.3	<5.0	0.72
KHSA2013-071	9/24/2013	7:30	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	15.7	7.43	162	8.85			67			<3.0	0.26	0.12		1.3	1.4	0.035	0.11			11.4			

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
								C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		mg/l	mg/l	ug/l
KHSA2013-081	11/19/2013	7:55	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	5.68	7.18	139	10.84	8.13	5.59	55	4.4	0.903	<3.0	0.12	0.39	0.148	0.8	1.2	0.02	0.09	0.0234	0.0043	19.2	7.3	<5.0	
KHSA2013-087	12/17/2013	8:35	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	0.72	7.27	151	13.27	24.54	7.86	58	4.3	1.8	<3.0	0.1	0.54	0.277	0.8	1.34	<0.05	0.08	0.0338	0.0147	24.3	20.3	<5.0	
KR13024	3/18/2013	12:30	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	8.65	6.37	234.5	9.97	11.4	15.8	76.9	6.14	1.63		0.1	0.48	0.21		1.12	0.073	0.06				49.5	9.5	
KR13046	4/16/2013	13:00	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	8.95	7.73	211.3	10.14	11.7	8.5	69.3	5.81	1.47		0.074	0.33	0.211		1.07	0.098	0.09				32.4	5.2	
KR13069	5/19/2013	12:10	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	17.48	8.6	198.8	9.08	5.5	5.4	74.7	5.88	0.726		<0.05	0.17	0.101		0.77	0.19	0.29				6.4	<5.0	
KR13092	6/21/2013	10:00	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	16.85	8.67	157	8.27	3.5	4.4	61.8	7.97	1.02		0.086	0.41	0.156		1.31	0.21	0.28				<5.0	<5.0	
KR13115	7/22/2013	13:40	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	25.52	7.67	147	6.81	11.1	14.2	55.4	7.91	0.207		0.08	0.99	0.0279		2.59	0.2	0.27				5.6	<5.0	
KR13138	8/22/2013	14:00	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	22.65	8	154	7.09	3.7	5.9	57.2	7.19	1.02		0.097	0.98	0.127		2.59	0.17	0.23				5.6	7	
KR13161	9/24/2013	16:50	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	15.59	8.28	165	8.6	4.2	6.1	62	5.22	1.08		<0.05	0.43	0.138		1.47	0.077	0.12				9.2	<5.0	
KR13183	10/24/2013	11:30	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	9.69	8.63	156	9.87	3.6	5.0	60.6	4.82	0.843		<0.05	0.36	0.132		1.16	0.051	0.69				6.2	<5.0	
KR13204	11/20/2013	15:50	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	5.85	8.4	145	10.92	2.0	2.7	52.9	4.31	0.834		0.052	0.46	0.105		1.24	0.051	0.08				7.4	<5.0	
KR13224	12/19/2013	9:10	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	0.1	8.06	159	12.53	5.7	7.2	58.1	4.22	1.05		<0.05	0.52	0.141		1.77	0.04	0.07				19.4	<5.0	
KR13070	5/19/2013	13:20	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	18.47	8.47	186	8.97	10.2	4.2			0.966				0.148										<0.18
KR13093	6/21/2013	9:15	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	17.9	8.94	158	6.83	2.3	3.0			0.831				0.123										<0.18
KR13116	7/22/2013	14:30	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	25.66	8.75	151	11.22	12.1	10.4			1.35				0.209										<0.18
KR13139	8/22/2013	13:30	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	22.49	7.83	152	6.63	1.1	1.6			0.704				0.0877										<0.18
KR13162	9/24/2013	15:00	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	16.08	7.48	157	8.08	2.5	3.3			0.758				0.0928										0.22
KR13184	10/24/2013	10:55	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	9.63	8.35	157	9.23	5.2	7.1			0.781				0.114										
KR13001	2/19/2013	14:30	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	1.12	7.95	284.3	11.87	10.9	9.2	91.9	6.5	0.941		0.076	0.7	0.15		1.75	0.11	0.19				19.4	<5.0	
KR13023	3/18/2013	13:15	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	8.6	6.29	240.6	10.42	8.4	10.4	80.6	6.14	0.971		0.088	0.48	0.13		1.54	0.057	0.10				26.8	5.2	
KR13045	4/16/2013	14:20	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	9.05	8.27	242.7	10.51	11.6	9.2	78.9	7.09	1.72		0.088	0.32	0.238		1.04	0.092	0.13				22.8	<5.0	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
								C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l
KR13068	5/19/2013	14:50	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	17.16	8.26	193	8.59	7.8	5.1	72.8	6.26	1.22		<0.05	0.15	0.173		0.77	0.18	0.26				12.2	<5.0	
KR13091	6/21/2013	8:30	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	17.2	8.45	154.2	8.29	2.7	3.7	62.7	6.85	0.763		0.19	0.28	0.103		1.3	0.2	0.27				<5.0	<5.0	
KR13114	7/22/2013	15:50	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	23.88	7.76	150.4	7.34	8.7	9.4	60.5	7.46	0.965		0.13	0.75	0.142		2.27	0.22	0.32				<5.0	<5.0	
KR13137	8/22/2013	10:55	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	21.65	7.79	151.3	7.63	1.5	2.4	56.3	6.36	0.685		0.2	1.18	0.0808		2.63	0.18	0.23				<5.0	5.8	
KR13160	9/24/2013	16:10	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	15.78	8.05	157.9	8.83	2.3	3.6	60.7	5.09	0.983		0.093	0.38	0.128		1.38	0.078	0.12				6.8	<5.0	
KR13182a	10/24/2013	10:15	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	9.48	8.32	156.8	10.09	4.5	6.5	61.4	1.28	0.584		0.064	0.37	0.0883		1.19	0.059	0.10				<5.0	<5.0	
KR13203	11/20/2013	15:10	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	6.01	7.94	150.3	11.09	2.3	3.0	54.3	4.04	0.777		0.058	0.43	0.1		1.21	0.049	0.09				11.2	<5.0	
KR13223	12/19/2013	10:40	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	0.56	7.99	155.8	12.95	4.4	5.6	58.3	3.96	1.06		<0.05	0.51	0.141		1.66	0.042	0.06				19.4	<5.0	
KR13005	2/19/2013	13:45	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	2.55	7.8	258	11.41	10.8	8.8	88.3	6.78	0.456		0.1	0.68	0.0691		1.58	0.094	0.06			15	22.8	<5.0	
KR13027	3/18/2013	14:15	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	8.87	6.09	238	10.2	8.1	10.5	80.7	6.74	1.01		0.053	0.47	0.128		1.31	0.069	0.06			18	28.8	6.8	
KR13049	4/16/2013	13:55	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	9.24	8.18	243	10.33	10.6	8.7	76.9	6.91	1.53		0.091	0.33	0.216		1.03	0.092	0.09			16	26.4	5	
KR13071	5/19/2013	14:15	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	16.73	8.11	194	8.68	7.1	5.3	73.1	5.86	1.42		<0.05	0.15	0.178		0.75	0.18	0.27			8.2	11.6	<5.0	<0.18
KR13094	6/21/2013	8:00	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	12.35	8.23	147	9.59	1.2	1.3	65.7	2.59	0.335		<0.05	0.26	0.0406		0.5	0.099	0.14			1.8	<5.0	<5.0	<0.18
KR13117	7/22/2013	15:20	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	23.67	7.59	151	7.04	5.9	6.8	59.2	6.56	1.02		0.13	0.77	0.15		2.23	0.22	0.31			2.7	<5.0	<5.0	<0.18
KR13140	8/22/2013	12:50	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	21.52	7.78	151	7.13	1.9	3.2	56.7	6.31	0.631		0.14	1.18	0.0795		2.55	0.18	0.23			2.7	<5.0	6.2	3.4
KR13163	9/24/2013	15:40	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	15.87	7.65	158	8.48	2.2	3.4	60.2	5.54	0.615		0.066	0.38	0.0727		1.39	0.073	0.12			7.3	8	<5.0	0.18
KR13185	10/24/2013	9:45	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	9.52	8.59	157	9.85	5.3	7.2	60.9	4.49	0.871		0.05	0.37	0.12		1.16	0.056	0.09			12	<5.0	<5.0	
KR13205	11/20/2013	14:45	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	6.08	3.95	151	10.86	2.4	3.6	54.4	4.07	0.834		0.052	0.42	0.102		1.17	0.047	0.08			14	9.6	<5.0	
KR13225	12/19/2013	10:10	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	0.72	8.03	156	12.67	3.8	5.0	59	3.63	0.992		<0.05	0.5	0.121		1.68	0.043	0.07			19	19.4	<5.0	
KR13010	2/20/2013	13:45	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	3.07	8.34	267	11.92	9.6	7.3	89.5	5.97	0.996	11.5	<0.05	0.72	0.159		1.66	0.088	0.10			15	20.3	6.3	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
								C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l
KR13032	3/18/2013	16:25	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	10.07	5.65	228	10.43	7.2	9.2	78.3	6.21	0.504	<2.0	<0.05	0.53	0.15		1.17	0.068	<0.05			18	25.6	<5.0	
KR13054	4/17/2013	9:45	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	8.46	7.82	215	11.06	8.1	7.7	71.7	5.35	0.84	<2.0	<0.05	0.37	0.112		0.86	0.08	0.08			14	17.8	<5.0	
KR13076	5/19/2013	17:30	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	17.99	8.59	181	8.94	5.0	3.6	68.7	5.03	0.713	<2.0	<0.05	0.13	0.101		0.6	0.15	0.22			6.5	9.6	<5.0	<0.18
KR13089	6/6/2013	13:30	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P							71.7	4.01		6.2	<0.05	0.094			0.33	0.093	0.13				<5.0	<5.0	
KR13099	6/20/2013	16:50	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	16.56	8.85	155	9.08	3.1	2.8	64.5	4.42	0.751	14.5	<0.05	0.28	0.0987		0.82	0.15	0.20			3.3	5.4	<5.0	<0.18
KR13112	7/11/2013	13:00	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P										7.4	<0.05	0.44			0.96	0.17	0.20						
KR13122	7/23/2013	16:45	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	24.83	8.47	143	8.18	2.8	3.1	62.6	4.01	0.865	2.1	<0.05	0.56	0.114		1.33	0.15	0.19			2.8	<5.0	<5.0	<0.18
KR13135	8/5/2013	13:00	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P										<2.0	<0.05	0.54			1.31	0.15	0.21						
KR13145	8/22/2013	9:30	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	19.07	8.05	153	8.67	1.4	2.2	59.4	4.87	0.583		<0.05	1.21	0.0722		2.12	0.16	0.23			2.4	<5.0	<5.0	<0.18
KR13158	9/10/2013	10:30	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P										<2.0	<0.05	0.35			0.97	0.078	0.14						
KR13168	9/24/2013	13:25	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	14.56	8.82	155	10.23	1.1	1.6	63	4.22	0.503	<2.0	<0.05	0.34	0.0604		0.96	0.072	0.10			5.8	<5.0	<5.0	<0.18
KR13181	10/9/2013	14:00	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P										3.8	<0.05	0.22			0.7	0.052	0.11						
KR13190	10/23/2013	16:05	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	10.99	8.96	154	9.97	2.1	2.7	62.3	1.25	0.714	<2.0	<0.05	0.35	0.11		<0.20	0.056	0.08			10	5.2	<5.0	
KR13210	11/19/2013	11:10	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	8.22	8.14	154	11.01	0.9	1.2	62.2	2.63	0.417	2.2	<0.05	0.32	0.0514		0.66	0.049	0.08			7.6	6.4	<5.0	
KR13230	12/9/2013	17:10	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P					2.3	2.9	63.8	3.42	0.616		<0.05	0.46	0.0844		1.61	0.056	0.09			19	12.6	<5.0	
KR13011	2/20/2013	12:05	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					2.3	2.0			0.509				0.0735										
KR13012	2/20/2013	12:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	2.91	7.91	184	10.9	1.8	1.7	70.6	3.28	0.47		0.067	0.55	0.0677		1.1	0.066	<0.05				<5.0	<5.0	
KR13013	2/20/2013	12:40	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	14.0	P					1.8	1.9	71.2	3.17	0.431		0.073	0.58	0.0632		1.1	0.067	0.06				<5.0	<5.0	
KR13014	2/20/2013	12:10	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	28.0	P					1.6	1.9	73.4	3.75	0.578		0.07	0.56	0.0853		1.09	0.075	0.27				5	<5.0	
KR13033	3/19/2013	13:05	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					4.0	4.5			0.945				0.121										
KR13034	3/19/2013	12:15	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	9.88	5.93	246	10.42	5.4	6.4	83.4	4.92	0.954		<0.05	0.62	0.131			0.085	0.06				16.8	<5.0	
KR13035	3/19/2013	13:40	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	10.0	P	7.08	5.32	262	9.57	4.4	4.9	84.5	4.74	0.978		<0.05	0.63	0.126			0.085	0.07				13.4	<5.0	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
								C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l
KR13036	3/19/2013	13:25	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	29.0	P	6.23	5.4	269	8.1			89	4.77			0.13	0.54				0.081	0.05					10.4	<5.0	
KR13055	4/17/2013	11:10	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					1.5	1.4			0.447				0.0601										
KR13056	4/17/2013	11:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	11.49	8.25	206	9.16	1.0	1.0	72.7	5.37	0.418		0.051	0.39	0.049		0.81	0.077	0.06					<5.0	<5.0	
KR13057	4/17/2013	11:30	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	15.0	P	11.33	7.8	206	9.07	1.6	1.2	84.4	4.9	0.473		0.075	0.4	0.0579		0.81	0.1	<0.05					6.2	<5.0	
KR13058	4/17/2013	11:15	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	31.0	P	8.7	7.23	220	6.17			72.5	4.62			0.27	0.59			1.29	0.078	0.07					<5.0	<5.0	
KR13082	5/20/2013	11:45	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					7.2	4.3			0.482				0.0761										<0.18
KR13083	5/20/2013	11:40	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	17.65	8.87	172	10.91	7.4	4.9	63.9	3.72	0.465		<0.05	0.074	0.0762		0.65	0.09	0.17					5.2	<5.0	<0.18
KR13084	5/20/2013	12:15	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	10.0	P	16.04	8.4	173	8.6	8.2	3.0	65.1	3.66	0.423		<0.05	0.14	0.0652		0.82	0.099	0.16					<5.0	<5.0	
KR13085	5/20/2013	12:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	30.0	P	5.68	6.84	212	3.66			79	4.17			0.081	0.64			1.47	0.13	0.19					<5.0	<5.0	
KR13100	6/20/2013	14:25	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					3.1	3.6			0.291				0.0493										1.4
KR13101	6/20/2013	14:35	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	21.21	9.09	232	9.93	3.1	4.5	85.5	6.91	0.417		<0.05	<0.01	0.0768		0.71	0.12	0.19					<5.0	<5.0	1.3
KR13102	6/20/2013	15:10	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	12.0	P	18.5	8.19	229	6.55	3.1	1.1	80.2	6.03	0.281		<0.05	0.19	0.045		0.8	0.16	0.21					<5.0	<5.0	
KR13103	6/20/2013	14:50	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	29.0	P	12.77	7.03	196	2.15			78.3	5.19			<0.05	0.52			0.81	0.12	0.16					<5.0	<5.0	
KR13123	7/23/2013	19:05	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					39.8	6.2			2.05				0.417										28
KR13124	7/23/2013	19:10	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	25.03	9.78	166	14.64	17.0	5.5	69.5	5.29	1.42		<0.05	<0.01	0.283		1.26	0.14	0.24					5.4	<5.0	12
KR13125	7/23/2013	19:40	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	13.0	P	22.3	9.47	164	9.22	7.3	2.5	70.1	4.7	0.745		<0.05	0.34	0.133		1.09	0.21	0.23					<5.0	<5.0	
KR13126	7/23/2013	19:25	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	30.0	P	10.49	7.49	216	0.02			80.8	4.4			0.23	0.31			1.12	0.23	0.24					<5.0	<5.0	
KR13146	8/21/2013	12:45	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					1.3	1.7			0.863				0.106										56
KR13147	8/21/2013	12:40	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	23.26	9.87	161	19.22	1281.4	189.8	66.5	6.56	33.2	<2.0	0.076	<0.01	4.96		14.1	0.057	1.58					140	250	1200
KR13148	8/21/2013	13:10	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	17.0	P	20.57	9.12	158	7	<0.68	0.7	68.4	4.37	0.347		0.25	0.48	0.0411		1.5	0.24	0.27					<5.0	<5.0	
KR13149	8/21/2013	12:50	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	31.0	P	10.81	7.47	225	0.04			86.3	4.49			0.49	<0.01			1.18	0.38	0.46					5.5	6.6	
KR13169	9/24/2013	12:15	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					<0.68	<0.68			0.275				0.0336										<0.18
KR13170	9/24/2013	12:20	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	17.6	8.06	162	7.22	<0.68	<0.68	65.6	4.88	0.306		0.097	0.24	0.0391		1.09	0.11	0.15					<5.0	<5.0	<0.18
KR13171	9/24/2013	13:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	20.0	P	16.7	8.07	164	6.22	<0.68	0.7	71	4.58	0.339		0.36	0.18	0.0403		1.13	0.19	0.21					<5.0	<5.0	
KR13172	9/24/2013	12:40	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	29.0	P	12.06	7.36	225	0.03			93.3	4.77			1.14	0.018			1.8	0.66	0.68					<5.0	<5.0	
KR13191	10/29/2013	17:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					0.8	0.8			0.284				0.0376										<0.18

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
								C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l
KR13192	10/29/2013	16:50	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	11.98	8.23	159	8.47	0.8	0.8		4.05	0.166		0.13	0.23	0.0255		0.69	0.078	0.10				<5.0	<5.0	0.18
KR13193	10/29/2013	17:25	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	22.0	P	10.75	8.17	164	8.21	1.0	1.5	69.7	3.91	0.243		0.28	0.23	0.0336		0.83	0.092	0.13				<5.0	<5.0	
KR13194	10/29/2013	17:15	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	30.0	P	10.39	7.83	167	4.62			71.1	3.72			0.43	0.2			0.91	0.12	0.14				<5.0	<5.0	
KR13211	11/19/2013	13:45	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					<0.68	0.8			0.66				0.0727										
KR13212	11/19/2013	13:50	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	9.05	8.08	159	8.71	0.7	1.0	64.5	3.63	0.362		0.12	0.3	0.0459		0.81	0.064	0.10				<5.0	<5.0	
KR13213	11/19/2013	14:10	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	15.0	P	8.45	7.97	159	8.65	0.7	1.0	62.7	3.33	0.467		0.11	0.32	0.0537		0.83	0.062	0.10				<5.0	<5.0	
KR13214	11/19/2013	14:30	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	29.0	P	8.35	7.92	158	8.67			62.1	3.22			0.11	0.34			0.88	0.06	0.10				<5.0	<5.0	
KR13231	12/9/2013	not sampled	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8																								
KR13232	12/9/2013	not sampled	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.0																								
KR13233	12/9/2013	not sampled	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.0																								
KR13234	12/9/2013	not sampled	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.0																								
KR13015	2/20/2013	10:20	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	2.68	7.86	185	10.94	1.7	1.8	69.7	3.33	0.435		0.063	0.58	0.0618		1.09	0.068	0.07				6.6	<5.0	
KR13037	3/19/2013	14:25	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	8.38	5.37	254	9.84	4.1	4.4	85.3	4.7	0.794		<0.05	0.61	0.0974			0.083	0.14				13	<5.0	
KR13059	4/17/2013	not sampled	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5																								
KR13081	5/29/2013	12:00	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	15.64	7.82	179	7.79	2.4	1.9	69.7	4.31	0.415		<0.05	0.16	0.056		0.65	0.12	0.19				<5.0	<5.0	<0.18
KR13104	6/20/2013	13:30	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	18.69	8.7	226	7.93	2.8	1.5	83.2	6.07	0.337		<0.05	0.085	0.0515		0.56	0.14	0.17				<5.0	<5.0	0.4
KR13127	7/24/2013	10:15	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	22.93	9.47	169	10.38	4.4	3.3	70.9	4.81	0.275		<0.05	0.013	0.0411		1.04	0.15	0.25				7.2	7.2	18
KR13150	8/21/2013	14:10	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	20.84	9.24	159	8.58	1.2	1.8	66	5.19	0.623		0.11	0.24	0.081		1.7	0.15	0.29				10.3	15.7	50
KR13173	9/24/2013	14:10	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	17.15	8.27	164	6.62	<0.68	<0.68	65.7	4.85	0.263		0.15	0.25	0.0347		1.15	0.12	0.15				<5.0	<5.0	<0.18
KR13195	10/29/2013	16:05	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	10.87	7.9	164	8.35	<0.68	0.7	69.8	3.98	0.254		0.15	0.24	0.0363		0.73	0.081	0.10				22	<5.0	<0.18
KR13215	11/19/2013	12:55	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	8.4	8	158	8.95	0.8	1.1	63	3.13	0.363		0.12	0.32	0.0447		0.81	0.063	0.11				<5.0	<5.0	
KR13235	12/19/2013	12:20	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	3.28	7.8	160	11	1.6	1.8	62.1	2.98	0.475		0.067	0.4	0.0559		1.24	0.057	0.06				<5.0	<5.0	
KR13016	2/20/2013	15:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					2.3	2.1			0.475				0.0662										

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
								C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l
KR13017	2/20/2013	15:05	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P					2.8	2.3	67.7	3.37	0.41		<0.05	0.52	0.0647		1.2	0.062	0.07					6.2	<5.0	
KR13018	2/20/2013	15:35	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	22.0	P					1.2	1.6	69.2	3.67	0.345		<0.05	0.6	0.053		1.19	0.068	<0.05					<5.0	<5.0	
KR13019	2/20/2013	15:25	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	43.0	P					1.1	1.7	70.7	3.7	0.368		0.06	0.62	0.0515		1.23	0.087	0.11					5.6	<5.0	
KR13038	3/19/2013	11:15	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					4.3	4.6			0.652				0.0929										
KR13039	3/19/2013	11:20	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	10	6.65	222	11.45	4.0	3.8	78.4	3.97	0.513		<0.05	0.48	0.0757			0.057	<0.05				5	<5.0	
KR13040	3/19/2013	11:50	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	5.0	P	5.58	5.4	200	9.7	3.9	3.8	79.3	5.2	0.434		<0.05	0.48	0.0677			0.059	<0.05				5.4	<5.0	
KR13041	3/19/2013	11:35	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	44.0	P	4.88	6.43	203	7.42			72.5	3.47			<0.05	0.65				0.07	0.06				<5.0	<5.0	
KR13060	4/17/2013	13:10	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					2.1	1.4			0.55				0.0779										
KR13061	4/17/2013	13:05	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	12.67	8.29	195	9.29	1.9	1.0	70.4	4.81	0.471		<0.05	0.44	0.0668		0.77	0.059	<0.05				<5.0	<5.0	
KR13062	4/17/2013	13:25	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	12.0	P	10.78	7.88	194	9.09	1.9	1.5	70.5	4.41	0.441		<0.05	0.45	0.0681		0.75	0.058	<0.05				<5.0	<5.0	
KR13063	4/17/2013	13:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	43.0	P	6.96	7.43	223	8.18			72.5	3.46			<0.05	0.67			0.91	0.081	0.07				<5.0	<5.0	
KR13077	5/29/2013	13:10	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					5.4	3.5			0.318				0.0538										<0.18
KR13078	5/29/2013	13:15	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	17.87	8.02	161	9.95	8.6	3.6	67.7	3.8	0.477		<0.05	<0.01	0.0896		0.63	0.049	0.12				5	<5.0	<0.18
KR13079	5/29/2013	13:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	14.0	P	15.34	6.95	176	6.94	3.2	2.7	72.6	4.1	0.294		<0.05	0.47	0.0381		<0.20	0.069	0.12				<5.0	<5.0	
KR13080	5/29/2013	13:25	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	44.0	P	8.7	6.62	228	0.53			76.4	3.51			<0.05	0.75			1.37	0.1	0.16				<5.0	<5.0	
KR13105	6/20/2013	11:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					2.5	1.7			0.378				0.0537										0.8
KR13106	6/20/2013	11:05	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	20.45	9.06	204	9.28	1.7	1.1	80.4	5.42	0.242		<0.05	<0.01	0.0406		0.53	0.082	0.13				<5.0	<5.0	0.77
KR13107	6/20/2013	11:45	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	12.0	P	19.53	8.7	206	8.7	1.2	1.0	71.7	4.83	0.228		<0.05	0.2	0.034		0.51	0.1	0.13				<5.0	<5.0	
KR13108	6/20/2013	11:25	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	44.0	P	9.48	7.1	199	5.26			77.9	3.82			<0.05	0.75			0.96	0.12	0.13				<5.0	<5.0	
KR13128	7/23/2013	10:10	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					11.0	3.3			0.935				0.164										7
KR13129	7/23/2013	10:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	25.36	9.61	189	10.63	1.2	<0.68	75.8	4.77	0.379		<0.05	<0.01	0.0525		0.75	0.097	0.15				<5.0	<5.0	1.8
KR13130	7/23/2013	10:35	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	14.0	P	22.31	9.28	177	8.94	4.2	1.5	76.4	4.12	0.63		<0.05	0.18	0.105		0.91	0.15	0.21				5.2	<5.0	
KR13131	7/23/2013	10:20	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	44.0	P	8.7	6.62	228	0.52	<0.68	0.7	78.9	3.63	0.369		<0.05	0.73	0.0422		1.31	0.12	0.14				6.2	<5.0	
KR13151	8/26/2013	14:45	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					<0.68	<0.68			0.342				0.0436										4.3
KR13152	8/26/2013	14:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	24.09	9.97	169	14.4	3.0	1.8	70.6	4.56	0.688		<0.05	<0.01	0.0934		1.55	0.09	0.14				9.1	15.5	19
KR13153	8/26/2013	15:10	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	15.0	P	20.83	9.01	164	4.75	<0.68	<0.68	76.6	4.5	0.122		0.17	0.12	0.0103		0.81	0.19	0.18				<5.0	5	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
								C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		mg/l	mg/l	ug/l
KR13154	8/26/2013	14:55	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	44.0	P	6.31	7.44	217	0.06			78.8	3.43			0.11	0.69			1.29	0.12	0.11				<5.0	<5.0	
KR13174	9/25/2013	15:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					<0.68	<0.68			0.296				0.0369										1.9
KR13175	9/25/2013	15:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	18.56	8.93	164	6.86	<0.68	<0.68	67.7	4.48	0.296		0.13	0.2	0.038		1.2	0.13	0.17				<5.0	<5.0	3.2
KR13176	9/25/2013	16:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	18.0	P	17.9	8.1	171	3.95	<0.68	<0.68	74.7	4.13	0.236		0.31	0.034	0.0302		0.96	0.21	0.23				<5.0	<5.0	
KR13177	9/25/2013	16:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	44.0	P	6.46	7.26	218	0.07			78.8	3.43			0.34	0.45			1.28	0.21	0.25				<5.0	<5.0	
KR13196	10/29/2013	13:20	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					0.7	<0.68			0.253				0.0376										0.18
KR13197	10/29/2013	13:15	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	12.7	7.39	167	7.01	<0.68	<0.68	71.1	4.51	0.173		0.19	0.25	0.0349		0.8	0.13	0.15				<5.0	<5.0	<0.18
KR13198	10/29/2013	13:35	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	22.0	P	12.1	7.94	167	6.67	<0.68	<0.68	72.7	3.99	0.0991		0.27	0.2	0.0201		0.82	0.12	0.14				<5.0	<5.0	
KR13199	10/29/2013	14:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	43.0	P	6.65	7.51	219	0.05			84.4	3.62			0.62	0.33			1.03	0.25	0.29				<5.0	<5.0	
KR13216	11/20/2013	12:10	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					0.8	0.8			0.38				0.0413										
KR13217	11/20/2013	11:15	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	9.88	6.93	169	7.54	<0.68	<0.68	69.8	3.77	0.191		0.21	0.28	0.0268		0.93	0.11	0.11				<5.0	<5.0	
KR13218	11/20/2013	12:15	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	23.0	P	9.63	7.5	169	7.32	<0.68	<0.68	69.8	3.42	0.291		0.25	0.27	0.0347		0.92	0.1	0.13				<5.0	<5.0	
KR13219	11/20/2013	12:35	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	45.0	P	9.41	7.59	169	6.41			90.2	4.04			0.88	0.28			1.6	0.25	0.29				5	<5.0	
KR13236	12/19/2013	13:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					<0.68	0.7			0.617				0.0638										
KR13237	12/19/2013	13:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	4.43	7.84	164	9.16	0.8	1.1	65.3	3.26	0.322		0.12	0.38	0.0369		0.68	0.074	0.09				<5.0	<5.0	
KR13238	12/19/2013	13:45	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	22.0	P	4.42	7.61	164	8.94	0.8	0.8	66.1	3.12	0.313		0.13	0.38	0.0391		0.7	0.073	0.10				<5.0	<5.0	
KR13239	12/19/2013	13:55	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	42.0	P	4.11	7.52	164	9.05			64.9	2.97			0.12	0.37			0.7	0.074	0.08				<5.0	<5.0	
KR13009	2/20/2013	16:45	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R					2.5	2.1	68.8	3.34	0.521	<2.0	<0.05	0.52	0.078		1.02	0.064	0.07			11	5.2	<5.0	
KR13031	3/19/2013	15:20	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R					3.2	2.9	76.8	9.43	1.16	<2.0	<0.05	0.52	0.0708			0.055	0.10			9.3	<5.0	<5.0	
KR13053	4/17/2013	14:30	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	11.26	8.34	197	10.17	1.8	1.2	71.1	4.8	0.864	<2.0	<0.05	0.45	0.127		0.76	0.058	<0.05			6.8	<5.0	<5.0	
KR13067	5/7/2013	14:15	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P					6.0	3.0	75.8	4.7	0.802		<0.05	0.32	0.11		1.15	0.056	<0.05			4.5	<5.0	<5.0	
KR13075	5/20/2013	9:00	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	15.79	8.44	179	9.61	22.0	7.1	70.3	3.88	0.845	2.3	<0.05	0.032	0.148		0.48	0.04	0.14			4	6.2	<5.0	<0.18
KR13090	6/6/2013	14:50	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P					4.4	1.9		4.27	0.294		<0.05	0.072	0.0515		0.48	0.08	0.14			3			<0.18
KR13098	6/20/2013	9:00	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	18.96	8.62	201.9	9.45	1.4	1.0	80.5	5.01	0.343		<0.05	0.052	0.057		0.6	0.095	0.13			1.8	<5.0	5.8	0.49

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
								C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l
KR13113	7/11/2013	14:30	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P					4.5	2.5	79.9	5.37	0.467	9.1	<0.05	0.043	0.0815		0.76	0.12	0.16			3.7	<5.0	<5.0	12
KR13121	7/23/2013	11:20	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	22.24	9.02	183.7	8.25	9.2	2.6	73.6	4.61	1.17	2.9	<0.05	0.027	0.14		0.75	0.14	0.20			2.9	<5.0	<5.0	5.7
KR13136	8/5/2013	14:20	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P					<0.68	0.7	78.7	4.35	0.276	<2.0	0.053	0.06	0.0399		0.91	0.13	0.17			1.7	<5.0	<5.0	3.7
KR13144	8/21/2013	15:05	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	21.39	9.26	167.7	8.62	0.9	0.9	69.4	4.25	0.233	2.6	0.12	0.17	0.0263		1.02	0.14	0.16			2.7	<5.0	5.8	2.7
KR13159	9/10/2013	11:50	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P							69.4	4.83		<2.0	0.15	0.24			1.15	0.15	0.22			2.1	<5.0	8.2	
KR13167	9/25/2013	17:00	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	18.05	8.75	167.9	8.04	<0.68	<0.68	67.6	4.33	0.66	<2.0	0.13	0.21	0.0861		1.08	0.14	0.18			6	<5.0	<5.0	0.32
KR13182	10/9/2013	13:00	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P					<0.68	<0.68	67.9		0.254	<2.0	0.19	0.23	0.051		1.49	0.14	0.19			1.5	<5.0	<5.0	0.47
KR13189	10/29/2013	14:45	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	12.26	7.96	166.9	9.2	0.8	0.7		4.01	0.119	<2.0	0.17	0.27	0.0307		0.79	0.12	0.15			2	<5.0	<5.0	<0.18
KR13209	11/19/2013	12:00	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	9.64	7.77	170.1	9.59	<0.68	<0.68	70	3.87	0.301	<2.0	0.18	0.3	0.0347		0.84	0.096	0.19			2.6	<5.0	<5.0	
KR13229	12/9/2013	15:40	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R					<0.68	0.8	66.6	3.17	0.369	<2.0	0.14	0.35	0.0403		0.82	0.08	0.11			4.7	<5.0	<5.0	
WA022013-OC	2/20/2013	13:31	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	R	4.56	8.4	232	12.24	3.7	2.6		2.98			0.01	0.416			0.762	0.06	0.087				11	2	
WA032013-OC	3/20/2013	12:10	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	R	7.49	8.28	219	11.41	5.1	2.8		3.31			0.017	0.481			0.833	0.054	0.093				13	3	
WA041713-OC	4/17/2013	11:44	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	R	10.33	8.24	212	11.32	2.7	2.2		3.71	0.69		0.01	0.403			0.76	0.05	0.077				6.5	1.5	
WA050813-OC	5/8/2013	11:37	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	R	15.27	8.29	224	10.31	3.2	2.8		4.65	0.595		0.01	0.219			0.6	0.058	0.102				5.3	2.3	
WA060513-OC	6/5/2013	12:20	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	R	20.01	8.36	193	9.55	1.1	3		4.69	0.356		0.016	0.057			0.422	0.082	0.116				2.6	0.5	
WA071013-OC	7/10/2013	11:24	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	R	22.63	7.22	232	7.19	3.5	3.5		5.99	0.816		<0.010	<0.010			0.608	0.119	0.169				3.5	1.3	
WA080713-OC	8/7/2013	12:19	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	R	23.28	8.98	198	9.05	6.9	4.6		4.88	1.15		<0.010	0.105			0.811	0.13	0.183				4.3	1.3	
WA091113-OC	9/11/2013	12:35	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	R	21.18	8.57	185	9.38	14	6.7		6.13	2.06		0.013	0.28			1.06	0.151	0.191				1.9	<0.50	
WA100913-OC	10/9/2013	12:30	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	R	13.78	8.06	206	10.36	1.6	3.6		5.41			0.015	0.316			0.749	0.145	0.158				3.6	1.4	
WA112013-OC	11/20/2013	11:59	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	R	10.01	8.11	209	10.99	1.6	5.5		3.47			0.015	0.338			0.823	0.102	0.111				3	1.5	
WA121803-OC	12/18/2013	11:59	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	R	3.41	7.98	207	11.83	1.9	3.4		2.99			0.032	0.503			0.922	0.081	0.113				3.3	1.3	
SV022013-OC	2/20/2013	11:20	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	R	4.86	8.34	218	12.12	3.7	1.5		2.17		<2.0	<0.010	0.317			0.649	0.038	0.056			3.7	7	2.5	
SV032013-OC	3/20/2013	10:46	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	R	8.99	8.27	209	11.11	6.4	5.2		2.84		<2.0	<0.010	0.31			0.552	0.03	0.073			3.8	15	2.5	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
								C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l
SV041713-OC	4/17/2013	10:02	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	R	9.35	8.13	190	11.25	1.9	1.3	87.7	3.37	0.556	<2.0	<0.010	0.309	0.0623	0.452	0.551	0.034	0.056			2.8	8.3	1.5	
SV050813-OC	5/8/2013	10:27	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	R	17.88	8.17	175	10.25	3.2	3.9		3.18	0.769	<2.0	<0.010	0.108	0.0848		0.333	0.025	0.056			1.6	6.9	0.87	
SV060513-OC	6/5/2013	10:17	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	R	19.51	8.07	201	9	1.1	3		3.69	0.375		0.012	0.062	0.058		0.327	0.052	0.08			1.5	2.9	1	
SV071013-OC	7/10/2013	10:07	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	R	23.61	8.33	231	8.49	1.1	1.1		5.08	0.59		0.02	0.012			0.449	0.101	0.14				2.7	1	
SV080713-OC	8/7/2013	10:26	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	R	22.55	8.51	205	8.96	7.7	5.7	93.1	4.68	1.01	<2.0	<0.010	0.011	0.153	0.612	0.507	0.12	0.163			1.1	3.5	1	1.1
SV091113-OC	9/11/2013	10:48	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	R	20.63	8.42	190	9.56	17	7.2		6.19	1.51	<2.0	<0.010	0.135	0.25		0.83	0.123	0.171			2	3.5	0.63	5.8
SV100913-OC	10/9/2013	10:09	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	R	12.81	8.02	213	10.22	2.1	3.5	106	5.18		<2.0	<0.010	0.257		0.62	0.634	0.119	0.139			1.4	3.3	0.5	0.25
SV112013-OC	11/20/2013	10:54	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	R	9.97	8.21	214	11.23	3.7	8.6		2.8		<2.0	<0.010	0.332			0.746	0.087	0.096			2.1	4.3	1.8	
SV121813-OC	12/18/2013	11:41	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	R	2.36	8.08	215	11.27	2.9	3.2		2.77		<2.0	0.02	0.488			0.783	0.073	0.094				3.5	1.3	
HC022013-OC	2/20/2013	10:25	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	R	4.78	8.26	188	12.07	4.3	1		1.8			<0.010	0.198			0.385	0.026	0.039				5.3	1.5	
HC032013-OC	3/20/2013	9:52	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	R	8.31	8.15	170	11.39	6.1	3.8		2.04			<0.010	0.179			0.355	0.02	0.046				12	3	
HC041713-OC	4/17/2013	9:16	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	R	8.37	8.06	171	11.62	2.1	0.7		2.53	0.444		<0.010	0.22			0.396	0.025	0.042				6.5	1.3	
HC050813-OC	5/8/2013	9:36	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	R	14.67	7.95	163	9.94	3.7	3.7		2.81	0.317		<0.010	0.074			0.29	0.018	0.042				4.6	1.4	
HC060513-OC	6/5/2013	9:31	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	R	19.22	7.93	189	8.95	3.7	6		3.37	1.02		0.012	0.041			0.342	0.04	0.082				13	3.2	
HC071013-OC	7/10/2013	9:17	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	R	23.27	7.74	226	7.08	1.4	1.4		4.65	0.499		<0.010	<0.010			0.429	0.083	0.111				2.5	1.2	
HC080713-OC	8/7/2013	9:25	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	R	22.17	8.12	205	8.28	4.8	6.4		4.33	0.922		<0.010	<0.010			0.434	0.104	0.154				4.8	1.7	0.59
HC091113-OC	9/11/2013	9:32	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	R	20.51	7.99	193	8.39	13	8.7		5.35	0.955		0.018	0.0117			0.682	0.107	0.14				4.1	1.1	2.2
HC100913-OC	10/9/2013	9:09	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	R	12.95	7.94	206	10.1	2.1	4.6		4.64			0.022	0.206			0.526	0.105	0.12				2.8	0.87	0.24
HC112013-OC	11/20/2013	10:13	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	R	9.21	8	193	10.88	8	17		2.91			<0.010	0.244			0.568	0.064	0.085				12	<0.50	
HC121813-OC	12/18/2013	10:07	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	R	2.41	8.21	211	11.67	3	3.5		2.57			0.016	0.428			0.684	0.063	0.085				2.7	1	
OR022013-OC	2/20/2013	8:47	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	R	5.21	8.43	145	12.68	3	<0.1	71.7	1.33			<0.010	0.113			0.299	0.014	0.021			0.96	2.8	0.63	
OR032013-OC	3/20/2013	7:40	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	R	8.53	8.36	141	11.83	5	3	72.4	1.46			0.011	0.109			0.189	0.013	0.033			1.7	5.2	1.2	
OR041713-OC	4/17/2013	7:55	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	R	8.36	8.85	452	11.18	1.5	<0.1		1.55	0.298		<0.010	0.116			0.219	0.014	0.025			1.6	4.2	1.5	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
								C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l
OR050813-OC	5/8/2013	7:51	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	R	14.24	8	128	10.39	2.1	1.2	65	1.92	0.295		<0.010	0.023			0.142	0.008	0.029			1.5	12	1.8	
OR060513-OC	6/5/2013	7:40	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	R	19.35	7.95	146	9.07	2.1	3.1	78.5	2.17	0.441		<0.010	0.014			0.133	0.021	0.039			1.1	4	1.3	
OR071013-OC	7/10/2013	7:51	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	R	23.71	8.19	200	8.18	0.3	0.3	96.3	2.96	0.351		<0.010	<0.010			0.262	0.043	0.065				1.5	0.67	
OR080713-OC	8/7/2013	7:54	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	R	22.19	8.28	191	8.15	5.9	5		3.16	0.825		<0.010	<0.010			0.309	0.061	0.097			0.91	4.3	2	0.77
OR091113-OC	9/11/2013	7:53	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	R	21.53	8.04	187	8.15	14	7	89.4	4.34	1.47		<0.010	<0.010			0.517	0.079	0.11			2.1	4.6	1	5.2
OR100913-OC	10/9/2013	7:54	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	R	13.19	7.99	186	10.09	4.8	3		3.45			<0.010	0.093			0.325	0.068	0.085			0.94	3.5	0.88	0.18
OR112013-OC	11/20/2013	8:47	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	R	11.65	10.12	168	9.38	16	31	86.2	2.76			<0.010	0.141			0.473	0.05	0.086			3.2	17	11	
OR121813-OC	12/18/2013	8:35	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	R	2.85	8.42	191	11.58	1.6	2.7	84.5	1.94		<2.0	0.012	0.291			0.498	0.043	0.056			2.5	1.2	0.67	
WE022013-OC	2/20/2013	10:51	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	5.36	8.44	145	12.96	3	<0.1		1.13			<0.010	0.087			0.23	0.01	0.02			0.82	2.6	1	
WE032013-OC	3/20/2013	10:32	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	8.46	8.11	139	11.74	6.41	3.31		1.104			<0.010	0.098			0.27	0.01	0.03			1.7	7.38	1.13	
WE041713-OC	4/17/2013	10:27	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	8.17	7.93	131	12.02	1.9	<0.1		1.44			<0.010	0.075			0.314	0.014	0.023			1.1	3.5	0.75	
WE050813-OC	5/8/2013	11:00	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	14.58	8.17	127	10.38	2.7	0.7		2.01			<0.010	0.013			0.182	0.009	0.022			1.4	4	1.4	<0.18
WE060513-OC	6/5/2013	11:45	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	20.08	8.33	137	9.54	1.3	0.7		1.69			<0.010	0.016			0.162	0.019	0.035			0.7	1.9	1.1	<0.18
WE071013-OC	7/10/2013	11:08	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	23.13	8.33	198	8.81	1.6	0.3		2.67			<0.010	<0.010			0.242	0.037	0.057			0.56	1.4	0.5	<0.18
WE080713-OC	8/7/2013	11:31	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	21.28	8.29	188	9.28	6.41	5.55		2.683			<0.010	<0.010			0.31	0.05	0.08			0.9	2.75	1.13	0.72
WE091113-OC	9/11/2013	11:32	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	21.01	8.26	184	8.94	13.88	5.18		3.6062			<0.010	<0.010			0.53	0.07	0.1			2.3	3.63	1.63	6.5
WE100913-OC	10/9/2013	11:40	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	13.28	8.22	185	10.47	2.14	0.48		3.374	0.272		<0.010	0.087			0.3	0.06	0.07			0.77	1.38	<0.50	<0.18
WE112013-OC	11/20/2013	11:27	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	10.14	7.49	170	11.21	26.7	26.38		2.41			<0.010	0.116			0.51	0.05	0.09			3.6	17.5	5.25	<0.18
WE121813-OC	12/18/2013	11:03	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	3.31	8.2	181	13.56	2.49	2.87		1.786			0.013	0.258			0.36	0.04	0.05			1.9	1.7	0.67	
TC022013-OC	2/20/2013	9:55	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	5.56	8.3	149	12.58	3	<0.1		0.771			<0.010	0.054			0.18	0.01	0.016			0.71	3.8	1.0	
TC032013-OC	3/20/2013	9:47	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	8.64	8.09	141	11.51	4.54	2		1.013			<0.010	0.067			0.21	0.01	0.02			1.7	5.63	1.13	
TC041713-OC	4/17/2013	9:37	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	8.62	7.95	133	11.78	1.3	0.2		1.5			<0.010	0.047			0.231	0.01	0.019			1.2	3.4	0.75	
TC050813-OC	5/8/2013	8:17	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	13.41	8	118	10.46	2.1	0.5		1.56			<0.010	0.019			0.13	0.015	0.02			2.3	6.8	1.4	<0.18
TC060513-OC	6/5/2013	10:13	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	19.24	8.18	128	9.21	1.3	0.3		1.49			<0.010	0.011			0.186	0.012	0.023			0.6	1.9	0.75	<0.18
TC071013-OC	7/10/2013	10:05	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	23.05	8.2	185	8.26	1.1	1.2		2.21			<0.010	<0.010			0.192	0.023	0.028			0.48	0.5	0.5	<0.18
TC080713-OC	8/7/2013	10:42	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	21.61	8.26	177	8.55	4.81	2.67		2.14			<0.010	<0.010			0.25	0.03	0.052			0.69	2.13	0.75	0.56

