

ERRATA

KLAMATH RIVER BASELINE WATER QUALITY SAMPLING – 2012 ANNUAL REPORT –

Prepared for the KHSA Water Quality Monitoring Group

Prepared by
Watercourse Engineering, Inc.
January 5, 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 2012 dataset which required the following changes be made to the Klamath River Baseline Water Quality Sampling 2012 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 2012 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 2012 Site IDs and Names and the corresponding Standardized Site IDs and Names.

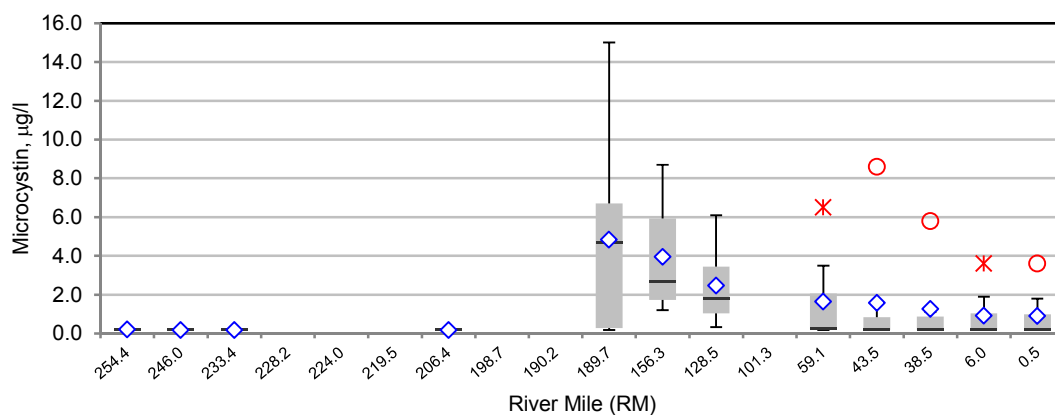
Old Site ID and Name		Corresponding Standardized Site ID and Name	
KR2544	Link Dam	KR25444	Link Dam (RM 254.44; Baseline)
KR2460	Keno Reservoir at Miller Island	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)
KR2330	Klamath River below Keno Dam	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)
KR2282	Klamath River above J.C. Boyle Dam	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)
KR2260	J.C. Boyle Reservoir	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)
KR2240	Klamath River below J.C. Boyle Dam	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)
KR2195	Klamath River below USGS Gage	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)
KR2064	KR above Shovel Creek (Stateline)	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)
KR1990	Copco Reservoir	KR19874	Copco Reservoir (RM 198.74; Baseline)
KR1950	Klamath River below Copco Dam	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)
KR1920	Iron Gate Reservoir	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)
KR1897	Klamath River below Iron Gate Dam	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)
KR1560	Klamath River at Walker Bridge Road	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)
KR1285	Klamath River below Seiad Valley	KR12850	Klamath River below Seiad (RM 128.5; Baseline)
KR1006	Klamath River near Happy Camp	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)
KR0591	Klamath River at Orleans (USGS)	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)
KR0435	Klamath River at Weitchpec	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)
KR0385	Klamath River below Trinity River	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)
KR0060	Klamath River near Klamath	KR00600	Klamath River near Klamath (RM 6.0; Baseline)
KR0005	Klamath River Estuary	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 2012, nor was the variability of the MDLs and RLs presented. The methods as well as the MDL and RL variation in 2012 are presented in Errata Table 2.

Errata Table 2. 2012 Laboratory methods, method detection limits (MDLs) and reporting limits (RLs). “na” indicates no limit available for a method.

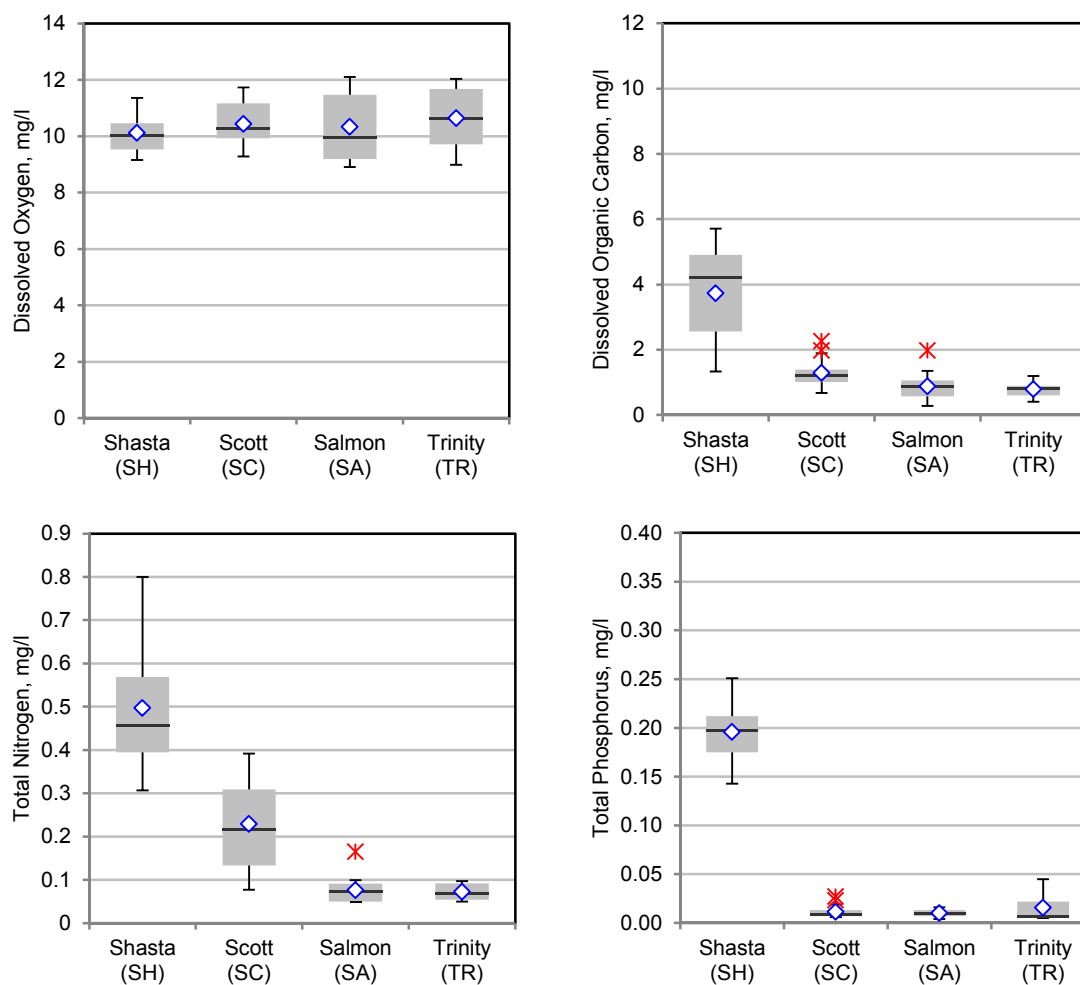
Constituent	ID	Basic			CH2MHill			Aquatic Research			CBL			EPA		
		Method	MDL	RL	Method	MDL	RL	Method	MDL	RL	Method	MDL	RL	Method	MDL	RL
Alkalinity	ALKT	SM 2320B	1.0	5.0	EPA 310.1	na	5.0	SM 2320B	1	-	-	-	-	-	-	-
Carbon, Dissolved Organic Carbon	DOC	SM 5310C	0.2	0.5	SM 5310C	0.065 0.047	0.5 0.5	SM 5310B	0.25	-	-	-	-	-	-	-
Demand, Carbonaceous Biological Oxygen Demand	CBOD	SM 5210	3.0	3.0	SM 5210B	na	2.0	SM 5210B	-	-	-	-	-	-	-	-
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	0.01 0.02	0.05 0.05	EPA353.2	0.0028	0.01	SM 4500NO3F	0.01	-	-	-	-	-	-	-
Nitrogen, Total Kjeldahl Nitrogen	TKN	EPA 351.2	0.1	0.2	EPA 351.2	0.044 0.062 0.051	0.2 0.2 0.2	-	-	-	-	-	-	-	-	-
Nitrogen, Total Nitrogen	TN	EPA 351.2	0.1	0.2	SM 4500-N C	0.062 0.051	0.2 0.2	SM 4500 NC	0.05	-	-	-	-	-	-	-
Phosphorus, Phosphate	OPO4	SM 4500P-E	0.01 0.005	0.05 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	0.024 0.022	0.05 0.05	SM 4500PF	0.002	-	-	-	-	-	-	-
Turbidity	TURB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solids, Total Suspended Solids	TSS	SM 2540D	1.0	5.0	SM 2540D	na 0.6	2.0 5.0	SM 2540D	0.5	-	-	-	-	-	-	-
Solids, Volatile Suspended Solids	VSS	SM 2540D	1.0	5.0	EPA 160.4	na na	2.0 5.0	SM 2540E	0.5	-	-	-	-	-	-	-
Algae, Chlorophyll-a	CHLA	SM 10200H	2.0	6.0	-	-	-	SM 10200H	0.1	-	EPA 445.0	0.21	-	-	-	-
Algae, Pheophytin	PHEO	SM 10200H	2.0	6.0	-	-	-	SM 10200H	0.1	-	EPA 445.0	0.09	-	-	-	-
Carbon, Particulate Carbon	PC	-	-	-	-	-	-	-	-	-	EPA 440.0	0.0633	-	-	-	-
Nitrogen, Particulate Nitrogen	PN	-	-	-	-	-	-	-	-	-	EPA 440.0	0.0105	-	-	-	-
Toxins, Microcystin	MYCN	-	-	-	-	-	-	-	-	-	-	-	-	ELISA	0.15	0.18

4. Because of the small sample size at each site during 2012, 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. Missing microcystin data was added to the dataset, and to reflect those changes, the mainstem microcystin boxplot in Figure 7 was revised and is presented below in Errata Figure 7.



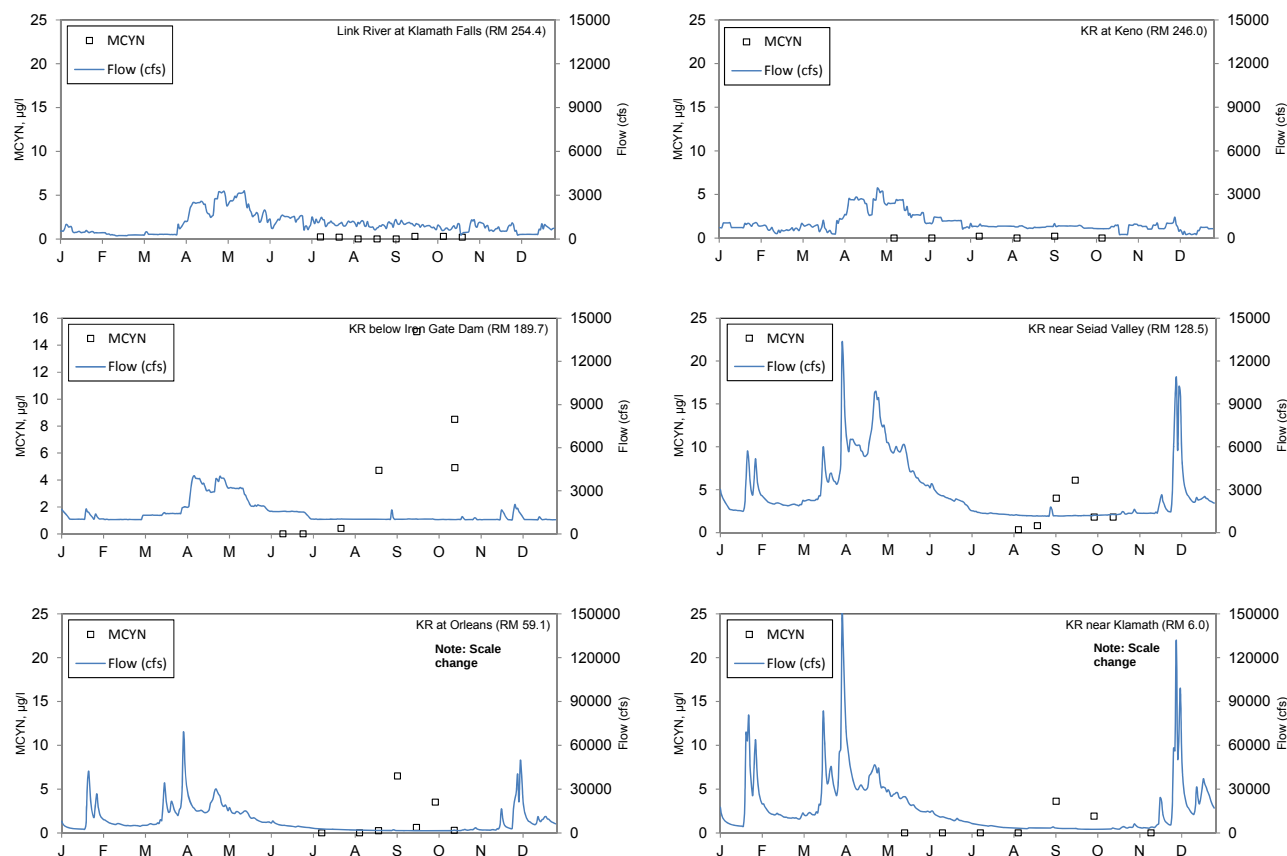
Errata Figure 7. Microcystin from Link River to the Klamath River Estuary with median (—), mean (◇), outliers (*), and extreme outliers (○) identified (February 2012 – December 2012). Note: Miller Island at Keno Reservoir (RM 246.0), Copco Reservoir (RM 198.7), and Iron Gate Reservoir (RM 190.2). River mile on x-axis not to scale. Note: No microcystin boxplots are included for River Mile 228.2, 224.0, 219.5, 198.7, 190.2 and 101.3 because there were fewer than six data points at each of these sites.