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
								C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l
TC091113-OC	9/11/2013	10:31	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	20.61	8.24	162	8.74	9	3.79		2.5818			<0.010	<0.010			0.346	0.037	0.061			1.5	2.13	0.87	3.8
TC100913-OC	10/9/2013	10:43	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	13.19	8	176	10.31	2	0.64		2.331	0.26		<0.010	0.068			0.216	0.044	0.048			0.63	1.13	0.5	<0.18
TC112013-OC	11/20/2013	10:33	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	10.21	8	176	11.07	14.95	21.68		1.765			<0.010	0.096			0.427	0.043	0.066			2.2	10.25	3.75	<0.18
TC121813-OC	12/18/2013	10:13	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	3.38	8.15	182	13.24	1.78	1.83		1.37			<0.010	0.186			0.284	0.027	0.04			1.6	1.1	1.0	
TG022013-OC	2/20/2013	7:34	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	6.21	8.28	146	11.91	2.6	<0.1		0.72			<0.010	0.081			0.167	0.009	0.015			1	2.6	0.5	
TG032013-OC	3/20/2013	7:46	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	9.06	7.93	135	11.03	5	1.55		1.097			<0.010	0.065			0.183	0.007	0.019			1.4	3.75	0.63	
TG041713-OC	4/17/2013	7:35	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	9.38	7.88	130	11.01	1	<0.1		1.18			<0.010	0.064			0.238	0.01	0.019			1.1	3.6	0.5	
TG050813-OC	5/8/2013	7:48	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	13.75	7.95	122	9.81	2	1.4		1.29			<0.010	0.027			0.144	0.006	0.021			2.1	6.8	1.4	<0.18
TG060513-OC	6/5/2013	7:57	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	17.89	8	131	8.72	1.1	1		1.24			<0.010	0.036			0.177	0.007	0.019			0.71	1.8	0.63	<0.18
TG071013-OC	7/10/2013	7:23	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	21.24	7.62	184	6.67	1.6	2.5		1.56			0.011	0.056			0.196	0.012	0.031			0.69	2.4	1.3	<0.18
TG080713-OC	8/7/2013	7:26	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	19.32	7.55	169	6.91	3.2	3.15		1.344			0.013	0.061			0.251	0.014	0.035			0.7	2.13	1.13	0.42
TG091113-OC	9/11/2013	7:17	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	20.8	8.02	164	7.53	6.41	4.81		2.1866			<0.010	0.013			0.264	0.027	0.054			1.9	3.25	1.5	2
TG100913-OC	10/9/2013	7:46	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	13.08	7.83	173	9.06	2.14	1.23		1.79	0.4		<0.010	0.178	0.046		0.301	0.032	0.04			1.6	4.13	1	<0.18
TG112013-OC	11/20/2013	7:39	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	10.8	7.71	166	10.5	4.81	4.54		1.79			<0.010	0.058			0.258	0.032	0.039			1.4	3.5	0.83	<0.18
TG121813-OC	12/18/2013	8:20	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	4.4	8.05	178	12.29	1.87	2.43		1			0.01	0.138			0.22	0.016	0.03			1.7	1.9	0.63	
LES022013-OC	2/20/2013	6:48	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	6.1	8.27	143	12.08	1.5	<0.1		0.67			<0.010	0.061			0.166	0.009	0.014			0.66	2.5	1.1	
LES032013-OC	3/20/2013	7:00	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	8.98	8.16	138	11.05	2.4	1.71		0.83			0.011	0.055			0.189	0.006	0.017			1.3	2.1	0.75	
LES041713-OC	4/17/2013	6:54	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	9.21	8	125	11.09	1	<0.1		1.18			<0.010	0.071			0.208	0.009	0.019			1.3	3.8	0.63	
LES050813-OC	5/8/2013	6:55	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	13.81	8	130	9.67	2.1	2		1.08			0.016	0.131			0.177	0.007	0.029			3.9	13	2.2	<0.18
LES060513-OC	6/5/2013	7:10	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	18.62	8	489	8.6	1.1	1.2		1.13			<0.010	0.021			0.122	0.009	0.024			0.8	2.6	1	<0.18
LES071013-OC	7/10/2013	10:11	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	21.91	8.29	1463	8.8	1	1.34		1.631			<0.010	0.012			0.183	0.015	0.034			0.55	1.13	<0.50	
LES080713-OC	8/7/2013	9:46	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	20.73	9	332	9.1	4	2.08		2.671			0.015	0.01			0.24	0.02	0.044			0.75	0.63	<0.50	0.56
LES091113-OC	9/11/2013	9:18	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	21.77	8.19	177	8.44	1.6	2.14		2.1528			<0.010	0.013			0.243	0.029	0.045			0.94	1.38	1.13	0.66
LES100913-OC	10/9/2013	7:00	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	13.13	7.89	1838	9.51	1.07	0.43		1.886	0.245		0.023	0.103			0.278	0.035	0.043			1.2	2	0.87	<0.18
LES112013-OC	11/20/2013	6:55	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	11.03	7.98	213	10.45	0.53	3.58		1.758			0.017	0.104			0.29	0.035	0.042			2.3	5.5	1.5	<0.18
LES121813-OC	12/18/2013	7:37	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	4.74	8.06	250	12.92	1.07	0.8		1.268			0.012	0.15			0.241	0.017	0.03			1.8	1.9	<0.50	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
								C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l
SH022013-OC	2/20/2013	13:29	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	6.4	8.67	461	11.3	4.8	1.5		1.74			<0.010	0.25			0.478	0.151	0.18			3.5	18	4.5	
SH032013-OC	3/20/2013	13:03	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	11.81	8.85	452	11.18	2.9	1.5		1.73			<0.010	0.137			0.223	0.144	0.179			1.4	6.5	1.8	
SH041713-OC	4/17/2013	12:40	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	11.11	8.77	529	12.51	1.3	0.5		3.82	0.298		<0.010	<0.010			0.27	0.115	0.139			0.76	2.2	0.83	
SH050813-OC	5/8/2013	12:37	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	18.52	8.6	553	9.67	1.6	0.6		5.73	0.392		<0.010	<0.010			0.427	0.155	0.19			1.1	3.1	1.6	
SH060513-OC	6/5/2013	13:11	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	22.93	8.57	603	9.77	2.1	0.1		7.47	0.271		<0.010	0.012			0.511	0.176	0.224			0.52	1.8	0.63	
SH071013-OC	7/10/2013	12:06	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	22.98	8.52	558	9.22	<0.1	<0.1		5.29	0.422		0.011	<0.010			0.483	0.214	0.27				1.8	1.2	
SH080713-OC	8/7/2013	13:22	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	23.73	8.94	559	10.78	2.7	1.4		4.07	0.713		<0.010	0.019			0.419	0.147	0.177			10	5.4	1.8	
SH091113-OC	9/11/2013	13:22	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	20.6	8.71	590	9.89	2.1	1.2		6.09	1.04		<0.010	0.01			0.453	0.165	0.178			0.8	1.6	0.87	
SH100913-OC	10/9/2013	13:35	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	11.31	8.44	446	10.74	3.7	3		3.02			<0.010	0.028			0.246	0.151	0.189			3.2	9.3	1.5	
SH112013-OC	11/20/2013	8:47	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	9.77	8.4	437	11	5.3	16		1.85			<0.010	0.121			0.39	0.162	0.185			2	13	4.5	
SH121813-OC	12/18/2013	12:43	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	3.53	8.13	434	11.7	5.6	2.8		1.25			0.017	0.409			0.532	0..178	0.212				4	1.4	
SC022013-OC	2/20/2013	11:52	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	5.1	8.46	192	11.86	1.9	<0.1		1.03			<0.010	0.247			0.371	0.003	0.008			0.29	2.5	1.1	
SC032013-OC	3/20/2013	11:29	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	8.9	8.37	163	11.18	5.9	3.1		1.49			<0.010	0.214			0.297	0.001	0.02			1.1	11	2.2	
SC041713-OC	4/17/2013	11:04	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	7.64	8.25	156	11.75	1.3	<0.1		1.34	0.291		<0.010	0.262			0.305	0.003	0.015			1.1	7.7	1.3	
SC050813-OC	5/8/2013	13:44	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	13.44	8.15	122	10.19	3.7	1.5		2.11	0.649		<0.010	0.056			0.185	0.003	0.031			2	7.9	2.1	
SC060513-OC	6/5/2013	10:46	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	17.83	8.24	199	9.34	1.3	1.3		1.3	0.26		0.013	0.167			0.24	<0.001	0.009			0.53	1.6	<0.50	
SC071013-OC	7/10/2013	10:50	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	22.75	8.39	241	8.75	0.4	0.4		1.28	0.41		0.012	0.087			0.194	0.002	0.012				2.7	0.83	
SC080713-OC	8/7/2013	11:36	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	22.62	8.5	249	8.87	1.1	0.8		1.04	0.268		<0.010	<0.010			0.083	<0.001	0.006			0.35	0.63	<0.50	
SC091113-OC	9/11/2013	11:50	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	20.59	8.37	265	9.23	0.5	1		1.01	0.279		<0.010	<0.010			0.08	<0.001	0.003			0.45	<0.50	<0.50	
SC100913-OC	10/9/2013	11:02	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	11.18	8.37	234	11.03	2.1	0.1		1.24			<0.010	0.02			0.06	0.003	0.003			0.25	0.87	<0.50	
SC112013-OC	11/20/2013	11:26	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	8.75	8.13	247	11.03	8.5	15		1.4			<0.013	0.251			0.413	<0.001	0.013			2	11	3.3	
SC121813-OC	12/18/2013	11:41	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	0.11	8.01	266	12.5	1.6	0.6		0.355			<0.010	0.583			0.593	0.002	0.004				0.75	0.75	
SA022013-OC	2/20/2013	9:15	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	4.42	8.49	105	12.42	<0.1	<0.1		0.654			<0.010	0.028			<0.050	0.004	0.006			0.16	<0.50	<0.50	
SA032013-OC	3/20/2013	8:47	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	7.91	8.19	87	11.7	2.1	0.3		0.869			<0.010	0.014			0.074	0.002	0.013			0.84	6.1	2	
SA041713-OC	4/17/2013	8:30	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	6.44	8.2	85	12.43	0.2	<0.1		0.915	0.166		<0.010	0.023			<0.050	0.002	0.006			0.33	2.5	0.75	
SA050813-OC	5/8/2013	8:20	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	12.07	7.85	65	10.62	<0.1	<0.1		1.44	0.0936		0.013	0.013			0.065	0.002	0.01			0.84	2.4	1	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
								C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l
SA060513-OC	6/5/2013	8:12	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	17.43	7.74	89	9.25	1.1	1.2		1.05	1.05		<0.010	0.012			0.067	0.002	0.027			1.1	13	3.5	
SA071013-OC	7/10/2013	8:20	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	20.96	7.35	122	8.57	1	1		0.556	0.224		<0.010	<0.010			0.066	0.002	0.014				3.5	0.83	
SA080713-OC	8/7/2013	8:24	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	18.72	8.19	140	8.94	0.5	1		0.63	0.448		<0.010	<0.010			0.065	0.002	0.019			0.39	4.6	0.6	
SA091113-OC	9/11/2013	8:34	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	18.52	7.82	150	8.7	1.1	1.5		0.749	0.402		<0.010	<0.010			0.053	0.002	0.019			0.48	2	0.88	
SA100913-OC	10/9/2013	8:18	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	11.06	7.98	120	10.46	1.5	<0.1		1.13			0.018	0.018			<0.050	0.005	0.011			0.62	3.9	0.75	
SA112013-OC	11/20/2013	9:19	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	9.18	8.35	114	10.97	4.8	1.9		2.26			<0.010	<0.010			0.111	0.011	0.022			1.5	5	4	
SA121813-OC	12/18/2013	9:10	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	1.63	8.72	131	11.87	10	1.5		0.561			<0.010	<0.010			0.069	0.004	0.047				12	6	
TR022013-OC	2/20/2013	10:41	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	5.79	8.34	158	12.52	1.5	<0.1		0.419			<0.010	0.028			0.094	0.004	0.008			0.56	2.3	0.63	
TR032013-OC	3/20/2013	10:40	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	9.03	8.08	146	11.37	1.602	0.27		0.5178			<0.010	<0.010			0.096079	0.004405	0.012221			1.2	3.5	0.875	
TR041713-OC	4/17/2013	10:43	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	9.93	8.06	141	11.23	0.3	<0.1		0.659			<0.010	<0.010			0.113	0.003	0.007			0.52	1.9	0.63	
TR050813-OC	5/8/2013	11:17	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	12.35	8.06	109	10.79	<0.1	1.1		0.876			<0.010	0.022			0.086	0.004	0.019			3.9	9.6	1.5	
TR060513-OC	6/5/2013	11:59	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	19.27	8.17	117	9.52	0.5	0.4		0.834			<0.010	0.016			0.104	0.003	0.008			0.49	1.1	0.5	
TR071013-OC	7/10/2013	11:34	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	22.98	8.28	161	8.84	0.9	<0.1		0.509			<0.010	<0.010			0.053	<0.001	0.008			0.3	1.3	0.87	
TR080713-OC	8/7/2013	11:59	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	21.83	8.19	153	8.95	1.068	<0.1		1.544			<0.010	<0.010			0.05528	<0.001	0.006549			0.23	<0.50	<0.50	
TR091113-OC	9/11/2013	11:57	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	19.9	8.16	130	9.29	1.068	0.8		1.17			<0.010	<0.010			0.106475	0.001185	0.005765			0.33	<0.50	<0.50	
TR100913-OC	10/9/2013	11:59	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	13.03	8.17	153	10.67	<0.1	<0.1		1.286	0.116		<0.010	<0.010			0.065107	0.00127	0.004599			0.3	<0.50	<0.50	
TR112013-OC	11/20/2013	11:52	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	10.47	7.84	172	11.25	2.67	0.69		1.549			<0.010	<0.010			<0.050	<0.001	0.006275			0.34	1.13	0.63	
TR121813-OC	12/18/2013	11:20	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	3.68	8.2	177	13.26	0.89	0.61		0.6188			<0.010	<0.010			<0.050	<0.001	0.006165			0.3	<0.50	<0.50	

End of Errata

~~May 20, 2014~~ Revised Nov 2, 2015

KLAMATH RIVER BASELINE WATER QUALITY SAMPLING 2013 ANNUAL REPORT

Prepared for the
KHSA Water Quality Monitoring Group

Prepared by
Watercourse Engineering, Inc.
May 20, 2014

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Introduction

On November 13, 2008, the United States, the states of California and Oregon, and PacifiCorp executed an Agreement in Principle (AIP) describing a framework for possible removal of PacifiCorp's dams on the Klamath River. Interim Measure 12 of the AIP stipulated a water quality monitoring program, including on-going monitoring of blue-green algae (cyanobacteria) and associated toxins. The Klamath Hydroelectric Settlement Agreement (KHSA), signed on February 18, 2010, supersedes the AIP. Interim Measure 15 (IM 15) - Water Quality Monitoring states that PacifiCorp shall fund ($500,000 per year) long-term baseline water quality monitoring to support water quality improvement activities, dam removal studies, permitting studies, and form a long-term record to assess trends and other potential changes in the basin. This includes funding for blue-green algae (BGA) and BGA toxin monitoring, as necessary to protect public health. The monitoring is performed by an entity or entities agreed upon by the parties to the KHSA and in consultation with the appropriate water quality agencies. The 2013 water quality monitoring was conducted under IM 15 and represents the fourth year of water quality monitoring under the KHSA.

The monitoring program is a cooperative effort of the KHSA Monitoring Group[1]. This group developed the KHSA IM15 monitoring study plan that is located on PacifiCorp's Klamath website[2], as well as the Klamath Basin Monitoring Program (KBMP) website[3]. Actual monitoring is completed by a sub-set of the group that includes the Yurok Tribe, Karuk Tribe, PacifiCorp, and the U.S. Bureau of Reclamation (USBR). The program continues to collect data from 254 miles of river and reservoirs from Link Dam near Klamath Falls in Oregon to the Klamath River Estuary in California. Annual planning and coordination meetings include the IM 15 Monitoring Group and interested stakeholders. The IM 15 Monitoring Group ensures that the intent of IM 15 is met, appropriate quality assurance protocols and standard operating procedures are in place, water quality conditions and sampling matters are tracked in a timely fashion, and the process is transparent.

This report summarizes the results from the 2013 grab sampling data collection and available water quality probe data. Four appendices accompany this report: the sampling locations (Appendix A); the 2013 baseline grab sample results (Appendix B); the phytoplankton species charts and biovolume graphs (Appendix C); and the 2013 inter-laboratory comparison tech memo (Appendix D).

[1] The KHSA Monitoring Group consists of representatives from the North Coast Regional Water Quality Control Board; Oregon Department of Environmental Quality; U.S. Environmental Protection Agency, Region IX; Karuk Tribe; Yurok Tribe; PacifiCorp; and U.S. Bureau of Reclamation.

[2] http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Hydro/Hydro_Licensing/Klamath_River/2013-IM15-Study-Plan.pdf

[3] http://kbmp.net/collaboration/klamath-hydroelectric-settlement-agreement-monitoring

Program Elements

The primary elements of the IM 15 monitoring program include baseline and public health monitoring. The baseline water quality monitoring element includes water quality grab samples, physical observations associated with these grab samples, water quality probe and algae species data. The water quality probes recorded observations at hourly or sub-hourly intervals. Parameters sampled by probes included water temperature, dissolved oxygen, specific conductivity, and pH at specific locations in the Klamath River (Table 1). The grab samples are collected for analytical determination for a suite of water quality constituents (Section 1.1). The algae data in the baseline monitoring element includes algae species identification and quantification samples collected at each sampling location. The grab sample and water quality probe data and algae species quantification are presented in this report, and are available in electronic form. Monitoring was carried out from February through December, 2013.

The public health monitoring program data consists of algae species at specific sites within reservoirs and river reaches and focuses on algae species and algal toxin sampling. These results are not discussed herein, but rather are reported separately as a compilation of summary reports presented through the 2013 season. These reports were used to track phytoplankton and toxin conditions that supported management decisions to post and de-post reservoir and river reaches.

KBMP has developed a database to store information collected under the IM 15 program, including the baseline monitoring and the public health monitoring elements. These data are accessible via the KBMP website. In addition, the KBMP website includes links to previous reports and other, associated program documents, and other materials and features that provide transparency to the KBMP process that are directly transferable to the IM 15 monitoring program. There are other Klamath River monitoring efforts outside of the IM 15 program that are sponsored by individual entities, including entities that participate in the IM 15 program. However, only data collected under the IM 15 are included herein.

Baseline Program Water Quality Sampling

In 2013, sampling was conducted at twenty-four sites along the Klamath River and its tributaries, from Link Dam to the Klamath River Estuary (Figure 1), by the four sampling entities: U.S. Bureau of Reclamation (USBR), PacifiCorp, Karuk Tribe, and Yurok Tribe. Sixteen of those sites were located on the mainstem of the Klamath River, four sites were located in the reservoirs on the Klamath River, and four sites were located on the major tributaries of the Klamath River (Shasta, Scott, Salmon and Trinity River). Sampling site locations, sampling frequency and sampling entity are presented in Table 1.

Discrete physical parameters (water temperature, dissolved oxygen, specific conductivity, and pH) were collected at all sites when grab samples were collected during the sampling year. Continuous water quality parameters were collected at six sites: Link Dam (RM 254.4), Klamath River above Keno Dam (RM 234.9), Klamath River below Iron Gate Dam (RM 189.7), Klamath River at Seiad Valley (RM 128.5), Klamath River at Weitchpec (RM 043.5), and Klamath River above Turwar (RM 008.0). Grab samples of all other baseline water quality constituents were collected monthly. Exceptions include: (a) at Link Dam and Klamath River below Iron Gate Dam, where samples were collected bi-monthly from May through October and monthly for the remainder of the sampling season, and (b) Klamath River below Keno and Klamath River at Stateline, where samples were collected bi-monthly from June through September and monthly for the remainder of the sampling season. Please refer to Table 1 for the frequencies at each sampling location.

For the grab samples, the following nutrients were analyzed: inorganic nitrogen (total nitrogen, total Kjeldahl nitrogen, nitrate+nitrite, ammonia), particulate nitrogen, inorganic phosphorus (total phosphorus, orthophosphate), particulate and dissolved carbon, total and volatile suspended solids, turbidity, chlorophyll-a, and carbonaceous biological oxygen demand. Phytoplankton species samples were also collected. All of these parameters were not collected at every site; please refer to Table 1 for the parameters analyzed at each sampling location. The data results from the 2013 baseline grab samples are presented in Appendix B.

Figure 1. 2013 KHSA Klamath River baseline monitoring sampling sites.

Table 1. 2013 Baseline monitoring locations, sampling frequency, and sampling entities.

Monitoring Location		Water Temperature (oC)	Dissolved Oxygen (mg/l)	pH (log(H+))	Conductance (uS/cm)	Total N (mg/l)	Ammonia N (mg/l)	TKN (mg/l)	Nitrite + Nitrate (mg/l)	Total P (mg/L)	Ortho P (mg/L)	Particulate P & Particulate Inorganic P (mg/l)	Dissolved Organic N & P (mg/l)	Particulate and Dissolved C (mg/l)	Total N (mg/l)	Particulate N (mg/l)	TSS/VSS (mg/l)	Alkalinity (mg/l)	Water Column chl_a/Pheo	Phytoplankton species	Microcystin (ug/l)	LCMS confirmation	CBOD, mg/l	Turbidity, (NTU)	Sampling Entity
Site ID	**Sampling Method:**	***T,P***	***P***	***P***	***P***	***G***	***G***	***G***	***G***	***G***	***G***	***G***	***G***	***G***	***G***	***G***	***G***	***G***	***G***	***G***	***G***	***G***	***G***	***G***	
KR2544	Link Dam (RM - 254.4)	H	H	H	H		M/BM	M/BM	M/BM	M/BM	M/BM	M/BM	M/BM	M/BM		M/BM	M/BM	M/BM	M/BM	M/BM	BM/S		M2/BM2	M2/BM2**	**USBR**
KR2460	Keno Reservoir at Miller Island (RM - 234.9)	H	H	H	H		M	M	M	M	M			M			M	M	M	M	M/S		M	M	**USBR**
KR2330	KR below Keno Dam (RM -233.4)	H	D	D	D		M2/BM2	M2/BM2	M2/BM2	M2/BM2	M2/BM2	M		M		M	M	M2/BM2**	M	M	M/S		M2/BM2	M2/BM2**	**USBR**
KR2282	KR above J.C. Boyle Reservoir (RM-228.2)	H	D	D	D	M	M		M	M	M			M	M		M	M	M	M-					**PacifiCorp**
KR2260	J.C. Boyle Reservoir (RM-226.0)[a]	VP	VP	VP	VP														M/S	M/S	M/S					**PacifiCorp**
KR2240	KR below J.C. Boyle Dam (RM-224.0)	H	D	D	D	M	M		M	M	M			M	M		M	M	M	M-					**PacifiCorp**
KR2195	KR below USGS Gage (RM-219.5)	H	D	D	D	M	M		M	M	M			M	M		M	M	M	M	M/S			M	**PacifiCorp**
KR2064	KR near Stateline (RM-206.4)	H	D	D	D	M2/BM2	M2/BM2		M2/BM2	M2/BM2	M2/BM2	M		M	M2/BM2	M	M	M	M	M	M/S		M2/BM2	M	**PacifiCorp**
KR1990	Copco Reservoir (RM-199.0)[b]	VP	VP	VP	VP	M	M		M	M	M			M	M		M	M	M	M-	M/S				**PacifiCorp**
KR1950	KR below Copco Dam (RM-195.0)	H	D	D	D	M	M		M	M	M			M	M		M	M	M	M-	M/S				**PacifiCorp**
KR1920	Iron Gate Reservoir (RM-192.0)[c]	VP	VP	VP	VP	M	M		M	M	M			M	M		M	M	M	M-	M/S				**PacifiCorp**
KR1897	KR below Iron Gate Dam (RM-189.7)	H	H	H	H	M/BM	M/BM		M/BM	M/BM	M/BM	M/BM		M/BM	M/BM	M/BM	M/BM	M/BM	M/BM	M/BM	BM/S		M2/BM2	M/BM	**PacifiCorp**
KR1560	KR at Walker Bridge (RM- 176.7)	H	D	D	D	M	M		M	M	M			M	M		M	*	M	M-	M/S	S2			**Karuk**
KR1285	KR below Seiad (RM - 128.5)	H	H	H	H	M	M		M	M	M	M		M	M	M	M	*	M	M	M/S		M	M	**Karuk**
KR1006	KR near Happy Camp (RM-93.5)	H	D	D	D	M	M		M	M	M			M	M		M	*	M	M-	M/S				**Karuk**
KR0591	KR at Orleans (USGS) (RM-59.1)	H	H	H	H	M	M		M	M	M			M	M		M	M	M	M	M/S			M	**Karuk**
KR0435	KR at Weitchpec (RM-43.5)	H	H	H	H	M	M		M	M	M			M	M		M	*	M	M-	M/S	S2			**Yurok**
KR0385	KR below Trinity River (RM-38.5)	H	H	H	H	M	M		M	M	M			M	M		M	*	M	M-	M/S				**Yurok**
KR0060	KR near Klamath (RM-6.0)	H	H	H	H	M	M		M	M	M	M		M	M	M	M	*	M	M	M/S			M	**Yurok**
KR0005	KR Estuary (RM-0.5)[d]	HP	D	D	D	M	M		M	M	M			M	M		M	*	M	M-	M/S				**Yurok**
SHR00	Shasta River near mouth	H	H	H	H	M	M		M	M	M			M	M		M	*	M	*				M	**Karuk**
SCR00	Scott River near mouth	H	H	H	H	M	M		M	M	M			M	M		M	*	M	*				M	**Karuk**
SAR00	Salmon River near mouth	H	H	H	H	M	M		M	M	M			M	M		M	*	M	*				M	**Karuk**
TRR00	Trinity River near mouth	H	H	H	H	M	M		M	M	M			M	M		M	*	M	*				M	**Yurok**

Notes:
[a] Sampling at one depth in J.C. Boyle reservoir (0.5 m depth = surface)
[b] Sampling at three depths in Copco reservoir (0.5 m below surface, one intermediate depth, and 0.5 m above bottom)
[c] Sampling at three depths in Iron Gate reservoir (0.5 m below surface, one intermediate depths, and 0.5 m above bottom)
[d] Hourly measurements at four locations (two in lower estuary, one in mid-estuary, and one in upper estuary) at two depths (0.5 m below surface and 0.5 m above bottom)
Key:
Sampling Method
T – Thermistor
P – Probe or data sonde
G – Grab sample
Sampling Frequency Codes
VP – vertical profile at stated sampling frequency
H – hourly measurements by sondes (in some instances sub-hourly data may be desired)
D – Discrete sample
HP - Hourly measurements in a profile
M – monthly sampling, excluding January
M/S – monthly sampling, seasonally from May through October
M/BM – Bi-monthly sampling May - October and monthly sampling the remainder of the year
M2/BM2 – Bi-monthly sampling June-September and monthly the remainder of the year
M- = Monthly Sampling with exception of December, January and February
M2/BM2 **– Bi-monthly sampling June-September and monthly the remainder of the year and consider adding May and October to go to M/BM
BM/S –Bimonthly sampling July-Oct
S2 – monthly sampling July - Oct
* - Not sampled This parameter is covered M/S by Tribal WQ Workgroup

1. Water Quality Sample Collection

Water samples included both water quality probe data (temperature, dissolved oxygen, specific conductivity, and pH) and grab samples. Grab samples (i.e., physical and chemical constituents listed in Table 1) were sent to respective laboratories for analysis. For turbidity, USBR used the HACH 2100P Turbidimeter for measurements rather than collecting grab samples.

1.1. Analytical Samples

Grab water samples were collected for analytical determination of:

- Nitrogen: ammonia (NH4), nitrate+nitrite (NO3+NO2), total Kjeldahl nitrogen (TKN), and total nitrogen (TN), particulate nitrogen (PN),
- Phosphorus: orthophosphate (OPO4) and total phosphorus (TP),
- Carbon: dissolved organic carbon (DOC) and particulate carbon (PC),
- Solids: total suspended solids (TSS) and volatile suspended solids (VSS),
- Carbonaceous biological oxygen demand (CBOD),
- Alkalinity (ALKT),
- Turbidity (TURB),
- Phytoplankton (algae): chlorophyll-a and pheophytin,
- Microcystin (MCYN).

Seven laboratories completed the analytical work during the 2013 field season:

- Basic Laboratories (BASIC) in Redding, California,
  - http://www.basiclab.com/
- CH2MHill Applied Sciences Laboratory (CH2MHill) in Corvalis, Oregon,
  - http://www.ch2m.com/corporate/services/asl/default.asp
- Aquatic Research, Inc (ARI) in Seattle, Washington,
  - http://www.aquaticresearchinc.com/index.htm
- Chesapeake Biological Laboratories (CBL) in Solomons, Maryland,
  - http://www.umces.edu/cbl
- EPA Region 9 (EPA) laboratory in Richmond, California,
  - http://www.epa.gov/region9/lab/
- California Department of Fish and Game Water Pollution Control (DFG) Laboratory in Rancho Cordova, California,
  - http://www.dfg.ca.gov/
- Aquatic Analysts in Friday Harbor, Washington.
  - (no public website)

1.2. Physical Measurements

Water temperature, pH, specific conductivity, and dissolved oxygen were measured at all sampling sites. In some cases, sampling entities collected additional information (e.g., turbidity) during field visits to meet multiple objectives. Physical measurements were recorded at each site using either thermistors, or water quality probes that were maintained and calibrated by each sampling entity. In addition to the vertical profiles in reservoirs and continuous time series monitoring (Table 1), physical water quality parameters were measured when grab samples were collected. Physical measurements that were collected during grab sampling are included in the field data (Appendix B) while time series monitoring data are maintained by (and available from) each sampling entity.

1.3. Quality Assurance

Program samples were collected under individual entity Quality Assurance Project Plans, Standard Operating Procedures, and/or Sampling Analysis Plans (Karuk 2009, PacifiCorp 2008, USBR 2005, and Yurok 2008). These methods have been compared and reviewed by the KHSA Working Group to ensure consistent sampling techniques are applied (KHSA-WG 2010).

1.4. Laboratory Comparison

Since 2009, data are collected in triplicate samples at least three times throughout the field season for laboratory comparison as part of the sampling protocol.

In 2009 and 2010, the sampling location was at Link Dam, and in 2011 the sampling location was changed to the Klamath River Estuary to capture the potential range of nutrient concentrations found in the IM15 sampling area. In 2012, the sampling location was changed to the Klamath River near Weitchpec because the concentrations of several constituents were too low to be detected in the Klamath River Estuary (i.e., below the method detection limit). The IM15 sampling entities agreed to move the laboratory comparison location every two years to capture nutrient variability. In 2013, the sampling location was the Klamath River below Seiad Valley.

Triplicate samples were collected on three days (April 17th, August 7th, and October 9th) and submitted for analysis to three laboratories: Aquatic Research, Basic Laboratory, and CH2MHill. Details on the 2013 laboratory comparisons are presented in Appendix D.

1.5. Water Quality Analytical Methods

Basic Laboratory, CH2MHill, Aquatic Research, and Chesapeake Biological Laboratories used either Standard Methods or EPA analytical methods for analysis of nutrients, dissolved and particulate carbon, alkalinity, carbonaceous biological oxygen demand, total suspended solids and volatile suspended solids (Table 2). Method detection limits (MDL) and reporting limits (RL) varied among the laboratories.

1.5.1. Algae Samples

Analysis of chlorophyll-a and pheophytin was performed by three of the aforementioned laboratories. Algae samples collected by USBR, PacifiCorp, Karuk Tribe, and Yurok Tribe were sent to Aquatic Analysts in Friday Harbor, Washington. Microcystin analysis was performed using the enzyme-linked immunosorbent assay (ELISA) method at the EPA laboratory. Additional microcystin analysis was completed by the California Department of Fish and Wildlife laboratory using liquid chromatography-tandem mass spectrometry (LCMS/MS) for selected locations.

Table 2. Analyzing laboratories, method references, method detection limits and method reporting limits for water quality constituents.

		Basic			CH2MHill			Aquatic Research			CBL		
Constituent Name	**Constituent ID**	**Method**	**MDL**	**RL**	**Method**	**MDL[1]**	**RL[2]**	**Method**	**MDL**	**RL**	**Method**	**MDL**	**RL**
Alkalinity	ALKT	SM 2320B	1.0	5.0	EPA 310.1	n/a	5.00	SM18 2320B	0.2	1	SM18 2320B	0.2	-
Ammonia	NH4	EPA 350.1	0.03	0.05	EPA 350.1	0.014	0.050	SM18 4500NH3H	.006	.01	SM1845 00NH3H	0.006	-
Carbonaceous Biological Oxygen Demand – 5 day	CBOD5	SM 5210	3.00	3.00	SM5210B	n/a	2.00	SM20 5210B	2.0	2.0	SM2052 10B	2	-
Dissolved Organic Carbon	DOC	SM5310C	0.20	0.50	SM5310C	0.047	0.50	SM20 5310B	0.095	0.25	SM2053 10B	0.095	-
Nitrate + Nitrite	NO3+NO2	EPA 353.2	0.02	0.05	EPA 353.2	0.003	0.010	SM18 4500N03F	0.005	0.01	SM1845 00N03F	0.005	-
Total Nitrogen	TN	EPA 351.2	0.1	0.20	SM4500-N C	0.062	0.20	SM204500 NC	.03	0.05	SM2045 00NC	0.03	-
Ortho-phosphate	OPO4	SM 4500P-E	0.005	0.01	EPA 365.1	0.0014	0.010	SM18 4500PF	0.001	0.001	SM18 4500PF	0.001	-
Total Phosphorus	TP	SM 4500P-BE	0.02	0.05	EPA 365.4	0.022	0.050	SM18 4500PF	0.002	0.002	SM18 4500PF	0.002	-
Total Kjeldahl Nitrogen	TKN	EPA 351.2	0.1	0.2	EPA 351.2	0.051	0.20	EPA 351.1	0.1	0.2	EPA 351.1	0.1	-
Total Suspended Solids	TSS	SM 2540D	1.0	5.0	SM 2540D	0.6	5.0	SM20 2540D	0.1	0.5	SM20 2540D	0.1	-
Volatile Suspended Solids	VSS	SM 2540D	1.0	5.0	EPA 160.4	0.6	5.0	SM20 2540E	0.1	0.5	SM20 2540E	0.1	-
Filtered Ammonia	NH3 filtered or NH3 filtered	EPA 350.1	0.03	0.05	EPA 350.1	0.0087	0.050	SM18 4500NH3H	0.01	-	-	-	-
Filtered Nitrate + Nitrite	NO3+NO2 filtered	EPA 353.2	0.02	0.05	EPA 353.2	0.0017	0.010	SM18 4500N03F	0.01	-	-	-	-
Particulate Carbon	PC	-	-	-	-	-	-	-	-	-	EPA 440.0	0.0759	
Particulate Inorganic Carbon	PIC	-	-	-	-	-	-	-	-	-	EPA 440.0	0.0759	
Particulate Organic Carbon	POC	-	-	-	-	-	-	-	-	-	EPA 440.0	0.0759	
Particulate Nitrogen	PN	-	-	-	-	-	-	-	-	-	EPA 440.0	0.0123	

MDL – method detection limit RL – method reporting limit
[1] CH2MHill uses the term limit of detection (LOD) instead of MDL
[2] CH2M Hill uses the term limit of quantification (LOQ) instead of RL

2. Baseline Program Water Quality Data

Water quality samples for the 2013 IM 15 baseline water quality monitoring program were collected from February through December. Sampling crews from the various entities collected samples within a few days of each other. Sampling on the same day throughout the basin was infeasible due to other obligations, shipping constraints, travel considerations, and other factors. In most cases all twenty-four sites were sampled each month. There were periods when one or more sites were omitted or one or more constituents were not sampled. The data is summarized in the appendices.

2.1. Data Summary

Physical measurements collected included water temperature, pH, specific conductivity, and dissolved oxygen. Chemical and biological water quality measurements include two types of algae related estimates (chlorophyll-a and pheophytin), alkalinity, two forms of carbon (dissolved organic and particulate), carbonaceous biological oxygen demand, four forms of nitrogen (ammonia, nitrate+nitrite, total Kjeldahl, total nitrogen, and particulate nitrogen), two forms of phosphorus (orthophosphate and total phosphorus), total suspended solids, and volatile suspended solids, and microcystin.

Data are summarized herein to illustrate general spatial and temporal patterns during the 2013 sampling period. Data are presented in three formats: (1) longitudinal boxplots[4] based on seasonal grab sample data, (2) physical water quality sonde data (hourly) at specific locations, and (3) charts and bar graphs representing the types of algae and respective biovolumes at the sampling locations. The first two formats are presented in the main report; the third format is presented in Appendix C. The mainstem sites and major tributaries (Shasta, Scott, Salmon, and Trinity Rivers) are graphed separately. Constituents presented include: dissolved oxygen, dissolved organic carbon, total nitrogen, total phosphorus, and microcystin.

Time series data are presented for individual constituents at locations on the Klamath River for which there are United States Geological (USGS) flow gages[5] (Table 3). While algae data are available for the May to October period, herein September percent biovolume are presented for eight locations: (1) Link River, (2) Klamath River below Keno Dam, (3) Copco Reservoir near Copco Dam, (4) Hatchery Bridge, (5) Klamath River near Seiad Valley, (6) Klamath River near Orleans, (7) Klamath River at Weitchpec, and (8) Klamath River Estuary (Figure 2). Plots representing algae species for other months are presented in Appendix C.

[4] A box-and-whisker plot is a graphical way of presenting statistical parameters including median, mean, lower and upper quartiles, and outliers. The median value is represented by a horizontal line; a box (gray) is formed by the 25th quartile and 75th quartile and represents the inter-quartile range (IQR); the whiskers extend beyond the 1.5*IQR above and below the quartiles; and points beyond the whiskers are termed outliers. Outliers are values between 1.5 to 3 times the IQR. Extreme outliers are values greater than 3 times the IQR.

[5] http://water.usgs.gov/

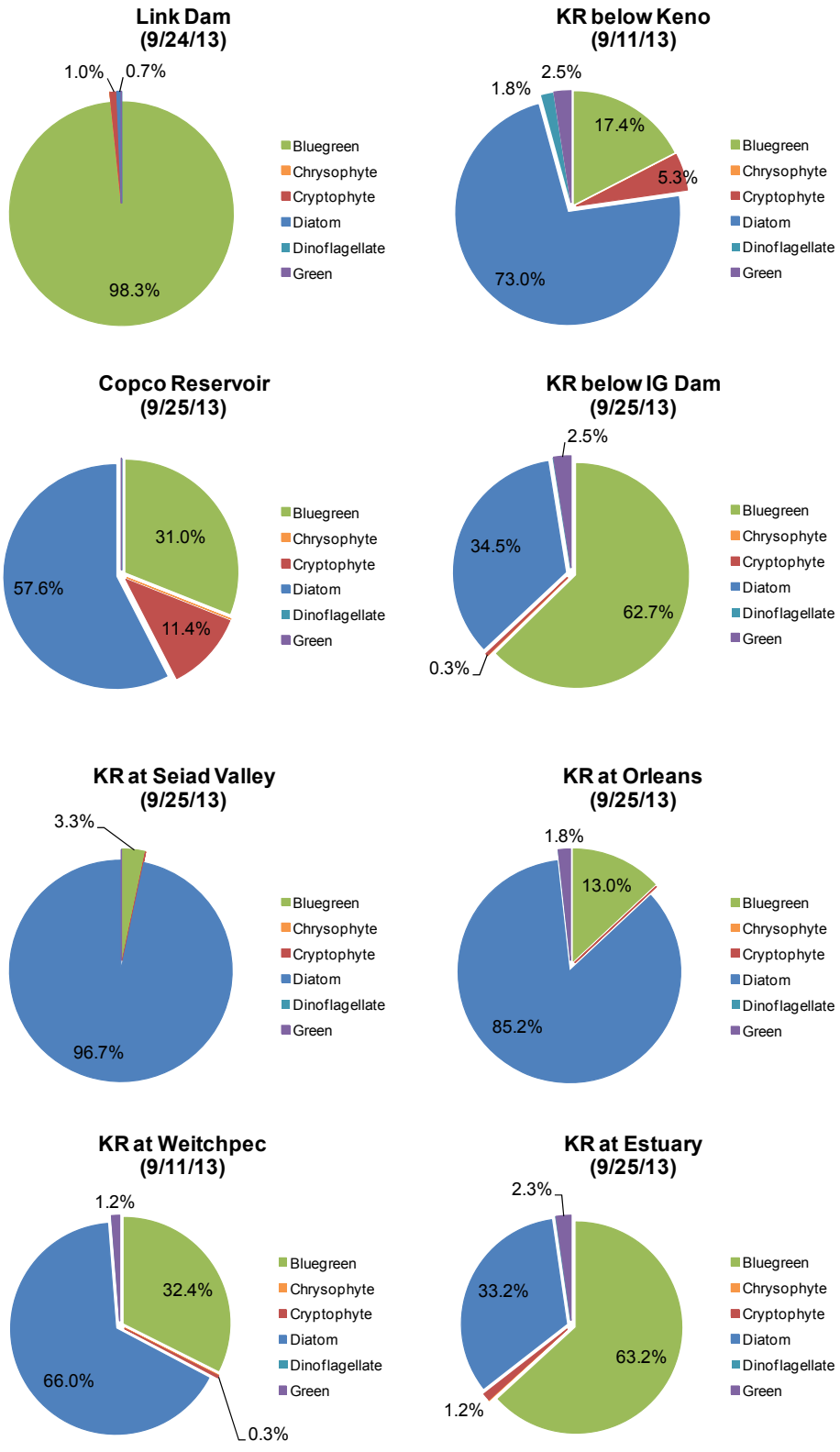

Figure 2. Phytoplankton species percent biovolume for the eight locations in the Klamath River: September 2013.

Table 3. USGS flow gage locations for time series constituent data. River mile and gage number presented.

Location	River Mile (RM) (*approximate*)	USGS Gage Number
Link River at Klamath Falls, OR	254	11507500
Klamath River at Keno, OR	232	11509500
Klamath River below Iron Gate Dam, CA	190	11516530
Klamath River near Seiad Valley, CA	129	11520500
Klamath River at Orleans, CA	59	11523000
Klamath River near Klamath, CA	8	11530500

Grab sample data and the associated physical water quality measurements (e.g., water temperature and dissolved oxygen) are presented in the figures (see Table 4 for list of figures). These illustrations are not intended to be comprehensive, but rather to present general conditions throughout the Klamath River during the sampling season. The complete data set is available on the KBMP website (http://www.kbmp.net/). The inter-laboratory comparison report is presented in Appendix D.

Table 4. List of figures, data type, and data description. Note: KR = Klamath River

Figure	Data Type	Constituents and Locations
Figure 3	Box plot	Dissolved oxygen, dissolved organic carbon, total nitrogen, total phosphorus for the Shasta, Scott, Salmon, and Trinity Rivers
Figure 4	Box plot	Dissolved oxygen readings in the KR from Link River to the KR Estuary
Figure 5	Box plot	Dissolved organic carbon sample results in the KR from Link River to the KR Estuary
Figure 6	Box plot	Total nitrogen sample results in the KR from Link River to the KR Estuary
Figure 7	Box plot	Total phosphorus sample results in the KR from Link River to the KR Estuary
Figure 8	Box plot	Microcystin sample results in the KR from Link River to the KR Estuary
Figure 9	Time series	Water temperature, dissolved oxygen, and pH data at major tributary locations: Shasta River, Scott River, Salmon River, and Trinity River.
Figure 10	Time series	Water temperature, dissolved oxygen, and pH data at mainstem locations: Link Dam, KR above Keno Dam, and KR below Iron Gate Dam.
Figure 11	Time series	Water temperature, dissolved oxygen, and pH data at mainstem locations: KR near Seiad Valley, KR at Weitchpec, and KR below the Trinity River.
Figure 12	Time series	Water Temperature readings and daily flow at USGS flow gage locations for the KR.
Figure 13	Time series	Dissolved oxygen readings and daily flow at USGS flow gage locations for the KR.
Figure 14	Time series	Dissolved organic carbon and daily flow at USGS flow gage locations for the KR.
Figure 15	Time series	Nitrogen and daily flow at USGS flow gage locations for the KR.
Figure 16	Time series	Phosphorus and daily flow at USGS flow gage locations for the KR.
Figure 17	Time series	Microcystin and daily flow at USGS flow gage locations for the KR.

2.1.1. Major tributaries (boxplot)

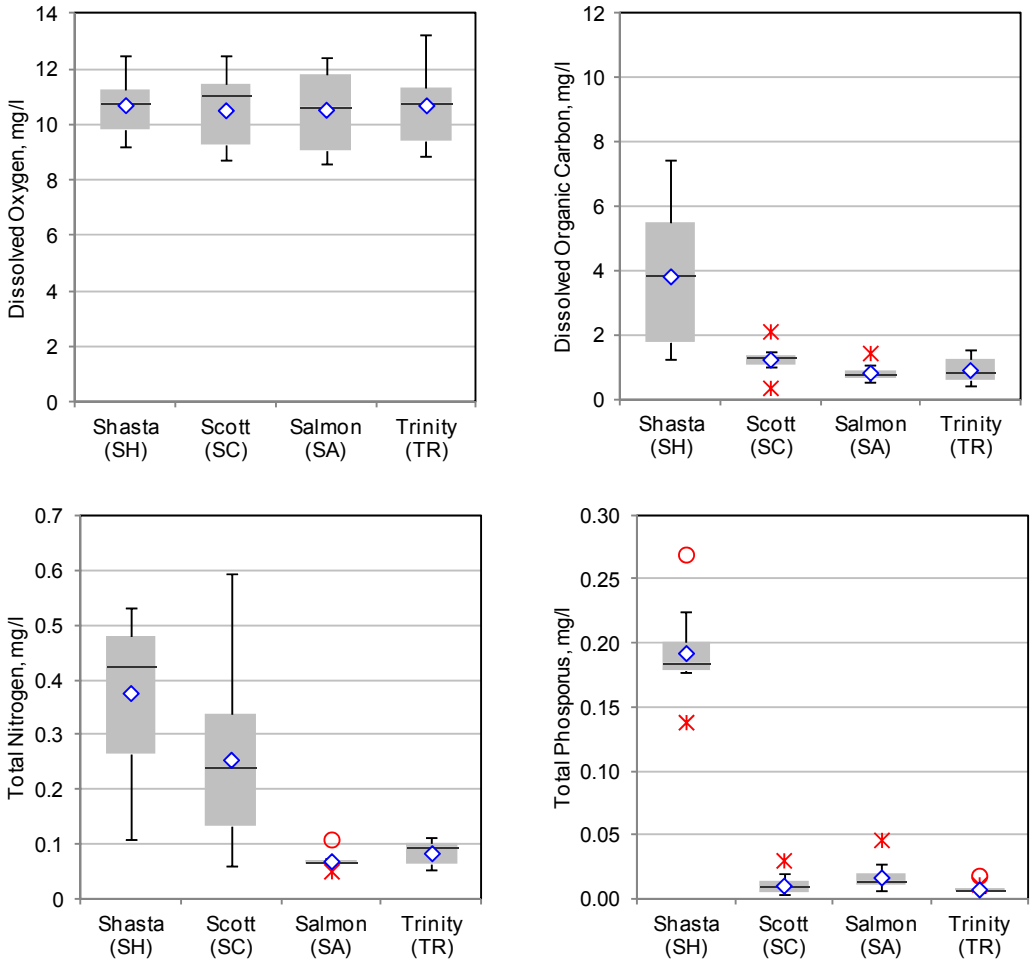

Figure 3. Baseline data for dissolved oxygen, dissolved organic carbon, total nitrogen, and total phosphorus for the Shasta, Scott, Salmon, and Trinity Rivers with median (−), mean (◊), outliers (*), and extreme outliers (○) identified (February 2013 – December 2013).

2.1.2. Mainstem locations (boxplot)

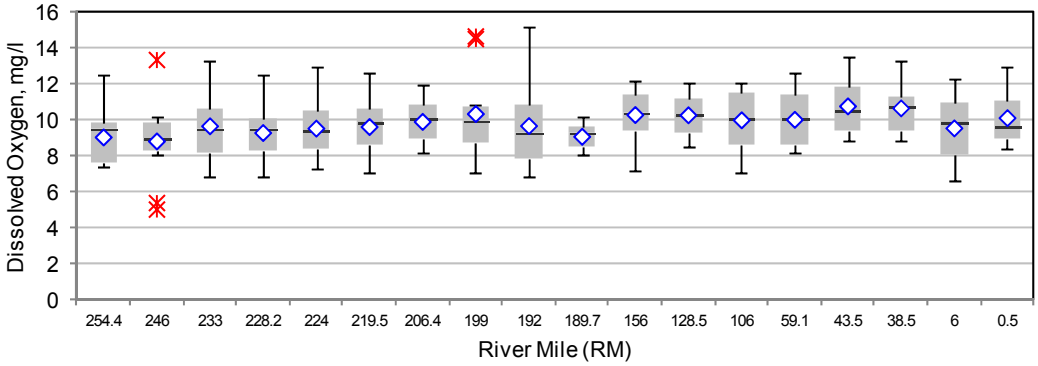

Figure 4. Dissolved oxygen from Link River to the Klamath River Estuary with median (−), mean (◊), outliers(*), and extreme outliers (○) identified (February 2013 – December 2013). Note: Miller Island at Keno Reservoir (RM 246), Copco Reservoir (RM 199), and Iron Gate Reservoir (RM 192). River mile on x-axis not to scale.

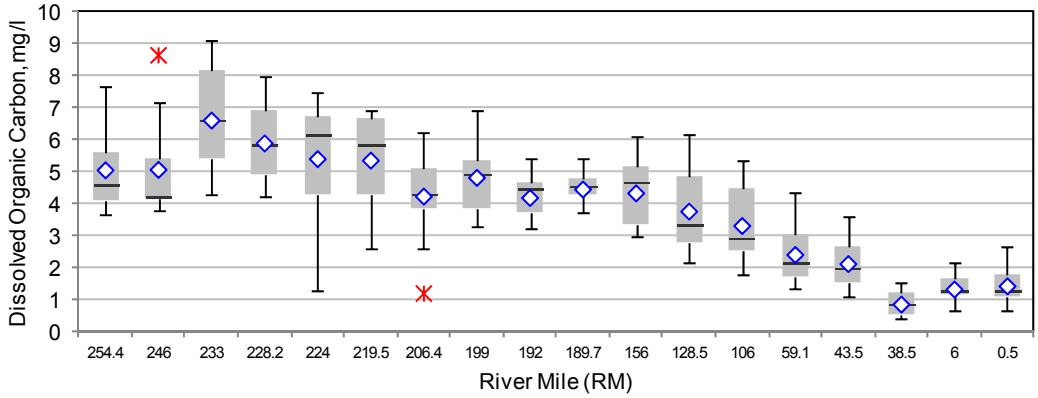

Figure 5. Dissolved organic carbon from Link River to the Klamath River Estuary with median (−), mean (◊), outliers(*), and extreme outliers (○) identified (February 2013 – December 2013). Note: Miller Island at Keno Reservoir (RM 246), Copco Reservoir (RM 199), and Iron Gate Reservoir (RM 192). River mile on x-axis not to scale.

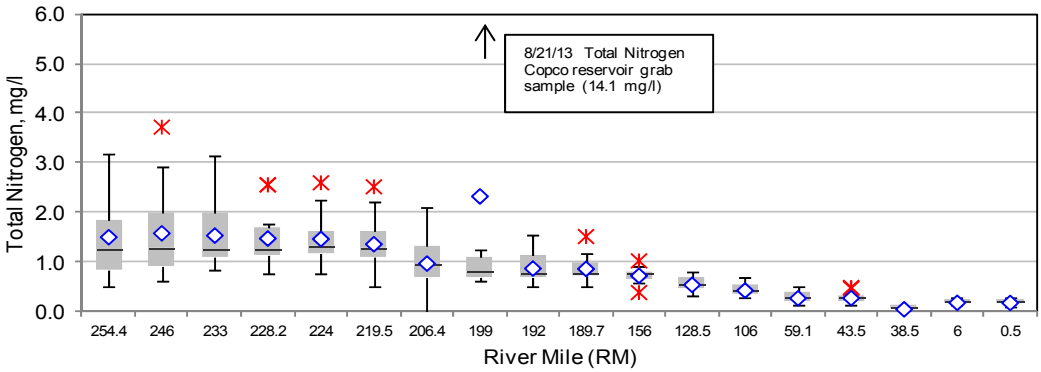

Figure 6. Total nitrogen from Link River to the Klamath River estuary with median (−), mean (◊), outliers(*), and extreme outliers (○) identified (February 2013 – December 2013). Note: Miller Island at Keno Reservoir (RM 246), Copco Reservoir (RM 199), and Iron Gate Reservoir (RM 192). River mile on x-axis not to scale.

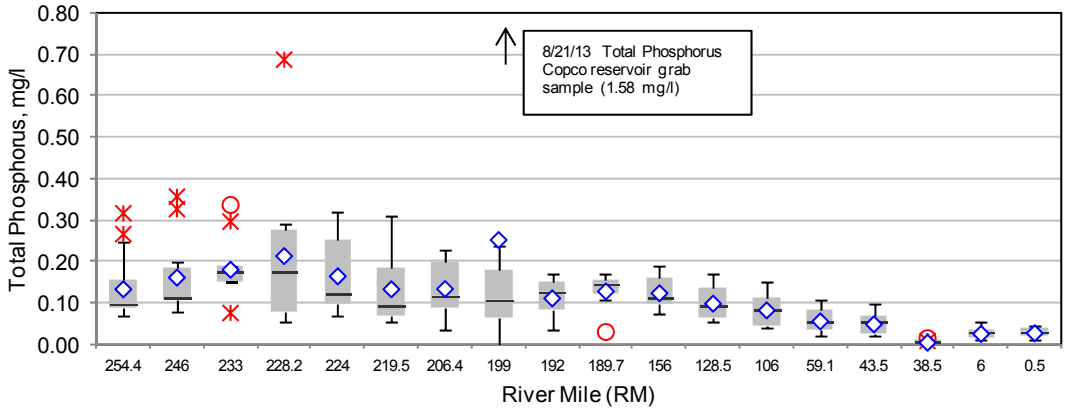

Figure 7. Total phosphorus from Link River to the Klamath River Estuary with median (−), mean (◊), outliers (*), and extreme outliers (○) identified (February 2013 – December 2013). Note: Miller Island at Keno Reservoir (RM 246), Copco Reservoir (RM 199), and Iron Gate Reservoir (RM 192). River mile on x-axis not to scale.

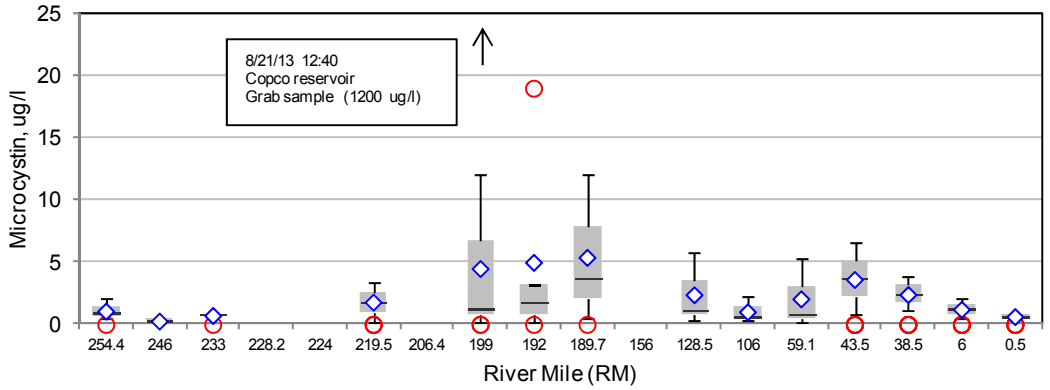

Figure 8. Microcystin from Link River to the Klamath River Estuary with median (−), mean (◊), outliers (*), and extreme outliers (○) identified (February 2013 – December 2013). Note: Miller Island at Keno Reservoir (RM 246), Copco Reservoir (RM 199), and Iron Gate Reservoir (RM 192). River mile on x-axis not to scale.

2.1.3. Major Tributaries (time series)

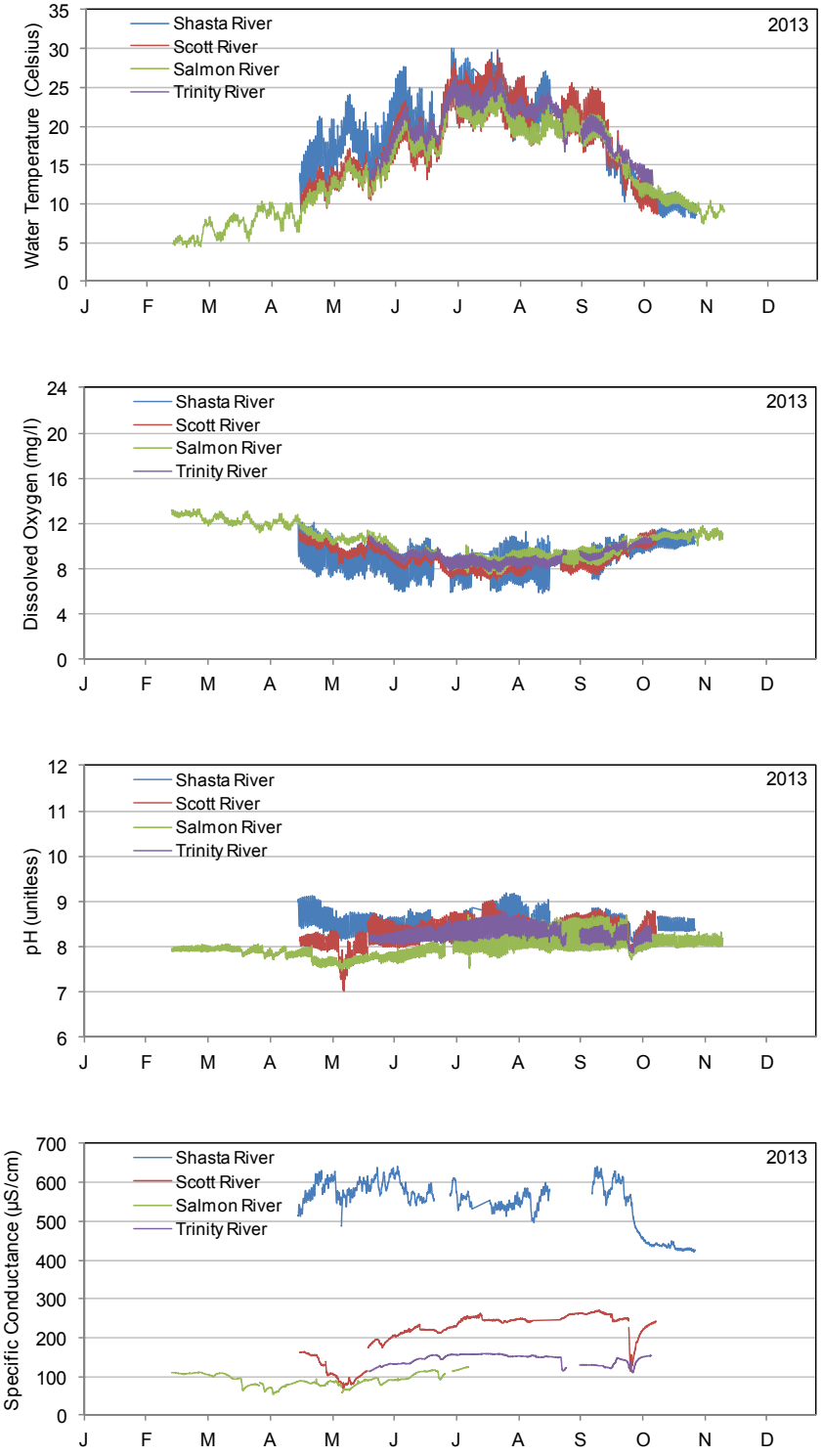

Figure 9. Water temperature, dissolved oxygen, pH, specific conductance data (2013) for the Shasta River, Scott River, Salmon River, and Trinity River. Continuous data was collected using data sondes.

2.1.4. Mainstem Locations (time series)

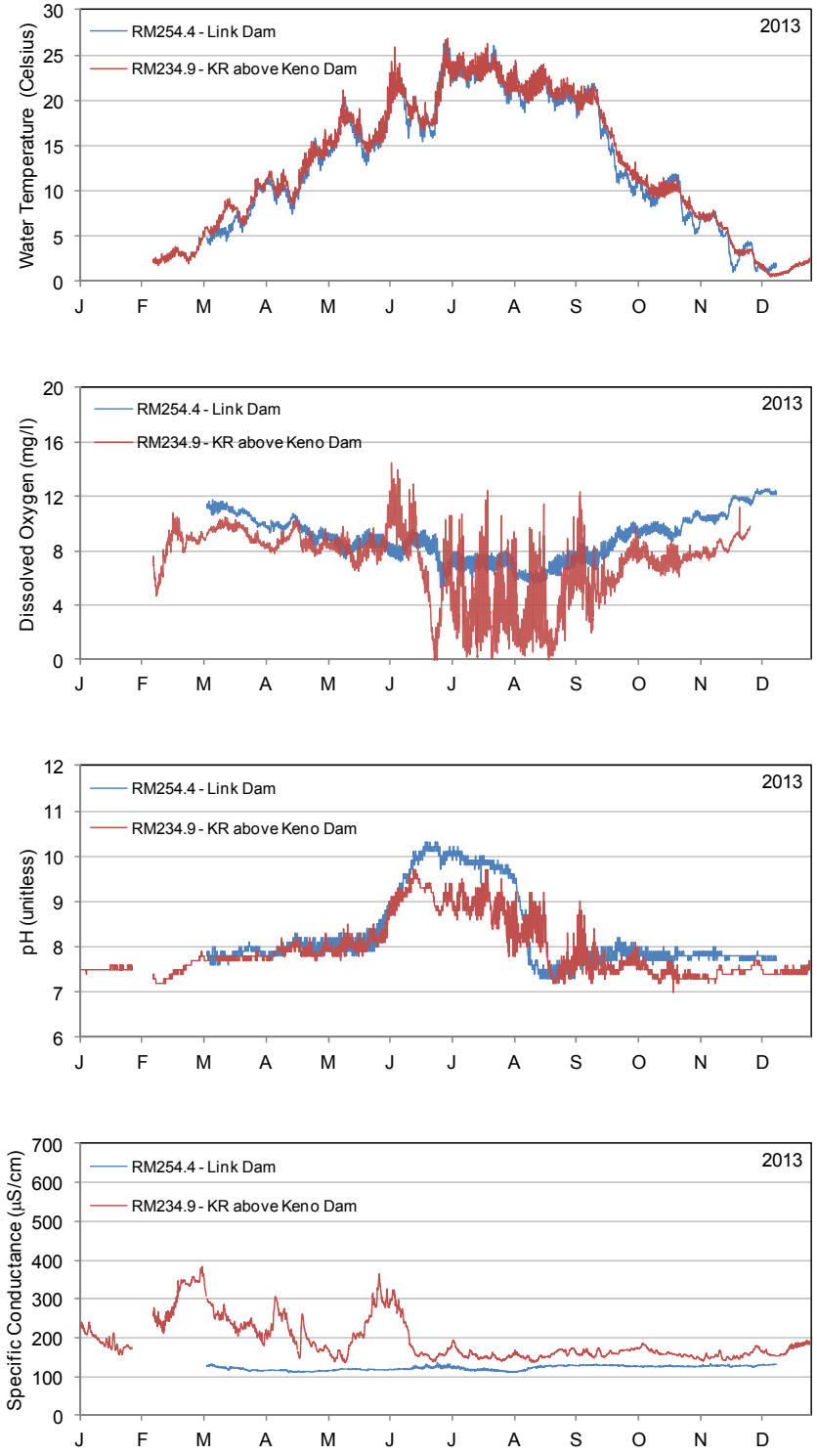

Figure 10. Water temperature, dissolved oxygen, pH, specific conductance data (2013) for the upper Klamath River at Link Dam and Klamath River above Keno Dam (near surface). Continuous data was collected using data sondes.

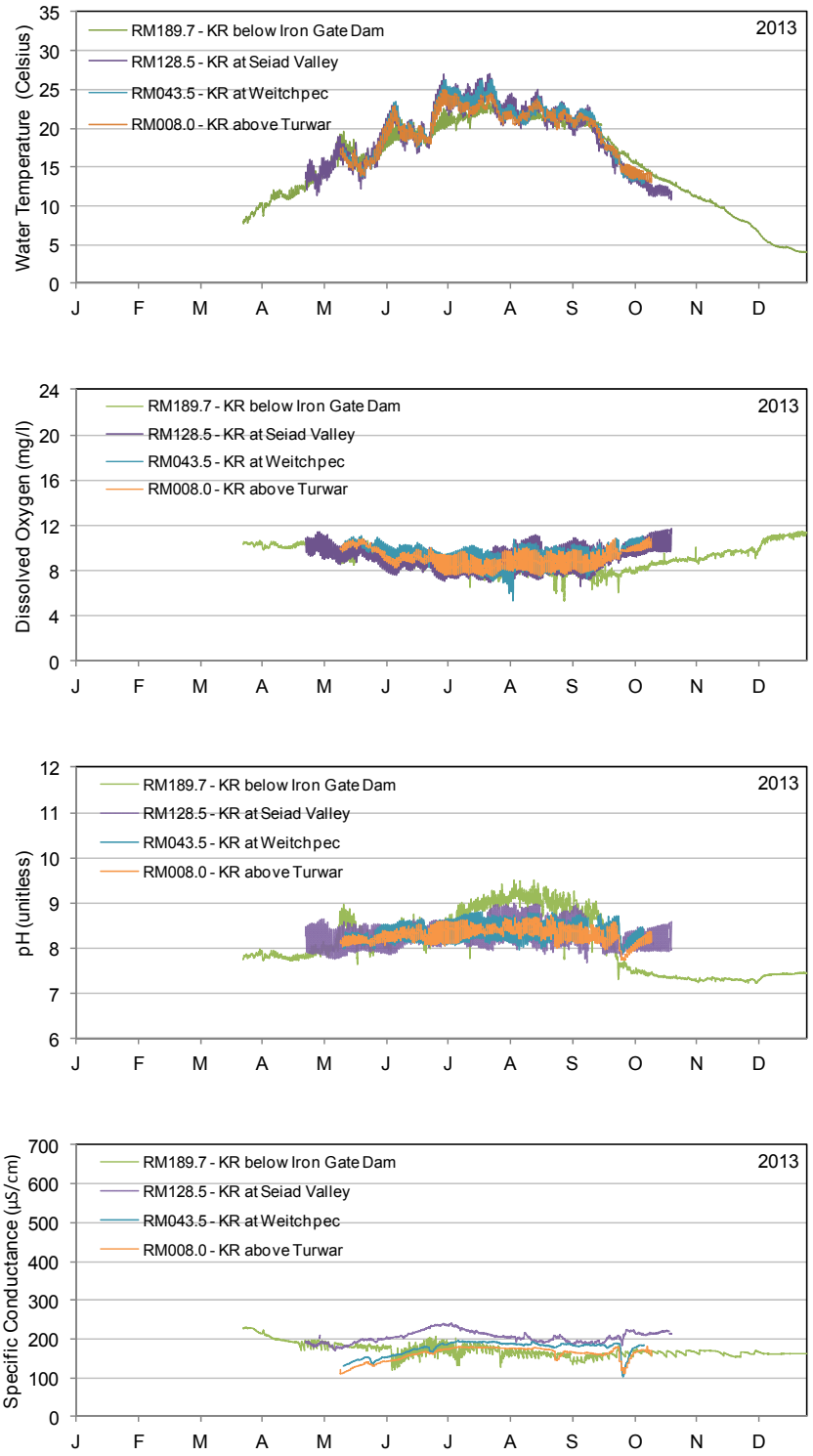

Figure 11. Water temperature, dissolved oxygen, pH, specific conductance data (2013) for the lower Klamath River at Klamath River below Iron Gate Dam, Klamath River near Seiad Valley, Klamath River at Weitchpec, and Klamath River above Turwar. Continuous data was collected using data sondes.