6. Erroneous total nitrogen data was corrected in the dataset; to reflect these changes, the total nitrogen boxplots for the tributaries in Figure 8 was revised and is presented below in Errata Figure 8.



Errata Figure 8. 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 2012 – December 2012).

7. Missing microcystin data was added to the dataset, and to reflect those changes, the microcystin and USGS flow graphs in Figure 17 were revised and are presented below in Errata Figure 17.



Errata Figure 17. Revised discrete 2012 microcystin (MYCN) measured during grab sampling and mean daily flow at USGS flow gage locations for: Link River at Klamath Falls (USGS Gage 11507500), Klamath River at Keno (USGS Gage 11509500), Klamath River below Iron Gate Dam (USGS Gage 11516530), Klamath River near Seiad Valley (USGS Gage 11520500), Klamath River at Orleans (USGS Gage 11523000), and Klamath River near Klamath (USGS Gage 11530500). Note the scale change for the secondary y-axis for Klamath River at Orleans (RM 59.1; Baseline) and Klamath River near Klamath (RM 6.0; Baseline).

8. The Appendix B 2012 KHSA dataset has been revised since the original 2012 Annual Report was completed. The revised dataset is presented in the table below in Errata Table B-1.

Errata Table B-1. 2012 KHSA dataset.

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
KHSA2012-003	2/22/12	10:30	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	4.11	7.69	110	10.12	6	<6	48	4.2	1.34	<3	0.2	0.39		0.8	1.2	<0.05	0.05			9.45	7	<2.0	
KHSA2012-008	3/20/12	8:00	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	3.21	7.81	111	11.09	14	8	45	3.9	2.76	<3	0.09	0.38		0.9	1.26	<0.05	0.09			27.06	44	7	
KHSA2012-015	4/25/12	12:00	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	14.27	8.43	109	10.07	<6	<6	46	4.3	3.12	3	0.11	0.11		0.8	0.9	<0.05	0.08			20.97	33.2	6.8	
KHSA2012-019	5/9/12	7:30	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	14.15	8.02	106	9.27	6	<6	47	5	1.61	<3	<0.05	<0.05		0.5	0.54	<0.05	0.07			11.70	9	3	
KHSA2012-025	5/23/12	7:40	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	14.14	7.84	107	8.02	6	<6	48	4.7	1.47	<3	<0.05	0.06	0.258	5	0.6	<0.05	0.08			7.89	4.3	2.7	
KHSA2012-029	6/6/12	7:30	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	14.22	7.66	105	7.77	<6	<6	48	5.3	2.62	<3	0.06	0.05	0.479	0.7	0.7	<0.05	0.13			12.32	6.7	3.4	
KHSA2012-035	6/20/12	8:00	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	17.55	8.48	109	8.42	10	<6	50	5.2	2.27	<3	0.08	<0.05	0.231	0.7	0.66	<0.05	0.1			10.06	17.7	5	
KHSA2012-040	7/11/12	7:00	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	22.87	9.73	122	10.21	187	<6	51	6.2	11.80	8	0.09	<0.05	2.45	2.3	2.3	<0.05	0.19			16.63	15.7	9.3	0.22
KHSA2012-046	7/25/12	6:50	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	21.22	10.14	119	8.17	370	<6	50	7.3	11.30	17	0.16	<0.05	2.21	2.8	2.8	0.1	0.14			34.23	21	10.3	0.20
KHSA2012-051	8/8/12	6:20	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	22.32	9.66	108	8.29	276	<6	48	7.9	11.70	17	0.13	<0.05	2.34	3.2	3.24	0.113	0.31			24.27	19.7	10.7	<0.18
KHSA2012-057	8/22/12	7:05	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	21.36	5.5	107	9.08	72	<6	49	7.7	4.63	7	0.16	0.05	0.982	1.5	1.6	0.99	0.24			13.07	15.7	4.7	<0.18
KHSA2012-062	9/5/12	8:50	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	19.29	7.95	115	6.1	19	<6	52	7.4	1.95	3	0.16	0.24	0.389	1.2	1.4	0.029	0.11			10.15	9.3	3	<0.18
KHSA2012-068	9/19/12	7:00	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	18.91	7.48	122	5.44	13	<6	53	7.1	2.97	3	0.04	0.2	0.601	0.9	1.1	0.01	0.08			9.90	5.7	2	0.29
KHSA2012-073	10/10/12	6:45	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	12.56	7.58	122	8.1	7	<6	53	5.6	1.57	<3	0.15	0.21	0.266	1.1	1.3	<0.01	0.07			13.53	6.4	<2.0	0.28
KHSA2012-079	10/24/12	7:45	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	6.78	7.74	126	8.73	<6	<6	53	5.2	1.77		0.22	0.3	0.306	0.9	1.2	0.012	0.07			14.40	9	2	0.20
KHSA2012-084	11/14/12	7:30	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	4.66	7.08	128	9.86	11	<6	54	5.1	1.93	<3	0.32	0.36	0.33	0.8	1.16	<0.01	0.12			25.80	21.3	4.4	
KHSA2012-090	12/12/12	9:00	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	2.21	7.47	122	10.51	6	<6	48	4		<3	0.39	0.44		0.8	1.26	0.014	0.11			59.00	75	8.7	
KHSA2012-001	2/22/12	12:00	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	4.65	8.07	168	10.79	24	7	70	3.4	1.74	3	0.3	0.47		1.2	1.6	<0.05	0.11			11.27	8	3	
KHSA2012-009	3/20/12	10:05	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	4.91	8.14	277	10.8	13	11	98	4	2.00	<3	0.22	0.38		0.9	1.28	<0.05	0.13			16.06	22	4	
KHSA2012-013	4/25/12	11:00	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	14.7	8.36	131	8.98	29	<6	56	4.4	4.01	3	0.11	0.13		0.9	1	<0.05	0.13			19.26	30.7	8	
KHSA2012-020	5/9/12	9:10	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	14.58	7.95	112	9.12	8	<6	48	5	1.42	<3	<0.05	<0.05		0.5	0.58	<0.05	0.08			13.70	9	3	<0.18
KHSA2012-032	6/6/12	9:00	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	16.29	8.26	111	9	9	<6	49	5.7	1.40	<3	0.04	0.04	0.21	0.6	0.6	<0.05	0.11			8.91	5.8	2.7	<0.18