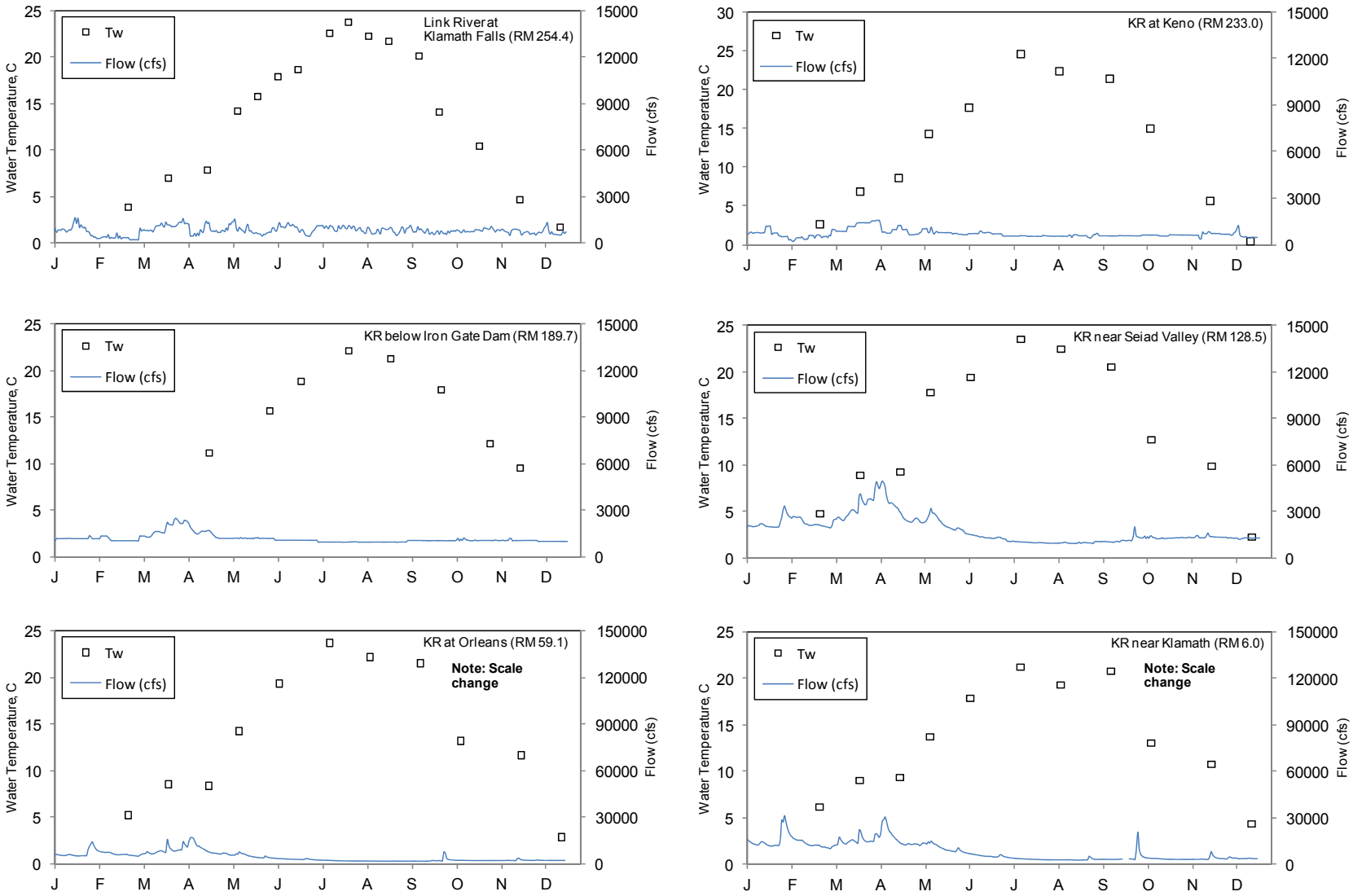

Figure 12. Water temperature (T_w) and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers. Note the scale change for the secondary y-axis at Orleans and near Klamath mouth. (2013)

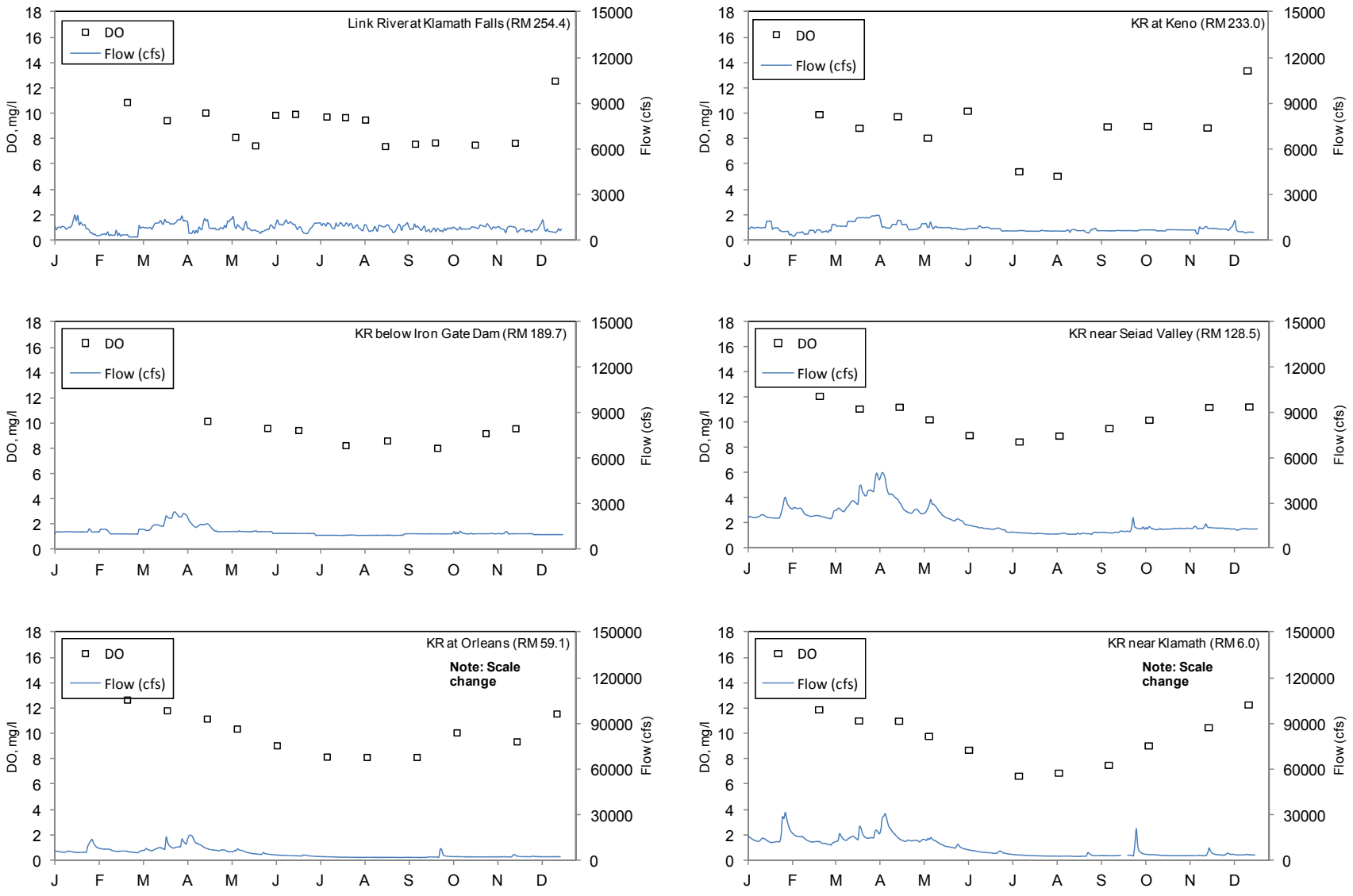

Figure 13. Dissolved oxygen (DO) and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers. Note the scale change for the secondary y-axis at Orleans and near Klamath mouth. (2013)

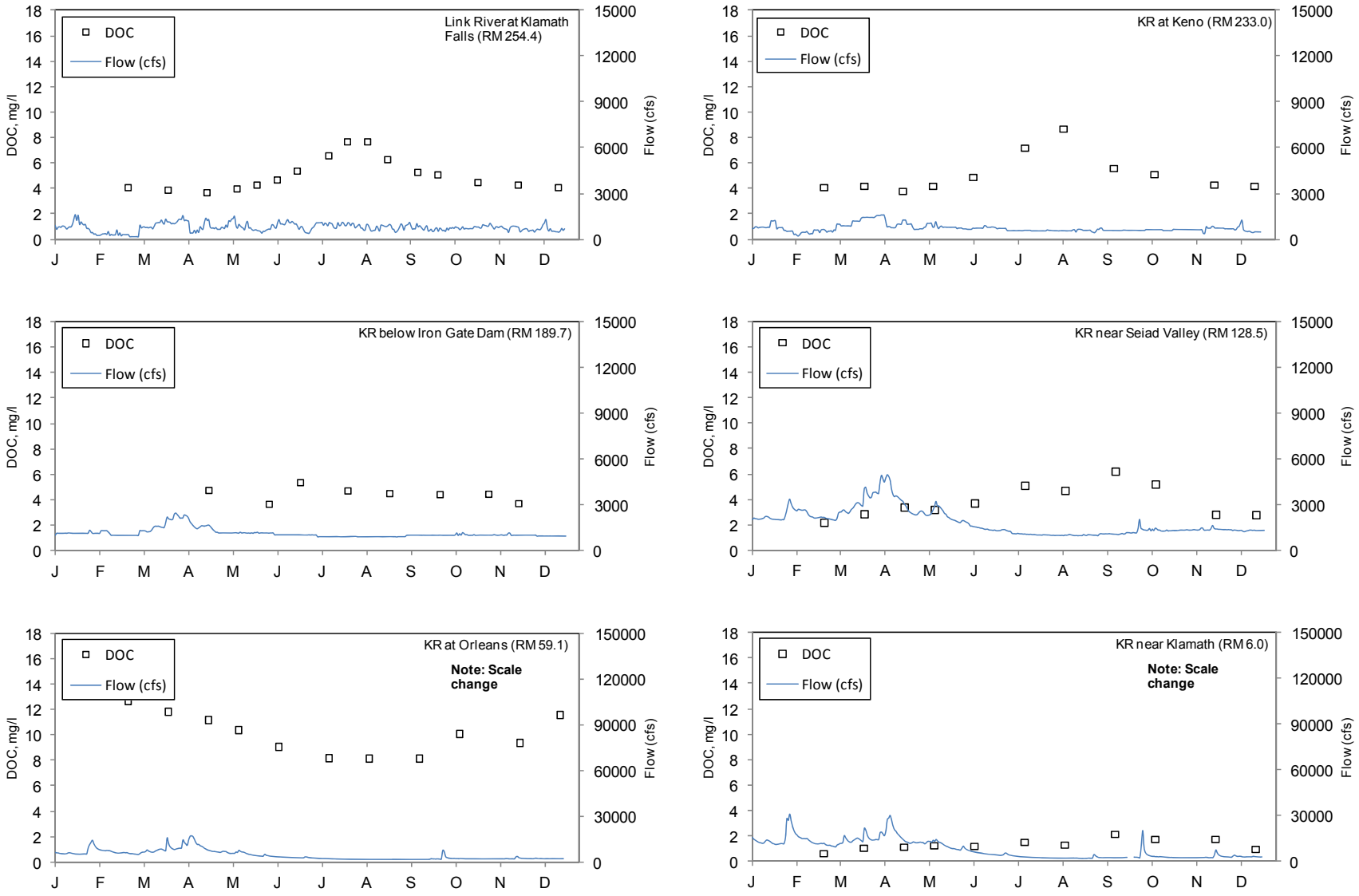

Figure 14. Dissolved organic carbon (DOC) and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers. Note the scale change for the secondary y-axis at Orleans and near Klamath mouth. (2013)

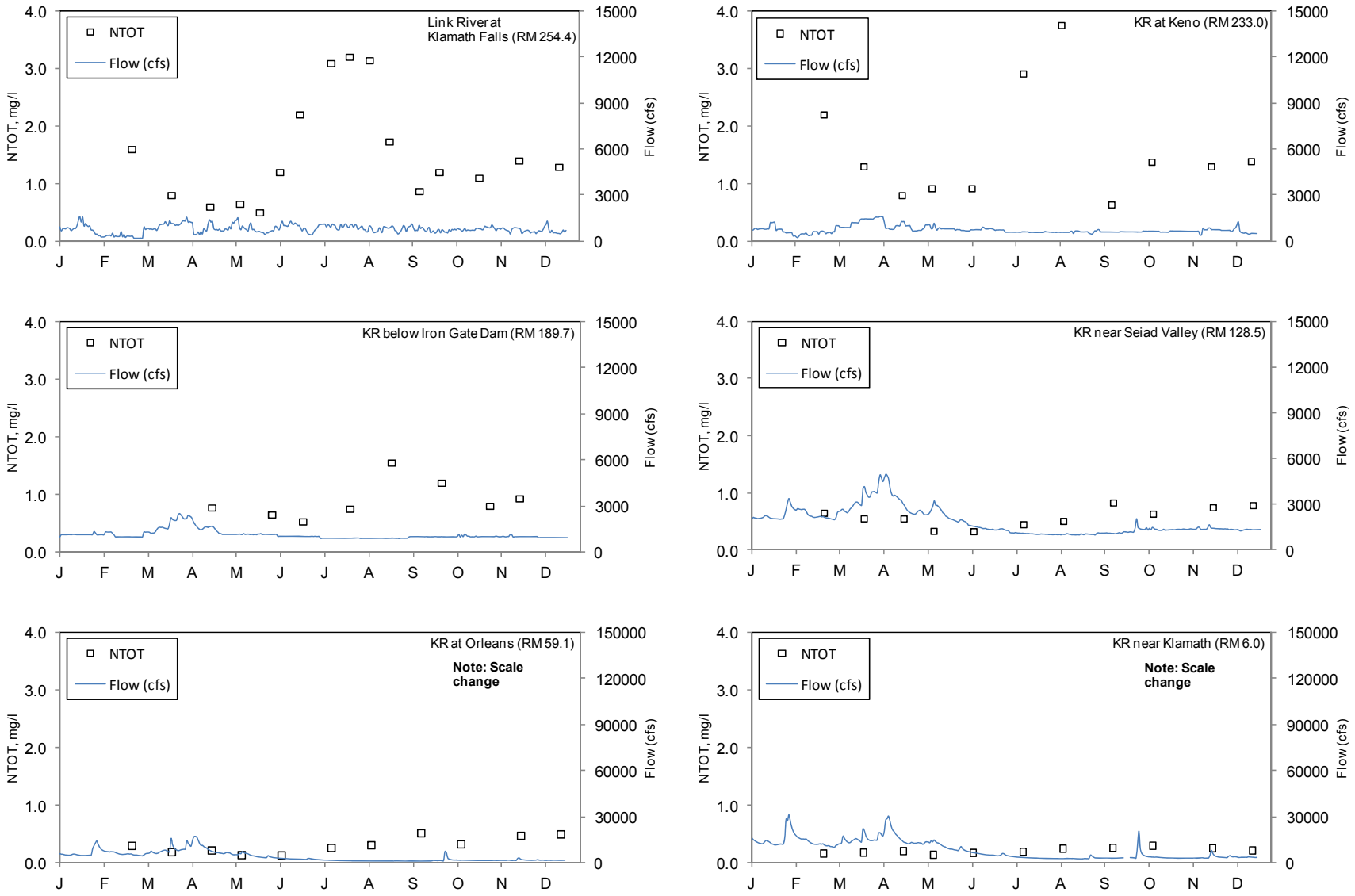

Figure 15. Total nitrogen (NTOT) and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers. Note the scale change for the secondary y-axis at Orleans and near Klamath mouth. (2013)

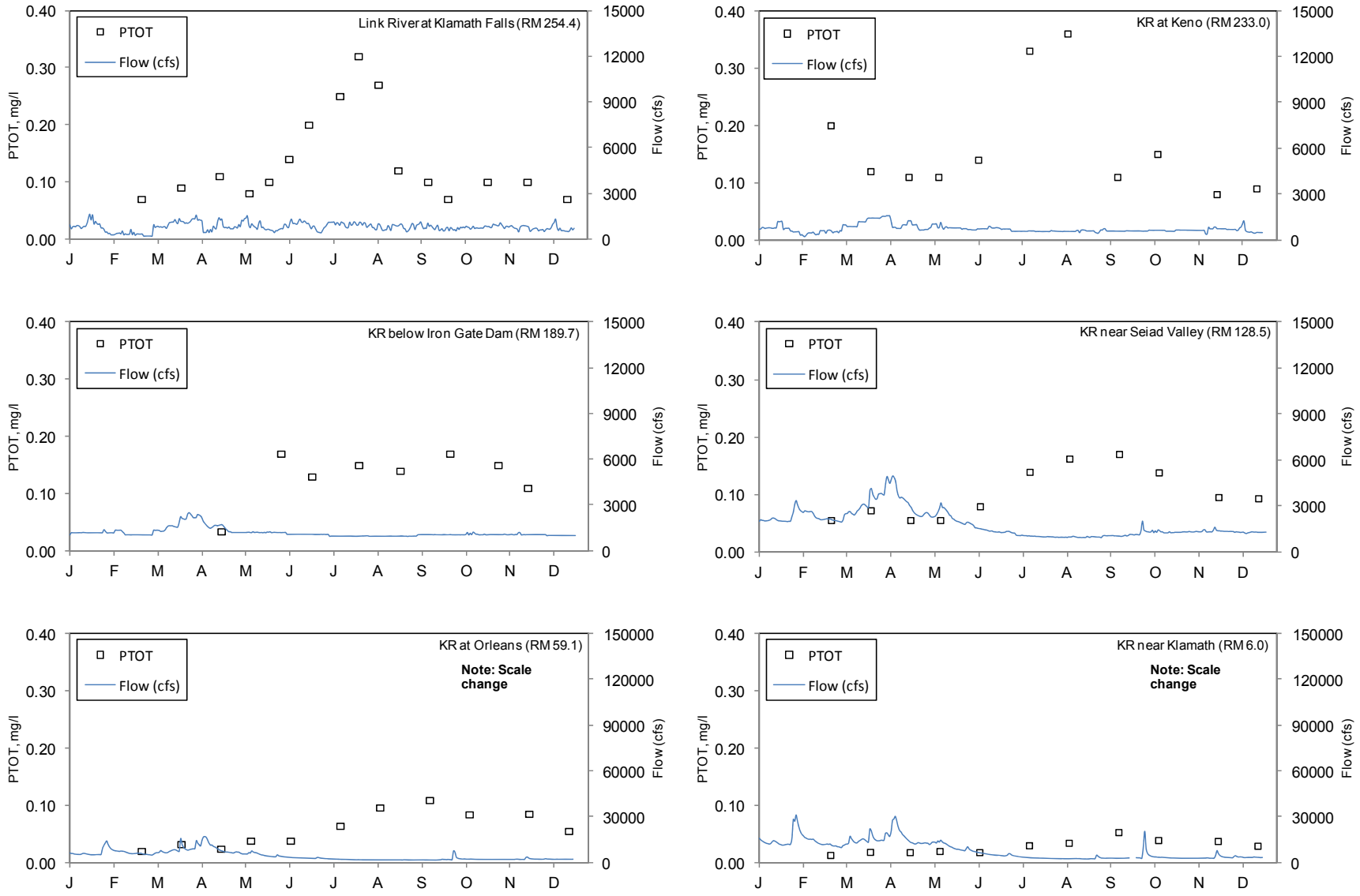

Figure 16. Total phosphorus (PTOT) and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers. Note the scale change for the secondary y-axis at Orleans and Klamath. (2013)

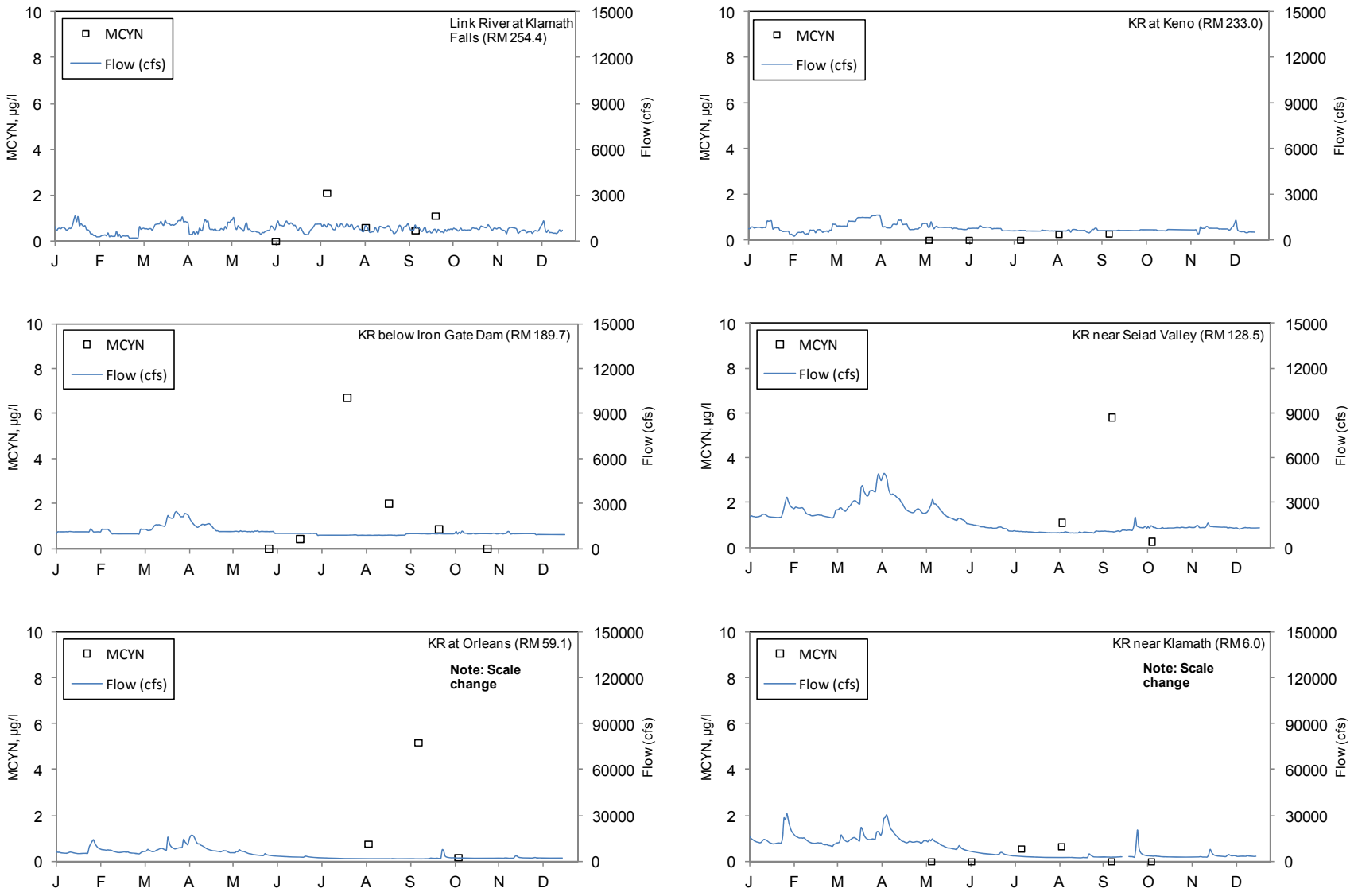

Figure 17. Microcystin (MCYN) and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers. Only surface samples are taken in consideration. Non-detect values are presented as zeros. Note the scale change for the secondary y-axis at Orleans and Klamath. (2013)

3. Summary

The KHSA IM 15 baseline water quality sampling program is an interagency cooperative effort to characterize water quality conditions in the Klamath Basin in support of ongoing and future measures pertaining to restoration, dam removal studies, public health, and other factors. The program was successfully implemented in 2010 and has been on-going. Quality assurance measures have been incorporated into the process and final data sets are available to all interested parties (http://kbmp.net/). The planning and monitoring effort has laid the groundwork for continued cooperation and quality data collection in the Klamath River basin. The 2013 KHSA Interim Measure 15 Monitoring Plan is available at the KBMP website.

4. References

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United States Bureau of Reclamation (USBR). 2005. Standard Operating Procedures for Quality Assurance. Revision 2005-01. Prepared by Environmental Monitoring Branch. January.

Yurok Tribe (Yurok). 2008. Lower Klamath River Nutrient, Periphyton, Phytoplankton and Algal Toxin Sampling Analysis Plan (SAP). June.

Appendix A. Site Locations and Data Summary

The table for the mainstem and major tributary sample locations is presented.

Table A-1. 2013 Klamath River mainstem and major tributaries sampling locations.

Site ID	Location	Site Type	River Mile	Sampling Entity
KR2544	Link Dam	Mainstem	254.4	USBR
KR2460	Keno Reservoir at Miller Island	Mainstem	246.0	USBR
KR2330	Klamath River below Keno Dam	Mainstem	233.4	USBR
KR2282	Klamath River above J.C. Boyle Reservoir	Mainstem	228.2	PacifiCorp
KR2260	J.C. Boyle Reservoir (surface)	Reservoir	224.8	PacifiCorp
KR2240	Klamath River below J.C. Boyle Dam	Mainstem	224.0	PacifiCorp
KR2195	Klamath River below USGS Gage (Spring Island)	Mainstem	219.5	PacifiCorp
KR2064	KR above Shovel Creek (Stateline)	Mainstem	206.4	PacifiCorp
KR1990	Copco Reservoir (0-8m integrated)	Reservoir	198.7	PacifiCorp
KR1950	Klamath River below Copco Dam	Mainstem	195.0	PacifiCorp
KR1920	Iron Gate Reservoir (0-8m integrated)	Reservoir	190.1	PacifiCorp
KR1897	Klamath River below Iron Gate Dam	Mainstem	189.7	PacifiCorp
KR1560	Klamath River at Walker Bridge Road	Mainstem	156.0	Karuk
KR1285	Klamath River below Seiad Valley	Mainstem	128.5	Karuk
KR1006	Klamath River at Happy Camp	Mainstem	106.0	Karuk
KR0591	Klamath River at Orleans (USGS)	Mainstem	59.1	Karuk
KR0435	Klamath River at Weitchpec	Mainstem	43.5	Yurok
KR0385	Klamath River below Trinity River	Mainstem	42.5	Yurok
KR0060	Klamath River near Klamath	Mainstem	6.0	Yurok
KR0005	Klamath River Estuary	Mainstem	0.5	Yurok
SHR00	Shasta River near mouth	Tributary	-	Karuk
SCR00	Scott River near mouth	Tributary	-	Karuk
SAR00	Salmon River near mouth	Tributary	-	Karuk
TRR00	Trinity River near mouth	Tributary	-	Yurok

Appendix B. Data Summary

The complete data set for the 2013 KHSA baseline sampling is presented. The four sampling entities are United States Bureau of Reclamation (USBR), PacifiCorp, the Karuk Tribe, and the Yurok Tribe. The liquid chromatography tandem mass spectrometry (LC-MS/MS) grab sample data collected by the Yurok Tribe are presented in this section. E&S Environmental Chemistry collected samples on behalf of PacifiCorp for Reclamation when the government shutdown occurred. The samples were collected on October 8, 2013 at three locations: Link Dam, Klamath River at Miller Island, and Klamath River below Keno Dam. The samples were sent to CH2MHill for laboratory analysis. Table revised November 2, 2015.

Table B-1. 2013 Klamath River Data Summary (mainstem). Note: KR = Klamath River.

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Carbonaceous Biological Oxygen	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	ppm	mg/l	mg/l	mg/l	ppm	mg/l	mg/l	mg/l	mg/l	NTU	mg/l	mg/l	ug/l
KHSA2013-001	2/20/2013	9:45	KR254.4	Link Dam	USBR	0.5	P	3.92	7.55	130	10.89	0.018	-	53	4.1		-	0.38	0.42	0.237	1.1	1.6	0.008	0.07	33	9.7	4.5	
KHSA2013-007	3/20/2013	6:50	KR254.4	Link Dam	USBR	0.5	P	7.04	7.11	122	9.46	0.01	0.02	47	3.9		-	0.15	0.33	0.419	0.4	0.8	-	0.09	27	34.7	2.3	
KHSA2013-013	4/16/2013	8:35	KR254.4	Link Dam	USBR	0.5	P	7.91	7.79	111	10.06	0.026	0.005	48	3.7		-	0.06	0.08	0.446	0.5	0.6	0.01	0.11	33	59.7	8.8	
KHSA2013-019	5/7/2013	8:20	KR254.4	Link Dam	USBR	0.5	P	14.25	7.5	112	8.14	0.01	-	49	4		-	0.05	0.06	0.365	0.6	0.65	0.02	0.08	13.5	9	2.5	
KHSA2013-025	5/21/2013	6:40	KR254.4	Link Dam	USBR	0.5	P	15.81	8.04	114	7.47	0.008	0.005	50	4.3		-	0.03	-	0.172	0.5	0.5	0.036	0.1	11.3	7.3	2.8	
KHSA2013-029	6/4/2013	9:05	KR254.4	Link Dam	USBR	0.5	P	17.94	8.93	113	9.88	0.062	-	51	4.7		-	0.06	-	0.605	1.2	1.2	0.016	0.14	13.3	15.8	7.3	
KHSA2013-035	6/18/2013	7:50	KR254.4	Link Dam	USBR	0.5	P	18.7	12.38	122	9.96	0.312	-	52	5.4		19	0.04	-	11.1	2.2	2.2	-	0.2	12.8	24	18.7	
KHSA2013-040	7/10/2013	7:00	KR254.4	Link Dam	USBR	0.5	P	22.6	6.11	116	9.75	0.211	-	49	6.6		12	0.09	0.03	1.56	3.1	3.09	0.113	0.25	12.8	13.3	9	2.1
KHSA2013-046	7/23/2013	8:00	KR254.4	Link Dam	USBR	0.5	P	23.79	7.75	115	9.7	0.32	-	49	7.7		18	0.04	-		3.2	3.2	0.103	0.32	38.4	29.7	10.5	
KHSA2013-051	8/6/2013	8:50	KR254.4	Link Dam	USBR	0.5	P	22.29	5.76	111	9.51	0.294	0.01	51	7.7		18	0.17	0.08	2.39	3.1	3.14	0.047	0.27	32.3	29.7	11.3	0.6
KHSA2013-057	8/20/2013	8:20	KR254.4	Link Dam	USBR	0.5	P	21.74	3.93	123	7.42	0.006	0.003	54	6.3		-	0.17	0.5	0.155	1.2	1.73	0.051	0.12	8.14	2	1.8	
KHSA2013-062	9/10/2013	8:20	KR254.4	Link Dam	USBR	0.5	P	20.16	5.99	130	7.6	0.011	0.002	55	5.3		-	0.17	0.24	0.244	0.6	0.87	0.038	0.1	10.9	4.5	1.3	0.46
KHSA2013-068	9/24/2013	9:15	KR254.4	Link Dam	USBR	0.5	P	14.14	7.68	126	7.7	0.009	0.003	55	5.1		-	0.09	0.25	0.204	1	1.2	0.026	0.07	10.1	5.3	2.3	1.1
KHSA2013-073	10/22/2013	7:30	KR254.4	Link Dam	USBR	0.5	P	10.48	9.59	129	7.53	0.011	0.004	52	4.5			0.1	0.36	0.261	0.8	1.1	-	0.1	20.6	15.8	3.7	
KHSA2013-077	11/19/2013	9:40	KR254.4	Link Dam	USBR	0.5	P	4.73	10.11	126	7.68			51	4.3		-	0.16	0.4		1	1.4	-	0.1	29.7	32.5	5.5	
KHSA2013-083	12/17/2013	9:50	KR254.4	Link Dam	USBR	0.5	P	1.78	7.52	132	12.58			54	4.1		-	0.21	0.44		0.8	1.29	-	0.07	23.9	11	3.7	
KHSA2013-004	2/20/2013	7:35	KR246.0	KR at Miller Island	USBR	0.5	P	2.66	7.64	203	9.93	0.014	0.02	80	4.1		-	0.06	0.56	0.559	1.6	2.2	0.048	0.2	68.5	101	13	

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Carbonaceous Biological Oxygen	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
KHSA2013-010	3/20/2013	9:25	KR246.0	KR at Miller Island	USBR	0.5	P	6.87	7.58	156	8.86	0.019	0.016	60	4.2		4	0.14	0.39	0.536	0.9	1.3	0.008	0.12	26.3	36.8	6	
KHSA2013-016	4/16/2013	6:35	KR246.0	KR at Miller Island	USBR	0.5	P	8.62	7.48	134	9.77	0.024	0.006	56	3.8		-	0.06	0.17	0.327	0.6	0.8	0.026	0.11	22.6	19.3	4.9	
KHSA2013-022	5/7/2013	6:20	KR246.0	KR at Miller Island	USBR	0.5	P	14.31	7.11	119	8.08	0.016	0.011	51	4.2		-	0.11	0.1	0.242	0.8	0.92	0.047	0.11	13.9	14.2	2.7	-
KHSA2013-032	6/4/2013	7:55	KR246.0	KR at Miller Island	USBR	0.5	P	17.69	8.65	123	10.21	0.053	0.005	54	4.9		4	0.07	-	0.626	0.9	0.92	0.061	0.14	9.32	10.2	3.2	-
KHSA2013-043	7/10/2013	9:25	KR246.0	KR at Miller Island	USBR	0.5	P	24.6	9.48	122	5.43	0.183	-	54	7.2		13	0.48	-	1.66	2.9	2.91	0.111	0.33	12.2	13	10	-
KHSA2013-054	8/6/2013	6:35	KR246.0	KR at Miller Island	USBR	0.5	P	22.38	9.13	122	5.07	0.29	0.029	55	8.7		18	0.45	-	2.65	3.8	3.75	0.056	0.36	25.1	21.7	14.3	0.26
KHSA2013-065	9/10/2013	9:40	KR246.0	KR at Miller Island	USBR	0.5	P	21.42	8.19	137	8.97	0.052	0.012	56	5.6		4	0.1	0.12	0.52	0.5	0.64	-	0.11	15	6.5	4	0.28
KHSA2013-080	11/19/2013	11:00	KR246.0	KR at Miller Island	USBR	0.5	P	5.67	7.51	136	8.88			52	4.3		-	0.14	0.49		0.8	1.3	0.014	0.08	20.9	10.3	2.5	
KHSA2013-086	12/17/2013	11:35	KR246.0	KR at Miller Island	USBR	0.5	P	0.48	7.76	156	13.39			62	4.2		-	0.13	0.52		0.9	1.39	0.005	0.09	22	16.3	5	
KHSA2013-005	2/20/2013	8:35	KR233.4	KR bel Keno Dam	USBR	0.2	P	2.81	7.63	327	12.74	0.019	0.012	112	6.9		3	0.43	0.72	0.447	1.4	2.2	0.067	0.19	30.6	36	6.5	
KHSA2013-011	3/20/2013	8:30	KR233.4	KR bel Keno Dam	USBR	0.5	P	8	7.57	218	9.78	0.024	0.016	80	6.3		-	0.19	0.39	0.612	1	1.4	0.026	0.18	36.8	51.8	7.4	
KHSA2013-017	4/16/2013	7:45	KR233.4	KR bel Keno Dam	USBR	0.5	P	8.84	7.55	206	10.14	0.018	0.006	72	5.6		-	0.12	0.28	0.344	0.8	1.08	0.051	0.15	25.5	28.3	5.6	
KHSA2013-023	5/7/2013	7:35	KR233.4	KR bel Keno Dam	USBR	0.7	P	14.76	7.32	146	8.74	0.01	0.009	60	5.4		-	0.09	0.1	0.22	0.8	0.86	0.098	0.15	16	17.5	3.8	-
KHSA2013-033	6/4/2013	7:00	KR233.4	KR bel Keno Dam	USBR	0.5	P	17.95	8.22	296	9.29	0.008	-	107	9.1		-	0.18	0.02	0.322	1.2	1.2	0.123	0.19	4.99	1.3	2.2	-
KHSA2013-038	6/18/2013	7:00	KR233.4	KR bel Keno Dam	USBR	0.4	P	18.46	9.39	154	8.51			63			5	0.16	0.02		1.5	1.5	0.124	0.23	8.03			
KHSA2013-044	7/10/2013	8:25	KR233.4	KR bel Keno Dam	USBR	0.4	P	23.48	8.93	163	6.85	0.019	0.005	68	9		3	0.47	-	0.898	2.4	2.35	0.229	0.34	4.63	3.8	2.2	-
KHSA2013-049	7/23/2013	7:10	KR233.4	KR bel Keno Dam	USBR	0.4	P	23.33	8.78	148	6.95			63			5	0.57	-		2.7	2.7	0.1	0.29	5.37			
KHSA2013-055	8/6/2013	10:30	KR233.4	KR bel Keno Dam	USBR	0.4	P	21.65	8.04	153	7.3	0.044	0.025	67	8.6		4	1.06	0.04	0.737	3.1	3.15	0.15	0.3	6.55	6.7	5.3	-
KHSA2013-060	8/20/2013	7:05	KR233.4	KR bel Keno Dam	USBR	0.5	P	21.47	7.81	153	7.15			65			4	1.04	0.04		2.8	2.81	0.1	0.23	5.53			
KHSA2013-066	9/10/2013	7:10	KR233.4	KR bel Keno Dam	USBR	0.4	P	20.3	7.81	165	8.07	0.015	0.024	68	7		4	0.26	0.04	0.387	0.9	0.91	0.032	0.17	11.7	6.3	3.1	0.72
KHSA2013-071	9/24/2013	7:30	KR233.4	KR bel Keno Dam	USBR	0.4	P	15.7	7.43	162	8.85			67			-	0.26	0.12		1.3	1.4	0.035	0.11	11.4			
KHSA2013-081	11/19/2013	7:55	KR233.4	KR bel Keno Dam	USBR	0.2	P	5.68	7.18	139	10.84			55	4.4		-	0.12	0.39		0.8	1.2	0.02	0.09	19.2	7.3	2	
KHSA2013-087	12/17/2013	8:35	KR233.4	KR bel Keno Dam	USBR	0.5	P	0.72	7.27	151	13.27			58	4.3		-	0.1	0.54		0.8	1.34	0.005	0.08	24.3	20.3	4	
KR2541310	10/8/2013	14:15	KR254.4	Link Dam	USBR	0.5	P	10.41	7.99	128.3	9.7			51.5	4.62		1.8	0.023	0.25			1.74	0.013	0.098		21.6	4.6	
KR2461310	10/8/2013	14:55	KR246.0	KR at Miller Island	USBR	0.5	P	12.67	7.99	156.1	8.3			62.1	4.81		1.3	0.02	0.29			1.33	0.04	0.14		3.6	2.2	
KBK1310	10/8/2013	16:25	KR233.4	KR bel Keno Dam	USBR	0.5	P	11.13	8.4	173.9	9.52			70.3	5.12		2.7	0.044	0.19			1.38	0.02	0.15		13.1	4.9	
KR13024	3/18/2013	12:30	KR22822	Above JCB reservoir	PacifiCorp	0.5	P	8.65	6.37	234.5	9.97	11.35	15.79	76.9	6.14	1.63		0.1	0.48	0.21		1.12	0.073	0.057		49.5	9.5	

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Carbonaceous Biological Oxygen	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
KR13046	4/16/2013	13:00	KR22822	Above JCB reservoir	PacifiCorp	0.5	P	8.95	7.73	211.3	10.14	11.65	8.45	69.3	5.81	1.47		0.074	0.33	0.211		1.07	0.098	0.089		32.4	5.2	
KR13069	5/19/2013	12:10	KR22822	Above JCB reservoir	PacifiCorp	0.5	P	17.48	8.6	198.8	9.08	5.52	5.38	74.7	5.88	0.726		-0.014	0.17	0.101		0.77	0.19	0.29		6.4	1.8	
KR13092	6/21/2013	10:00	KR22822	Above JCB reservoir	PacifiCorp	0.5	P	16.85	8.67	157	8.27	3.53	4.41	61.8	7.97	1.02		0.086	0.41	0.156		1.31	0.21	0.28		3.4	0.2	
KR13115	7/22/2013	13:40	KR22822	Above JCB reservoir	PacifiCorp	0.5	P	25.52	7.67	147	6.81	11.05	14.24	55.4	7.91	0.207		0.08	0.99	0.0279		2.59	0.2	0.27		5.6	4.8	
KR13138	8/22/2013	14:00	KR22822	Above JCB reservoir	PacifiCorp	0.5	P	22.65	8	154	7.09	3.71	5.93	57.2	7.19	1.02		0.097	0.98	0.127		2.59	0.17	0.23		5.6	7	
KR13161	9/24/2013	16:50	KR22822	Above JCB reservoir	PacifiCorp	0.5	P	15.59	8.28	165	8.6	4.16	6.06	62	5.22	1.08		0.023	0.43	0.138		1.47	0.077	0.12		9.2	3.4	
KR13183	10/24/2013	11:30	KR22822	Above JCB reservoir	PacifiCorp	0.5	P	9.69	8.63	156	9.87	3.65	5.04	60.6	4.82	0.843		0.0095	0.36	0.132		1.16	0.051	0.69		6.2	1.4	
KR13204	11/20/2013	15:50	KR22822	Above JCB reservoir	PacifiCorp	0.5	P	5.85	8.4	145	10.92	1.99	2.66	52.9	4.31	0.834		0.052	0.46	0.105		1.24	0.051	0.077		7.4	1.6	
KR13224	12/19/2013	9:10	KR22822	Above JCB reservoir	PacifiCorp	0.5	P	0.1	8.06	159	12.53	5.72	7.18	58.1	4.22	1.05		0.043	0.52	0.141		1.77	0.04	0.066		19.4	2.6	
KR13070	5/19/2013	13:20	KR22478	JCB reservoir 0.5 m	PacifiCorp	0.5	P	18.47	8.47	186	8.97	10.18	4.22			0.966				0.148								ND
KR13093	6/21/2013	9:15	KR22478	JCB reservoir 0.5 m	PacifiCorp	0.5	P	17.9	8.94	158	6.83	2.27	3.00			0.831				0.123								ND
KR13116	7/22/2013	14:30	KR22478	JCB reservoir 0.5 m	PacifiCorp	0.5	P	25.66	8.75	151	11.22	12.09	10.40			1.35				0.209								ND
KR13139	8/22/2013	13:30	KR22478	JCB reservoir 0.5 m	PacifiCorp	0.5	P	22.49	7.83	152	6.63	1.07	1.65			0.704				0.0877								ND
KR13162	9/24/2013	15:00	KR22478	JCB reservoir 0.5 m	PacifiCorp	0.5	P	16.08	7.48	157	8.08	2.46	3.27			0.758				0.0928								0.22
KR13184	10/24/2013	10:55	KR22478	JCB reservoir 0.5 m	PacifiCorp	0.5	P	9.63	8.35	157	9.23	5.17	7.07			0.781				0.114								
KR13001	2/19/2013	14:30	KR22460	Below JCB dam	PacifiCorp	0.5	R	1.12	7.95	284.3	11.87	10.88	9.22	91.9	6.5	0.941		0.076	0.7	0.15		1.75	0.11	0.19		19.4	4.6	
KR13023	3/18/2013	13:15	KR22460	Below JCB dam	PacifiCorp	0.5	R	8.6	6.29	240.6	10.42	8.41	10.39	80.6	6.14	0.971		0.088	0.48	0.13		1.54	0.057	0.1		26.8	5.2	
KR13045	4/16/2013	14:20	KR22460	Below JCB dam	PacifiCorp	0.5	R	9.05	8.27	242.7	10.51	11.64	9.18	78.9	7.09	1.72		0.088	0.32	0.238		1.04	0.092	0.13		22.8	1.2	
KR13068	5/19/2013	14:50	KR22460	Below JCB dam	PacifiCorp	0.5	R	17.16	8.26	193	8.59	7.80	5.07	72.8	6.26	1.22		0.0044	0.15	0.173		0.77	0.18	0.26		12.2	1.4	
KR13091	6/21/2013	8:30	KR22460	Below JCB dam	PacifiCorp	0.5	R	17.2	8.45	154.2	8.29	2.66	3.67	62.7	6.85	0.763		0.19	0.28	0.103		1.3	0.2	0.27		3.8	0.8	
KR13114	7/22/2013	15:50	KR22460	Below JCB dam	PacifiCorp	0.5	R	23.88	7.76	150.4	7.34	8.66	9.35	60.5	7.46	0.965		0.13	0.75	0.142		2.27	0.22	0.32		4	4.8	
KR13137	8/22/2013	10:55	KR22460	Below JCB dam	PacifiCorp	0.5	R	21.65	7.79	151.3	7.63	1.47	2.41	56.3	6.36	0.685		0.2	1.18	0.0808		2.63	0.18	0.23		3.4	5.8	
KR13160	9/24/2013	16:10	KR22460	Below JCB dam	PacifiCorp	0.5	R	15.78	8.05	157.9	8.83	2.32	3.58	60.7	5.09	0.983		0.093	0.38	0.128		1.38	0.078	0.12		6.8	3	
KR13182a	10/24/2013	10:15	KR22460	Below JCB dam	PacifiCorp	0.5	R	9.48	8.32	156.8	10.09	4.45	6.46	61.4	1.28	0.584		0.064	0.37	0.0883		1.19	0.059	0.097		4.6	1.4	
KR13203	11/20/2013	15:10	KR22460	Below JCB dam	PacifiCorp	0.5	R	6.01	7.94	150.3	11.09	2.29	3.02	54.3	4.04	0.777		0.058	0.43	0.1		1.21	0.049	0.088		11.2	2.4	
KR13223	12/19/2013	10:40	KR22460	Below JCB dam	PacifiCorp	0.5	R	0.56	7.99	155.8	12.95	4.44	5.57	58.3	3.96	1.06		0.042	0.51	0.141		1.66	0.042	0.068		19.4	1.7	
KR13005	2/19/2013	13:45	KR22000	Spring Island	PacifiCorp	0.5	P	2.55	7.8	258	11.41	10.77	8.80	88.3	6.78	0.456		0.1	0.68	0.0691		1.58	0.094	0.062	15	22.8	2.8	

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Carbonaceous Biological Oxygen	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
KR13027	3/18/2013	14:15	KR22000	Spring Island	PacifiCorp	0.5	P	8.87	6.09	238	10.2	8.14	10.45	80.7	6.74	1.01		0.053	0.47	0.128		1.31	0.069	0.057	18	28.8	6.8	
KR13049	4/16/2013	13:55	KR22000	Spring Island	PacifiCorp	0.5	P	9.24	8.18	243	10.33	10.64	8.73	76.9	6.91	1.53		0.091	0.33	0.216		1.03	0.092	0.094	16	26.4	5	
KR13071	5/19/2013	14:15	KR22000	Spring Island	PacifiCorp	0.5	P	16.73	8.11	194	8.68	7.13	5.30	73.1	5.86	1.42		0.042	0.15	0.178		0.75	0.18	0.27	8.2	11.6	3.2	ND
KR13094	6/21/2013	8:00	KR22000	Spring Island	PacifiCorp	0.5	P	12.35	8.23	147	9.59	1.18	1.33	65.7	2.59	0.335		-0.029	0.26	0.0406		0.5	0.099	0.14	1.8	2.4	0.8	ND
KR13117	7/22/2013	15:20	KR22000	Spring Island	PacifiCorp	0.5	P	23.67	7.59	151	7.04	5.92	6.76	59.2	6.56	1.02		0.13	0.77	0.15		2.23	0.22	0.31		4.4	4.2	ND
KR13140	8/22/2013	12:50	KR22000	Spring Island	PacifiCorp	0.5	P	21.52	7.78	151	7.13	1.94	3.22	56.7	6.31	0.631		0.14	1.18	0.0795		2.55	0.18	0.23	2.7	4	6.2	3.4
KR13163	9/24/2013	15:40	KR22000	Spring Island	PacifiCorp	0.5	P	15.87	7.65	158	8.48	2.22	3.38	60.2	5.54	0.615		0.066	0.38	0.0727		1.39	0.073	0.12	7.3	8	3.8	0.18
KR13185	10/24/2013	9:45	KR22000	Spring Island	PacifiCorp	0.5	P	9.52	8.59	157	9.85	5.33	7.17	60.9	4.49	0.871		0.05	0.37	0.12		1.16	0.056	0.093	12	4	2	
KR13205	11/20/2013	14:45	KR22000	Spring Island	PacifiCorp	0.5	P	6.08	3.95	151	10.86	2.43	3.57	54.4	4.07	0.834		0.052	0.42	0.102		1.17	0.047	0.075		9.6	0.8	
KR13225	12/19/2013	10:10	KR22000	Spring Island	PacifiCorp	0.5	P	0.72	8.03	156	12.67	3.77	4.99	59	3.63	0.992		0.039	0.5	0.121		1.68	0.043	0.055		19.4	1.7	
KR13010	2/20/2013	13:45	KR20642	Abv Shovel creek	PacifiCorp	0.5	P	3.07	8.34	267	11.92	9.59	7.29	89.5	5.97	0.996	11.5	0.028	0.72	0.159		1.66	0.088	0.099	15	20.3	6.3	
KR13032	3/18/2013	16:25	KR20642	Abv Shovel creek	PacifiCorp	0.5	P	10.07	5.65	228	10.43	7.16	9.15	78.3	6.21	0.504	1.1	-0.021	0.53	0.15		1.17	0.068	0.034	18	25.6	4.7	
KR13054	4/17/2013	9:45	KR20642	Abv Shovel creek	PacifiCorp	0.5	P	8.46	7.82	215	11.06	8.07	7.67	71.7	5.35	0.84	1.7	-0.0023	0.37	0.112		0.86	0.08	0.082		17.8	3	
KR13076	5/19/2013	17:30	KR20642	Abv Shovel creek	PacifiCorp	0.5	P	17.99	8.59	181	8.94	4.95	3.57	68.7	5.03	0.713	1.8	-0.027	0.13	0.101		0.6	0.15	0.22	6.5	9.6	2	ND
KR13089	6/6/2013	13:30	KR20642	Abv Shovel creek	PacifiCorp	0.5	P	-	-	-	-			71.7	4.01		6.2	-0.041	0.094			0.33	0.093	0.13	3	1.2	0	
KR13099	6/20/2013	16:50	KR20642	Abv Shovel creek	PacifiCorp	0.5	P	16.56	8.85	155	9.08	3.10	2.84	64.5	4.42	0.751	14.5	-0.011	0.28	0.0987		0.82	0.15	0.2	3.3	5.4	1	ND
KR13112	7/11/2013	13:00	KR20642	Abv Shovel creek	PacifiCorp	0.5	P	-	-	-	-						7.4	0.021	0.44			0.96	0.17	0.2				
KR13122	7/23/2013	16:45	KR20642	Abv Shovel creek	PacifiCorp	0.5	P	24.83	8.47	143	8.18	2.79	3.13	62.6	4.01	0.865	2.1	-0.013	0.56	0.114		1.33	0.15	0.19	2.8	4.8	3.2	ND
KR13135	8/5/2013	13:00	KR20642	Abv Shovel creek	PacifiCorp	0.5	P	-	-	-	-						1.7	-0.017	0.54			1.31	0.15	0.21				
KR13145	8/22/2013	9:30	KR20642	Abv Shovel creek	PacifiCorp	0.5	P	19.07	8.05	153	8.67	1.44	2.21	59.4	4.87	0.583		0.019	1.21	0.0722		2.12	0.16	0.23		2.8	2.4	ND
KR13158	9/10/2013	10:30	KR20642	Abv Shovel creek	PacifiCorp	0.5	P	-	-	-	-						1.4	0.024	0.35			0.97	0.078	0.14				
KR13168	9/24/2013	13:25	KR20642	Abv Shovel creek	PacifiCorp	0.5	P	14.56	8.82	155	10.23	1.07	1.61	63	4.22	0.503	0.6	0.028	0.34	0.0604		0.96	0.072	0.096	5.8	2.8	2.2	ND
KR13181	10/9/2013	14:00	KR20642	Abv Shovel creek	PacifiCorp	0.5	P	-	-	-	-						3.8	-0.018	0.22			0.7	0.052	0.11				
KR13190	10/23/2013	16:05	KR20642	Abv Shovel creek	PacifiCorp	0.5	P	10.99	8.96	154	9.97	2.13	2.72	62.3	1.25	0.714	1.1	-0.0074	0.35	0.11		0.0037	0.056	0.084	10	5.2	3.2	
KR13210	11/19/2013	11:10	KR20642	Abv Shovel creek	PacifiCorp	0.5	P	8.22	8.14	154	11.01	0.93	1.23	62.2	2.63	0.417	2.2	-0.014	0.32	0.0514		0.66	0.049	0.082		6.4	2.4	
KR13230	12/9/2013	17:10	KR20642	Abv Shovel creek	PacifiCorp	0.5	P	-	-	-	-	2.26	2.90	63.8	3.42	0.616		0.037	0.46	0.0844		1.61	0.056	0.094		12.6	1.5	
KR13012	2/20/2013	12:00	KR19874	Copco 0.5 m grab	PacifiCorp	0.5	P	2.91	7.91	184	10.9	1.83	1.70	70.6	3.28	0.47		0.067	0.55	0.0677		1.1	0.066	-0.035		4.4	-0.4	

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Carbonaceous Biological Oxygen	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
KR13013	2/20/2013	12:40	KR19874	Copco Thermocline	PacifiCorp	14.0	P	-	-	-	-	1.79	1.91	71.2	3.17	0.431		0.073	0.58	0.0632		1.1	0.067	0.059		4.6	0.6	
KR13014	2/20/2013	12:10	KR19874	Copco 1.0 m from bottom	PacifiCorp	28.0	P	-	-	-	-	1.60	1.90	73.4	3.75	0.578		0.07	0.56	0.0853		1.09	0.075	0.27		5	-0.6	
KR13034	3/19/2013	12:15	KR19874	Copco 0.5 m grab	PacifiCorp	0.5	P	9.88	5.93	246	10.42	5.44	6.42	83.4	4.92	0.954		-0.019	0.62	0.131			0.085	0.057		16.8	2.6	
KR13035	3/19/2013	13:40	KR19874	Copco Thermocline	PacifiCorp	10.0	P	7.08	5.32	262	9.57	4.36	4.91	84.5	4.74	0.978		0.033	0.63	0.126			0.085	0.071		13.4	2.2	
KR13036	3/19/2013	13:25	KR19874	Copco 1.0 m from bottom	PacifiCorp	29.0	P	6.23	5.4	269	8.1			89	4.77			0.13	0.54				0.081	0.052		10.4	1.4	
KR13055	4/17/2013	11:10	KR19874	Copco 8 m INT sample	PacifiCorp	0.0 - 8.0	I	-	-	-	-	1.52	1.41			0.447				0.0601								
KR13056	4/17/2013	11:00	KR19874	Copco 0.5 m grab	PacifiCorp	0.5	P	11.49	8.25	206	9.16	0.97	1.01	72.7	5.37	0.418		0.051	0.39	0.049		0.81	0.077	0.055		2.6	-0.2	
KR13057	4/17/2013	11:30	KR19874	Copco Thermocline	PacifiCorp	15.0	P	11.33	7.8	206	9.07	1.56	1.24	84.4	4.9	0.473		0.075	0.4	0.0579		0.81	0.1	0.046		6.2	0	
KR13058	4/17/2013	11:15	KR19874	Copco 1.0 m from bottom	PacifiCorp	31.0	P	8.7	7.23	220	6.17			72.5	4.62			0.27	0.59			1.29	0.078	0.071		2.2	0.8	
KR13077	5/29/2013	13:10	KR19874	Copco 8 m INT sample	PacifiCorp	0.0 - 8.0	I	-	-	-	-	5.44	3.52			0.318				0.0538								ND
KR13078	5/29/2013	13:15	KR19874	Copco 0.5 m grab	PacifiCorp	0.5	P	17.87	8.02	161	9.95	8.64	3.60	67.7	3.8	0.477		-0.016	0.0014	0.0896		0.63	0.049	0.12		5	2.6	ND
KR13079	5/29/2013	13:40	KR19874	Copco Thermocline	PacifiCorp	14.0	P	15.34	6.95	176	6.94	3.21	2.68	72.6	4.1	0.294		-0.033	0.47	0.0381		0.092	0.069	0.12		2.8	0	
KR13080	5/29/2013	13:25	KR19874	Copco 1.0 m from bottom	PacifiCorp	44.0	P	8.7	6.62	228	0.53			76.4	3.51			-0.038	0.75			1.37	0.1	0.16		2.4	-0.6	
KR13100	6/20/2013	14:25	KR19874	Copco 8 m INT sample	PacifiCorp	0.0 - 8.0	I	-	-	-	-	3.10	3.65			0.291				0.0493								1.4
KR13101	6/20/2013	14:35	KR19874	Copco 0.5 m grab	PacifiCorp	0.5	P	21.21	9.09	232	9.93	3.10	4.54	85.5	6.91	0.417		-0.031	0.005	0.0768		0.71	0.12	0.19		3.8	2	1.3
KR13102	6/20/2013	15:10	KR19874	Copco Thermocline	PacifiCorp	12.0	P	18.5	8.19	229	6.55	3.10	1.11	80.2	6.03	0.281		-0.019	0.19	0.045		0.8	0.16	0.21		1.4	0	
KR13103	6/20/2013	14:50	KR19874	Copco 1.0 m from bottom	PacifiCorp	29.0	P	12.77	7.03	196	2.15			78.3	5.19			0.04	0.52			0.81	0.12	0.16		4.4	0.8	
KR13123	7/23/2013	19:05	KR19874	Copco 8 m INT sample	PacifiCorp	0.0 - 8.0	I	-	-	-	-	39.79	6.19			2.05				0.417								28
KR13124	7/23/2013	19:10	KR19874	Copco 0.5 m grab	PacifiCorp	0.5	P	25.03	9.78	166	14.64	16.95	5.49	69.5	5.29	1.42		-0.0034	0.001	0.283		1.26	0.14	0.24		5.4	4.6	12
KR13125	7/23/2013	19:40	KR19874	Copco Thermocline	PacifiCorp	13.0	P	22.3	9.47	164	9.22	7.31	2.49	70.1	4.7	0.745		-0.0026	0.34	0.133		1.09	0.21	0.23		3	4	
KR13126	7/23/2013	19:25	KR19874	Copco 1.0 m from bottom	PacifiCorp	30.0	P	10.49	7.49	216	-0.02			80.8	4.4			0.23	0.31			1.12	0.23	0.24		4	4.2	
KR13146	8/21/2013	12:45	KR19874	Copco 8 m INT sample	PacifiCorp	0.0 - 8.0	I	-	-	-	-	1.33	1.74			0.863				0.106								56
KR13147	8/21/2013	12:40	KR19874	Copco 0.5 m grab	PacifiCorp	0.5	P	23.26	9.87	161	19.22	1281.44	189.83	66.5	6.56	33.2	1.3	0.076	0.0078	4.96		14.1	0.057	1.58		140	250	1200
KR13148	8/21/2013	13:10	KR19874	Copco Thermocline	PacifiCorp	17.0	P	20.57	9.12	158	7	0.47	0.66	68.4	4.37	0.347		0.25	0.48	0.0411		1.5	0.24	0.27		1.8	4.2	
KR13149	8/21/2013	12:50	KR19874	Copco 1.0 m from bottom	PacifiCorp	31.0	P	10.81	7.47	225	-0.04			86.3	4.49			0.49	0.0086			1.18	0.38	0.46		5.5	6.6	
KR13169	9/24/2013	12:15	KR19874	Copco 8 m INT sample	PacifiCorp	0.0 - 8.0	I	-	-	-	-	0.45	0.39			0.275				0.0336								0.15
KR13170	9/24/2013	12:20	KR19874	Copco 0.5 m grab	PacifiCorp	0.5	P	17.6	8.06	162	7.22	0.39	0.28	65.6	4.88	0.306		0.097	0.24	0.0391		1.09	0.11	0.15		2.2	2	ND

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Carbonaceous Biological Oxygen	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
KR13171	9/24/2013	13:00	KR19874	Copco Thermocline	PacifiCorp	20.0	P	16.7	8.07	164	6.22	0.45	0.67	71	4.58	0.339		0.36	0.18	0.0403		1.13	0.19	0.21		3.4	2.2	
KR13172	9/24/2013	12:40	KR19874	Copco 1.0 m from bottom	PacifiCorp	29.0	P	12.06	7.36	225	-0.03			93.3	4.77			1.14	0.018			1.8	0.66	0.68		3.4	2.4	
KR13191	10/29/2013	17:00	KR19874	Copco 8 m INT sample	PacifiCorp	0.0 - 8.0	I	-	-	-	-	0.78	0.82			0.284				0.0376								0.15
KR13192	10/29/2013	16:50	KR19874	Copco 0.5 m grab	PacifiCorp	0.5	P	11.98	8.23	159	8.47	0.75	0.83		4.05	0.166		0.13	0.23	0.0255		0.69	0.078	0.1		1.4	1.2	0.18
KR13193	10/29/2013	17:25	KR19874	Copco Thermocline	PacifiCorp	22.0	P	10.75	8.17	164	8.21	1.04	1.54	69.7	3.91	0.243		0.28	0.23	0.0336		0.83	0.092	0.13		1.8	1.8	
KR13194	10/29/2013	17:15	KR19874	Copco 1.0 m from bottom	PacifiCorp	30.0	P	10.39	7.83	167	4.62			71.1	3.72			0.43	0.2			0.91	0.12	0.14		1	2.6	
KR13211	11/19/2013	13:45	KR19874	Copco 8 m INT sample	PacifiCorp	0.0 - 8.0	I	-	-	-	-	0.58	0.75			0.66				0.0727								
KR13212	11/19/2013	13:50	KR19874	Copco 0.5 m grab	PacifiCorp	0.5	P	9.05	8.08	159	8.71	0.66	1.02	64.5	3.63	0.362		0.12	0.3	0.0459		0.81	0.064	0.099		1	0.6	
KR13213	11/19/2013	14:10	KR19874	Copco Thermocline	PacifiCorp	15.0	P	8.45	7.97	159	8.65	0.66	0.96	62.7	3.33	0.467		0.11	0.32	0.0537		0.83	0.062	0.099		2	1	
KR13214	11/19/2013	14:30	KR19874	Copco 1.0 m from bottom	PacifiCorp	29.0	P	8.35	7.92	158	8.67			62.1	3.22			0.11	0.34			0.88	0.06	0.099		2.8	2	
KR13011	2/20/2013	12:05	KR19874	Copco 8 m INT sample	PacifiCorp	0.0 - 8.0	I	-	-	-	-	2.30	2.04			0.509				0.0735								
KR13033	3/19/2013	13:05	KR19874	Copco 8 m INT sample	PacifiCorp	0.0 - 8.0	I	-	-	-	-	3.98	4.51			0.945				0.121								
KR13231	Not Sampled	-	KR19874	Copco 8 m INT sample	PacifiCorp	0.0 - 8.0	I																					
KR13232	Not Sampled	-	KR19874	Copco 0.5 m grab	PacifiCorp		P																					
KR13233	Not Sampled	-	KR19874	Copco Thermocline	PacifiCorp		P																					
KR13234	Not Sampled	-	KR19874	Copco 1.0 m from bottom	PacifiCorp		P																					
KR13015	2/20/2013	10:20	KR19645	Below Copco 2	PacifiCorp	0.5	P	2.68	7.86	185	10.94	1.67	1.82	69.7	3.33	0.435		0.063	0.58	0.0618		1.09	0.068	0.069		6.6	-0.4	
KR13037	3/19/2013	14:25	KR19645	Below Copco 2	PacifiCorp	0.5	P	8.38	5.37	254	9.84	4.09	4.43	85.3	4.7	0.794		0.016	0.61	0.0974			0.083	0.014		13	2	
KR13059	Not Sampled	-	KR19645	Below Copco 2	PacifiCorp	0.5	P																					
KR13081	5/20/2013	11:45	KR19645	Below Copco 2	PacifiCorp	0.5	P	15.64	7.82	179	7.79	2.39	1.93	69.7	4.31	0.415		-0.025	0.16	0.056		0.65	0.12	0.19		3.4	0.2	ND
KR13104	6/20/2013	13:30	KR19645	Below Copco 2	PacifiCorp	0.5	P	18.69	8.7	226	7.93	2.84	1.55	83.2	6.07	0.337		-0.031	0.085	0.0515		0.56	0.14	0.17		2	1.6	0.4
KR13127	7/24/2013	10:15	KR19645	Below Copco 2	PacifiCorp	0.5	P	22.93	9.47	169	10.38	4.37	3.27	70.9	4.81	0.275		-0.015	0.013	0.0411		1.04	0.15	0.25		7.2	7.2	18
KR13150	8/21/2013	14:10	KR19645	Below Copco 2	PacifiCorp	0.5	P	20.84	9.24	159	8.58	1.24	1.75	66	5.19	0.623		0.11	0.24	0.081		1.7	0.15	0.29		10.3	15.7	50
KR13173	9/24/2013	14:10	KR19645	Below Copco 2	PacifiCorp	0.5	P	17.15	8.27	164	6.62	0.26	0.33	65.7	4.85	0.263		0.15	0.25	0.0347		1.15	0.12	0.15		2.2	2	0.17
KR13195	10/29/2013	16:05	KR19645	Below Copco 2	PacifiCorp	0.5	P	10.87	7.9	164	8.35	0.58	0.74	69.8	3.98	0.254		0.15	0.24	0.0363		0.73	0.081	0.096		22	1.8	0.16
KR13215	11/19/2013	12:55	KR19645	Below Copco 2	PacifiCorp	0.5	P	8.4	8	158	8.95	0.76	1.14	63	3.13	0.363		0.12	0.32	0.0447		0.81	0.063	0.11		1	1	
KR13235	12/19/2013	12:20	KR19645	Below Copco 2	PacifiCorp	0.5	P	3.28	7.8	160	11	1.58	1.84	62.1	2.98	0.475		0.067	0.4	0.0559		1.24	0.057	0.061		2.6	1.4	

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Carbonaceous Biological Oxygen	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
KR13017	2/20/2013	15:05	KR19019	Iron Gate 0.5 m grab	PacifiCorp	0.5	P	-	-	-	-	2.77	2.30	67.7	3.37	0.41		0.029	0.52	0.0647		1.2	0.062	0.073		6.2	0.2	
KR13018	2/20/2013	15:35	KR19019	Iron Gate Thermocline	PacifiCorp	22.0	P	-	-	-	-	1.21	1.57	69.2	3.67	0.345		0.00039	0.6	0.053		1.19	0.068	0.048		4	0.8	
KR13019	2/20/2013	15:25	KR19019	Iron Gate 1.0 m from bottom	PacifiCorp	43.0	P	-	-	-	-	1.09	1.68	70.7	3.7	0.368		0.06	0.62	0.0515		1.23	0.087	0.11		5.6	1	
KR13039	3/19/2013	11:20	KR19019	Iron Gate 0.5 m grab	PacifiCorp	0.5	P	10	6.65	222	11.45	4.01	3.83	78.4	3.97	0.513		0.006	0.48	0.0757			0.057	0.046		5	1.4	
KR13040	3/19/2013	11:50	KR19019	Iron Gate Thermocline	PacifiCorp	5.0	P	5.58	5.4	200	9.7	3.86	3.80	79.3	5.2	0.434		0.0027	0.48	0.0677			0.059	0.029		5.4	1.6	
KR13041	3/19/2013	11:35	KR19019	Iron Gate 1.0 m from bottom	PacifiCorp	44.0	P	4.88	6.43	203	7.42			72.5	3.47			-0.045	0.65				0.07	0.064		3.8	0.6	
KR13060	4/17/2013	13:10	KR19019	Iron Gate 8 m INT	PacifiCorp	0.0 - 8.0	I	-	-	-	-	2.07	1.44			0.55				0.0779								
KR13061	4/17/2013	13:05	KR19019	Iron Gate 0.5 m grab	PacifiCorp	0.5	P	12.67	8.29	195	9.29	1.91	1.03	70.4	4.81	0.471		-0.021	0.44	0.0668		0.77	0.059	0.034		2	0.4	
KR13062	4/17/2013	13:25	KR19019	Iron Gate Thermocline	PacifiCorp	12.0	P	10.78	7.88	194	9.09	1.91	1.49	70.5	4.41	0.441		0.017	0.45	0.0681		0.75	0.058	0.036		2.6	0.2	
KR13063	4/17/2013	13:40	KR19019	Iron Gate 1.0 m from bottom	PacifiCorp	43.0	P	6.96	7.43	223	8.18			72.5	3.46			-0.0041	0.67			0.91	0.081	0.069		3.6	0.8	
KR13082	5/20/2013	11:40	KR19019	Iron Gate 8 m INT	PacifiCorp	0.0 - 8.0	I	-	-	-	-	7.22	4.32			0.482				0.0761								ND
KR13083	5/20/2013	12:15	KR19019	Iron Gate 0.5 m grab	PacifiCorp	0.5	P	17.65	8.87	172	10.91	7.41	4.95	63.9	3.72	0.465		-0.015	0.074	0.0762		0.65	0.09	0.17		5.2	1	ND
KR13084	5/20/2013	12:00	KR19019	Iron Gate Thermocline	PacifiCorp	10.0	P	16.04	8.4	173	8.6	8.19	2.95	65.1	3.66	0.423		-0.024	0.14	0.0652		0.82	0.099	0.16		3.8	1	
KR13085	5/29/2013	12:00	KR19019	Iron Gate 1.0 m from bottom	PacifiCorp	30.0	P	5.68	6.84	212	3.66			79	4.17			0.081	0.64			1.47	0.13	0.19		3.4	0.4	
KR13105	6/20/2013	11:00	KR19019	Iron Gate 8 m INT	PacifiCorp	0.0 - 8.0	I	-	-	-	-	2.52	1.68			0.378				0.0537								0.8
KR13106	6/20/2013	11:05	KR19019	Iron Gate 0.5 m grab	PacifiCorp	0.5	P	20.45	9.06	204	9.28	1.67	1.14	80.4	5.42	0.242		-0.019	0.0032	0.0406		0.53	0.082	0.13		1	1.6	0.77
KR13107	6/20/2013	11:45	KR19019	Iron Gate Thermocline	PacifiCorp	12.0	P	19.53	8.7	206	8.7	1.18	0.96	71.7	4.83	0.228		-0.018	0.2	0.034		0.51	0.1	0.13		1.6	0.4	
KR13108	6/20/2013	11:25	KR19019	Iron Gate 1.0 m from bottom	PacifiCorp	44.0	P	9.48	7.1	199	5.26			77.9	3.82			-0.017	0.75			0.96	0.12	0.13		1.8	0	
KR13128	7/23/2013	10:10	KR19019	Iron Gate 8 m INT	PacifiCorp	0.0 - 8.0	I	-	-	-	-	10.99	3.25			0.935				0.164								7
KR13129	7/23/2013	10:00	KR19019	Iron Gate 0.5 m grab	PacifiCorp	0.5	P	25.36	9.61	189	10.63	1.23	0.54	75.8	4.77	0.379		-0.016	-0.0009	0.0525		0.75	0.097	0.15		2.2	1.6	1.8
KR13130	7/23/2013	10:35	KR19019	Iron Gate Thermocline	PacifiCorp	14.0	P	22.31	9.28	177	8.94	4.21	1.47	76.4	4.12	0.63		0.0046	0.18	0.105		0.91	0.15	0.21		5.2	4	
KR13131	7/23/2013	10:20	KR19019	Iron Gate 1.0 m from bottom	PacifiCorp	44.0	P	8.7	6.62	228	0.52	0.57	0.67	78.9	3.63	0.369		-0.0077	0.73	0.0422		1.31	0.12	0.14		6.2	3.2	
KR13151	8/26/2013	14:45	KR19019	Iron Gate 8 m INT	PacifiCorp	0.0 - 8.0	I	-	-	-	-	0.48	0.56			0.342				0.0436								4.3
KR13152	8/26/2013	14:40	KR19019	Iron Gate 0.5 m grab	PacifiCorp	0.5	P	24.09	9.97	169	14.4	3.00	1.77	70.6	4.56	0.688		-0.016	-0.0001	0.0934		1.55	0.09	0.14		9.1	15.5	19
KR13153	8/26/2013	15:10	KR19019	Iron Gate Thermocline	PacifiCorp	15.0	P	20.83	9.01	164	4.75	0.31	0.33	76.6	4.5	0.122		0.17	0.12	0.0103		0.81	0.19	0.18		1.6	5	
KR13154	8/26/2013	14:55	KR19019	Iron Gate 1.0 m from bottom	PacifiCorp	44.0	P	6.31	7.44	217	-0.06			78.8	3.43			0.11	0.69			1.29	0.12	0.11		4.6	4.2	
KR13174	9/25/2013	15:30	KR19019	Iron Gate 8 m INT	PacifiCorp	0.0 - 8.0	I	-	-	-	-	0.21	0.18			0.296				0.0369								1.9

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Carbonaceous Biological Oxygen	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
KR13175	9/25/2013	15:40	KR19019	Iron Gate 0.5 m grab	PacifiCorp	0.5	P	18.56	8.93	164	6.86	0.38	0.44	67.7	4.48	0.296		0.13	0.2	0.038		1.2	0.13	0.17		3.4	3.4	3.2
KR13176	9/25/2013	16:30	KR19019	Iron Gate Thermocline	PacifiCorp	18.0	P	17.9	8.1	171	3.95	0.21	0.25	74.7	4.13	0.236		0.31	0.034	0.0302		0.96	0.21	0.23		1.8	1.8	
KR13177	9/25/2013	16:00	KR19019	Iron Gate 1.0 m from bottom	PacifiCorp	44.0	P	6.46	7.26	218	-0.07			78.8	3.43			0.34	0.45			1.28	0.21	0.25		3.6	1.6	
KR13196	10/29/2013	13:20	KR19019	Iron Gate 8 m INT	PacifiCorp	0.0 - 8.0	I	-	-	-	-	0.69	0.49			0.253				0.0376								0.18
KR13197	10/29/2013	13:15	KR19019	Iron Gate 0.5 m grab	PacifiCorp	0.5	P	12.7	7.39	167	7.01	0.58	0.36	71.1	4.51	0.173		0.19	0.25	0.0349		0.8	0.13	0.15		-0.2	0.8	0.15
KR13198	10/29/2013	13:35	KR19019	Iron Gate Thermocline	PacifiCorp	22.0	P	12.1	7.94	167	6.67	0.25	0.37	72.7	3.99	0.0991		0.27	0.2	0.0201		0.82	0.12	0.14		1.6	0.8	
KR13199	10/29/2013	14:00	KR19019	Iron Gate 1.0 m from bottom	PacifiCorp	43.0	P	6.65	7.51	219	-0.05			84.4	3.62			0.62	0.33			1.03	0.25	0.29		2.6	2.4	
KR13216	11/20/2013	12:10	KR19019	Iron Gate 8 m INT	PacifiCorp	0.0 - 8.0	I	-	-	-	-	0.78	0.79			0.38				0.0413								
KR13217	11/20/2013	11:15	KR19019	Iron Gate 0.5 m grab	PacifiCorp	0.5	P	9.88	6.93	169	7.54	0.27	0.29	69.8	3.77	0.191		0.21	0.28	0.0268		0.93	0.11	0.11		0	-0.4	
KR13218	11/20/2013	12:15	KR19019	Iron Gate Thermocline	PacifiCorp	23.0	P	9.63	7.5	169	7.32	0.33	0.47	69.8	3.42	0.291		0.25	0.27	0.0347		0.92	0.1	0.13		1	0.4	
KR13219	11/20/2013	12:35	KR19019	Iron Gate 1.0 m from bottom	PacifiCorp	45.0	P	9.41	7.59	169	6.41			90.2	4.04			0.88	0.28			1.6	0.25	0.29		5	1	
KR13237	12/19/2013	13:40	KR19019	Iron Gate 0.5 m grab	PacifiCorp	0.5	P	4.43	7.84	164	9.16	0.79	1.05	65.3	3.26	0.322		0.12	0.38	0.0369		0.68	0.074	0.093		0.8	0	
KR13238	12/19/2013	13:45	KR19019	Iron Gate Thermocline	PacifiCorp	22.0	P	4.42	7.61	164	8.94	0.78	0.83	66.1	3.12	0.313		0.13	0.38	0.0391		0.7	0.073	0.095		0.6	0	
KR13239	12/19/2013	13:55	KR19019	Iron Gate 1.0 m from bottom	PacifiCorp	42.0	P	4.11	7.52	164	9.05			64.9	2.97			0.12	0.37			0.7	0.074	0.077		1.4	0	
KR13016	2/20/2013	15:00	KR19019	Iron Gate 8 m INT	PacifiCorp	0.0 - 8.0	I	-	-	-	-	2.29	2.07			0.475				0.0662								
KR13038	3/19/2013	11:15	KR19019	Iron Gate 8 m INT	PacifiCorp	0.0 - 8.0	I	-	-	-	-	4.32	4.62			0.652				0.0929								
KR13236	12/19/2013	13:40	KR19019	Iron Gate 8 m INT	PacifiCorp	0.0 - 8.0	I	-	-	-	-	0.60	0.70			0.617				0.0638								
KR13009	2/20/2013	16:45	KR18973	Hatchery bridge	PacifiCorp	0.5	R	-	-	-	-	2.54	2.09	68.8	3.34	0.521	1.4	0.029	0.52	0.078		1.02	0.064	0.066	11	5.2	0.8	
KR13031	3/19/2013	15:20	KR18973	Hatchery bridge	PacifiCorp	0.5	R	-	-	-	-	3.24	2.87	76.8	9.43	1.16	0.7	-0.0033	0.52	0.0708			0.055	0.096	9.3	4.6	1.2	
KR13053	4/17/2013	14:30	KR18973	Hatchery bridge	PacifiCorp	0.5	R	11.26	8.34	197	10.17	1.76	1.23	71.1	4.8	0.864	1.5	0.0078	0.45	0.127		0.76	0.058	0.036		3.2	1.2	
KR13067	5/7/2013	14:15	KR18973	Hatchery bridge	PacifiCorp	0.5	P	-	-	-	-	6.04	2.96	75.8	4.7	0.802		-0.0018	0.32	0.11		1.15	0.056	0.047	4.5	1.8	1	
KR13075	5/20/2013	9:00	KR18973	Hatchery bridge	PacifiCorp	0.5	R	15.79	8.44	179	9.61	22.03	7.11	70.3	3.88	0.845	2.3	-0.028	0.032	0.148		0.48	0.04	0.14	4	6.2	2.6	ND
KR13090	6/6/2013	14:50	KR18973	Hatchery bridge	PacifiCorp	0.5	P	-	-	-	-	4.45	1.93		4.27	0.294		-0.019	0.072	0.0515		0.48	0.08	0.14				ND
KR13098	6/20/2013	9:00	KR18973	Hatchery bridge	PacifiCorp	0.5	R	18.96	8.62	201.9	9.45	1.44	1.04	80.5	5.01	0.343		-0.032	0.052	0.057		0.6	0.095	0.13	1.8	2.2	5.8	0.49
KR13113	7/11/2013	14:30	KR18973	Hatchery bridge	PacifiCorp	0.5	P	-	-	-	-	4.54	2.53	79.9	5.37	0.467	9.1	-0.054	0.043	0.0815		0.76	0.12	0.16	3.7	3.2	2.2	12
KR13121	7/23/2013	11:20	KR18973	Hatchery bridge	PacifiCorp	0.5	R	22.24	9.02	183.7	8.25	9.22	2.64	73.6	4.61	1.17	2.9	0.0051	0.027	0.14		0.75	0.14	0.2	2.9	3.8	4.2	5.7
KR13136	8/5/2013	14:20	KR18973	Hatchery bridge	PacifiCorp	0.5	P	-	-	-	-	0.57	0.74	78.7	4.35	0.276	1.9	0.053	0.06	0.0399		0.91	0.13	0.17	1.7	3.2	2	3.7