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
KHSA2012-043	7/11/12	9:15	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	23.93	9.51	123	5.61	143	<6	55	6.9	9.04	9	0.51	<0.05	1.87	2.8	2.8	<0.05	0.24				10.2	9.4	<0.18
KHSA2012-054	8/8/12	9:05	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	23.2	9.02	113	0.51	48	<6	52	8.3	6.48	9	0.83	<0.05	1.42	2.7	2.71	0.117	0.32			12.23	10.8	7.2	<0.18
KHSA2012-065	9/5/12	8:05	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	18.94	7.49	140	2.52	17	<6	62	8	2.24	4	0.48	0.1	0.436	1.8	1.9	0.027	0.12			8.07	8.4	2.8	<0.18
KHSA2012-076	10/10/12	9:00	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	12.93	7.2	154	3.15	8	<6	66	6.1	0.76	<3	0.11	0.32	0.124	0.7	1	0.022	0.06			10.70	3.3	<2.0	<0.18
KHSA2012-087	11/14/12	9:55	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	5.66	7.06	135	6.12	<6	14	53	4.8	1.72	<3	0.22	0.55	0.292	0.7	1.27	0.016	0.08			19.57	14	<2.0	
KHSA2012-093	12/12/12	10:20	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	2.78	7.19	192	6.71	6	6	78	6		<3	0.37	0.62		1	1.57	0.114			49.23	29.3	6.4		
KHSA2012-002	2/22/12	9:15	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	4.24	8.77	203	11.72	64	10	73	6	3.81	5	0.08	0.42		1.2	1.7	<0.05	0.11			14.87	20	8	
KHSA2012-007	3/20/12	6:55	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	4.36	7.92	254	11.06	26	9	94	7.3	3.72	<3	0.25	0.36		1.5	1.9	<0.05	0.15			26.30	33	8	
KHSA2012-014	4/25/12	7:30	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	15.21	8.34	131	9.81	31	6	53	4.7	4.69	<3	0.11	0.13		0.9	1	<0.05	0.14			27.90	47.8	9.8	
KHSA2012-021	5/9/12	11:48	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	14.15	8.13	129	10.62	10	<6	53	5.3	2.41	<3	0.04	<0.05		0.8	0.76	<0.05	0.12			19.00	28.6	5.8	<0.18
KHSA2012-033	6/6/12	10:40	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	15.72	8.46	133	9.7	13	<6	56	6.3	1.68	<3	<0.05	<0.05	0.25	0.7	0.7	0.051	0.12			9.63	12	2.6	<0.18
KHSA2012-038	6/20/12	10:00	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	18.42	8.21	138	8.71			59			<3	0.05	<0.05		0.8	0.79	0.066	0.13			7.58			
KHSA2012-044	7/11/12	10:30	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	22.19	9.05	137	7.75	15	6	61	7.1	2.02	<3	0.16	<0.05	0.351	1.1	1.1	0.092	0.18			4.32	5.4	2.8	0.19
KHSA2012-049	7/25/12	8:25	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	21.49	8.98	138	6.91			61			4	0.66	<0.05		2.1	2.1	0.155	0.21			6.55			
KHSA2012-055	8/8/12	8:00	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	22.92	8.78	132	6.77	122	<6	58	9.1	5.97	11	0.84	<0.05	1.31	3.1	3.07	0.183	0.36			14.63	10.8	7.2	<0.18
KHSA2012-060	8/22/12	8:30	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	21.89	7.76	144	6.96			61			6	0.95	<0.05		2.7	2.7	0.115	0.29			7.17			
KHSA2012-066	9/5/12	6:50	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	19.15	8.01	156	9.22	56	6	67	9.4	3.89	9	0.41	0.04	0.827	2.3	2.3	0.05	0.19			13.27	8.2	6.2	0.19
KHSA2012-071	9/19/12	8:30	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	18.72	7.38	158	7.81			67			4	0.29	0.11		1.3	1.5	<0.01	0.09			6.75			
KHSA2012-077	10/10/12	8:10	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	14.72	7.27	162	8	10	9	69	7.1	1.10	<3	0.14	0.13	0.202	1	1.2	<0.01	0.07			8.82	4	<2.0	<0.18
KHSA2012-082	10/24/12	6:45	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	10.52	7.49	106	9.27			70				0.12	0.32		1	1.34	0.021	0.08			12.80			
KHSA2012-088	11/14/12	9:00	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	5.94	7.13	137	10.19	16	<6	54	5.2	1.17	<3	0.16	0.35	0.165	0.7	1.25	<0.01	0.08			21.57	12.2	2.4	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate/Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
KHSA2012-094	12/12/12	8:10	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	R	3.30	7.42	180	11.05	10	9	68.0	5.10		<3	0.30	0.59		0.8	1.34	0.041				38.10	33	4.8	
IG062712-OC	6/27/2012	13:30	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	Karuk	0.5	P	18.69	8.56	102.0	9.51	6.9	2.2	67.1	4.050	0.5570		0.011	0.052			0.511	0.058	0.091			0.99	3.0	0.67	
IG072512-OC	7/25/2012	12:58	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	Karuk	0.5	P	21.99	8.43	149.0	8.92	5.3	0.6	69.4	3.930			0.019	0.064			0.527	0.084	0.105			0.76	1.70	1.30	
IG082212-OC	8/22/2012	13:57	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	Karuk	0.5	P	21.19	8.53	149.0	7.00	12.0	2.3	66.9	5.380	1.3800		0.020	0.262			1.180	0.132	0.182			1.70	3.50	3.00	4.70
IG091912-OC	9/19/2012	14:25	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	Karuk	0.5	P	19.67	9.12	148.0	9.86	22.0	5.8	73.6	4.690	3.5500		<0.010	0.204			1.330	0.127	0.194			3.40	10.00	7.30	15.00
IG101712-OC	10/17/2012	13:26	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	Karuk	0.5	P	15.92	7.93	157.0	8.26	11.0	3.2	73.8	4.760	0.9930		0.020	0.333			1.080	0.100	0.160			1.70	3.00	2.50	8.50
KR12001	2/23/12	9:40	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P	3.00	8.46	222	11.83			72.1	5.91			<0.05	0.380		0.94	1.630	0.025	0.052				15.0	6.5	
KR12002	2/23/12	11:00	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	2.64	8.40	231	11.38			70.4	5.61			<0.05	0.420		0.98	1.810	0.031	<0.05				22.0	8.8	
KR12003	2/23/12	not sampled	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	3.57	8.68	219	13.35																			
KR12004	2/23/12	not sampled	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8.0	P																							
KR12005	2/23/12	9:00	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	2.94	8.44	223	12.24			73.1	6.59		5	<0.05	0.400		0.59	1.640	0.025	0.076			9.56	15.2	6.4	
KR12009	2/22/12	16:35	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P	3.35	7.81	178	11.92			67.5	3.37		2.6	0.100	0.610		0.59	1.210	0.046	0.078			3.68	<2.0	<2.0	
KR12010	2/22/12	15:40	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	5.11	8.25	217	11.63			72.8	4.59		6.3	<0.05	0.410		0.55	1.400	0.020	0.090			8.13	13.6	5.6	
KR12011	2/22/12	11:55	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I																							
KR12012	2/22/12	11:40	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	4.4	7.71	195	10.94			68.7	3.70			<0.05	0.630		0.64	1.100	0.061	0.120				2.8	<2.0	
KR12013	2/22/12	11:50	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	13.0	P							67.7	3.89			0.071	0.64		0.53	1.29	0.063	0.086				<2.0	<2.0	
KR12014	2/22/12	12:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	26.0	P							68.0	4.33			0.120	0.660		0.63	1.250	0.068	0.120				2.0	<2.0	
KR12015	2/22/12	12:55	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	3.88	7.82	193	10.67			68.0	3.56			0.065	0.630		0.63	1.240	0.063	0.096				<2.0	<2.0	
KR12016	2/22/12	14:05	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I																							
KR12017	2/22/12	14:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	3.65	7.83	176	10.86			66.0	3.64			0.140	0.600		0.52	1.260	0.046	0.056				<2.0	<2.0	
KR12018	2/22/12	14:15	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	6.0	P							66.8	3.61			0.17	0.57		0.61	1.34	0.053	0.09				<2.0	<2.0	
KR12019	2/22/12	14:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	44.0	P							67.6	3.53			0.240	0.560		0.94	1.290	0.069	0.410				<2.0	<2.0	
KR12023	3/20/12	17:45	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P	2.68	8.06	291	11.35	7.45	8.62	101.0	8.56	2.23		0.200	0.430	0.263	1.58	1.820	0.100	0.150				25.6	2.4	
KR12024	3/20/12	15:30	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	4.45	7.74	254	10.48			89.4	8.02			0.130	0.550		1.42	1.770	0.110	0.150				19.3	3.3	
KR12025	3/20/12	not sampled	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	3.02	7.94	283	10.18																			
KR12026	3/20/12	not sampled	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8.0	P																							

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l	
KR12027	3/20/12	17:15	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	7.42	8.26	194	10.27	2.40	3.20	80.4	4.42	0.737		<0.05	0.320	0.071	0.5	0.690	0.063	0.075			6.40	4.8	<2.0		
KR12031	3/21/12	16:10	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P	4.23	7.88	172	11.21	1.22	1.50	69.7	3.44	0.497	2.9	<0.05	0.470	0.056	0.59	0.920	0.041	0.061			3.70	<2.0	<2.0		
KR12032	3/21/12	17:20	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	6.59	8.50	262	10.83	4.99	6.85	94.0	6.80	1.62	4.9	<0.05	0.500	0.183	1.15	1.470	0.079	0.110			15.40	10.7	2.0		
KR12033	3/21/12	12:50	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					1.00	1.46			0.69				0.07											
KR12034	3/21/12	12:15	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	5.28	7.99	206	9.87			78.1	5.33			0.091	0.340		0.67	0.910	0.037	0.061				<2.0	<2.0		
KR12035	3/21/12	12:45	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	7.0	P					0.72	1.2	78.4	4.83	0.403		0.100	0.34	0.0289	0.7	0.89	0.04	0.064				<2.0	<2.0		
KR12036	3/21/12	12:30	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	28.0	P								4.76			0.130	0.320		0.67	0.980	0.052	0.071				<2.0	<2.0		
KR12037	3/21/12	13:30	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	5.19	8.12	207	9.90	1.16	1.65	78.1	4.82	0.476		0.080	0.340	0.042	0.71	0.900	0.039	0.059				<2.0	<2.0		
KR12038	3/21/12	15:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					1.46	1.77			0.84				0.08											
KR12039	3/21/12	14:50	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	4.54	8.16	177	10.46	1.55	1.90		4.07	0.457		<0.05	0.380	0.053	0.56	0.830		0.050							
KR12040	3/21/12	15:15	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	44.0	P					1.42	1.73	67.3	3.73	0.462		0.086	0.510	0.059	0.43	0.950	0.048	0.062				<2.0	<2.0		
KR12041	3/21/12	15:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	6.0	P							69.3	3.69			<0.05	0.4		0.47	0.83	0.031	<0.05				<2.0	<2.0		
KR12045	4/23/12	14:00	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P	12.05	7.93	147	9			56.8	5.30			0.073	0.180		1.09	0.960	0.078	0.180				34.0	6.8		
KR12046	4/23/12	15:00	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P				8.66	8.26	8.56	57.5	5.11	1.9		<0.05	0.150	0.262	0.59	1.130	0.051	0.066				43.6	8.4		
KR12047	4/23/12	not sampled	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P																								
KR12048	4/23/12	not sampled	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8.0	P																								
KR12049	4/24/12	17:00	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	14.16	8.31	145	9.18			56.5	4.73		<2	<0.05	0.190		0.7	0.840	0.069	0.120			19.00	35.2	7.6		
KR12053	4/24/12	11:40	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P	10.97	7.98	153	10.56	4.30	3.12	58.1	4.51	1.76	<2	<0.05	0.300	0.245	0.86	0.790	0.047	0.140			9.10	5.6	3.2		
KR12054	4/23/12	12:45	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	12.02	7.78	147	8.76	8.97	8.14	56.7	4.69	0.688		0.064	0.180	0.086	0.93	0.920	0.064	0.140			20.00	33.6	7.6		
KR12055	4/24/12	14:50	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					2.95	2.66			0.84				0.11											
KR12056	4/24/12	14:40	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	14.00	7.95	153	9.44	2.15	1.47	57.0	5.16	0.532		<0.05	0.240	0.064	0.67	0.650	0.046	0.077				4.4	<2.0		
KR12057	4/24/12	15:20	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	5.0	P							55.4	4.66			<0.05	0.25		0.65	0.97	0.053	0.1				8.0	3.2		
KR12058	4/24/12	15:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	28.0	P							60.0	5.13			0.260	0.290		0.95	0.980	0.140	0.170				8.8	30.8		
KR12059	4/24/12	10:00	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	11.05	7.64	151	9.03			55.5	5.27			0.081	0.280		0.78	0.760	0.059	0.077				7.6	<2.0		
KR12060	4/24/12	12:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					2.74	2.73			0.57				0.08											
KR12061	4/24/12	12:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	13.43	8.03	146	9.39	1.03	1.23	57.6	5.43	0.466		<0.05	0.280	0.060	0.71	0.640	0.039	0.070				8.4	2.4		