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Carbonaceous Biological Oxygen	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
KR13144	8/21/2013	15:05	KR18973	Hatchery bridge	PacifiCorp	0.5	R	21.39	9.26	167.7	8.62	0.86	0.90	69.4	4.25	0.233	2.6	0.12	0.17	0.0263		1.02	0.14	0.16	2.7	2.4	5.8	2.7
KR13159	9/10/2013	11:50	KR18973	Hatchery bridge	PacifiCorp	0.5	P	-	-	-	-			69.4	4.83		1.6	0.15	0.24			1.15	0.15	0.22	2.1	3.4	8.2	
KR13167	9/25/2013	17:00	KR18973	Hatchery bridge	PacifiCorp	0.5	R	18.05	8.75	167.9	8.04	0.65	0.58	67.6	4.33	0.66	1.3	0.13	0.21	0.0861		1.08	0.14	0.18	6	2.4	2.4	0.32
KR13182	10/9/2013	13:00	KR18973	Hatchery bridge	PacifiCorp	0.5	P	-	-	-	-	0.63	0.55	67.9		0.254	1.4	0.19	0.23	0.051		1.49	0.14	0.19		0.9	0.4	0.47
KR13189	10/29/2013	14:45	KR18973	Hatchery bridge	PacifiCorp	0.5	R	12.26	7.96	166.9	9.2	0.85	0.70		4.01	0.119	0.8	0.17	0.27	0.0307		0.79	0.12	0.15	2	1.2	1.2	ND
KR13209	11/19/2013	12:00	KR18973	Hatchery bridge	PacifiCorp	0.5	R	9.64	7.77	170.1	9.59	0.46	0.55	70	3.87	0.301	0.9	0.18	0.3	0.0347		0.84	0.096	0.19		0.8	1.2	
KR13229	12/9/2013	15:40	KR18973	Hatchery bridge	PacifiCorp	0.5	R	-	-	-	-	0.59	0.77	66.6	3.17	0.369	1.4	0.14	0.35	0.0403		0.82	0.08	0.11		1	0.2	
WA022013-OC	2/20/2013	13:31	KR156.0	KR at Walker Bridge	Karuk	0.5	P	4.56	8.4	232	12.24	3.7	2.6		2.98			0.01	0.416			0.762	0.06	0.087		11	2	
WA032013-OC	3/20/2013	12:10	KR156.0	KR at Walker Bridge	Karuk	0.5	P	7.49	8.28	219	11.41	5.1	2.8		3.31			0.017	0.481			0.833	0.054	0.093		13	3	
WA041713-OC	4/17/2013	11:44	KR156.0	KR at Walker Bridge	Karuk	0.5	P	10.33	8.24	212	11.32	2.7	2.2		3.71	0.69		0.01	0.403			0.76	0.05	0.077		6.5	1.5	
WA050813-OC	5/8/2013	11:37	KR156.0	KR at Walker Bridge	Karuk	0.5	P	15.27	8.29	224	10.31	3.2	2.8		4.65	0.595		0.01	0.219			0.6	0.058	0.102		5.3	2.3	
WA060513-OC	6/5/2013	12:20	KR156.0	KR at Walker Bridge	Karuk	0.5	P	20.01	8.36	193	9.55	1.1	3		4.69	0.356		0.016	0.057			0.422	0.082	0.116		2.6	0.5	
WA071013-OC	7/10/2013	11:24	KR156.0	KR at Walker Bridge	Karuk	0.5	P	22.63	7.22	232	7.19	3.5	3.5		5.99	0.816		<0.010	<0.010			0.608	0.119	0.169		3.5	1.3	
WA080713-OC	8/7/2013	12:19	KR156.0	KR at Walker Bridge	Karuk	0.5	P	23.28	8.98	198	9.05	6.9	4.6		4.88	1.15		<0.010	0.105			0.811	0.13	0.183		4.3	1.3	
WA091113-OC	9/11/2013	12:35	KR156.0	KR at Walker Bridge	Karuk	0.5	P	21.18	8.57	185	9.38	14	6.7		6.13	2.06		0.013	0.28			1.06	0.151	0.191		1.9	<0.50	
WA100913-OC	10/9/2013	12:30	KR156.0	KR at Walker Bridge	Karuk	0.5	P	13.78	8.06	206	10.36	1.6	3.6		5.41			0.015	0.316			0.749	0.145	0.158		3.6	1.4	
WA112013-OC	11/20/2013	11:59	KR156.0	KR at Walker Bridge	Karuk	0.5	P	10.01	8.11	209	10.99	1.6	5.5		3.47			0.015	0.338			0.823	0.102	0.111		3	1.5	
WA121803-OC	12/18/2013	11:59	KR156.0	KR at Walker Bridge	Karuk	0.5	P	3.41	7.98	207	11.83	1.9	3.4		2.99			0.032	0.503			0.922	0.081	0.113		3.3	1.3	
SV022013-OC	2/20/2013	11:20	KR128.5	KR below Seiad Valley	Karuk	0.5	P	4.86	8.34	218	12.12	3.7	1.5		2.17		<2.00	<0.010	0.317			0.649	0.038	0.056	3.7	7	2.5	
SV032013-OC	3/20/2013	10:46	KR128.5	KR below Seiad Valley	Karuk	0.5	P	8.99	8.27	209	11.11	6.4	5.2		2.84		<2.00	<0.010	0.31			0.552	0.03	0.073	3.8	15	2.5	
SV041713-OC	4/17/2013	10:02	KR128.5	KR below Seiad Valley	Karuk	0.5	P	9.35	8.13	190	11.25	1.9	1.3	87.7	3.37	0.556	<2.00	<0.010	0.309	0.0623	0.452	0.551	0.034	0.056	2.8	8.3	1.5	
SV050813-OC	5/8/2013	10:27	KR128.5	KR below Seiad Valley	Karuk	0.5	P	17.88	8.17	175	10.25	3.2	3.9		3.18	0.769	<2.00	<0.010	0.108	0.0848		0.333	0.025	0.056	1.6	6.9	0.9	
SV060513-OC	6/5/2013	10:17	KR128.5	KR below Seiad Valley	Karuk	0.5	P	19.51	8.07	201	9	1.1	3		3.69	0.375		0.012	0.062	0.058		0.327	0.052	0.08	1.5	3	1	
SV071013-OC	7/10/2013	10:07	KR128.5	KR below Seiad Valley	Karuk	0.5	P	23.61	8.33	231	8.49	1.1	1.1		5.08	0.59		0.02	0.012			0.449	0.101	0.14		3	1	
SV080713-OC	8/7/2013	10:26	KR128.5	KR below Seiad Valley	Karuk	0.5	P	22.55	8.51	205	8.96	7.7	5.7	93.1	4.68	1.01	<2.00	<0.010	0.011	0.153	0.612	0.507	0.12	0.163	1.1	4	1	1.1
SV091113-OC	9/11/2013	10:48	KR128.5	KR below Seiad Valley	Karuk	0.5	P	20.63	8.42	190	9.56	17	7.2		6.19	1.51	<2.00	<0.010	0.135	0.25		0.83	0.123	0.171	2	4	0.6	5.8
SV100913-OC	10/9/2013	10:09	KR128.5	KR below Seiad Valley	Karuk	0.5	P	12.81	8.02	213	10.22	2.1	3.5	106	5.18		<2.00	<0.010	0.257		0.62	0.634	0.119	0.139	1.4	3	0.5	0.25

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Carbonaceous Biological Oxygen	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
SV112013-OC	11/20/2013	10:54	KR128.5	KR below Seiad Valley	Karuk	0.5	P	9.97	8.21	214	11.23	3.7	8.6		2.8		<2.00	<0.010	0.332			0.746	0.087	0.096	2.1	4.3	1.8	
SV121813-OC	12/18/2013	11:41	KR128.5	KR below Seiad Valley	Karuk	0.5	P	2.36	8.08	215	11.27	2.9	3.2		2.77		<2.00	0.02	0.488			0.783	0.073	0.094		3.5	1.3	
HC022013-OC	2/20/2013	10:25	KR106.0	KR below Happy Camp	Karuk	0.5	P	4.78	8.26	188	12.07	4.3	1		1.8			<0.010	0.198			0.385	0.026	0.039		5.3	1.5	
HC032013-OC	3/20/2013	9:52	KR106.0	KR below Happy Camp	Karuk	0.5	P	8.31	8.15	170	11.39	6.1	3.8		2.04			<0.010	0.179			0.355	0.02	0.046		12	3	
HC041713-OC	4/17/2013	9:16	KR106.0	KR below Happy Camp	Karuk	0.5	P	8.37	8.06	171	11.62	2.1	0.7		2.53	0.444		<0.010	0.22			0.396	0.025	0.042		6.5	1.3	
HC050813-OC	5/8/2013	9:36	KR106.0	KR below Happy Camp	Karuk	0.5	P	14.67	7.95	163	9.94	3.7	3.7		2.81	0.317		<0.010	0.074			0.29	0.018	0.042		4.6	1.4	
HC060513-OC	6/5/2013	9:31	KR106.0	KR below Happy Camp	Karuk	0.5	P	19.22	7.93	189	8.95	3.7	6		3.37	1.02		0.012	0.041			0.342	0.04	0.082		13	3.2	
HC071013-OC	7/10/2013	9:17	KR106.0	KR below Happy Camp	Karuk	0.5	P	23.27	7.74	226	7.08	1.4	1.4		4.65	0.499		<0.010	<0.010			0.429	0.083	0.111		2.5	1.2	
HC080713-OC	8/7/2013	9:25	KR106.0	KR below Happy Camp	Karuk	0.5	P	22.17	8.12	205	8.28	4.8	6.4		4.33	0.922		<0.010	<0.010			0.434	0.104	0.154		4.8	1.7	0.59
HC091113-OC	9/11/2013	9:32	KR106.0	KR below Happy Camp	Karuk	0.5	P	20.51	7.99	193	8.39	13	8.7		5.35	0.955		0.018	0.0117			0.682	0.107	0.14		4.1	1.1	2.2
HC100913-OC	10/9/2013	9:09	KR106.0	KR below Happy Camp	Karuk	0.5	P	12.95	7.94	206	10.1	2.1	4.6		4.64			0.022	0.206			0.526	0.105	0.12		2.8	0.9	0.24
HC112013-OC	11/20/2013	10:13	KR106.0	KR below Happy Camp	Karuk	0.5	P	19.21	8	193	10.88	8	17		2.91			<0.010	0.244			0.568	0.064	0.085		12	<0.50	
HC121813-OC	12/18/2013	10:07	KR106.0	KR below Happy Camp	Karuk	0.5	P	2.41	8.21	211	11.67	3	3.5		2.57			0.016	0.428			0.684	0.063	0.085		2.7	1	
OR022013-OC	2/20/2013	8:47	KR059.1	KR at Orleans (USGS)	Karuk	0.5	P	5.21	8.43	145	12.68	3	<0.1	71.7	1.33			<0.010	0.113			0.299	0.014	0.021	0.96	2.8	0.63	
OR032013-OC	3/20/2013	7:40	KR059.1	KR at Orleans (USGS)	Karuk	0.5	P	8.53	8.36	141	11.83	5	3	72.4	1.46			0.011	0.109			0.189	0.013	0.033	1.7	5.2	1.2	
OR041713-OC	4/17/2013	7:55	KR059.1	KR at Orleans (USGS)	Karuk	0.5	P	8.36	8.85	452	11.18	1.5	<0.1		1.55	0.298		<0.010	0.116			0.219	0.014	0.025	1.6	4.2	1.5	
OR050813-OC	5/8/2013	7:51	KR059.1	KR at Orleans (USGS)	Karuk	0.5	P	14.24	8	128	10.39	2.1	1.2	65	1.92	0.295		<0.010	0.023			0.142	0.008	0.029	1.5	12	1.8	
OR060513-OC	6/5/2013	7:40	KR059.1	KR at Orleans (USGS)	Karuk	0.5	P	19.35	7.95	146	9.07	2.1	3.1	78.5	2.17	0.441		<0.010	0.014			0.133	0.021	0.039	1.1	4	1.3	
OR071013-OC	7/10/2013	7:51	KR059.1	KR at Orleans (USGS)	Karuk	0.5	P	23.71	8.19	200	8.18	0.3	0.3	96.3	2.96	0.351		<0.010	<0.010			0.262	0.043	0.065		1.5	0.67	
OR080713-OC	8/7/2013	7:54	KR059.1	KR at Orleans (USGS)	Karuk	0.5	P	22.19	8.28	191	8.15	5.9	5		3.16	0.825		<0.010	<0.010			0.309	0.061	0.097	0.91	4.3	2	0.77
OR091113-OC	9/11/2013	7:53	KR059.1	KR at Orleans (USGS)	Karuk	0.5	P	21.53	8.04	187	8.15	14	7	89.4	4.34	1.47		<0.010	<0.010			0.517	0.079	0.11	2.1	4.6	1	5.2
OR100913-OC	10/9/2013	7:54	KR059.1	KR at Orleans (USGS)	Karuk	0.5	P	13.19	7.99	186	10.09	4.8	3		3.45			<0.010	0.093			0.325	0.068	0.085	0.94	3.5	0.88	0.18
OR112013-OC	11/20/2013	8:47	KR059.1	KR at Orleans (USGS)	Karuk	0.5	P	11.65	10.12	168	9.38	16	31	86.2	2.76			<0.010	0.141			0.473	0.05	0.086	3.2	17	11	
OR121813-OC	12/18/2013	8:35	KR059.1	KR at Orleans (USGS)	Karuk	0.5	P	2.85	8.42	191	11.58	1.6	2.7	84.5	1.94		<2.00	0.012	0.291			0.498	0.043	0.056	2.5	1.2	0.67	
WE022013-OC	2/20/2013		KR043.5	KR near Weitchpec	Yurok	0.5	P	5.36	8.44	145	12.96	3	<0.1	DNS	1.13			<0.010	0.087			0.23	0.01	0.02	0.82	2.6	1	
WE032013-OC	3/20/2013		KR043.5	KR near Weitchpec	Yurok	0.5	P	8.46	8.11	139	11.74	6.41	3.31	DNS	1.104			<0.010	0.098			0.27	0.01	0.03	1.7	7.375	1.125	
WE041713-OC	4/17/2013		KR043.5	KR near Weitchpec	Yurok	0.5	P	8.17	7.93	131	12.02	1.9	<0.1		1.44			<0.010	0.075			0.314	0.014	0.023	1.1	3.5	0.75	

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Carbonaceous Biological Oxygen	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
WE050813-OC	5/8/2013		KR043.5	KR near Weitchpec	Yurok	0.5	P	14.58	8.17	127	10.38	2.7	0.7		2.01			<0.010	0.013			0.182	0.009	0.022	1.4	4	1.4	-
WE060513-OC	6/5/2013		KR043.5	KR near Weitchpec	Yurok	0.5	P	20.08	8.33	137	9.54	1.3	0.7		1.69			<0.010	0.016			0.162	0.019	0.035	0.7	1.9	1.1	-
WE071013-OC	7/10/2013	11:08	KR043.5	KR near Weitchpec	Yurok	0.5	P	23.13	8.33	198	8.81	1.6	0.3		2.67			<0.010	<0.010			0.242	0.037	0.057	0.56	1.4	0.5	<0.18
WE080713-OC	8/7/2013	11:31	KR043.5	KR near Weitchpec	Yurok	0.5	P	21.28	8.29	188	9.28	6.41	5.55	DNS	2.683			<0.010	<0.010			0.31	0.05	0.08	0.9	2.75	1.125	0.72
WE091113-OC	9/11/2013	11:32	KR043.5	KR near Weitchpec	Yurok	0.5	P	21.01	8.26	184	8.94	13.88	5.18	DNS	3.6062			<0.010	<0.010			0.53	0.07	0.1	2.3	3.625	1.625	6.5
WE100913-OC	10/9/2013	11:40	KR043.5	KR near Weitchpec	Yurok	0.5	P	13.28	8.22	185	10.47	2.14	0.48	DNS	3.374	0.272		<0.010	0.087			0.3	0.06	0.07	0.77	1.375	<0.50	<0.18
WE112013-OC	11/20/2013	11:27	KR043.5	KR near Weitchpec	Yurok	0.5	P	10.14	7.49	170	11.21	26.7	26.38	DNS	2.41			<0.010	0.116			0.51	0.05	0.09	3.6	17.5	5.25	-
WE121813-OC	12/18/2013	11:03	KR043.5	KR near Weitchpec	Yurok	0.5	P	3.31	8.2	181	13.56	2.49	2.87	DNS	1.786			0.013	0.258			0.36	0.04	0.05	1.9	1.7	0.67	
TC022013-OC	2/20/2013		KR038.5	KR below Trinity River	Yurok	0.5	P	5.56	8.3	149	12.58	3	<0.1	DNS	0.771			<0.010	0.054			0.18	0.01	0.016	0.71	3.8	1	
TC032013-OC	3/20/2013		KR038.5	KR below Trinity River	Yurok	0.5	P	8.64	8.09	141	11.51	4.54	2	DNS	1.013			<0.010	0.067			0.21	0.01	0.02	1.7	5.625	1.125	
TC041713-OC	4/17/2013		KR038.5	KR below Trinity River	Yurok	0.5	P	8.62	7.95	133	11.78	1.3	0.2		1.5			<0.010	0.047			0.231	0.01	0.019	1.2	3.4	0.8	
TC050813-OC	5/8/2013		KR038.5	KR below Trinity River	Yurok	0.5	P	13.41	8	118	10.46	2.1	0.5		1.56			<0.010	0.019			0.13	0.015	0.02	2.3	7	1.4	-
TC060513-OC	6/5/2013		KR038.5	KR below Trinity River	Yurok	0.5	P	19.24	8.18	128	9.21	1.3	0.3		1.49			<0.010	0.011			0.186	0.012	0.023	0.6	1.9	0.8	-
TC071013-OC	7/10/2013	10:05	KR038.5	KR below Trinity River	Yurok	0.5	P	23.05	8.2	185	8.26	1.1	1.2		2.21			<0.010	<0.010			0.192	0.023	0.028	0.48	0.5	0.5	-
TC080713-OC	8/7/2013	10:42	KR038.5	KR below Trinity River	Yurok	0.5	P	21.61	8.26	177	8.55	4.81	2.67	DNS	2.14			<0.010	<0.010			0.25	0.03	0.052	0.69	2.1	0.8	1
TC091113-OC	9/11/2013	10:31	KR038.5	KR below Trinity River	Yurok	0.5	P	20.61	8.24	162	8.74	9	3.79	DNS	2.5818			<0.010	<0.010			0.346	0.037	0.061	1.5	2.125	0.875	3.8
TC100913-OC	10/9/2013	10:43	KR038.5	KR below Trinity River	Yurok	0.5	P	13.19	8	176	10.31	2	0.64	DNS	2.331	0.26		<0.010	0.068			0.216	0.044	0.048	0.63	1.125	0.5	-
TC112013-OC	11/20/2013	10:33	KR038.5	KR below Trinity River	Yurok	0.5	P	10.21	8	176	11.07	14.95	21.68	DNS	1.765			<0.010	0.096			0.427	0.043	0.066	2.2	10.25	3.75	-
TC121813-OC	12/18/2013	10:13	KR038.5	KR below Trinity River	Yurok	0.5	P	3.38	8.15	182	13.24	1.78	1.83	DNS	1.37			<0.010	0.186			0.284	0.027	0.04	1.6	1.1	1	
TG022013-OC	2/20/2013		KR006.0	KR near Klamath	Yurok	0.5	P	6.21	8.28	146	11.91	2.6	<0.1	DNS	0.72			<0.010	0.081			0.167	0.009	0.015	1	2.6	0.5	
TG032013-OC	3/20/2013		KR006.0	KR near Klamath	Yurok	0.5	P	9.06	7.93	135	11.03	5	1.55	DNS	1.097			<0.010	0.065			0.183	0.007	0.019	1.4	3.75	0.625	
TG041713-OC	4/17/2013		KR006.0	KR near Klamath	Yurok	0.5	P	9.38	7.88	130	11.01	1	<0.1		1.18			<0.010	0.064			0.238	0.01	0.019	1.1	3.6	0.5	
TG050813-OC	5/8/2013		KR006.0	KR near Klamath	Yurok	0.5	P	13.75	7.95	122	9.81	2	1.4		1.29			<0.010	0.027			0.144	0.006	0.021	2.1	6.8	1.4	-
TG060513-OC	6/5/2013		KR006.0	KR near Klamath	Yurok	0.5	P	17.89	8	131	8.72	1.1	1		1.24			<0.010	0.036			0.177	0.007	0.019	0.71	1.8	0.63	-
TG071013-OC	7/10/2013	7:23	KR006.0	KR near Klamath	Yurok	0.5	P	21.24	7.62	184	6.67	1.6	2.5		1.56			0.011	0.056			0.196	0.012	0.031	0.69	2.4	1.3	<0.18

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Carbonaceous Biological Oxygen	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
TG080713-OC	8/7/2013	7:26	KR006.0	KR near Klamath	Yurok	0.5	P	19.32	7.55	169	6.91	3.2	3.15	DNS	1.344			0.013	0.061			0.251	0.014	0.035	0.7	2.125	1.125	0.42
TG091113-OC	9/11/2013	7:17	KR006.0	KR near Klamath	Yurok	0.5	P	20.8	8.02	164	7.53	6.41	4.81	DNS	2.1866			<0.010	0.013			0.264	0.027	0.054	1.9	3.25	1.5	2
TG100913-OC	10/9/2013	7:46	KR006.0	KR near Klamath	Yurok	0.5	P	13.08	7.83	173	9.06	2.14	1.23	DNS	1.79	0.4		<0.010	0.178	0.046		0.301	0.032	0.04	1.6	4.1	1	-
TG112013-OC	11/20/2013	7:39	KR006.0	KR near Klamath	Yurok	0.5	P	10.8	7.71	166	10.5	4.81	4.54	DNS	1.79			<0.010	0.058			0.258	0.032	0.039	1.4	3.5	0.83	-
TG121813-OC	12/18/2013	8:20	KR006.0	KR near Klamath	Yurok	0.5	P	4.4	8.05	178	12.29	1.87	2.43	DNS	1			0.01	0.138			0.22	0.016	0.03	1.7	1.9	0.6	
LES022013-OC	2/20/2013		KR000.5	KR Lower Estuary	Yurok	0.5	P	6.1	8.27	143	12.08	1.5	<0.1	DNS	0.67			<0.010	0.061			0.166	0.009	0.014	0.66	2.5	1.1	
LES032013-OC	3/20/2013		KR000.5	KR Lower Estuary	Yurok	0.5	P	8.98	8.16	138	11.05	2.4	1.71	DNS	0.83			0.011	0.055			0.189	0.006	0.017	1.3	2.1	0.8	
LES041713-OC	4/17/2013		KR000.5	KR Lower Estuary	Yurok	0.5	P	9.21	8	125	11.09	1	<0.1		1.18			<0.010	0.071			0.208	0.009	0.019	1.3	3.8	0.63	
LES050813-OC	5/8/2013		KR000.5	KR Lower Estuary	Yurok	0.5	P	13.81	8	130	9.67	2.1	2		1.08			0.016	0.131			0.177	0.007	0.029	3.9	13	2.2	-
LES060513-OC	6/5/2013		KR000.5	KR Lower Estuary	Yurok	0.5	P	18.62	8	489	8.6	1.1	1.2		1.13			<0.010	0.021			0.122	0.009	0.024	0.8	2.6	1	-
LES071013-OC	7/10/2013	10:11	KR000.5	KR Lower Estuary	Yurok	0.5	P	21.91	8.29	1463	8.8	1	1.34		1.631			<0.010	0.012			0.183	0.015	0.034	0.55	1.125	<0.50	
LES080713-OC	8/7/2013	9:46	KR000.5	KR Lower Estuary	Yurok	0.5	P	20.73	9	332	9.1	4	2.08	DNS	2.671			0.015	0.01			0.24	0.02	0.044	0.75	0.625	<0.50	0.56
LES091113-OC	9/11/2013	9:18	KR000.5	KR Lower Estuary	Yurok	0.5	P	21.77	8.19	177	8.44	1.6	2.14	DNS	2.1528			<0.010	0.013			0.243	0.029	0.045	0.94	1.375	1.125	0.7
LES100913-OC	10/9/2013	7:00	KR000.5	KR Lower Estuary	Yurok	0.5	P	13.13	7.89	1838	9.51	1.07	0.43	DNS	1.886	0.245		0.023	0.103			0.278	0.035	0.043	1.2	2	0.875	-
LES112013-OC	11/20/2013	6:55	KR000.5	KR Lower Estuary	Yurok	0.5	P	11.03	7.98	213	10.45	0.53	3.58	DNS	1.758			0.017	0.104			0.29	0.035	0.042	2.3	5.5	1.5	-
LES121813-OC	12/18/2013	7:37	KR000.5	KR Lower Estuary	Yurok	0.5	P	4.74	8.06	250	12.92	1.07	0.8	DNS	1.268			0.012	0.15			0.241	0.017	0.03	1.8	1.9	<0.50	

Non-detect values were replaced with "-".
PacifiCorp and USBR values below the reporting limit (RL) but above the method detection limit (MDL) are j-flagged.
Karuk Tribe and Yurok Tribe values below the MDL are presented as "<" and the MDL value.

Table B-2. 2013 Klamath River Data Summary (major tributaries)

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	ppm	mg/l	mg/l	mg/l	ppm	mg/l	mg/l	mg/l	mg/l	mg/l	NTU	mg/l	mg/l	ug/l
SA022013-OC	2/20/13	9:15	SA	Salmon River	Karuk	0.5	OC	4.42	8.49	105	12.42	<0.1	<0.1		0.654			<0.010	0.028			<0.050	0.004	0.006	0.16	<0.50	<0.50	
SA032013-OC	3/20/13	8:47	SA	Salmon River	Karuk	0.5	OC	7.91	8.19	87	11.7	2.10	0.30		0.87			<0.010	0.014			0.074	0.002	0.013	0.84	6	2.0	
SA041713-OC	4/17/13	8:30	SA	Salmon River	Karuk	0.5	OC	6.44	8.2	85	12.43	0.20	<0.1		0.92	0.2		<0.010	0.023			<0.050	0.002	0.006	0.3	2.5	0.8	
SA050813-OC	5/8/13	8:20	SA	Salmon River	Karuk	0.5	OC	12.07	7.85	65	10.62	<0.1	<0.1		1.44	0.1		0.013	0.013			0.065	0.002	0.010	0.84	2.4	1.0	
SA060513-OC	6/5/13	8:12	SA	Salmon River	Karuk	0.5	OC	17.43	7.74	89	9.25	1	1.2		1.05	1.05		<0.010	0.012			0.067	0.002	0.027	1.1	13	3.5	
SA071013-OC	7/10/13	8:20	SA	Salmon River	Karuk	0.5	OC	20.96	7	122	8.57	1	1		0.556	0.224		<0.010	<0.010			0.066	0.002	0.014		3.5	0.83	
SA080713-OC	8/7/13	8:24	SA	Salmon River	Karuk	0.5	OC	18.72	8	140	8.94	1	1		0.63	0.448		<0.010	<0.010			0.065	0.002	0.019	0.39	4.6	0.6	
SA091113-OC	9/11/13	8:34	SA	Salmon River	Karuk	0.5	OC	18.52	8	150	8.7	1	1.5		0.749	0.402		<0.010	<0.010			0.053	0.002	0.019	0.48	2	0.88	
SA100913-OC	10/9/13	8:18	SA	Salmon River	Karuk	0.5	OC	11.06	7.98	120	10.46	2	<0.1		1.13			0.018	0.018			<0.050	0.005	0.011	0.62	3.9	0.75	
SA112013-OC	11/20/13	9:19	SA	Salmon River	Karuk	0.5	OC	9.18	8.35	114	10.97	4.80	1.90		2.26			<0.010	<0.010			0.111	0.011	0.022	1.5	5	4	
SA121813-OC	12/18/13	9:10	SA	Salmon River	Karuk	0.5	OC	1.63	9	131	11.87	10.00	1.50		0.561			<0.010	<0.010			0.069	0.004	0.047		12	6	
SC022013-OC	2/20/13	11:52	SC	Scott River	Karuk	0.5	OC	5.1	8	192	11.86	1.90	<0.1		1.03			<0.010	0.247			0.371	0.003	0.008	0.29	2.5	1.1	
SC032013-OC	3/20/13	11:29	SC	Scott River	Karuk	0.5	OC	8.9	8	163	11.18	5.90	3.10		1.49			<0.010	0.214			0.297	0.001	0.02	1.1	11	2.2	
SC041713-OC	4/17/13	11:04	SC	Scott River	Karuk	0.5	OC	7.64	8.25	156	11.75	1.30	<0.1		1.34	0		<0.010	0.262			0.305	0.003	0.015	1.10	8	1.3	
SC050813-OC	5/8/13	13:44	SC	Scott River	Karuk	0.5	OC	13.44	8.15	122	10.19	3.70	1.50		2.11	0.6		<0.010	0.056			0.185	0.003	0.031	2.0	7.9	2.1	
SC060513-OC	6/5/13	10:46	SC	Scott River	Karuk	0.5	OC	17.83	8.24	199	9.34	1.30	1.30		1.30	0		0.013	0.167			0.240	<0.001	0.009	0.53	2	<0.50	
SC071013-OC	7/10/13	10:50	SC	Scott River	Karuk	0.5	OC	22.75	8.39	241	8.75	0.40	0.40		1.28	0.41		0.012	0.087			0.194	0.002	0.012		2.70	0.83	
SC080713-OC	8/7/13	11:36	SC	Scott River	Karuk	0.5	OC	22.62	8.50	249	8.87	1.10	0.80		1.040	0.27		<0.010	<0.010			0.083	<0.001	0.006	0.35	0.63	<0.50	
SC091113-OC	9/11/13	11:50	SC	Scott River	Karuk	0.5	OC	20.59	8.37	265	9.23	1	1		1.01	0.279		<0.010	<0.010			0.08	<0.001	0.003	0.45	<0.50	<0.50	
SC100913-OC	10/9/13	11:02	SC	Scott River	Karuk	0.5	OC	11.18	8.37	234	11.03	2	0.1		1.24			<0.010	0.02			0.06	0.003	0.003	0.25	0.87	<0.50	
SC112013-OC	11/20/13	11:26	SC	Scott River	Karuk	0.5	OC	8.75	8.13	247	11.03	9	15		1.4			<0.013	0.251			0.413	<0.001	0.013	2	11	3.3	
SC121813-OC	12/18/13	11:41	SC	Scott River	Karuk	0.5	OC	0.11	8.01	266	12.50	2	0.6		0.355			<0.010	0.583			0.593	0.002	0.004		0.75	0.75	
SH022013-OC	2/20/13	13:29	SH	Shasta River	Karuk	0.5	OC	6.40	8.67	461	11.30	5	1.5		1.74			<0.010	0.25			0.478	0.151	0.18	3.5	18	4.5	
SH032013-OC	3/20/13	13:03	SH	Shasta River	Karuk	0.5	OC	11.81	9	452	11.18	3	1.5		1.73			<0.010	0.137			0.223	0.144	0.179	1.4	6.5	1.8	
SH041713-OC	4/17/13	12:40	SH	Shasta River	Karuk	0.5	OC	11.11	9	529	12.51	1	0.5		3.82	0.298		<0.010	<0.010			0.27	0.115	0.139	0.76	2.2	0.83	
SH050813-OC	5/8/13	12:37	SH	Shasta River	Karuk	0.5	OC	18.52	8.60	553	9.67	1.60	0.60		5.73	0.392		<0.010	<0.010			0.427	0.155	0.19	1.1	3.1	1.6	

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
SH060513-OC	6/5/13	13:11	SH	Shasta River	Karuk	0.5	OC	22.93	8.57	603	9.77	2.10	0.10		7.47	0.271		<0.010	0.012			0.511	0.176	0.224	0.52	1.8	0.63	
SH071013-OC	7/10/13	12:06	SH	Shasta River	Karuk	0.5	OC	22.98	8.52	558	9.22	<0.1	<0.1		5.29	0.422		0.011	<0.010			0.483	0.214	0.27		1.8	1.2	
SH080713-OC	8/7/13	13:22	SH	Shasta River	Karuk	0.5	OC	23.73	8.94	559	10.78	2.70	1.40		4.07	0.713		<0.010	0.019			0.419	0.147	0.177	10	5.4	1.8	
SH091113-OC	9/11/13	13:22	SH	Shasta River	Karuk	0.5	OC	20.6	8.71	590	9.89	2.10	1.20		6.09	1.04		<0.010	0.01			0.453	0.165	0.178	0.8	1.6	0.87	
SH100913-OC	10/9/13	13:35	SH	Shasta River	Karuk	0.5	OC	11.31	8.44	446	10.74	3.70	3.00		3.02			<0.010	0.028			0.246	0.151	0.189	3.2	9.3	1.5	
SH112013-OC	11/20/13	8:47	SH	Shasta River	Karuk	0.5	OC	9.77	8.40	437	11	5.30	16.00		1.85			<0.010	0.121			0.39	0.162	0.185	2	13	4.5	
SH121813-OC	12/18/13	12:43	SH	Shasta River	Karuk	0.5	OC	3.53	8.13	434	11.7	5.60	2.80		1.25			0.017	0.409			0.532	0..178	0.212		4	1.4	
TR022013-OC	2/20/13		TR	Trinity River	Yurok	0.5	OC	5.79	8.34	158	12.52	1.50	<0.1	DNS	0.419			<0.010	0.028			0.094	0.004	0.008	0.56	2.3	0.63	
TR032013-OC	3/20/13		TR	Trinity River	Yurok	0.5	OC	9.03	8.08	146	11.37	1.60	0.27	DNS	0.5178			<0.010	<0.010			0.0961	0.0044	0.0122	1.2	3.5	0.875	
TR041713-OC	4/17/13		TR	Trinity River	Yurok	0.5	OC	9.93	8.06	141	11.23	0.30	<0.1		0.659			<0.010	<0.010			0.113	0.003	0.007	0.52	1.9	0.63	
TR050813-OC	5/8/13		TR	Trinity River	Yurok	0.5	OC	12.35	8.06	109	10.79	<0.1	1.10		0.876			<0.010	0.022			0.086	0.004	0.019	3.9	9.6	1.5	
TR060513-OC	6/5/13		TR	Trinity River	Yurok	0.5	OC	19.27	8.17	117	9.52	0.50	0.40		0.834			<0.010	0.016			0.104	0.003	0.008	0.49	1.1	0.5	
TR071013-OC	7/10/13	11:34	TR	Trinity River	Yurok	0.5	OC	22.98	8.28	161	8.84	0.90	<0.1		0.509			<0.010	<0.010			0.053	<0.001	0.008	0.3	1.3	0.87	
TR-080713-OC	8/7/13	11:59	TR	Trinity River	Yurok	0.5	OC	21.83	8.19	153	8.95	1.07	<0.1	DNS	1.544			<0.010	<0.010			0.0553	<0.001	0.0065	0.23	<050	<0.50	
TR091113-OC	9/11/13	11:57	TR	Trinity River	Yurok	0.5	OC	19.9	8.16	130	9.29	1.068	0.801	DNS	1.17			<0.010	<0.010			0.1065	0.0012	0.0058	0.33	<0.50	<0.50	
TR100913-OC	10/9/13	11:59	TR	Trinity River	Yurok	0.5	OC	13.03	8.17	153	10.67	<0.1	<0.1	DNS	1.286	0.116		<0.010	<0.010			0.0651	0.0013	0.0046	0.3	<0.50	<0.50	
TR112013-OC	11/20/13	11:52	TR	Trinity River	Yurok	0.5	OC	10.47	7.84	172	11.25	2.67	0.69	DNS	1.549			<0.010	<0.010			<0.050	<0.001	0.0063	0.34	1.125	0.625	
TR121813-OC	12/18/13	11:20	TR	Trinity River	Yurok	0.5	OC	3.68	8.20	177	13.26	0.89	0.61	DNS	0.6188			<0.010	<0.010			<0.050	<0.001	0.0062	0.3	<0.50	<0.50	

Non-detect values were replaced with "-".
PacifiCorp and USBR values below the reporting limit (RL) but above the method detection limit (MDL) are j-flagged.
Karuk Tribe and Yurok Tribe values below the MDL are presented as "<" and the MDL value.

Table B-3. Mass Spectroscopy data for the samples collected at the Klamath River at Weitchpec. Results are presented in micrograms per liter (µg/l). Note: ND = non-detect.