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
KR12062	4/24/12	13:20	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	6.0	P							58.2	4.78			<0.05	0.29		0.7	0.72	0.052	0.077				9.6	4.4	
KR12063	4/24/12	12:50	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	47.0	P							72.9	4.30			<0.05	0.510		0.48	0.790	0.091	0.130				3.6	3.2	
KR12067	5/22/12	13:20	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P	15.13	7.80	136	8.6			54.3	5.56			0.052	0.150		0.82	0.800	0.079	0.120				12.0	3.6	
KR12068	5/22/12	15:00	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P							53.5	5.48			<0.05	0.11		0.8	0.69	0.075	0.12				10.8	3.2	<0.18
KR12069	5/22/12	14:15	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P																							<0.18
KR12070	5/22/12	14:30	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8.0	P																							<0.18
KR12071	5/22/12	12:00	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	15.35	7.59	136	8.26			54.5	5.18			0.068	0.150		0.74	0.730	0.080	0.130			8.40	9.6	2.8	<0.18
KR12075	5/23/12	10:00	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P	15.12	8.06	137	9.70			55.7	5.31		<2	<0.05	0.130		0.54	0.510	0.078	0.099		4.40	<2.0	3.6		
KR12076	5/23/12	9:05	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	13.43	7.96	137	9.24			56.5	4.68		<2	<0.05	0.180		0.58	0.550	0.072	0.100		7.30	8.8	4.4	<0.18	
KR12077	5/23/12	14:40	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I																							
KR12078	5/23/12	14:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	16.61	7.89	133	8.21			54.0	4.49			<0.05	0.170		0.51	0.530	0.086	0.110			<2.0	<2.0	<0.18	
KR12079	5/23/12	14:30	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	11.0	P							53.7	4.4			<0.05	0.16		0.55	0.56	0.092	0.12			<2.0	<2.0		
KR12080	5/23/12	14:45	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	27.0	P							63.6	4.38			0.600	0.077		1.2	1.090	0.360	0.390			4.0	2.0		
KR12081	5/29/12	14:00	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P							56.6	5.75			0.071	0.140		0.59	0.600	0.094	0.110			4.4	3.6	<0.18	
KR12082	5/23/12	12:20	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I																							
KR12083	5/23/12	12:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	15.47	8.00	136	8.61			54.7	4.79			<0.05	0.130		0.72	0.540	0.075	0.110			<2.0	<2.0	<0.18	
KR12084	5/23/12	12:10	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	10.0	P							54.4	4.17			<0.05	0.14		0.48	0.46	0.079	0.1			<2.0	2.0		
KR12085	5/23/12	12:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	43.0	P							72.8	4.43			<0.05	0.65		0.48	0.990	0.120	0.130			<2.0	<2.0		
KR12089	5/29/12	15:00	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P							55.2	4.59		4.2	<0.05	0.110		0.56	0.530	0.075	0.110			4.50	4.4	2.4	
KR12091	6/12/12	14:10	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P					3.27	2.73	60.7		0.498	14.3	<0.05	<0.01	0.076	0.77	0.540	0.035	0.120		5.40	96.7		<0.18	
KR12092	6/12/12	15:20	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P					5.45	2.95		5.54	0.8	5	<0.05	0.042	0.124	0.78	0.610	0.052	0.091					<0.18	
KR12093	6/26/12	18:40	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P	15.41	7.70	137	8.56	6.28	4.77	57.3	6.56	0.678		<0.05	0.074	0.096	0.77	0.930	0.086	0.130			8.8	<2.0		
KR12094	6/26/12	16:50	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	16.74	7.9	134	8.26	4.67	3.8	55.6	6.4	0.746		<0.05	0.055	0.107	0.78	0.86	0.078	0.12			9.2	2.4	<0.18	
KR12095	6/26/12	not sampled	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P																							
KR12096	6/26/12	not sampled	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8.0	P																							
KR12097	6/26/12	18:05	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	15.15	7.6	137	8.19	5.43	4.22	57.4	6.85	0.705		<0.05	0.075	0.107	0.74	0.870	0.084	0.130		5.70	8.0	<2.0	<0.18	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate/Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
KR12101	6/27/12	15:40	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P	16.85	7.88	142	8.85	4.96	1.81	59.5	5.22	0.327	<2	<0.05	0.061	0.047	0.51	0.540	0.065	0.094			2.10	<2.0	2.0	<0.18
KR12102	6/27/12	10:30	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	13.1	8.15	142	9.61	2.78	2.59	61.3	4.38	0.567	<2	<0.05	0.130	0.080	0.53	0.630	0.078	0.100			4.40	8.4	4.4	<0.18
KR12103	6/27/12	13:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					2.21	1.61		0.46					0.06										<0.18
KR12104	6/27/12	12:50	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	18.40	8.19	140	8.49	2.02	0.91	60.3	5.29	0.262		<0.05	0.050	0.049	0.58	0.550	0.075	0.100				<2.0	<2.0	0.23
KR12105	6/27/12	13:25	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	14.5	P							59.7	4.97			0.087	0.14		0.64	0.69	0.13	0.16				2.0	<2.0	
KR12106	6/27/12	13:15	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	28.5	P							66.2	5.19			0.680	0.049		1.19	1.360	0.410	0.450				4.4	2.4	
KR12107	6/27/12	15:00	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	16.59	7.71	143	7.20	1.52	1.10	60.2	4.81	0.432		<0.05	0.089	0.067	0.59	0.670	0.100	0.130				2.4	<2.0	<0.18
KR12108	6/30/12	15:15	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					2.62	1.84		0.33					0.05										<0.18
KR12109	6/30/12	15:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	20.88	8.22	142	9.61	1.74	0.60	62.9	5.74	0.303		<0.05	<0.01	0.047	0.48	0.380	0.045	0.073				<2.0	<2.0	0.22
KR12110	6/30/12	15:35	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	14.5	P					1.3	0.94	58.4	4.67	0.217		<0.05	0.19	0.04	0.42	0.6	0.081	0.096				<2.0	<2.0	
KR12111	6/30/12	15:20	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	44.0	P							74.4	4.72			0.130	0.600		0.73	1.290	0.140	0.170				3.2	<2.0	
KR12115	7/11/12	14:30	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P					1.33	0.66	61	8.49	0.211	<2	<0.05	0.068	0.0355	0.48	0.49	0.078	0.098			1.30	<2.0	<2.0	
KR12116	7/11/12	11:10	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P					10.57	5.47		0.904	6.2	<0.05	0.16	0.164	0.57	0.66	0.11	0.12							
KR12117	7/24/12	15:50	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P	20.64	7.84	136	7.57	1.34	1.86	54	7.03	0.424		0.180	0.750	0.064	1.34	2.010	0.180	0.280				3.6	2.0	
KR12118	7/24/12	13:10	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	21.91	8.04	139	7.18	1.83	2.71	54	9.11	1.06		0.13	0.72	0.152	1.56	2.21	0.18	0.27				4.8	4	<0.18
KR12119	7/24/12	14:10	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	21.31	8.17	135	7.87	0.54	0.63		0.142					0.022										<0.18
KR12120	7/24/12	14:30	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8.0	P					0.81	1.13		0.207					0.0309										<0.18
KR12121	7/24/12	15:15	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	20.67	7.93	135	7.51	1.07	1.59	53.5	7.97	0.2		0.14	0.75	0.0331	1.25	1.92	0.18	0.24			2.50	3.4	2.4	<0.18
KR12125	7/25/12	13:45	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P	20.47	8.11	147	8.41	0.33	0.49	61.4	4.2	0.0865	4.2	<0.05	0.07	0.0132	0.63	0.44	0.083	0.12			1.10	<2.0	<2.0	0.40
KR12126	7/25/12	9:40	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	17.68	8	143	8.78	0.45	0.65	57.9	5.58	0.28	5.1	<0.05	0.73	0.0331	0.72	1.41	0.14	0.17			1.60	2.0	<2.0	<0.18
KR12127	7/25/12	16:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					0.51	0.82		0.33					0.04										2.40
KR12128	7/25/12	15:40	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P					0.54	0.61	62.1	7.22	0.143		<0.05	<0.01	0.020	0.75	0.620	0.071	0.130				4.8	3.4	3.40
KR12129	7/25/12	16:30	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	14.5	P					0.42	0.63	59.3	4.44	0.349		0.052	0.29	0.0331	0.58	0.66	0.21	0.24				<2.0	<2.0	
KR12130	7/25/12	16:10	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	28.5	P							65.9	4.99			0.900	0.011		1.39	1.280	0.530	0.580				2.4	<2.0	
KR12131	7/25/12	15:00	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	19.82	8.33	146	7.99	0.38	0.47	61.4	5.17	0.221		<0.05	0.15	0.0265	0.8	0.7	0.11	0.16				<2.0	<2.0	1.90
KR12132	7/25/12	12:10	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					0.39	0.60		0.16					0.02										0.41

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll/a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l	
KR12133	7/25/12	12:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P					0.18	0.23	61.6	4.22	0.135		<0.05	<0.01	0.018	0.59	0.280	0.053	0.087				<2.0	<2.0	0.64	
KR12134	7/25/12	12:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	14.5	P					0.35	0.51	57.7	3.56	0.109		<0.05	0.34	0.0154	0.42	0.57	0.1	0.12				<2.0	<2.0		
KR12135	7/25/12	12:20	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	44.0	P							74	5.38			0.25	0.58		0.76	1.2	0.2	0.23				3.0	<2.0		
KR12139	8/22/12	8:50	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P	20.71	7.47	141	7.41	3.92	5.73	53.6	8.99	0.852		0.28	0.97	0.123	1.42	2.77	0.24	0.33				3.4	<5.0		
KR12140	8/22/12	11:25	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	20.71	7.71	141	6.95	6.66	10	52	8.7	1.55		0.2	1.06	0.232	1.59	2.99	0.19	0.31				4.6	<5.0		
KR12141	8/22/12	10:40	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	21.26	7.19	141	5.30	2.60	3.48			0.592				0.076											
KR12142	8/22/12	10:50	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8.0	P					4.64	6.99			0.877				0.116											
KR12143	8/22/12	10:00	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	19.54	7.08	142	5.73	4.12	6.45	53.9	7.73	1.14		0.21	1	0.163	1.39	2.68	0.23	0.32			2.50	3.6	<5.0		
KR12147	8/21/12	10:05	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P	20.44	8.29	147	6.89	6.6	1.98	63	4.96	0.744	<2	<0.05	0.18	0.141	0.76	1.2	0.12	0.19			3.20	3.2	<5.0		
KR12148	8/21/12	17:00	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	19.64	8.25	140	8.17	2.99	4.09	55.3	7.15	0.896	<2	<0.05	1.02	0.122	0.98	2.34	0.2	0.31			2.70	4.8	<5.0		
KR12149	8/21/12	15:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					2.25	2.70			0.69				0.10											
KR12150	8/21/12	15:10	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P					17.16	6.42	61.7	5.91	1.84		<0.05	0.017	0.315	1.74	1.930	0.092	0.280				15.0	12.8		
KR12151	8/21/12	16:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	18.0	P					0.82	1.01	62.3	4.54	0.687		0.17	0.18	0.0559	0.56	0.98	0.25	0.32				4.6	<5.0		
KR12152	8/21/12	15:30	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	28.0	P							68.9	4.43			0.960	0.029		1.37	1.61	0.6	0.68				6.2	<5.0		
KR12153	8/21/12	14:00	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	20.44	8.82	143	8.8	2.19	2.77	59.7	6.13	0.48		<0.05	0.33	0.0693	1	1.74	0.14	0.23				6.2	5.4		
KR12154	8/21/12	11:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					1.09	1.00			0.68				0.09											
KR12155	8/21/12	11:50	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P					1.44	0.52	65.3	5.10	0.338		<0.05	<0.01	0.480	0.91	1.140	0.050	0.130				5.6	5.6		
KR12156	8/21/12	13:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	17.0	P					0.85	0.86	58.8	4.09	0.26		<0.05	0.29	0.0335	0.36	0.9	0.11	0.15				<2.0	<5.0		
KR12157	8/21/12	12:20	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	44.0	P							77.9	<0.5			0.340	0.46		0.7	1.49	0.23	0.28				4.2	<5.0		
KR12161	8/27/12	13:10	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P					2.02	2.73			0.672	6.9	<0.05	0.62	0.0872	0.6	1.47	0.13	0.14							
KR12162	8/27/12	14:20	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P					3.36	1.94	50.2	4.8	0.725		<0.05	0.22	0.118	0.87	1.46	0.12	0.12				4.4	<5.0		
KR12163	9/11/12	15:50	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P											2.4	0.051	0.63		0.77	1.29	0.1	0.14						
KR12164	9/11/12	13:15	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P							62.4	4.47			15.2	0.075	0.23	1.2	1.15	0.13	0.19			3.90	3.9	<5.0		
KR12165	9/16/12	18:15	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P	17.8	7.61	154	7.83	1.74	2.58	61.2	6.46	0.488		0.22	0.64	0.0623	1.19	1.86	0.088	0.16				3.1	<5.0		
KR12166	9/16/12	15:45	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	19.14	7.18	152	7.59	2.21	3.51	60.1	6.65	0.67		<0.05	0.61	0.0846	1.19	1.78	0.062	0.094				4.0	<5.0	<0.18	
KR12167	9/16/12	17:00	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	18.46	7.1	152	7.12	0.60	0.76			0.205				0.020										<0.18	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll/a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate-Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l	
KR12168	9/16/12	17:10	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8.0	P					0.63	0.82			0.255				0.02										<0.18	
KR12169	9/16/12	17:50	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	17.77	7.6	153	7.4	0.71	0.75	60.7	6.85	0.556		0.120	0.65	0.0579	1.19	1.82	0.084	0.11			3.50	3.4	<5.0	<0.18	
KR12173	9/17/12	18:45	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P	18.41	8.7	149	8.08	13.9	1.87	63.3	4.77	1.24	<2	<0.05	0.26	0.234	0.96	1.11	0.12	0.17			4.40	5.4	5.6		
KR12174	9/17/12	17:40	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	16.97	8.18	151	8.42	1.64	2.34	61.8	5.61	0.865	<2	0.073	0.61	0.114	1.13	1.52	0.076	0.096			3.40	4.8	<5.0	<0.18	
KR12175	9/17/12	15:40	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					9.71	8.77			1.24				0.19										52.00	
KR12176	9/17/12	15:30	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	18.35	9.01	149	14.2	2.40	3.55	66.1	5.01	1.13		<0.05	0.160	0.158	1.91	2.120	0.085	0.200				17.6	14.4	120.00	
KR12177	9/17/12	16:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	18.0	P					0.32	0.53	68.4	4.44	0.333		0.35	0.31	0.0334	1.01	1.37	0.21	0.23				2.4	<5.0		
KR12178	9/17/12	15:50	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	30.0	P							72.9	4.15			1.49	0.025		1.95	2.37	0.93	0.96					2.8	<5.0	
KR12179	9/17/12	14:40	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	17.55	8.75	700	9.76	1.2	2.03	63.3	5.08	0.63		<0.05	0.24	0.0802	1.13	1.5	0.11	0.16				6.4	5.2	31.00	
KR12180	9/17/12	13:10	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					1.19	1.74			0.57				0.08										24.00	
KR12181	9/17/12	13:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P					0.96	1.26	64.6	4.13	0.948		<0.05	<0.01	0.135	1.41	1.550	0.082	0.190				4.8	13.6	53.00	
KR12182	9/17/12	14:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	19.0	P					0.2	0.31	60.2	3.23	0.314		0.17	0.26	0.0245	0.43	0.76	0.16	0.17				<2.0	<5.0		
KR12183	9/17/12	not sampled	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.0	P																								
KR12187	10/8/12	16:00	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P					2.65	1.66	67.7	3.67	0.471	4.2	<0.05	0.27	0.0738	0.92	1.08	0.12	0.19				2.80	4.0	<5.0	
KR12188	10/8/12	15:00	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P										3.7	<0.05	0.21		0.58	0.66	0.055	0.1							
KR12189	10/18/12	10:20	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P					3.38	4.88	68.8	8.99	0.459		<0.05	0.31	0.0559	1.08	1.06	0.041	0.083				6.0	<5.0		
KR12190	10/18/12	13:10	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	12.18	8.32	173	9.22	1.24	1.78	68.9	7.87	0.875		<0.05	0.350	0.127	1.01	1.150	0.035	0.079				7.0	<5.0	<0.18	
KR12191	10/18/12	12:25	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	11.88	7.94	170	8.53	2.25	3.57			0.72				0.0894										<0.18	
KR12192	10/18/12	12:35	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8.0	P					1.51	2.41			0.597				0.0782										<0.18	
KR12193	10/18/12	11:40	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	11.71	7.92	170	9.09	3.25	4.66	68.3	7.41	0.493	<0.05	0.32	0.0648	1.06	1.04	0.039	0.085				7.30	6.4	<5.0	<0.18	
KR12197	10/17/12	17:50	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P	14.83	7.72	156	7.66	2.9	1.42	65.4	6.89	0.498	<2	<0.05	0.3	0.0704	0.89	0.97	0.11	0.15			1.70	3.4	<5.0	4.90	
KR12198	10/18/12	9:00	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	11.6	7.91	170	9.39			69.2	5.65		<2	<0.05	0.34		0.79	0.94	0.049	0.081			4.80	2.8	<5.0	<0.18	
KR12199	10/17/12	15:50	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					1.43	0.97			0.42				0.06										3.00	
KR12200	10/17/12	15:55	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	14.58	8.15	160	8.18	0.88	0.49	67.7	5.94	0.509		<0.05	0.200	0.072	0.86	0.790	0.076	0.110				2.8	<5.0	3.20	
KR12201	10/17/12	16:20	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	12.0	P					0.98	0.84	68.5	5.9	0.264		<0.05	0.2	0.0335	0.94	1.19	0.076	0.12				2.2	<5.0		
KR12202	10/17/12	16:10	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	28.0	P					0.89	1.35	70.3	5.74	0.417		0.25	0.18	0.0469	1.09	1	0.084	0.14				<2.0	<5.0		

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate/Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
KR12203	10/17/12	15:00	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P					1.94	0.86	67.3	6.24	0.361		<0.05	0.22	0.0492	1.01	0.9	0.077	0.085				2.2	<5.0	3.40
KR12204	10/17/12	13:10	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					6.32	1.82			0.77				0.13										9.60
KR12205	10/17/12	13:15	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	15.54	7.98	152	7.07	2.55	1.85	65.0	6.52	0.419		<0.05	0.260	0.067	1.06	1.080	0.096	0.160				3.6	<5.0	9.70
KR12206	10/17/12	13:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	8.0	P					0.42	0.53	65	7.58	0.905		<0.05	0.29	0.161	0.88	0.94	0.1	0.17				<2.0	<5.0	
KR12207	10/17/12	13:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	44.0	P							77.5				0.75	0.21		1.44	1.53	0.32	0.37				5.5	<5.0	
KR12211	11/27/12	14:05	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P	3.22	7.56	504	11.41	7.75	6.24	63.3	5.31	0.95		<0.05	0.62	0.135	0.91	1.47	0.058	0.089				15.8	<5.0	
KR12212	11/27/12	15:00	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	3.51	7.62	169	11.02	10.35	7.50	62.1	4.92	0.97		<0.05	0.630	0.153	1.07	1.570	0.055	0.110				18.2	<5.0	
KR12215	11/27/12	13:20	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	3.3	7.27	166	11.14	7.98	5.92	63	5.1	0.652	17	<0.05	0.62	0.104	0.95	1.34	0.055	0.089			17.00	16.6	<5.0	
KR12219	11/28/12	12:10	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P	7.48	7.08	169	7.62	0.71	1.05	69.2	4.49	0.124	<2	0.18	0.32	0.02	0.86	1.1	0.11	0.15			3.70	<2.0	<5.0	
KR12220	11/28/12	10:50	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	4.85	7.81	158	11.2	4.21	4.27	69.8	3.16	0.552	<2	<0.05	0.48	0.0754	0.58	1.03	0.054	0.1			9.00	6.4	<5.0	
KR12221	11/28/12	15:30	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					1.08	1.17			0.21				0.04										
KR12222	11/28/12	15:20	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	6.28	7.62	159	9.36	1.27	1.33	66.1	3.93	0.309		0.057	0.380	0.038	0.82	1.200	0.057	0.100				<2.0	<5.0	
KR12223	11/28/12	15:35	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	16.0	P					1.34	1.43	67.7	4.15	0.327		0.058	0.4	0.0377	0.78	1.02	0.057	0.084				2.6	<5.0	
KR12224	11/28/12	15:45	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	30.0	P							62.3	3.46			0.120	0.4		0.92	1.38	0.061	0.084				4.8	<5.0	
KR12225	11/28/12	14:45	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	6.15	7.39	157	9.09	1.21	1.63	64.3	3.83	0.154		0.068	0.4	0.0244	0.61	1.13	0.061	<0.05				2.2	<5.0	
KR12226	11/28/12	13:10	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					0.4	0.5			0.27				0.04										
KR12227	11/28/12	13:15	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	7.89	7.27	168	5.58	0.50	0.63	71.9	4.28	0.146		0.110	0.330	0.020	0.56	0.940	0.100	<0.05				<2.0	<5.0	
KR12228	11/28/12	13:35	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	23.0	P					0.59	0.87	72.4	3.88	0.0633		0.12	0.35	0.0133	0.86	0.89	0.092	0.13				<2.0	<5.0	
KR12229	11/28/12	13:25	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	44.0	P							77	4.16			0.610	0.2		1.19	1.25	0.21	0.25				4.6	<5.0	
KR12233	12/26/12	16:45	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P	0.00	7.83	293	12.43	3.92	4.46	99.5	6.15	1.06		0.19	0.76	0.13	1.21	1.51	0.13	0.15				18.7	<5.0	
KR12237	12/26/12	16:00	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	0.04	7.86	283	12.13	4.18	4.17	93.3	5.56	1.08		0.170	0.740	0.144	0.92	1.440	0.120	0.130			21.00	20.2	<5.0	
KR12241	12/19/12	16:00	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P	5.11	7.50	161	10.04	1	1.33	62.8	3.85	0.418	<2	<0.05	0.47	0.0488	0.51	0.84	0.071	0.081			6.90	2.0	<5.0	
KR12242	12/19/12	13:20	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	2.47	8.02	187	12.16	2.23	2.60	76.4	3.51	0.616	<2	<0.05	0.570	0.080	0.58	0.920	0.110	0.063			15.00	16.4	<5.0	
KR12243	12/19/12	12:05	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					1.4	1.7			0.55				0.07										
KR12244	12/19/12	11:40	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	3.81	7.36	157	9.67	1.41	1.74	60.4	4.18	0.574		0.059	0.440	0.067	0.71	0.900	0.068	0.074				3.6	<5.0	
KR12245	12/19/12	12:20	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	14.0	P					1.28	1.49	63	4.28	0.668		0.055	0.450	0.098	0.71	0.880	0.066	0.067				3.4	<5.0	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
KR12246	12/19/12	12:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	29.0	P						61	4.37			<0.05	0.45		0.61	0.9	0.067	0.065				3.6	<5.0		
KR12247	12/19/12	10:35	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	3.82	7.17	157	9.98	1.58	1.97	61.4	4.040	0.492		<0.05	0.460	0.056	0.6	0.830	0.067	0.049				3.6	<5.0	
KR12248	12/19/12	14:45	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					1.0	1.1			0.32				0.04										
KR12249	12/19/12	14:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	5.34	7.62	159	8.18	0.23	0.35	63.4	4.50	3.62		<0.05	0.470	0.710	1.34	1.360	0.077	0.170				3.2	<5.0	
KR12250	12/19/12	15:20	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	21.0	P					1.17	1.54	63.0	3.96	0.31		<0.05	0.460	0.038	0.85	0.810	0.072	0.067				<2.0	<5.0	
KR12251	12/19/12	15:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	44.0	P							63.8	3.8			0.05	0.44		0.48	0.88	0.087	0.074				3.2	<5.0	
WA022212-OC	2/22/2012	12:03	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	7.17	8.24	215.0	11.95	3.7	1.5		2.520	0.6640		<0.010	0.562			0.942	0.051	0.075				5.0	1.70	
WA032112-OC	3/21/2012	12:09	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	7.21	7.93	231.0	11.38	4.8	7.9		3.140	0.7490		<0.010	0.303			0.656	0.037	0.060				7.3	2.50	
WA041912-OC	4/19/2012	12:31	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	10.25	7.67	199.0	10.80	5.3	6.6		4.680	0.9560		0.026	0.308			0.975	0.045	0.083				12.0	3.50	
WA051712-OC	5/17/2012	12:32	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	15.67	8.03	149.0	9.52	3.2	2.8		3.700	0.3180		0.012	0.130			0.539	0.063	0.087				7.2	2.20	
WA053112-OC	5/31/2012	13:04	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	17.15	8.34	155.0	10.04	5.6	3.7	71.9	3.590	0.6440		<0.010	0.090			0.545	0.055	0.095		3.20	4.7	1.50		
WA061312-OC	6/13/2012	12:08	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	17.87	6.23	161.0	9.57	2.1	2.7		3.540	0.6140		0.012	0.052			0.466	0.044	0.070				3.7	<0.50	
WA062712-OC	6/27/2012	11:51	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	17.67	8.29	162.0	9.74	2.1	2.7	75.6	3.850	0.2390		<0.010	0.049			0.451	0.058	0.083		1.70	3.3	1.20		
WA071112-OC	7/11/2012	11:24	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	22.43	8.46	163.0		0.8	1.3		3.750	0.4840		<0.010	0.047			0.467	0.078	0.088				2.00	0.75	
WA072512-OC	7/25/2012	11:30	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	22.70	8.35	164.0	8.81	1.6	1.0	76.7	3.700	0.3370		<0.010	0.035			0.450	0.085	0.102		0.71	1.50	0.75		
WA080812-OC	8/8/2012	11:27	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	22.38	8.35	169.0	8.92	2.4	2.6		5.300	0.4280		<0.010	0.087			0.694	0.107	0.121				2.00	1.10	1.20
WA082212-OC	8/22/2012	11:49	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	22.31	8.36	171.0	9.10	3.7	2.2	77.1	5.400	0.6580		<0.010	0.248	0.3880		0.892	0.130	0.157		0.71	2.30	1.70	1.70	
WA090512-OC	9/5/2012	11:55	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	20.84	8.43	172.0	9.34	7.5	4.0		6.000	1.1700		0.013	0.273			0.929	0.136	0.185				2.80	1.30	3.60
WA091912-OC	9/19/2012	12:48	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	19.80	8.55	181.0	10.07	9.6	3.1	87.7	4.630	1.0000		<0.010	0.267			1.110	0.151	0.185		2.40	3.80	3.50	8.70	
WA100312-OC	10/3/2012	12:00	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	17.89	8.40	194.0	9.50	6.9	3.5		4.680	0.9300		<0.010	0.309			1.090	0.123	0.162				3.30	2.50	6.70
WA101712-OC	10/17/2012	11:21	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	15.10	8.28	194.0	9.75	4.3	2.5	92.3	4.540	0.6790		0.012	0.343			0.866	0.112	0.153		0.86	2.30	<0.50	1.80	
WA111512-OC	11/15/2012	12:13	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	10.21	8.43	209.0	11.03	1.1	2.3		3.610	0.3200		0.010	0.361			0.786	0.098	0.120				2.30	1.10	
WA121212-OC	12/12/2012	12:07	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	6.98	8.22	226.0	11.34	1.1	2.3		3.300	0.4250		0.023	0.435			0.871	0.080	0.100				4.30	1.70	
SV022212-OC	2/22/2012	10:55	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	7.92	8.17	208.0	11.94	4.3	1.0		1.950	0.4960	<2.00	<0.010	0.443	0.0702		0.681	0.038	0.054			2.00	5.1	1.40	
SV032112-OC	3/21/2012	11:03	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	7.62	7.90	201.0	11.41	3.2	5.8		2.310	0.7090	<2.00	<0.010	0.214	0.0869		0.430	0.024	0.044			2.60	7.3	2.00	
SV041912-OC	4/19/2012	11:08	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	10.23	7.75	186.0	10.85	4.8	3.0		3.550	1.1100	<2.00	0.010	0.250	0.1120		0.646	0.031	0.060		5.20	12.0	2.30		