Sample ID	Lab ID	Date	Time	Site Name	MC-RR	MC-Desmethyl-RR*	MC-LR	MC-Desmethyl-LR	MC-YR	MC-LA	MC-LW	MC-LF	MC-LY	Anatoxin A	Domoic acid	Okadaic acid	Nodularin
WE072413-OC	DFG	7/24/2013		WE	ND	ND	ND	ND	ND	1.21	ND	ND	ND	ND	ND	ND	ND
WE080713-OC	DFG	8/7/2013		WE	ND	ND	ND	ND	ND	1.97	ND	ND	ND	ND	ND	ND	ND
WE091113-OC	DFG	9/11/2013		WE	ND	ND	1.03	ND	ND	3.2	ND	ND	ND	ND	ND	ND	ND
WE102313-OC	DFG	10/23/2013		WE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Appendix C. Phytoplankton Charts

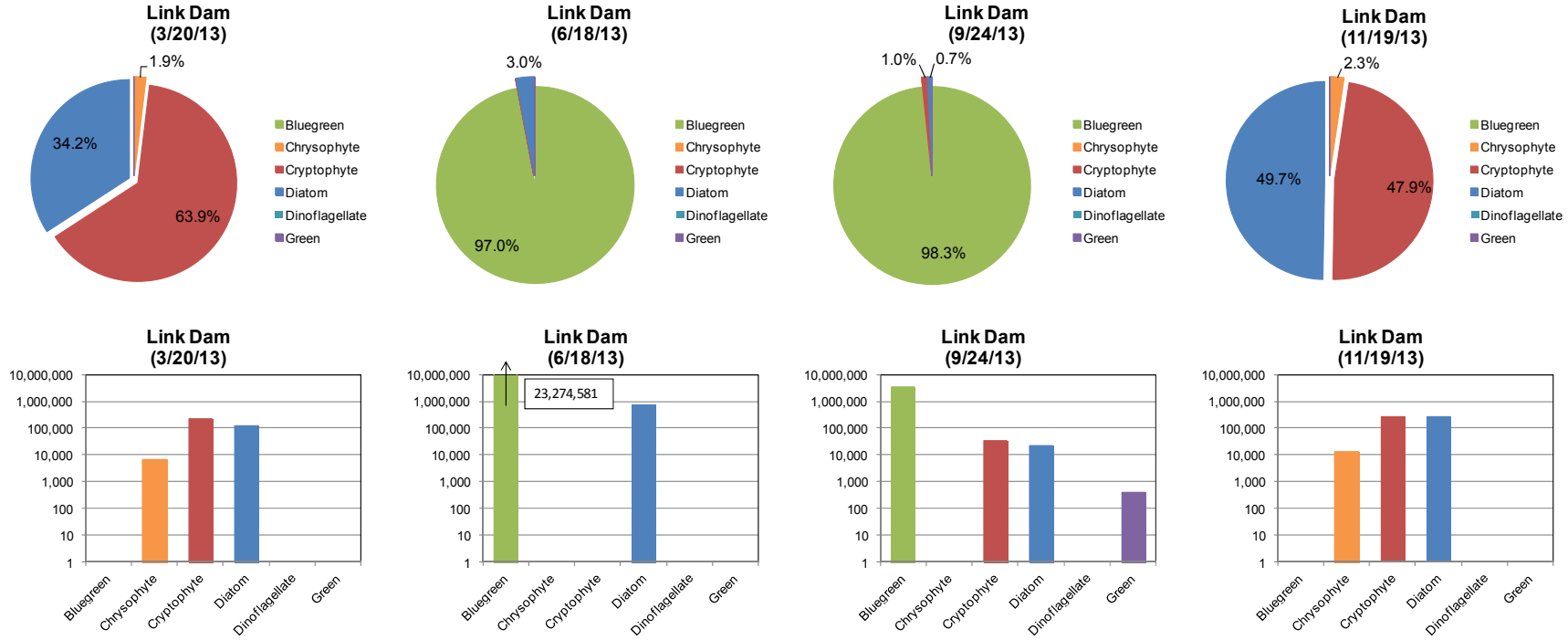

Chart C-1. Phytoplankton species (top) and biovolume (bottom) at Link River for 3/20/13, 6/18/13, 9/24/13, and 11/19/13. Note: y-axis in logarithmic scale.

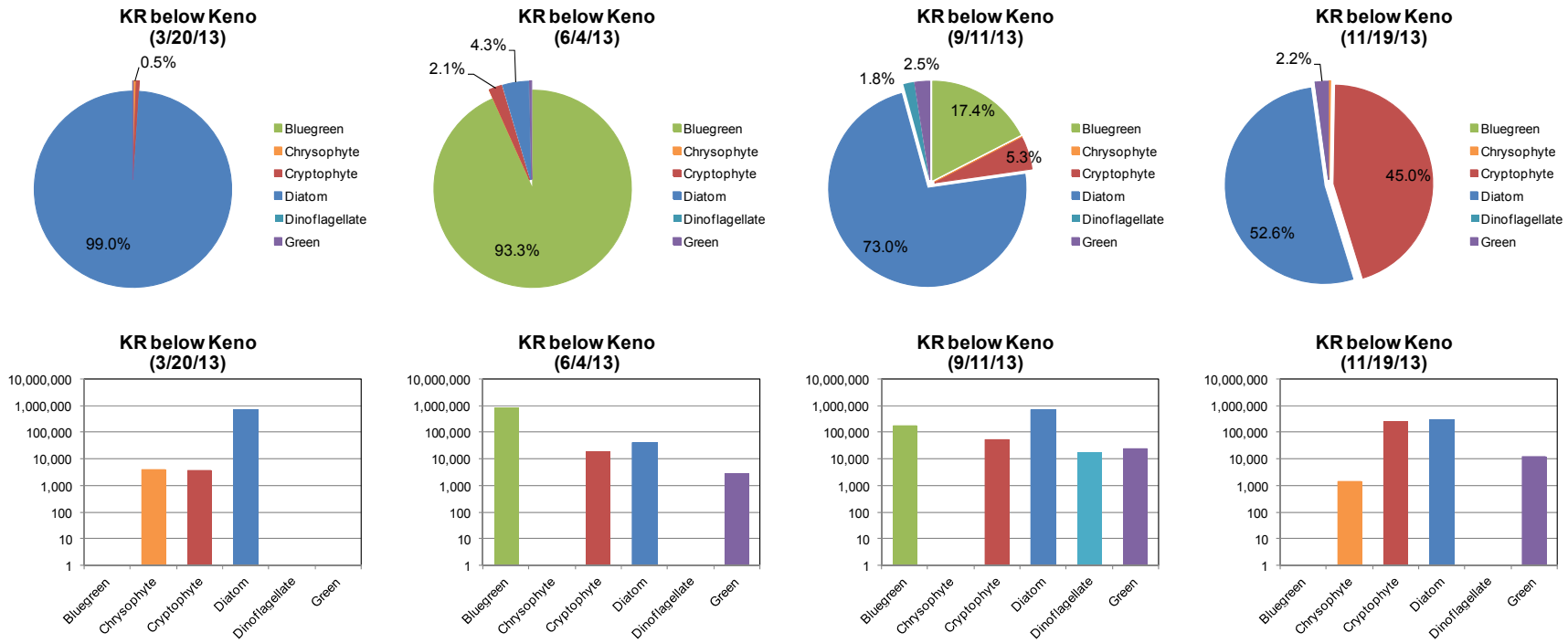

Chart C-2. Phytoplankton species (top) and biovolume (bottom) at Klamath River below Keno Dam for 3/20/13, 6/4/13, 9/11/13, and 11/19/13. Note: y-axis in logarithmic scale.

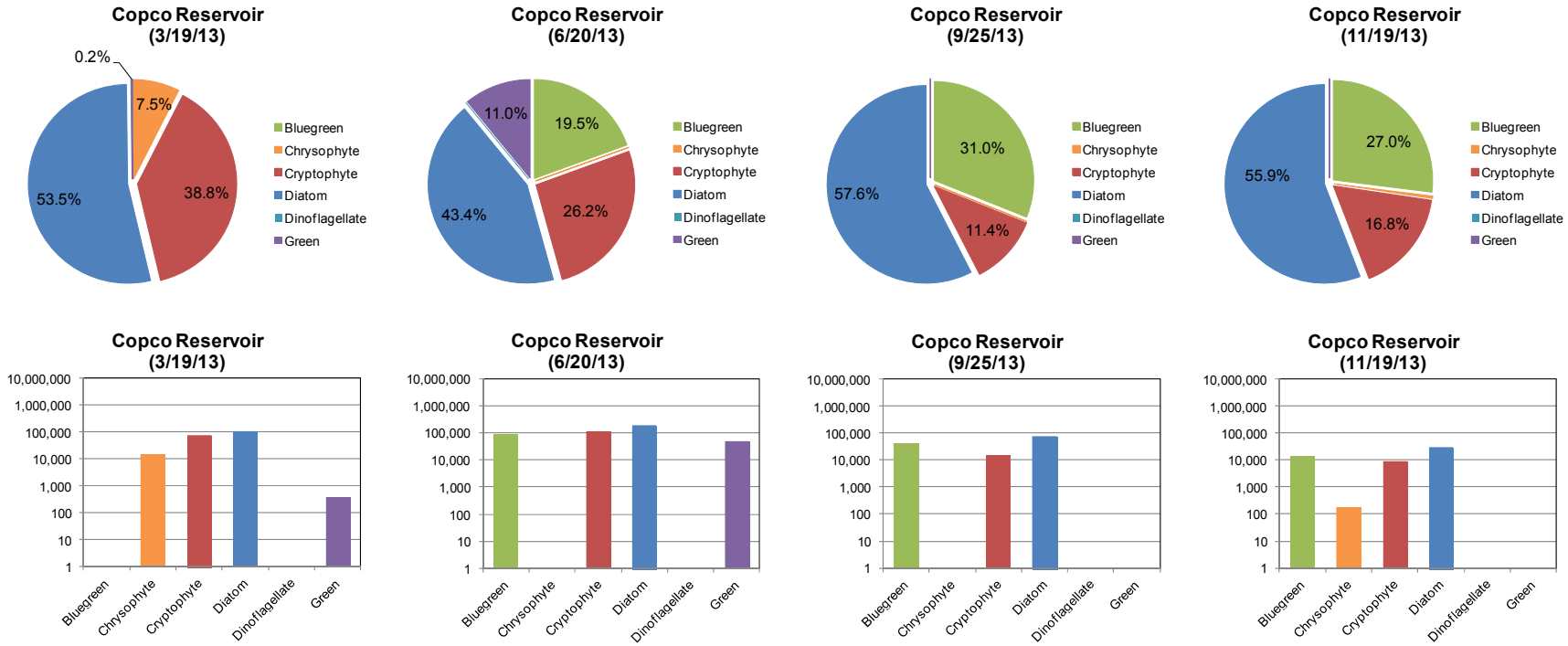

Chart C-3. Phytoplankton species (top) and biovolume (bottom) at Copco Reservoir near dam for 3/19/13, 6/20/13, 9/25/13, and 11/19/13. Note: y-axis in logarithmic scale.

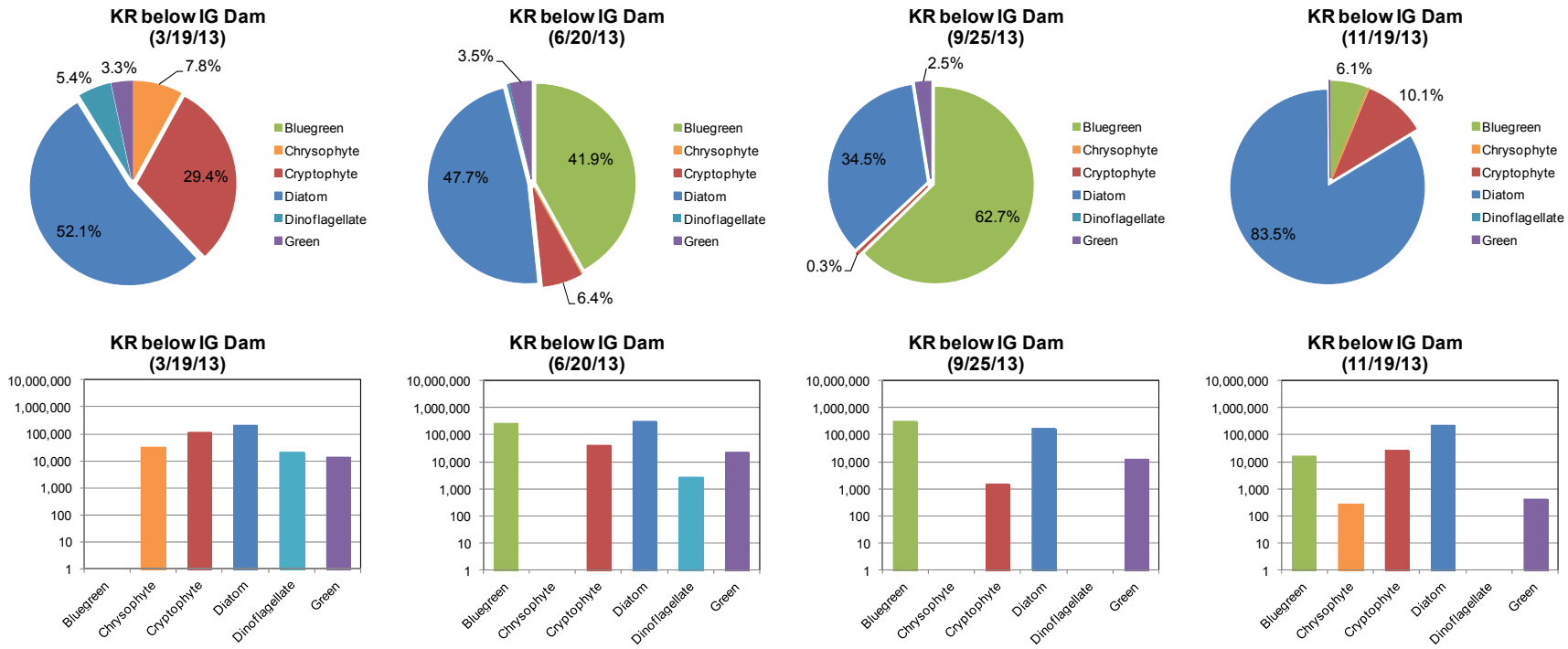

Chart C-4. Phytoplankton species (top) and biovolume (bottom) at Klamath River below Iron Gate Dam (near Hatchery Bridge) for 3/19/13, 6/20/13, 9/25/13, and 11/19/13. Note: y-axis in logarithmic scale.

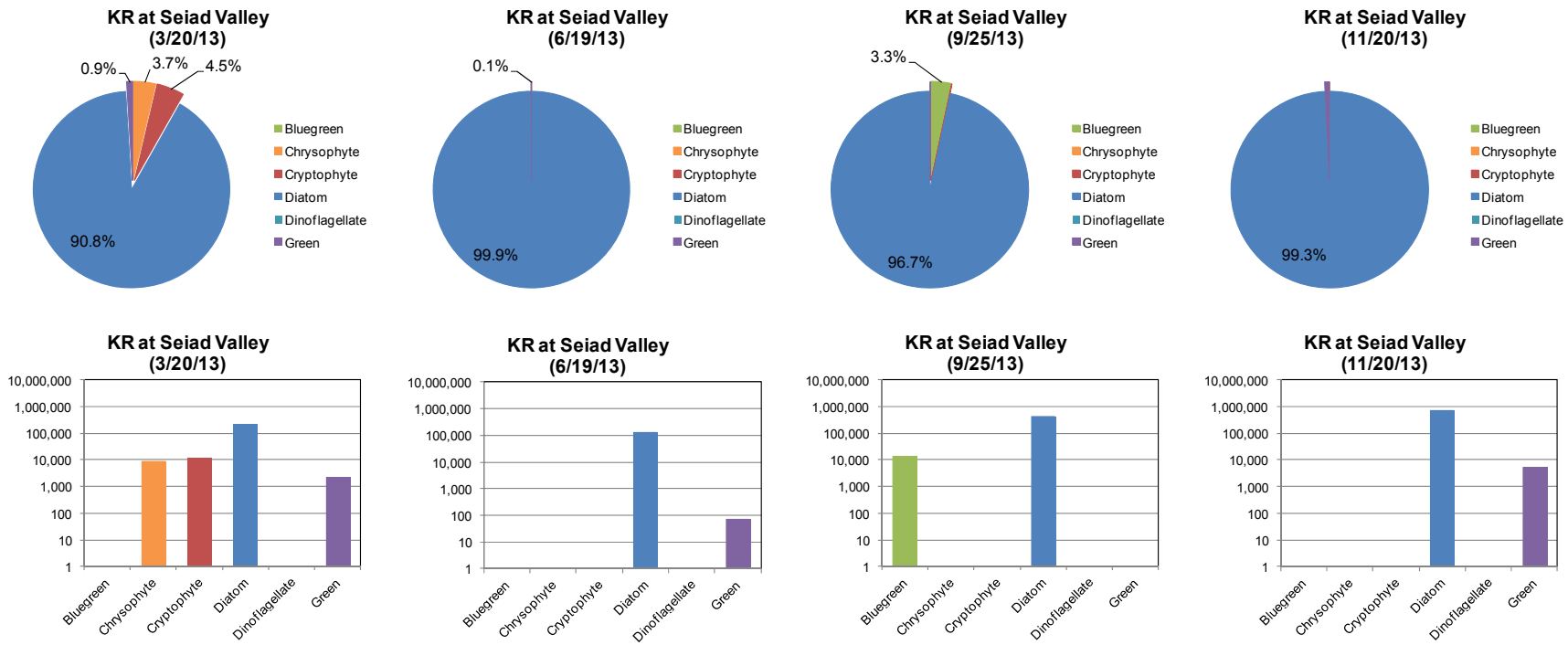

Chart C-5. Phytoplankton species (top) and biovolume (bottom) at Klamath River near below Seiad Valley for 3/20/13, 6/19/13, 9/25/13, and 11/20/13. Note: y-axis in logarithmic scale.

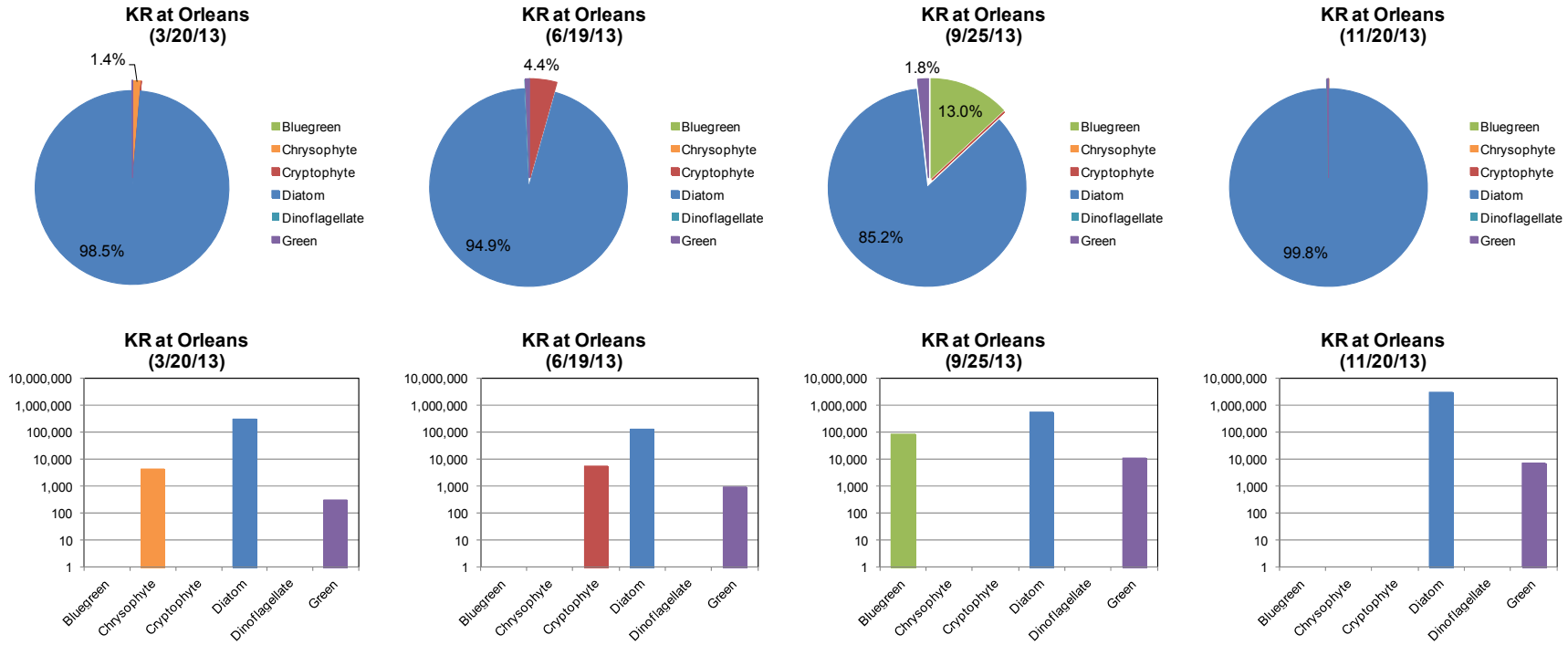

Chart C-6. Phytoplankton species (top) and biovolume (bottom) at Klamath River at Orleans for 3/20/13, 6/19/13, 9/25/13, and 11/20/13. Note: y-axis in logarithmic scale.

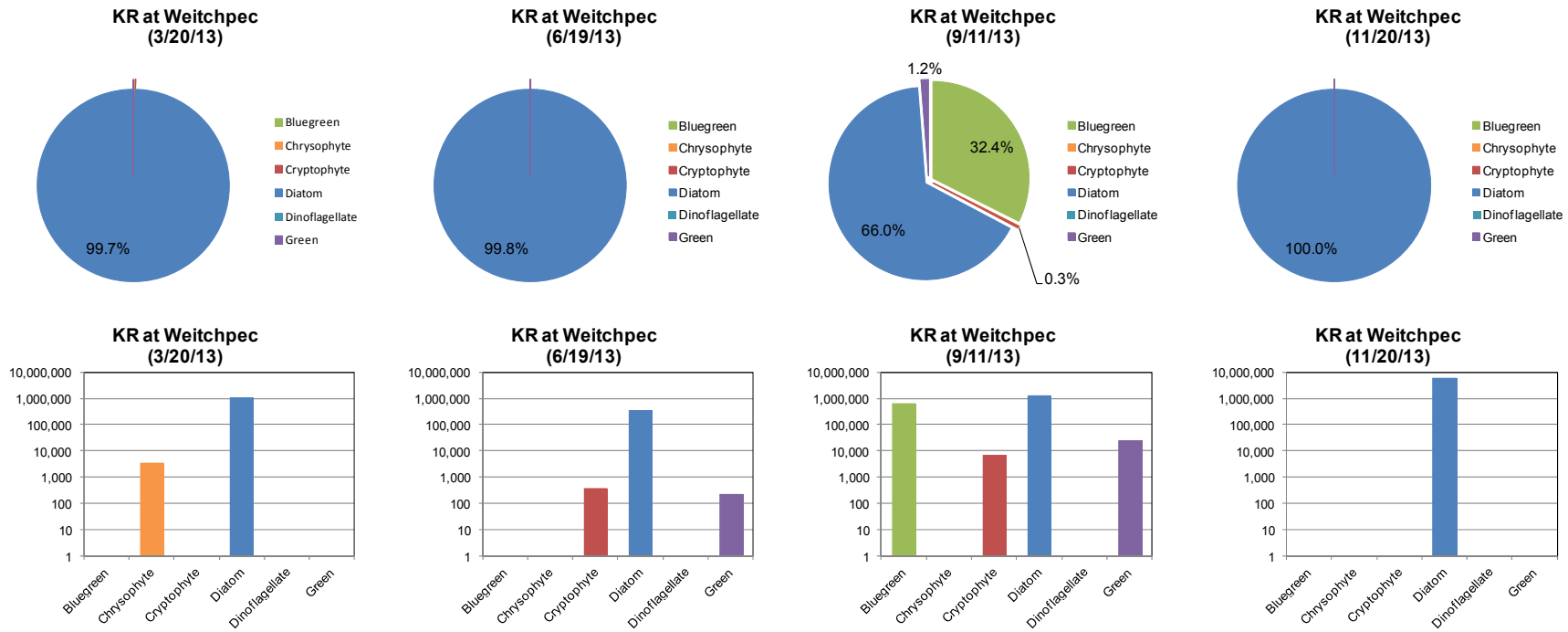

Chart C-7. Phytoplankton species (top) and biovolume (bottom) at Klamath River at Weitchpec for 3/20/13, 6/19/13, 9/11/13, and 11/20/13. Note: y-axis in logarithmic scale.

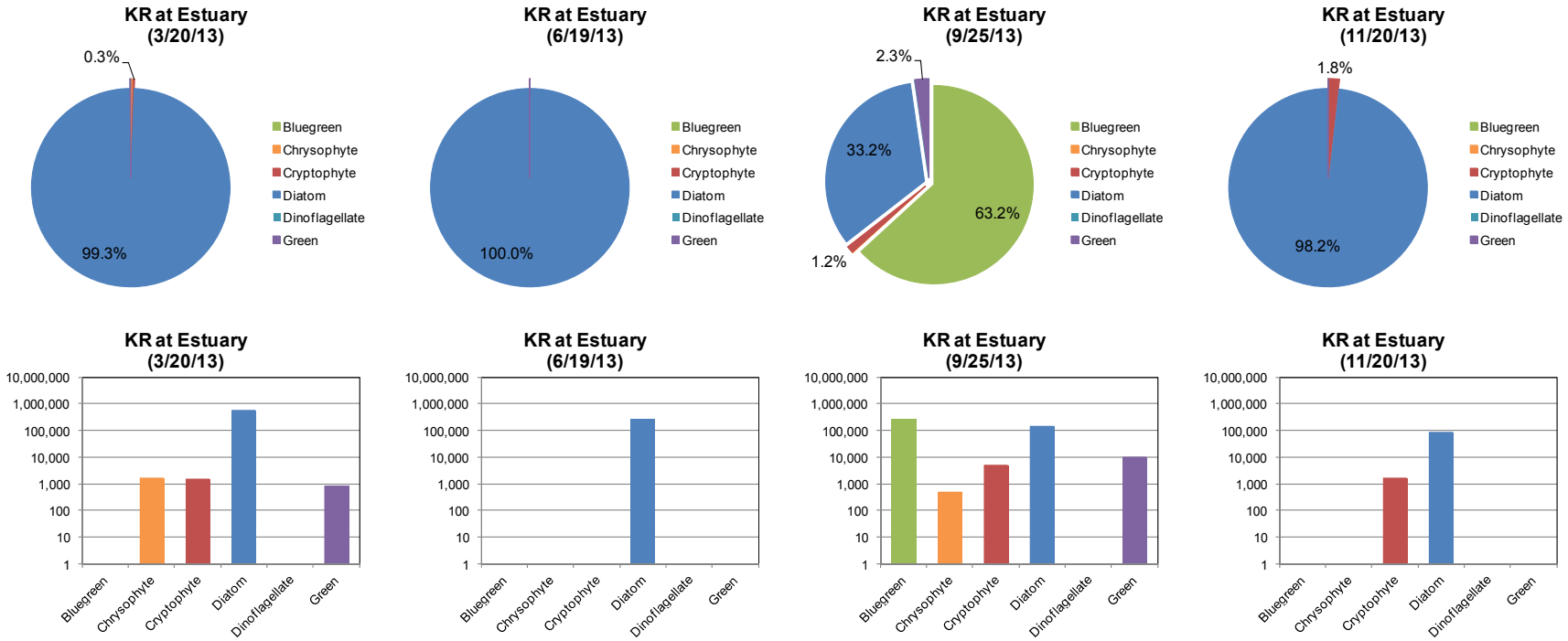

Chart C-8. Phytoplankton species (top) and biovolume (bottom) at Klamath River near Estuary 3/20/13, 6/19/13, 9/25/13, and 11/20/13. Note: y-axis in logarithmic scale.

Appendix D. 2013 Laboratory Cross Comparison

Watercourse Engineering Inc.

Technical Memorandum

Date: January 13, 2014

To: Crystal Bowman, Karuk Tribe
Kathleen Sloan, Yurok Tribe
Micah Gibson, Yurok Tribe
Rick Carlson, U.S. Bureau of Reclamation
Clayton Creager, North Coast Regional Water Quality Control Board
Sue Keydel, U.S. Environmental Protection Agency, Region 9
Chris Stine, Oregon Department of Environmental Quality
Sam Mackey, E&S Environmental Chemistry
Linda Prendergast, PacifiCorp

From: Eric Miao, Watercourse Engineering, Inc.
Mike Deas, Watercourse Engineering, Inc.

Re: 2013 KHSA Laboratory Cross Comparison Memo

Introduction

Three laboratory cross comparisons sampling events occurred during the 2013 Klamath Hydroelectric Settlement Agreement (KHSA) Baseline Sampling program to provide insight into laboratory performance at the three principal laboratories employed: Basic Laboratory (Redding, CA), CH2M Hill Applied Sciences Laboratory (Corvallis, Oregon) and Aquatic Research, Inc. (Seattle, WA).

A single surface grab sample was collected at the Klamath River below Seiad Valley on April 17, August 7, and October 9. Each sample was split into three separate bottles (triplicate sample set) via churn-splitter and sent to the three laboratories. Water quality constituents analyzed include: alkalinity, carbonaceous biological oxygen demand – 5 day (CBOD5), dissolved organic carbon (DOC), ammonia (NH4), nitrate plus nitrite (NO3+NO2), total nitrogen (TN), total Kjeldahl nitrogen (TKN), ortho-phosphate (OPO4), total phosphorus (TP), total suspended solids (TSS), volatile suspended solids (VSS), and total chlorophyll-a (chlor-a).

Even for an identical sample, laboratories may present different results due to the analytical equipment differences, experience of technicians, and varying methods. The cross comparison exercise is not intended to rate the performance of each laboratory or to determine which laboratory is "best." Such an undertaking would require a much more comprehensive study. Rather, the comparisons are intended to illustrate the range of results produced by the three laboratories for the identified constituents over a sampling

season. This memo presents background information on the inter-laboratory study, overview of each laboratory's methods, detection limits and reporting limits, cross comparison methods, summary of results and findings, and plots for each constituent.

Background

2013 was the fifth year of the KHSA cross comparison. To explore different water quality conditions as well as share the burden in collecting the cross comparison samples, the KHSA monitoring group unanimously decided to move sampling locations every two years. The sampling location for the cross comparison in 2009 and 2010 was Link Dam, near Klamath Falls (RM 254.4). In 2011, three grab samples were collected at the Klamath River near the Estuary (RM 0.5). Several constituents were below the detection level at this location. Therefore, the group decided to move the 2012 sampling site further upstream. In 2012, three grab samples were collected at the Klamath River near Weitchpec (RM 43.5) by the Yurok Tribe. In 2013, the location was moved further upstream. Three grab sampled were collected at the Klamath River below Seiad Valley (RM 128.5) by the Karuk Tribe.

In 2011 and 2012, the general trend for TN, TP, and DOC suggests higher concentrations near Weitchpec than at the estuary. The TSS concentrations were lower near Weitchpec than at the estuary. Similarly, in 2013 the trends for nutrients (Figure D-1) also suggest TN, TP, DOC generally increased while TSS were lower than previous year locations.

Censored data samples refers to laboratory results with "less than" (<), "non-detect" (ND), and (j) flag data. Data sets with "less than" and "non-detect" are results below the method detection limit (MDL). When censored data is present for a constituent at two laboratories, then the pair is excluded from the cross comparisons. More information on this topic is mentioned in cross comparison methods section.

The method detection limit (MDL) is explicitly defined in Standard Methods (APHA 2005) as "the constituent concentration that, when processed through the complete method, produces a signal with a 99 percent probability that it is different than the blank." (j) flag data refers to results greater than or equal to the laboratory MDL, but below the method reporting limit (RL)[6]. The RL can be defined as lowest constituent concentration in a sample that can be quantitatively determined with statistical rigor.

[6] Certain analytical laboratories are adopting more formal names for MDL, such as the Limit of Detection (LOD), and also for RL, such as the Level of Quantitation (LOQ) or Minimum Level of Quantitation (MLQ).

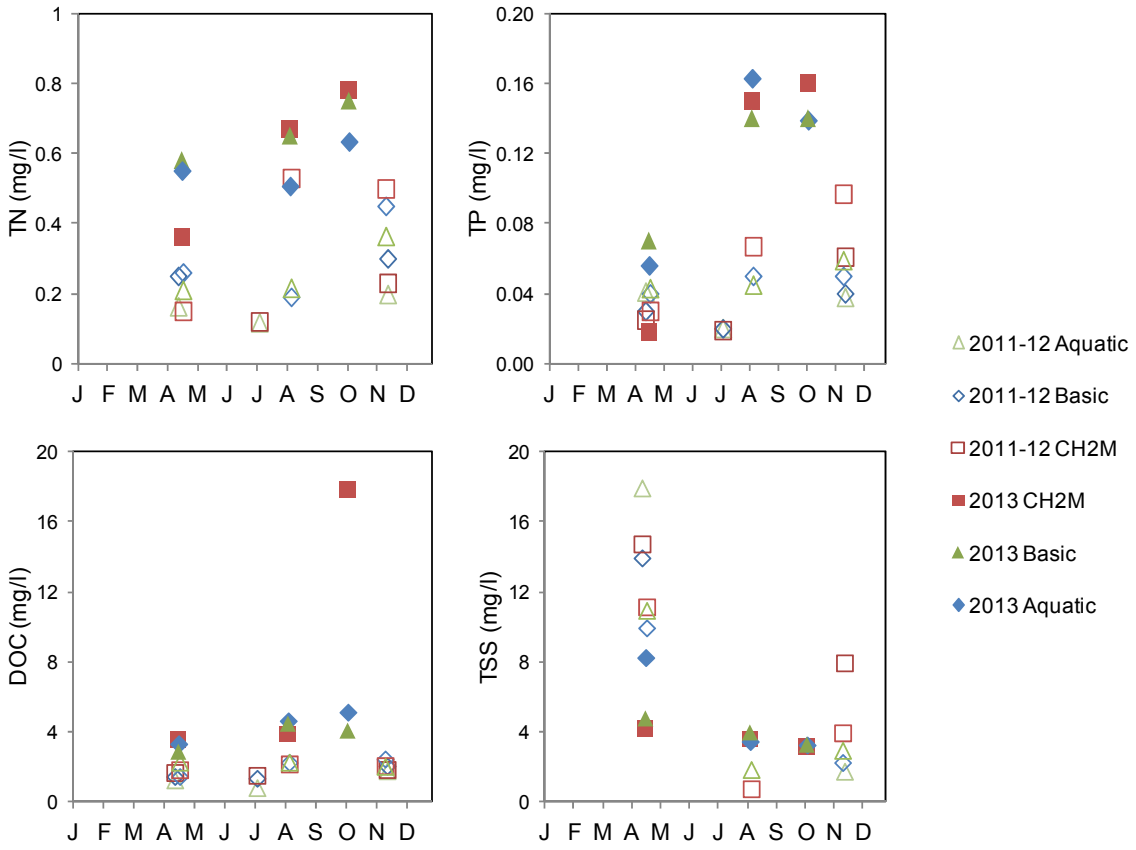

Figure D-1. 2011-2012 (outlined symbols) and 2013 (solid symbols) laboratory results for total nitrogen (TN), total phosphorus (TP), dissolved organic carbon (DOC), and total suspended solids (TSS).

Overview of Labs: Methods, Detection and Reporting Limits

All methods used by the analytical laboratories were either EPA methods or Standard Methods. While laboratories used the same methods for certain constituent analysis, the method detection limit (MDL) and reporting limit (RL) were not necessarily the same. The analytical methods and associated limits at each constituent at each laboratory are presented Table D-1, Table D-2, and Table D-3.

Laboratory reporting values for constituents varied; generally, the RL for each laboratory was within a factor of 5. For example, the RL for ammonia was 0.05 mg/l for Basic and CH2M Hill and 0.01 mg/l for Aquatic Research– a maximum difference of a factor of 5. However, for TSS and VSS, this maximum difference (between Basic and Aquatic Research) was 10. For OPO4 and TP, the maximum difference between Basic and Aquatic Research was a factor of 50 and 25, respectively. However, in this case Aquatic Research did not provide a distinct RL for these constituents, but rather assumed the RL was equal to the MDL.

When reviewing results, consideration of the RL differences for TSS and VSS between Basic and the other two laboratories, and for OPO4 and TP between Aquatic Research and the other two laboratories may be useful.

Table D-1. Laboratory methods, method detection limits (MDL), and reporting limits (RL) for Basic Laboratory (2013).

			Basic Laboratory	
Constituent	units	Method	MDL	RL
Alkalinity	mg/l	SM2320B	1	5
NH4	mg/l	EPA 350.1	0.03	0.05
CBOD5 [a]	mg/l	SM5210	3	3
DOC	mg/l	SM5310C	0.2	0.5
NO3+NO2	mg/l	EPA 353.2	0.02	0.05
TN	mg/l	EPA 351.2	0.1	0.2
OPO4	mg/l	SM 4500P-E	0.005	0.01
TP	mg/l	SM 4500P-BE	0.02	0.05
TKN	mg/l	EPA 351.2	0.1	0.2
TSS	mg/l	SM 2540D	1	5
VSS	mg/l	EPA 160.4	1	5
Chlor-a	µg/l	SM 10200H	2	6

[a] MDL and RL for CBOD5 are often equal values at production laboratories such as those used in this study.

Table D-2. Laboratory methods, method detection limits (MDL), and reporting limits (RL) for CH2M Hill (2013).

			CH2M Hill	
Constituent	units	Method	MDL	RL
Alkalinity	mg/l	E310.1	N/A	5
NH4	mg/l	E350.1	0.014	0.05
CBOD5	mg/l	SM5210B	N/A	2
DOC	mg/l	SM5310B	0.047	0.5
NO3+NO2	mg/l	E353.2	0.003	0.01
TN	mg/l	SM4500-N C	0.062	0.2
OPO4	mg/l	E365.1	0.0014	0.01
TP	mg/l	E365.4	0.022	0.05
TKN	mg/l	E351.2	0.051	0.2
TSS	mg/l	SM2540D	0.6	5
VSS	mg/l	E160.4	0.6	5
Chlor-a [a]	µg/l	EPA 445.0		

[a] CH2M Hill does not analyze for chlorophyll-a. Samples were sent to Chesapeake Biological Laboratory (CBL) for analysis.

Table D-3. Laboratory methods, method detection limits (MDL), and reporting limits (RL) for Aquatic Research (2013).

			Aquatic Research	
Constituent	units	Method	MDL	RL
Alkalinity	mg/l	SM18 2320B		1
NH4	mg/l	SM184500NH3H	0.006	0.01
CBOD5 [a]	mg/l	SM205210B	2	2
DOC	mg/l	SM205310B	0.095	0.25
NO3+NO2	mg/l	SM184500N03F	0.005	0.01
TN	mg/l	SM204500NC	0.03	0.05
OPO4 [b]	mg/l	SM18 4500PF	0.001	0.001
TP [b]	mg/l	SM18 4500PF	0.002	0.002
TKN	mg/l	EPA 351.1	0.1	0.2
TSS	mg/l	SM20 2540D	0.1	0.5
VSS	mg/l	SM20 2540E	0.1	0.5
Chlor-a [b]	µg/l	SM18 10200H	0.10	0.10

[a] MDL and RL for CBOD5 are often equal values at production laboratories such as those used in this study.
[b] The MDL and RL values were set as the same concentration at Aquatic Research.