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate/Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
SV051712-OC	5/17/2012	11:58	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	11.73	8.17	91.0	10.50	4.8	1.9		2.600	1.0800	<2.00	0.011	0.085	0.0341		0.389	0.035	0.080			4.60	26.0	3.20	
SV053112-OC	5/31/2012	11:41	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	17.23	8.36	149.0	10.26	8.3	4.2	70.8	2.740	0.7670	<2.00	<0.010	0.036	0.0874		0.311	0.033	0.063			2.10	15.0	1.80	
SV061312-OC	6/13/2012	10:37	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	17.57	7.96	166.0	9.61	3.7	4.1		2.780	0.6220	<2.00	<0.010	0.041	0.0693		0.380	0.033	0.064			2.20	5.7	0.83	
SV062712-OC	6/27/2012	10:30	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	17.05	8.17	169.0	9.61	1.9	2.2	79.4	3.140	0.6600	<2.00	<0.010	0.055	0.0562		0.384	0.043	0.065			0.98	4.0	1.80	
SV071112-OC	7/11/2012	9:37	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	22.01	8.29	178.0	8.72	1.1	1.4	86.1	3.200	0.4040	<2.00	<0.010	0.035	0.0285		0.392	0.063	0.070			0.79	2.80	0.75	
SV072512-OC	7/25/2012	10:05	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	22.10	8.25	177.0	8.78	1.6	1.2	84.0	3.210	0.3360	<2.00	<0.010	<0.010	0.0418		0.371	0.060	0.076			0.65	1.30	1.00	
SV080812-OC	8/8/2012	9:48	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	21.64	8.19	152.0	8.86	3.2	1.7		4.430	0.4930	<2.00	<0.010	<0.027	0.0602		0.530	0.086	0.099			0.79	2.30	1.30	0.34
SV082212-OC	8/22/2012	10:09	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	21.70	8.32	177.0	9.06	6.4	4.4	81.8	4.930	0.7720	<2.00	<0.010	0.133	0.1060		0.678	0.108	0.133			0.35	3.00	1.80	0.79
SV090512-OC	9/5/2012	10:18	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	20.16	8.31	179.0	9.21	7.8	4.4		5.830	1.1000	<2.00	0.012	0.229		0.842	0.121	0.165			1.90	4.20	2.00	4.00	
SV091912-OC	9/19/2012	10:55	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	18.91	8.43	177.0	10.07	8.0	4.3	90.3	4.530	1.5500	<2.00	0.015	0.199	0.2610		0.987	0.133	0.165			2.00	4.30	2.30	6.10
SV100312-OC	10/3/2012	10:33	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	17.20	8.35	165.0	9.69	4.3	2.8		4.510	0.6890	<2.00	<0.010	0.341	0.1400		0.959	0.127	0.153			0.75	3.30	2.00	1.80
SV101712-OC	10/17/2012	10:02	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	15.15	8.27	199.0	9.75	5.3	4.4	97.0	3.990	0.7500	<2.00	<0.010	0.339	0.0978		0.822	0.102	0.141			0.81	3.30	1.80	1.80
SV111512-OC	11/15/2012	11:04	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	10.43	8.41	216.0	11.17	1.6	3.3		3.290	0.3810	<0.010	0.326	0.0578		0.683	0.087	0.104			0.61	2.50	1.10		
SV121212-OC	12/12/2012	10:59	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	6.57	8.14	195.0	11.37	1.1	1.5		2.700	0.4380	<2.00	0.018	0.326	0.0415		0.490	0.049	0.062			2.50	4.50	1.50	
HC022212-OC	2/22/2012	10:00	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	7.80	8.01	183.0	11.89	2.7	2.2		2.250	0.4450	<0.010	0.305				0.515	0.028	0.039			3.5	1.10		
HC032112-OC	3/21/2012	10:16	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	6.87	7.64	165.0	11.78	3.7	2.6		2.330	0.6260	<0.010	0.129				0.245	0.015	0.032			5.8	1.30		
HC041912-OC	4/19/2012	10:33	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	9.60	7.71	162.0	11.20	4.3	1.0		2.950	0.5460	<0.010	0.170				0.487	0.025	0.043			11.0	1.30		
HC051712-OC	5/17/2012	10:35	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	14.16	8.02	117.0	10.10	4.3	1.3		2.200	0.6900	<0.010	0.059				0.275	0.025	0.052			10.0	2.00		
HC053112-OC	5/31/2012	10:42	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	16.09	8.14	146.0	10.08	8.3	3.9	73.0	2.280	0.6550	<0.010	<0.010				0.257	0.021	0.052			2.20	9.5	3.00	
HC061312-OC	6/13/2012	9:49	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	17.18	7.82	165.0	9.48	4.3	6.0		2.410	0.9700	<0.010	0.024				0.291	0.025	0.059			7.2	1.50		
HC062712-OC	6/27/2012	9:45	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	16.63	8.09	167.0	9.68	2.1	1.6	82.1	2.640	0.6240		0.011	0.036			0.313	0.037	0.059			0.96	4.8	1.80	
HC071112-OC	7/11/2012	8:52	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	21.90	8.17	178.0		1.3	0.5		3.190	0.3900	<0.010	0.020				0.339	0.054	0.059			2.80	1.30		
HC080812-OC	8/8/2012	8:56	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	21.70	8.15	181.0	8.56	1.3	0.9		4.270	0.2970	<0.010	<0.010				0.338	0.070	0.079			1.90	1.10	0.18	
HC090512-OC	9/5/2012	9:21	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	19.88	8.19	176.0	8.73	11.0	6.4		5.230			0.042	0.140			0.720	0.103	0.146			4.70	2.70	5.20	
HC091912-OC	9/19/2012	9:41	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	18.40	8.15	183.0	9.32	9.6	4.6	91.8	3.930			0.024	0.126			0.808	0.109	0.144			2.10	5.00	3.30	
HC100312-OC	10/3/2012	9:49	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	17.13	8.16	188.0	9.13	9.1	6.6		3.990	1.0200	<0.010	0.158				0.800	0.093	0.131			4.50	2.50	7.50	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate/Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
HC111512-OC	11/15/2012	10:16	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	10.44	8.23	209.0	10.83	2.1	4.2		2.940	0.3580	<0.010	0.243				0.610	0.071	0.089				2.40	1.00	
HC121212-OC	12/12/2012	10:11	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	6.47	8.03	166.0	11.73	1.8	<0.1		2.160	0.2170	0.016	0.227				0.454	0.036	0.047				2.80	0.67	
OR022212-OC	2/22/2012	8:40	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	8.08	7.94	147.0	12.12	1.6	0.6	74.6	0.871	0.2860	<0.010	0.164				0.280	0.016	0.022			0.66	1.8	0.63	
OR032112-OC	3/21/2012	8:52	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	7.23	6.93	121.0	12.22	2.1	1.6	64.1	0.700	0.4000	<0.010	0.056				0.111	0.011	0.025			0.88	7.2	1.00	
OR041912-OC	4/19/2012	8:34	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	9.67	7.05	125.0	11.86	4.8	1.5	63.0	1.440	0.3540	<0.010	0.085				0.267	0.014	0.033			5.10	10.0	1.30	
OR051712-OC	5/17/2012	8:40	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	13.78	8.39	87.0	10.71	6.4	0.3	48.0	1.350	0.3110	<0.010	0.035				0.176	0.013	0.034			3.10	9.7	2.00	
OR053112-OC	5/31/2012	9:03	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	15.51	8.32	128.0	10.43	5.3	1.6	59.6	1.710	0.3620	<0.010	<0.010				0.129	0.013	0.027			0.93	3.9	0.88	
OR061312-OC	6/13/2012	8:08	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P					2.1	1.8	64.6	1.520	0.2960	<0.010	<0.010				0.151	0.015	0.033			0.88	2.9	<0.50	
OR062712-OC	6/27/2012	8:11	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	16.41	8.28	141.0	10.13	3.2	1.3	70.8	1.730	0.3960	<0.010	0.010				0.193	0.024	0.035			0.64	3.3	1.00	
OR071112-OC	7/11/2012	7:04	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	21.92	8.22	153.0	8.65	0.5	1.1	79.7	1.730	0.2950	<0.010	0.011				0.229	0.038	0.038			0.26	2.10	0.87	<0.18
OR072512-OC	7/25/2012	7:36	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	22.45	8.22	162.0	8.48	1.4	<0.1	80.8	1.880	0.2950	<0.010	<0.010				0.187	0.032	0.041			0.36	0.87	0.50	
OR080812-OC	8/8/2012	7:10	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	22.49	8.54	164.0	8.40	1.3	1.1	78.7	3.220	0.2760	<0.010	<0.010				0.265	0.042	0.051			0.46	1.60	0.87	<0.18
OR082212-OC	8/22/2012	7:46	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	22.22	8.71	167.0	8.35	3.7	3.7	77.0	2.390	0.5120	<0.010	<0.010				0.339	0.049	0.069			0.61	3.70	1.30	0.25
OR090512-OC	9/5/2012	7:45	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	20.30	9.05	166.0	8.71	20.0	11.0	77.4	4.450	1.1900	0.016	<0.010	0.2070			0.637	0.061	0.131			4.60	31.00	8.00	6.50
OR091912-OC	9/19/2012	7:47	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	19.29	8.29	168.0	9.19	2.7	1.8	88.1	3.210	1.5000	0.034	0.144				0.578	0.093	0.101			0.45	2.90	1.40	0.62
OR100312-OC	10/3/2012	7:52	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	17.80	8.38	166.0	9.20	13.0	11.0	87.8	3.090	1.0400	0.012	0.037				0.746	0.060	0.123			3.60	16.00	6.00	3.50
OR101712-OC	10/17/2012	8:04	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	16.31	8.22	146.0	9.46	11.0	11.0	89.8	2.870	0.8540	0.013	0.142				0.518	0.066	0.100			0.76	7.50	2.50	0.28
OR111512-OC	11/15/2012	9:37	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	10.21	8.22	179.0	11.15	2.1	3.8	85.0	2.150	0.4540	<0.010	0.143				0.358	0.046	0.059			0.42	2.30	1.00	
OR121212-OC	12/12/2012	8:34	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	6.98	8.07	131.0	12.23	1.5	<0.1	66.8	1.530	0.4730	0.014	0.124				0.226	0.021	0.039			3.50	15.00	2.20	
WE022212-OC	2/22/12	11:17	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	8.19	8.12	142	12.16	1.60	0.27		0.8045	0.238	<0.010	0.150				0.250	0.015	0.023			0.72	3.25	0.625	
WE032112-OC	3/21/12	11:27	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	7.37	8.02	115	12.35	2.14	0.48		1.035	0.638	<0.010	0.049				0.104	0.013	0.040			4.80	18	2	
WE041812-OC	4/18/12	11:23	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	9.8	8.08	133	11.65	2.70	0.70		2.32	0.434	<2.00	<0.010	0.109			0.210	0.017	0.043			4.20	11	<0.50	
WE051612-OC	5/16/12	12:14	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	14.19	7.81	91	10.77	3.00	<0.1		1.55	0.628	<0.010	0.027				0.234	0.015	0.034			3.50	14	3	<0.18
WE061312-OC	6/13/12	11:40	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	17.42	8.27	131	9.75	2.40	1.70		1.38	0.532	<0.010	<0.010				0.161	0.015	0.035			0.93	4.1	0.87	<0.18
WE071112-OC	7/11/12	11:41	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	22.07	8.36	156	9.14	2.4	0.4		1.69	0.33	0.013	<0.010				0.23	0.032	0.033			0.49	2	0.5	<0.18
WE080812-OC	8/8/12	11:07	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	21.91	8.55	168	8.86	2.90	0.60		2.32	0.226	<2.00	<0.010	0.011			0.216	0.036	0.045			0.27	1.9	0.63	<0.18

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
WE090512-OC	9/5/12	12:04	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	19.85	8.39	168	9.4	15.00	4.10		3.61	1.82		<0.010	<0.010			0.572	0.054	0.1			2.60	6.3	5.3	8.60
WE100312-OC	10/3/12	10:45	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	17.28	8.29	182	9.39	6	4.6		2.82	0.921		<0.010	0.041			0.566	0.056	0.086			0.80	5.7	3.2	1.50
WE111412-OC	11/14/12	12:38	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	10.2	8.50	182	11.56	2.70	3.10		2.08	0.0413	<2.00	<0.010	0.138			0.364	0.048	0.059			0.53	3	1.5	<0.18
WE121212-OC	12/12/12	11:26	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	7.19	8.08	128	12.1	0.70	<0.1		1.31	0.235		<0.010	0.108			0.192	0.02	0.031			2.40	6.7	0.83	
TC022212-OC	2/22/12	10:33	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	8.46	8.04	146	11.99	1.70	<0.1		0.61	0.2		<0.010	0.103			0.205	0.011	0.019			0.68	3.5	1.3	
TC032112-OC	3/21/12	10:42	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	7.33	8.02	119	12.22	2.14	0.11		0.78	0.6		0.010	0.047			0.098	0.010	0.042			8.50	41.3	2.5	
TC041812-OC	4/18/12	10:26	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	9.94	8	136	11.46	4	0.2		1.5	0.586		<0.010	0.084			0.153	0.013	0.041			6.40	24	2.8	
TC051612-OC	5/16/12	11:20	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	13.73	8	97	10.66	2	0.481		1.242	0.537		<0.010	0.021			0.170	0.011	0.029			5.20	17.75	1.75	<0.18
TC061312-OC	6/13/12	10:34	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	16.64	8	127	9.74	1.60	1.40		1.04	0.409		<0.010	0.011			0.128	0.013	0.024			1.60	4.9	1.3	<0.18
TC071112-OC	7/11/12	10:54	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	20.88	8	146	9.01	1.90	0.70		1.11	0.292		<0.010	0.013			0.133	0.018	0.019			0.54	2	0.87	<0.18
TC080812-OC	8/8/12	10:11	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	21.76	8.50	166	8.55	1.30	1.30		1.72	0.3		<0.010	0.011			0.184	0.027	0.033			0.40	2.1	0.8	<0.18
TC090512-OC	9/5/12	11:14	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	19.12	8.35	152	9.35	8.50	2.30		2.97	1.1		<0.010	<0.010			0.336	0.032	0.058			2.00	3.8	1.8	5.80
TC100312-OC	10/3/12	10:01	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	17.63	8.36	173	9.12	4.30	1.70		2.27	1		<0.010	0.021			0.320	0.040	0.060			0.68	2	1.5	1.10
TC111412-OC	11/14/12	11:10	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	10.18	8.38	180	11.38	2	2.1		1.92	0.267		<0.010	0.104			0.269	0.037	0.044			0.47	2	0.87	
TC121212-OC	12/12/12	10:30	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	7.43	8.09	134	11.91	1	<0.1		1.4	0.251		0.011	0.092			0.151	0.015	0.03			3.50	8.5	0.83	
TG022212-OC	2/22/12	8:26	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	8.79	7.99	142	11.38	1	<0.1		0.606	0.189		<0.010	0.119	0.0172		0.206	0.010	0.017			0.83	4.25	0.875	
TG032112-OC	3/21/12	8:29	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	7.69	7.85	113	11.8	2	3.47		0.867	0.593		0.011	0.076	0.0567		0.124	0.012	0.049			9.90	29	2.75	
TG041812-OC	4/18/12	8:15	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	10.41	7.90	136	10.91	2.70	0.10		1.4	0.459		<0.010	0.096	0.0625		0.202	0.013	0.041			7.30	19	2	
TG051612-OC	5/16/12	8:33	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	14.16	8.19	104	10.09	2.14	1.23		1.451	0.176		<0.010	0.036	0.0362		0.221	0.010	0.025			4.60	11.5	2	<0.18
TG061312-OC	6/13/12	7:57	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	16.5	8.18	130	9.37	1.90	0.60		1.28	0.299		<0.010	0.019	0.0522		0.124	0.011	0.021			0.98	4	0.88	<0.18
TG071112-OC	7/11/12	7:53	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	19.37	7.97	149	8.16	2.90	0.80		0.964	0.27		<0.010	0.034	0.0306		0.180	0.007	0.013			0.39	1.6	0.87	<0.18
TG080812-OC	8/8/12	7:19	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	20.37	7.89	169	7.3	2.40	1.90		1.08	0.314		<0.010	0.070	0.0359		0.224	0.016	0.028			0.65	2.5	0.5	<0.18
TG090512-OC	9/5/12	8:29	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	19.38	8.28	155	8.21	9.80	2.90		2.63	1.2		<0.010	<0.010	0.207		0.339	0.026	0.056			2.00	5.8	2.8	3.60
TG100312-OC	10/3/12	7:59	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	17.22	8.15	172	8.16	6.70	2.50		1.93	0.608		<0.010	0.018	0.104		0.325	0.028	0.050			0.87	3.1	1.5	1.90
TG111412-OC	11/14/12	12:05	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	10.54	7.83	176	9.88	2.10	2.30		1.59	0.28		<0.010	0.135	0.0307		0.415	0.038	0.044			0.41	2	1.1	<0.18
TG121212-OC	12/12/12	8:08	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	7.89	8.02	128	11.35	1.50	<0.1		1.07	0.125		0.011	0.111	0.0239		0.219	0.015	0.032			4.80	13	2.5	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate/Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
LE5022212-OC	2/22/12	7:31	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	8.57	7.82	141	11.54	0.9	<0.1		0.5441	0.188		<0.010	0.119			0.193	0.010	0.015			0.80	2.625	1	
LE5032112-OC	3/21/12	7:14	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	7.63	8.04	111	11.84	3.20	2.40		1.135	0.497		0.010	0.103			0.166	0.011	0.056			20.00	38.5	3	
LE5041812-OC	4/18/12	7:13	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	10.34	7.91	135	11.02	2.70	0.10		1.28	0.488		0.011	0.089			0.182	0.013	0.041			8.10	22	1.8	
LE5051612-OC	5/16/12	7:30	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	14.19	8.24	103	10.19	4	0.3738		1.541	0.666		0.011	0.023			0.192	0.012	0.034			6.10	17.75	3	<0.18
LE5061312-OC	6/13/12	7:09	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	16.31	8.16	137	9.34	1.60	0.60		1.05	0.294		<0.010	0.013			0.119	0.01	0.02			0.94	2.8	0.05	<0.18
LE5071112-OC	7/11/12	7:11	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	20.35	8.15	354	7.94	9.90	1.30		1.08	0.422		<0.010	<0.010			0.169	0.007	0.018			0.98	3.1	0.88	<0.18
LE5080812-OC	8/8/12	6:27	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	20.54	8.33	2405	7.96	1.60	0.60		1.48	0.217		<0.010	0.025			0.176	0.018	0.024			0.45	1.3	0.75	<0.18
LE5090512-OC	9/5/12	7:43	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	19.27	8.20	810	8.03	6.80	2.20		1.88	0.833		<0.010	<0.010			0.306	0.023	0.046			1.50	3.5	1.8	3.60
LE5100312-OC	10/3/12	7:19	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	16.93	8.19	3128	8.75	6.10	1.50		2.01	0.6		<0.010	0.013			0.382	0.026	0.049			0.76	2.1	1.1	1.80
LE511412-OC	11/14/12	7:20	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R					1.30	1.50		1.52	0		0.020	0.118			0.292	0.032	0.037			0.43	2	1.3	<0.18
LE5121212-OC	12/12/12	7:39	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	7.89	7.91	132	11.47	2.10	0.10		1.11	0.5		0.013	0.126			0.243	0.014	0.039			6.20	17.0	2.00	
SA022212-OC	2/22/2012	9:08	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	7.70	7.95	98.0	11.96	0.9	<0.1		0.635	0.1970		<0.010	0.018			0.080	0.002	0.004			0.21	0.8	<0.50	
SA032112-OC	3/21/2012	9:22	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	7.00	7.38	90.0	12.10	1.5	<0.1		0.592	0.3160		<0.010	0.021			<0.050	0.003	0.013			0.69	3.3	0.75	
SA041912-OC	4/19/2012	9:16	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	8.49	7.38	85.0	11.91	1.5	<0.1		0.978	0.1230		<0.010	0.015			0.098	0.005	0.016			1.90	8.2	1.70	
SA051712-OC	5/17/2012	9:15	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	10.27	8.25	55.0	11.32	1.1	<0.1		1.360	0.3280		<0.010	0.023			0.099	<0.001	0.012			0.89	6.5	2.00	
SA053112-OC	5/31/2012	9:40	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	12.95	8.31	72.0		1.1	<0.1	37.2	1.130	0.2320		<0.010	<0.010			<0.050	<0.001	0.007			0.42	1.9	0.87	
SA061312-OC	6/13/2012	8:44	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	14.46	7.79	66.0	10.19	1.5	<0.1		0.898	0.2820		<0.010	<0.010			<0.050	<0.001	0.007			0.42	1.4	<0.50	
SA062712-OC	6/27/2012	8:52	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	13.49	8.14	92.0	10.36	1.0	<0.1	45.4	0.574	0.2490		<0.010	<0.010			0.053	0.006	0.006			0.28	1.1	<0.50	
SA071112-OC	7/11/2012	7:47	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	19.30	8.13	105.0	9.10	2.0	14.0		0.502	0.8320		<0.010	<0.010			0.165	0.005	0.013			0.43	8.90	1.60	
SA072512-OC	7/25/2012	8:09	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	19.31	8.14	119.0	9.01	0.5	<0.1	61.7	0.279	0.1510		<0.010	<0.010			<0.050	0.002	0.006			0.20	<0.50	<0.50	
SA080812-OC	8/8/2012	7:47	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	19.48	8.14	128.0	8.91	0.5	0.6		1.980	0.2120		<0.010	<0.010			<0.050	0.004	0.008			0.35	<0.50	<0.50	
SA082212-OC	8/22/2012	8:15	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	19.25	8.37	134.0	8.91	1.1	<0.1	66.0	0.885	0.1590		<0.010	<0.010			0.081	0.003	0.009			0.17	0.50	<0.50	
SA090512-OC	9/5/2012	8:17	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	17.38	8.40	139.0	9.23	1.6	1.2		1.040	1.6200		0.017	<0.010			0.083	0.002	0.013			0.79	6.50	1.70	
SA091912-OC	9/19/2012	8:32	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	16.26	8.08	144.0	9.70	0.7	<0.1	76.0	0.559	0.3750		<0.010	<0.010			0.052	0.008	0.009			1.90	0.75	<0.50	
SA100312-OC	10/3/2012	8:34	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	14.96	8.03	146.0	9.47	2.2	<0.1		0.325	0.3400		<0.010	<0.010			0.074	0.002	0.008			0.28	2.80	0.87	
SA101712-OC	10/17/2012	8:31	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	14.28	8.12	134.0	9.74	3.7	0.7	73.3	1.280	0.5350		<0.010	<0.010			0.091	0.002	0.014			0.40	3.70	1.30	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophylla ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate/Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
SA111512-OC	11/15/2012	9:08	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	8.88	8.14	125.0	11.32	3.2	1.7		0.859	0.8980	<0.010	<0.010				0.073	0.003	0.015			0.22	6.80	2.40	
SA121212-OC	12/12/2012	9:14	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	6.44	8.16	90.0	11.98	<0.1	<0.1		1.060	0.2020	0.014	0.044				0.099	0.005	0.010			0.41	3.30	<0.50	
SC022212-OC	2/22/2012	11:30	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	8.49	8.31	182.0	11.55	1.9	<0.1		0.790	0.1710	<0.010	0.249				0.306	0.003	0.008			0.35	1.1	0.63	
SC032112-OC	3/21/2012	11:36	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	7.69	7.56	150.0	11.36	3.2	0.9		1.390	0.6050	<0.010	0.128				0.183	0.006	0.019			1.80	5.7	1.50	
SC041912-OC	4/19/2012	11:52	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	9.69	7.79	156.0	11.10	3.0	<0.1		1.980	0.0627	<0.010	0.130				0.297	0.004	0.023			3.60	12.0	1.80	
SC051712-OC	5/17/2012	11:58	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	11.73	8.17	91.0	10.50	2.6	<0.1		1.850	0.5540	<0.010	0.048				0.133	<0.001	0.027			5.10	17.0	2.70	
SC053112-OC	5/31/2012	12:22	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	15.27	8.55	134.0	10.36	4.8	0.8	73.3	1.260	0.4920	<0.010	0.065				0.136	<0.001	0.010			0.66	4.0	1.10	
SC061312-OC	6/13/2012	11:29	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	15.87	8.36	157.0	10.00	3.7	0.7		1.130	0.3440	<0.010	0.106				0.217	<0.001	0.013			0.74	2.8	<0.50	
SC062712-OC	6/27/2012	11:20	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	15.44	8.39	184.0	9.98	2.9	0.8	101.0	1.230	0.5630	<0.010	0.108				0.260	0.005	0.008			0.44	7.5	1.00	
SC071112-OC	7/11/2012	10:21	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	20.60	8.50	221.0		1.6	<0.1		2.260	0.2870	<0.010	0.257				0.352	<0.001	0.006			0.46	0.88	<0.50	
SC072512-OC	7/25/2012	10:45	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	20.81	8.42	240.0	9.35	1.3	<0.1	124.0	0.750	0.2900	<0.010	0.291				0.392	<0.001	0.007			0.34	0.75	0.63	
SC080812-OC	8/8/2012	10:34	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	20.68	8.37	236.0	9.81	1.7	<0.1		1.220	0.2190	<0.010	0.085				0.206	0.002	0.006			0.35	1.00	0.75	
SC082212-OC	8/22/2012	10:52	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	20.47	8.38	214.0	9.28	2.1	0.1	118.0	1.370	0.3530	<0.010	<0.010				0.125	0.004	0.010			0.27	1.60	0.75	
SC090512-OC	9/5/2012	10:55	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	19.24	8.33	243.0	9.44	0.5	0.3		1.290	0.2590	<0.010	<0.010				0.078	<0.001	0.008			0.25	0.75	0.50	
SC091912-OC	9/19/2012	11:51	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	18.94	8.50	252.0	10.16	0.4	<0.1	132.0	0.708	0.2900	<0.010	<0.010				0.077	0.007	0.007			0.15	0.63	<0.50	
SC100312-OC	10/3/2012	11:05	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	15.65	8.43	216.0	9.97	0.9	<0.1		0.681	1.6900	<0.010	<0.010				0.106	0.002	0.008			0.17	0.75	<0.50	
SC101712-OC	10/17/2012	10:36	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	12.89	8.58	272.0	10.89	4.8	<0.1	136.0	1.150	0.3230	<0.010	0.275				0.320	<0.001	0.008			0.27	1.70	<0.50	
SC111512-OC	11/15/2012	11:34	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	8.08	8.60	260.0	11.73	3.2	0.2		1.010	0.2210	<0.010	0.301				0.389	0.001	0.006			0.17	1.00	1.00	
SC121212-OC	12/12/2012	11:52	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	6.03	8.13	147.0	11.52	1.1	<0.1		1.890	0.2960	0.015	0.236				0.309	0.007	0.015			2.00	4.40	1.00	
SH022212-OC	2/22/2012	12:47	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	10.03	8.57	463.0	11.27	6.4	5.9		1.340	2.7700	<0.010	0.295				0.652	0.154	0.216			6.60	33.0	7.00	
SH032112-OC	3/21/2012	12:57	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	8.73	8.41	520.0	10.93	8.5	9.4		2.560	3.0500	<0.010	0.264				0.711	0.140	0.209			8.40	40.0	11.00	
SH041912-OC	4/19/2012	13:17	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	13.23	8.56	530.0	10.30	6.4	5.6		4.910	1.1500	<0.010	0.163				0.704	0.131	0.219			5.60	19.0	4.70	
SH051712-OC	5/17/2012	13:17	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	17.89	8.50	550.0	9.54	2.1	2.3		4.310	0.5570	<0.010	<0.010				0.395	1.140	0.212			1.90	5.5	1.70	
SH053112-OC	5/31/2012	14:01	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	22.37	8.70	581.0	9.19	1.1	1.7	445.0	5.370	0.4540	<0.010	<0.010				0.456	0.179	0.200			0.92	3.7	<0.50	
SH161312-OC	6/13/2012	13:03	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	20.94	8.59	564.0	9.46	3.7	2.6		4.980	0.8480	<0.010	0.015				0.551	0.139	0.191			2.60	8.0	1.30	
SH062712-OC	6/27/2012	12:50	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	18.45	8.68	565.0	10.10	1.3	2.0	300.0	4.250	0.6500	<0.010	<0.010				0.408	0.116	0.143			0.83	3.5	1.50	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophylla ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate/Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
SH071112-OC	7/11/2012	12:10	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	23.98	8.69	565.0		1.5	<0.1		5.250	0.6550		0.011	0.011			0.800	0.188	0.251			5.60	49.00	11.00	
SH072512-OC	7/25/2012	12:26	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	23.45	8.61	556.0	9.16	2.3	<0.1	287.0	4.630	0.4120		<0.010	<0.010			0.473	0.186	0.200			0.97	5.70	2.20	
SH080812-OC	8/8/2012	12:18	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	21.60	8.53	523.0	9.53	3.8	<0.1		4.200	0.5650		<0.010	<0.010			0.470	0.159	0.171			1.70	8.50	2.00	
SH082212-OC	8/22/2012	12:36	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	21.35	8.54	500.0	9.79	2.1	0.5	256.0	4.120	0.2900		<0.010	<0.010			0.336	0.162	0.168			0.45	1.70	0.83	
SH090512-OC	9/5/2012	12:59	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	19.44	8.57	502.0	10.07	2.4	0.2		5.710	0.2840		<0.010	<0.010			0.387	0.147	0.175			0.63	1.30	<0.50	
SH091912-OC	9/19/2012	15:05	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	19.53	8.79	458.0	10.00	4.3	2.1	278.0	3.590	0.5900		<0.010	<0.010			0.406	0.182	0.197			0.75	11.00	2.50	
SH100312-OC	10/3/2012	13:15	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	15.59	8.64	495.0	9.68	1.6	1.4		2.270	0.4610		<0.010	0.015			0.307	0.146	0.175			2.50	9.20	3.70	
SH101712-OC	10/17/2012	12:08	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	12.75	8.60	447.0	10.26	2.7	2.9	232.0	1.570	0.7470		0.049	0.245			0.434	0.171	0.213			1.80	7.00	2.80	
SH111512-OC	11/15/2012	13:04	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	8.64	8.68	430.0	11.21	2.1	2.0		1.450	0.4970		<0.010	0.254			0.394	0.179	0.191			0.55	4.00	1.10	
SH121212-OC	12/12/2012	13:39	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	6.48	8.53	503.0	11.36	2.7	0.3		2.900	0.6260		0.029	0.400			0.569	0.179	0.195			2.00	6.50	2.30	
TR022212-OC	2/22/12	11:33	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	R	9.16	8.25	156	11.85	1.70	<0.1		0.40822	0.148		<0.010	<0.010			0.093	0.0028	0.0061			0.59	1.75	0.50	
TR032112-OC	3/21/12	11:44	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	R	7.39	8.06	132	12.04	1.07	2.30		0.61	0.595		0.016	0.042			0.082	0.008	0.045			21.0	38.50	1.50	
TR041812-OC	4/18/12	12:04	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	R	10.08	8.12	141	11.33	3.20	0.20		0.80	0.299		0.012	0.037			<0.050	0.006	0.038			8.3	25.00	1.30	
TR051612-OC	5/16/12	12:31	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	R	13.71	7.76	106	10.62	1.50	<0.1		1.10	0.296		<0.010	<0.010			0.092	0.004	0.018			5.4	18.00	2.00	
TR061312-OC	6/13/12	12:03	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	R	15.95	8.19	121	10.04	0.80	0.10		0.60	0.192		<0.010	<0.010			<0.050	0.003	0.008			0.91	2.90	0.50	
TR071112-OC	7/11/12	12:06	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	R	19.79	7.98	131	9.35	0.90	<0.1		0.59	0.2		<0.010	<0.010			0.097	0.002	0.005			0.47	1.30	0.62	
TR080812-OC	8/8/12	11:50	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	R	21.76	8.21	163	8.99	0.50	0.20		0.86	0.1		<0.010	0.012			0.068	0.002	0.006			0.34	1.00	0.75	
TR090512-OC	9/5/12	12:26	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	R	18.28	8.2	129	9.66	0.80	0.30		1.20	0.2		<0.010	<0.010			0.056	<0.001	0.006			0.21	1.00	0.75	
TR100312-OC	10/3/12	11:09	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	R	16.7	8.32	151	9.77	0.90	<0.1		0.87	0.1		<0.010	<0.010			0.053	0.002	0.007			0.25	0.63	<0.50	
TR111412-OC	11/14/12	12:47	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	R	10.54	8.47	175	11.61	1.10	<0.1		0.80	0.1		<0.010	0.010			0.059	0.004	0.007			0.16	0.63	0.63	
TR121212-OC	12/12/12	11:43	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	R	7.84	8.14	149	11.73	1.10	0.80		0.919	0.2		0.010	0.064			0.092	0.008	0.026			5.1	12.0	1.5	