Cross Comparison Method (RPD & AD)

To compare the results from each laboratory, relative percent difference (RPD) or absolute difference (AD) calculations were applied to the following sets of paired sample results: Basic and CH2M Hill, Basic and Aquatic Research, CH2M Hill and Aquatic Research. The sample results used to calculate RPD or AD for each sampling event are presented in Table D-4, Table D-6, and Table D-8. The three laboratories reported different significant figures and the data presented herein are taken directly from the laboratory reports.

The RPD and AD, as used for assessing a regular and duplicate sample are calculated as:

$$RPD\ (percent) = |(R - D)|/((R + D)/2) * 100 \quad (1)$$

$$AD\ (concentration) = |R - D| \quad (2)$$

Where: R = Regular sample result
D = Duplicate sample result

These RPD and AD formulae were adapted for the laboratory comparison as follows:

$$RPD\ (percent) = |(X1 - X2)|/((X1 + X2)/2) * 100 \quad (3)$$

$$AD\ (concentration) = |X1 - X2| \quad (4)$$

Where: X1 = Result sample result from laboratory 1
X2 = Result sample result from laboratory 2

During each comparison, if the two laboratories used different reporting limits the larger of the two was selected as the criteria to determine whether to use the RPD or AD calculation to compare the sample results. The use of the larger RL value allows the comparison to encapsulate the largest possible uncertainty associated with the data.

To determine which comparison calculation to use, if the sample result was equal to or greater than five times the selected reporting limit, the RPD was calculated. A RPD criteria of 20 percent was used to determine if two samples were similar (RPD of less than or equal to 20 percent) or dissimilar (RPD of greater than 20 percent) (USBR, 2009). If the RPD result was less than or equal to 20 percent, the two samples were deemed to be similar and the comparison was labeled with an "OK" result in Table D-5, Table D-7, Table D-9. If the RPD result was greater than 20 percent, the RPD result was presented within the table.

If the sample result was less than five times the selected reporting limit, the AD was calculated and a different criteria of the reporting limit was used to determine if two samples were similar (AD less than or equal to the selected reporting limit) or dissimilar (AD greater than the selected reporting limit) (USBR, 2009). If the AD was less than the selected reporting limit for the sample comparison, the comparison was labeled with an "OK" result. If the AD was greater than the selected reporting limit for the sample comparison, the AD result was presented, along with a footnote of the laboratory reporting limit used. This process is illustrated in Figure D-2.

4.1.1. Censored Data

Censored data refers to sample results without a result (e.g. "<" value, non-detect, (j) flagged). When censored data is present for a constituent at two laboratories, then that pair is excluded from the cross comparison analysis. For example, in April, the triplicate sample was sent to the three laboratories to be analyzed for total phosphorus (TP). The results were 0.04(j) mg/l, 0.03(j) mg/l, and 0.043 mg/l for Basic laboratory, CH2M Hill, and Aquatic Research, respectively. Data from Basic laboratory and CH2M Hill were below the laboratories' respective RLs (e.g., (j) flagged) and are replaced by the laboratory RLs in the data tables. Cross comparisons are not performed for paired data that consist of two RL values, but rather are marked as "censored" and excluded from the cross-laboratory comparison.

Chlorophyll-a

In 2013, chlorophyll-a was collected and analyzed for the three sampling events. CH2M Hill does not analyze for chlorophyll-a. Therefore, the samples were sent to Chesapeake Biological Laboratory (CBL) in Maryland for analysis. In this report, chlorophyll-a was presented in micrograms per liter (µg/l). Chlorophyll-a comparisons involving Basic laboratory were not considered due to the laboratory's relatively high reporting limit. ~~The RPD was applied to CH2M Hill and Aquatic Research when both concentrations were equal to or greater than 5 times the reporting limit.~~ Chlorophyll-a was also collected and analyzed in 2012.

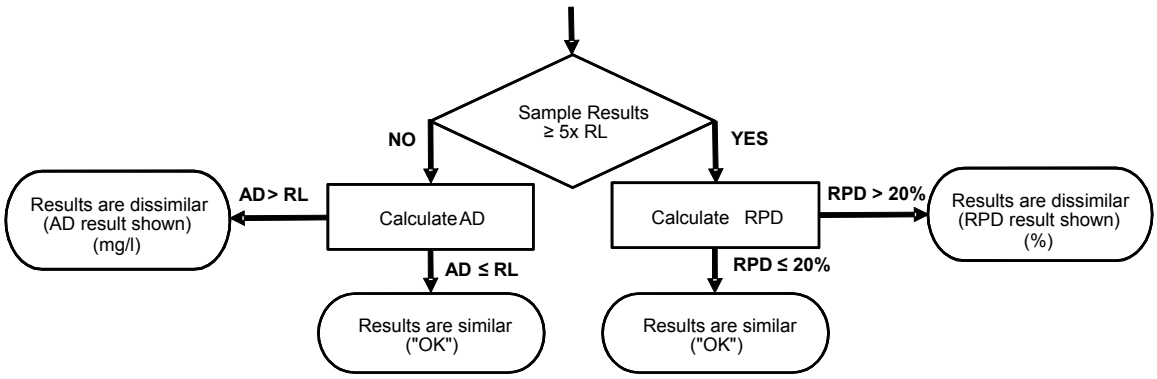

Figure D-2. Flow diagram of the comparison process. RPD = relative percent difference. RL = reporting limit. AD = absolute difference.

Table D-4. Data used to determine relative percent difference (RPD) or absolute difference (AD) for April 17, 2013. RL = reporting limit.

	Laboratory	Basic Laboratory (BASIC)	CH2M Hill Applied Sciences (CH2M)*	Aquatic Research, Inc. (ARI)
	Sample ID	*3040790*	*M167501*	*AES004-94*
	Units			
Alkalinity	mg/l	81	77.6	87.7
NH4	mg/l	(0.05) [a]	-	(0.01) [b]
CBOD5[c]	mg/l	(3) [c]	(2) [d]	(2) [e]
DOC	mg/l	2.9	3.62	3.37
NO3+NO2	mg/l	0.33	0.31	0.309
TN	mg/l	0.58	0.36	0.551
OPO4	mg/l	0.032	0.038	0.034
TP	mg/l	0.07	(0.05) [f]	0.056
TKN	mg/l	0.2	0.4	0.452
TSS	mg/l	(5) [g]	(5) [h]	8.3
VSS	mg/l	(5) [i]	(2) [j]	1.5
Chlor-a	µg/l	(6) [k]	1.68*	1.9

[a] BASIC result for NH4: "ND" mg/l.
[b] ARI result for NH4: "<0.01".
[c] BASIC result for CBOD5: "ND".
[d] CH2M result for CBOD5: "1.1".
[e] ARI result for CBOD5: "<2" mg/l.
[f] CH2M result for TP: 0.018 mg/l.
[g] BASIC result for TSS: 4.8 mg/l.
[h] CH2M result for TSS: 4.2 mg/l.
[i] BASIC result for VSS: "ND" mg/l.
[j] CH2M result for VSS: 1.8 mg/l.
[k] Basic result for Chlor-a: 2 mg/l.
* Sample sent to Chesapeake Biological Laboratory (CBL) for chlorophyll-a analysis.

Table D-5. Results for paired laboratory comparisons: April 17, 2013. The comparisons of two laboratory reporting limits (RL) are considered "censored".

Constituent	BASIC versus CH2M Hill	BASIC versus Aquatic Research, Inc.	CH2M Hill versus Aquatic Research, Inc.
Alkalinity	OK	OK	OK
NH4	n/a	censored	n/a
CBOD5	censored	censored	censored
DOC	(22.1%) [a]	OK	OK
NO3+NO2	OK	OK	OK
TN	(0.220 mg/l) [b]	OK	OK
OPO4	OK	OK	OK
TP	OK	OK	OK
TKN	OK	(0.252 mg/l) [c]	OK
TSS	censored	OK	OK
VSS	censored	OK	OK
Chlor-a	(112.5%) [d]	(103.8%) [e]	OK

[a] BASIC and CH2M value greater than 20 percent absolute difference.
[b] BASIC RL result for TN: 0.2 mg/l.
[c] BASIC RL result for TKN: 0.2 mg/l.
[d] BASIC and CH2M value greater than 20 percent absolute difference.
[e] BASIC and ARI value greater than 20 percent absolute difference.

Table D-6. Data used to determine relative percent difference (RPD) or absolute difference (AD) for August 7, 2012. RL = reporting limit.

	Laboratory	Basic Laboratory (BASIC)	CH2M Hill Applied Sciences (CH2M)*	Aquatic Research, Inc. (ARI)
	Sample ID	*13H0352-01*	*M244001*	*AES005-08*
	Units			
Alkalinity	mg/l	84	82.8	93.1
NH4	mg/l	0.07	(0.05) [a]	(0.01) [b]
CBOD5[c]	mg/l	(3) [c]	14.4	(2) [d]
DOC	mg/l	4.5	3.9	4.68
NO3+NO2	mg/l	(0.05) [e]	(0.01) [f]	0.011
TN	mg/l	0.65	0.67	0.507
OPO4	mg/l	0.121	0.14	0.12
TP	mg/l	0.14	0.15	0.163
TKN	mg/l	0.6	0.55	0.612
TSS	mg/l	(5) [g]	(5) [h]	3.5
VSS	mg/l	(5) [i]	(5) [j]	1
Chlor-a	µg/l	11	-	7.7

[a] CH2M result for NH4: "-0.011" mg/l.
[b] ARI result for NH4: "<0.01".
[c] BASIC result for CBOD5: "ND".
[d] ARI result for CBOD5: "<2".
[e] BASIC result for NO3+NO2: 0.02 mg/l.
[f] CH2M result for NO3+NO2: 0.0085 mg/l.
[g] BASIC result for TSS: 4 mg/l.
[h] CH2M result for TSS: 3.6 mg/l.
[i] BASIC result for VSS: 2.3 mg/l.
[j] CH2M result for VSS: 0.8 mg/l.

Table D-7. Results for paired laboratory comparisons: August 7, 2013. The comparisons of two laboratory reporting limits (RL) are considered "censored".

Constituent	BASIC versus CH2M Hill	BASIC versus Aquatic Research, Inc.	CH2M Hill versus Aquatic Research, Inc.
Alkalinity	OK	OK	OK
NH4	OK	(0.060 mg/l) [a]	censored
CBOD5	(11.400 mg/l) [b]	censored	(12.400 mg/l) [c]
DOC	OK	OK	OK
NO3+NO2	censored	OK	OK
TN	OK	OK	OK
OPO4	OK	OK	OK
TP	OK	OK	OK
TKN	OK	OK	OK
TSS	censored	OK	OK
VSS	censored	OK	OK
Chlor-a	n/a	(35.3%) [d]	n/a

[a] BASIC RL result for NH4: 0.05 mg/l.
[b] BASIC RL result for cBOD5: 3 mg/l.
[c] CH2M RL result for cBOD5: 2 mg/l.
[d] BASIC and ARI value greater than 20 percent absolute difference.

Table D-8. Data used to determine relative percent difference (RPD) or absolute difference (AD) for October 9, 2013. RL = reporting limit.

	Laboratory	Basic Laboratory (BASIC)	CH2M Hill Applied Sciences (CH2M)*	Aquatic Research, Inc. (ARI)
	Sample ID	*13J0539*	*M296001*	*AES00520*
	Units			
Alkalinity	mg/l	91	88.1	106
NH4	mg/l	(0.05) [a]	(0.05) [b]	(0.01) [c]
CBOD5	mg/l	(3) [d]	6	(2) [e]
DOC	mg/l	4.1	17.9	5.18
NO3+NO2	mg/l	0.29	0.24	0.257
TN	mg/l	0.75	0.78	0.634
OPO4	mg/l	0.111	0.12	0.119
TP	mg/l	0.14	0.16	0.139
TKN	mg/l	0.5	0.58	0.62
TSS	mg/l	(5) [f]	(5) [g]	3.3
VSS	mg/l	(5) [h]	(5) [i]	0.5
Chlor-a	µg/l	-	3.58*	2.1

[a] BASIC result for NH4: 0.04 mg/l.
[b] CH2M result for NH4: 0.00097 mg/l.
[c] ARI result for NH4: "<0.01".
[d] BASIC result for CBOD5: "ND" mg/l.
[e] ARI result for CBOD5: "<2".
[f] BASIC result for TSS: 3.3 mg/l.
[g] CH2M result for TSS: 3.2 mg/l.
[h] BASIC result for VSS: 3 mg/l.
[i] CH2M result for VSS: 2 mg/l.
* Sample sent to Chesapeake Biological Laboratory (CBL) for chlorophyll-a analysis.

Table D-9. Results for paired laboratory comparisons: October 9, 2013. The comparisons of two laboratory reporting limits (RL) are considered "censored".

Constituent	BASIC versus CH2M Hill	BASIC versus Aquatic Research, Inc.	CH2M Hill versus Aquatic Research, Inc.
Alkalinity	OK	OK	OK
NH4	censored	censored	censored
CBOD5	OK	censored	(4 mg/l) [a]
DOC	(125.5%) [b]	(23.3%) [c]	(110.2%) [d]
NO3+NO2	OK	OK	OK
TN	OK	OK	OK
OPO4	OK	OK	OK
TP	OK	OK	OK
TKN	OK	OK	OK
TSS	censored	OK	OK
VSS	censored	OK	OK
Chlor-a	n/a	n/a	n/a

[a] CH2M RL result for CBOD5: 2 mg/l.
[b] BASIC and CH2M value greater than 20 percent absolute difference.
[c] BASIC and ARI value greater than 20 percent absolute difference.
[d] CH2M and ARI value greater than 20 percent absolute difference.

Comparison Summary

For the 2013 inter-lab comparison of samples collected in the Klamath River at Weitchpec, comparisons were completed for ALKALINITY, CBOD5, DOC, NH4, NO3+NO2, TKN, TN, OPO4, TP, TSS,VSS, and Chlor-a. A total of 83 laboratory cross comparisons were considered.

In 2013, the inter-lab included: 71 similar pairs and 14 dissimilar pairs. The 14 dissimilar pairs include: (4) DOC, (3) CBOD5, (1) NH4, (1) TP, (1) TKN, and (4) Chlorophyll-a. CH2M Hill values for CBOD5 and DOC were notably higher than the BASIC and Aquatic Analyst- CBOD5 in August and DOC in October. There were 17 censored data pairs, which do not count towards the comparison pairs. The 17 censored pairs include: (5) NH4, (5) CBOD5, (3) TSS, (3) VSS, and (1) NO3+NO2. There were 8 non-applicable pairs. When laboratories are unable to analyze a sample, then the comparison pair is not meaningful. The comparisons were labeled as non-applicable pairs because the pair is not a similar, dissimilar, or censored paired. This information is presented in Table D-10. Constituent results were replaced by the reporting limit (RL) due to low concentrations (and relatively high reporting limits).

To take a closer look at the correlation between the laboratory and data results, the constituents were identified based on the regression percentages. Constituents will be in one of three groups: a) 90 to 100 percent regression lines in at least 2 laboratories b) 75 to 89 percent regression lines in at least 2 laboratories c) 50 to 74 percent regression lines in at least two laboratories. This information is presented in Table D-11.

Based on suggestions from the IM 15 monitoring group, comparison pairs for each constituent were plotted. The trend lines and linear regression equations were included in the graphs which are presented in Appendix B (Figure E-1 to Figure E-12) for the 2013 sampling season.

Table D-10. Summary of laboratory cross comparisons for each constituent (2013). These comparisons include: 71 similar pairs, 14 dissimilar pairs, 17 censored pairs, 6 non-applicable pairs.

	Similar Pairs	Dissimilar Pairs	Censored Pairs	Non-applicable*
Alkalinity	9	-	-	-
NH4	1	1	5	2
CBOD5	1	3	5	-
DOC	5	4	-	-
NO3+NO2	8	-	1	-
TN	9	-	-	-
OPO4	9	-	-	-
TP	8	1	-	-
TKN	8	1	-	-
TSS	6	-	3	-
VSS	6	-	3	-
Chlorophyll-a	1	4	-	4
Total	**71**	**14**	**17**	**6**

*When data for laboratory pair is not available.

Table D-11. Inter-lab constituents separated by strength of regression line (R^2).

Data from 2009-2013		
$90 \leq R^2 \leq 100$	$75 \leq R^2 \leq 89$	$75 < R^2$
ALKALINITY	CBOD5	VSS
NO3+NO2	OPO4	CHLOR-A
TKN	DOC	
NH4	TSS	
TN		
TP		

References

U.S. Bureau of Reclamation (USBR). 2009. *Standard Operating Procedures for Quality Assurance*. Revision 2009-05. Environmental Monitoring Branch, Mid-Pacific Region, Sacramento, CA. May.

American Public Health Assc., American Water Works Assc., and Water Environment Federation (APHA). 2005. *Standard Methods for the Examination of Water and Wastewater*, 21st Ed. Eds. A.E. Eaton, L.S. Clesceri, E.W. Rice, and A.E. Greenberg. Washington D.C.

Appendix E. 2009-2013 Constituent Plots

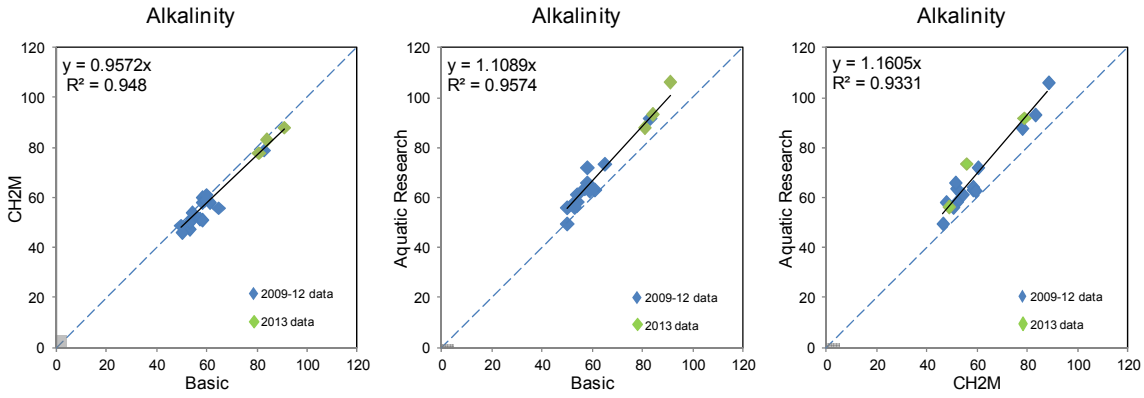

Figure E-1. KHSA inter-laboratory plots from 2009-2013 for Alkalinity. Units in milligrams per liter (mg/l). Grey region in lower corner shows concentrations below the RL for the respective laboratories in 2013.

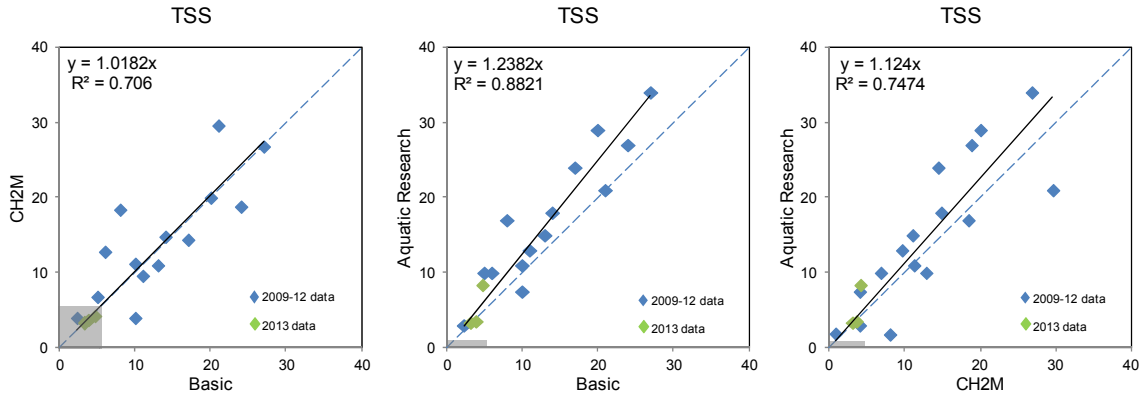

Figure E-2. KHSA inter-laboratory plots from 2009-2013 for Total Suspended Solids. Units in milligrams per liter (mg/l). Grey region in lower corner shows concentrations below the RL for the respective laboratories in 2013.

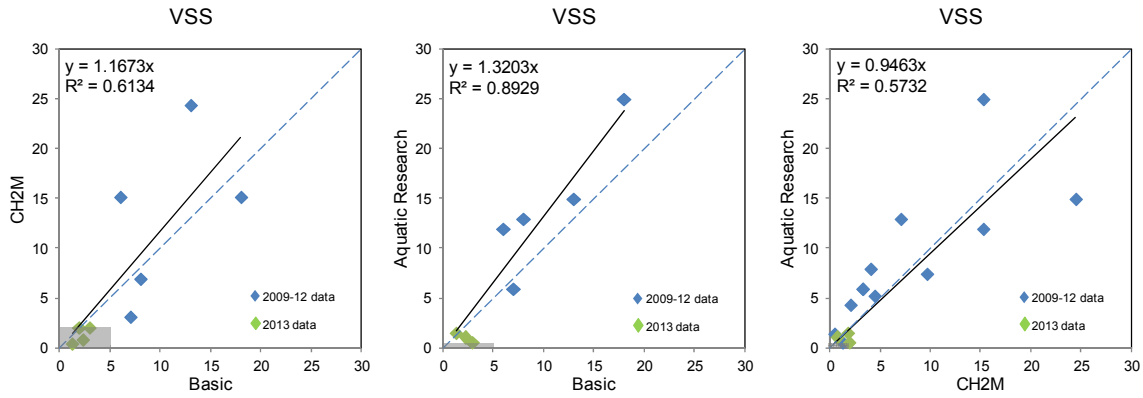

Figure E-3. KHSA inter-laboratory plots from 2009-2013 for Volatile Suspended Solids. Units in milligrams per liter (mg/l). Grey region in lower corner shows concentrations below the RL for the respective laboratories in 2013.

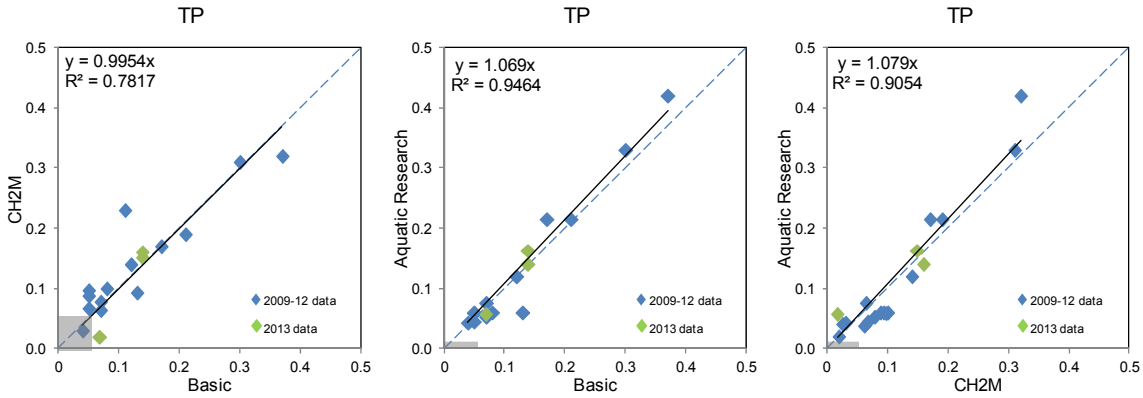

Figure E-4. KHSA inter-laboratory plots from 2009-2013 for Total Phosphorus. Units in milligrams per liter (mg/l). Grey region in lower corner shows concentrations below the RL for the respective laboratories in 2013.

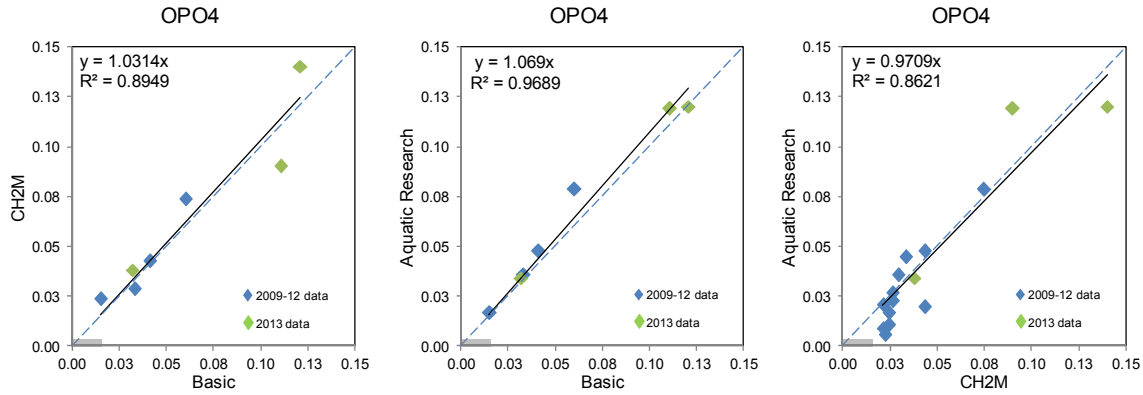

Figure E-5. KHSA inter-laboratory plots from 2009-2013 for Orthophosphate. Units in milligrams per liter (mg/l). Grey region in lower corner shows concentrations below the RL for the respective laboratories in 2013.

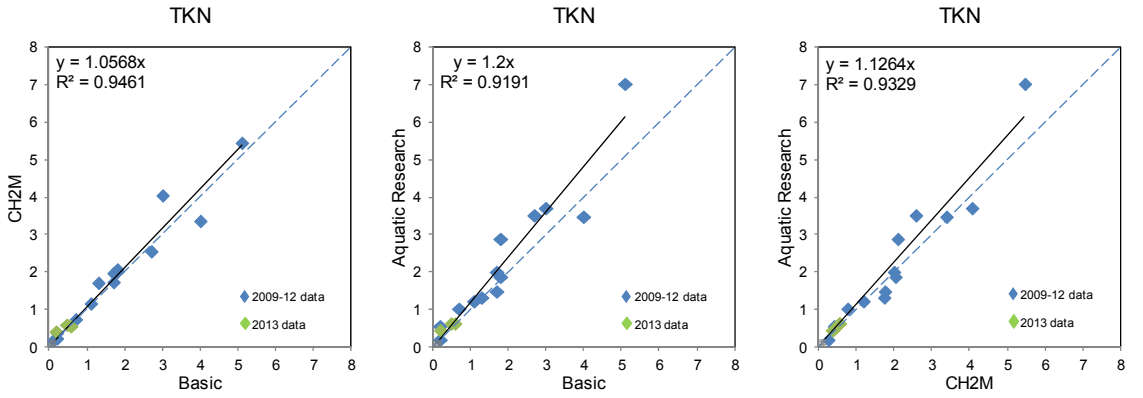

Figure E-6. KHSA inter-laboratory plots from 2009-2013 for Total Kjehldahl Nitrogen. Units in milligrams per liter (mg/l). Grey region in lower corner shows concentrations below the RL for the respective laboratories in 2013.

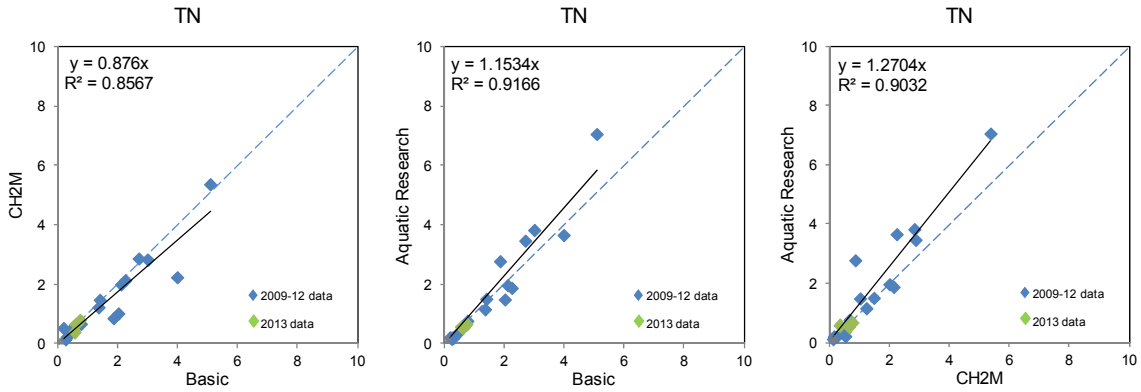

Figure E-7. KHSA inter-laboratory plots from 2009-2013 for Total Nitrogen. Units in milligrams per liter (mg/l). Grey region in lower corner shows concentrations below the RL for the respective laboratories in 2013.

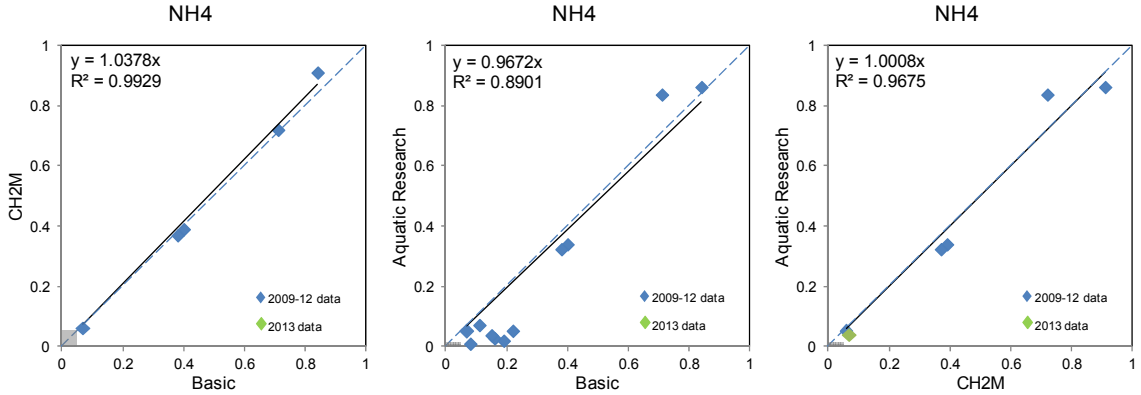

Figure E-8. KHSA inter-laboratory plots from 2009-2013 for Ammonia. Units in milligrams per liter (mg/l). Grey region in lower corner shows concentrations below the RL for the respective laboratories in 2013.

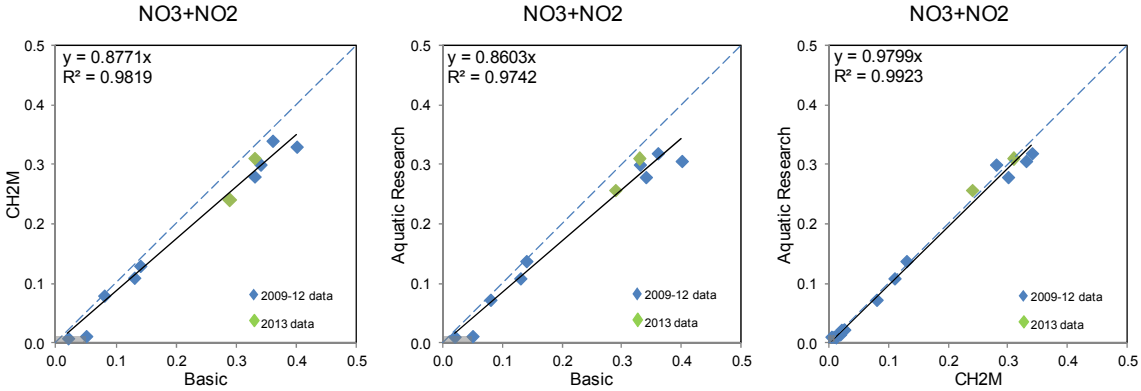

Figure E-9. KHSA inter-laboratory plots from 2009-2013 for Nitrate+Nitrite. Units in milligrams per liter (mg/l). Grey region in lower corner shows concentrations below the RL for the respective laboratories in 2013.

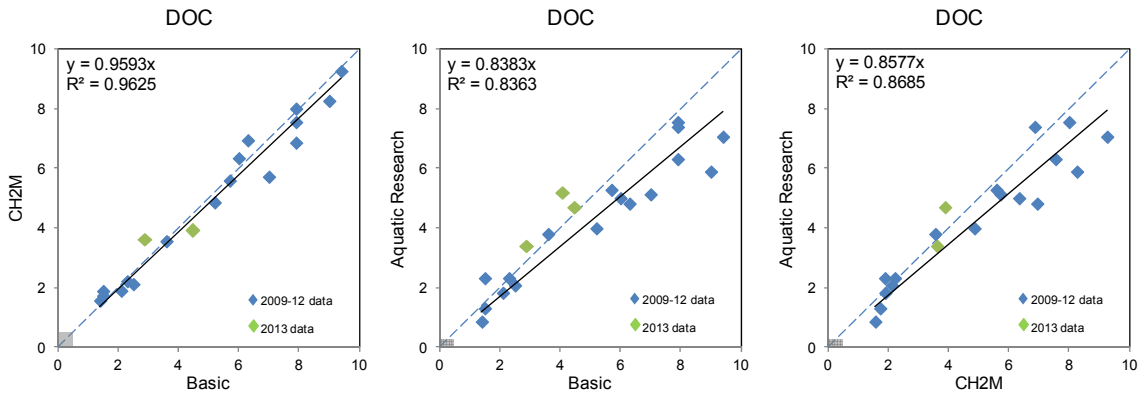

Figure E-10. KHSA inter-laboratory plots from 2009-2013 for Dissolved Organic Carbon. Units in milligrams per liter (mg/l). Grey region in lower corner shows concentrations below the RL for the respective laboratories in 2013.

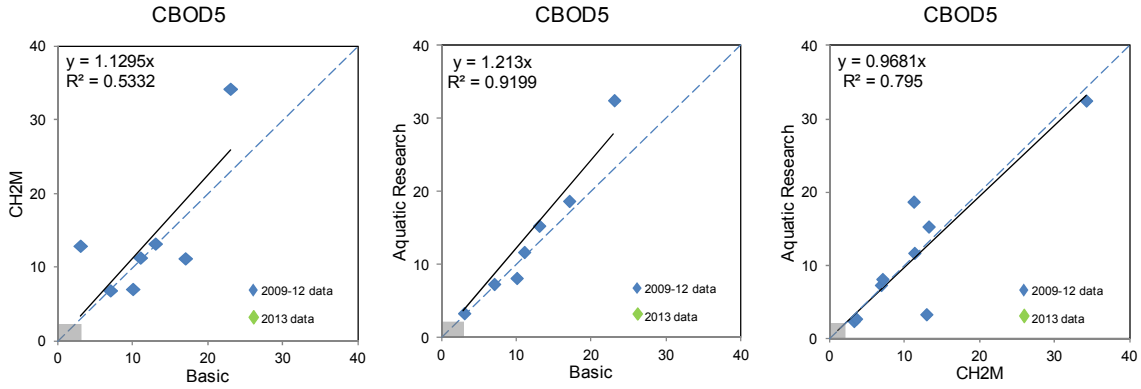

Figure E-11. KHSA inter-laboratory plots from 2009-2013 for Carbonaceous Biological Oxygen Demand. Units in milligrams per liter (mg/l). Grey region in lower corner shows concentrations below the RL for the respective laboratories in 2013.

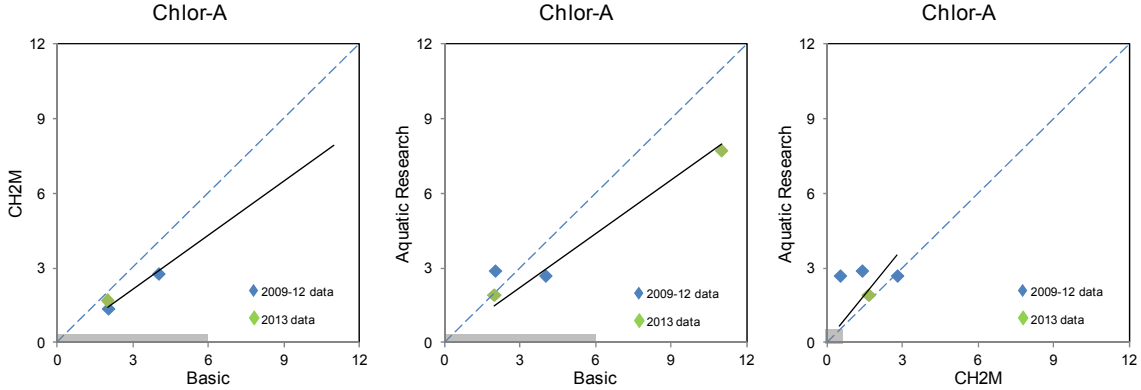

Figure E-12. KHSA inter-laboratory plots from 2009-2013 for Chlorophyll-a. Units in micrograms per liter (µg/l). Chlorophyll-a was not collected from 2009-2011. Grey region in lower corner shows concentrations below the RL for the respective laboratories in 2013.

Table E-1. CH2M Hill method detection limits (MDL) and method reporting limits (RL) for the three sampling events in 2013.

	4/17/2013			8/7/2013			10/9/2013		
	MDL	**RL**	**METHOD**	**MDL**	**RL**	**METHOD**	**MDL**	**RL**	**METHOD**
Alkalinity	N/A	5	E310.1	N/A	5	E310.1	N/A	5	E310.1
Ammonia	0.014	0.05	E350.1	0.014	0.05	E350.1	0.014	0.05	E350.1
CBOD5 a	N/A	2	SM5210B	N/A	2	SM5210B	N/A	2	SM5210B
DOC	0.047	0.5	SM5310B	0.078	0.84	SM5310B			SM5310B
NO3+NO2	0.003	0.01	E353.2	0.0028	0.01	E353.2	0.0028	0.01	E353.2
TN	0.062	0.2	SM4500-N C	0.062	0.2	SM4500-N C	0.062	0.2	SM4500-N C
OPO4	0.0014	0.01	E365.1	0.0014	0.01	E365.1	0.0014	0.01	E365.1
TP	0.022	0.05	E365.4	0.022	0.05	E365.4	0.022	0.05	E365.4
TKN	0.051	0.2	E351.2	0.051	0.2	E351.2	0.051	0.2	E351.2
TSS	0.6	5	SM2540D	0.6	5	SM2540D	0.6	5	SM2540D
VSS	0.6	5	E160.4	N/A	5	E160.4	N/A	5	E160.4
Alkalinity	N/A	5	E310.1	N/A	5	E310.1	N/A	5	E310.1

[a] The MDL and RL values were set at the same concentration for Chlorophyll-a. CH2M Hill does not analyze for chlorophyll-a. Samples were sent to Chesapeake Biological laboratory for analysis.