End of Errata

KLAMATH RIVER BASELINE WATER QUALITY SAMPLING 2012 ANNUAL REPORT



Photo: Grant Johnson

Prepared for the
KHSa Water Quality Monitoring Group

Prepared by
Watercourse Engineering, Inc.
June 13, 2013



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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) of the KHSa states that PacifiCorp shall fund long-term baseline water quality monitoring to support dam removal, nutrient removal, and permitting studies, and blue-green algae (BGA) and BGA toxin monitoring as necessary to protect public health. PacifiCorp provides funding of \$500,000 per year for this measure. 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 2012 water quality monitoring was conducted under IM 15 and represents the fourth year of water quality monitoring.

The monitoring program is a cooperative effort of the KHSa Monitoring Group¹. This group developed the KHSa IM15 monitoring study plan that is located on PacifiCorp's Klamath website². 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 2012 grab sampling data collection and available water quality probe (i.e., continuous monitoring) data. Five appendices accompany this report: the sampling locations (Appendix A); the 2012 baseline grab sample results (Appendix B); the estuary water temperature study by the Yurok Tribe (Appendix C); the phytoplankton species charts and biovolume graphs (Appendix D); and the 2012 inter-laboratory comparison tech memo (Appendix E).

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/KHSa152012plan_Final.pdf

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 sample data, physical observations associated with these grab samples, water quality probe data 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 in 2012.

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 2012 season (<http://kbmp.net/>). These reports were used to track phytoplankton and toxin conditions that supported management decisions to post and de-post reservoir and river reaches.

A database is being developed through the Klamath Basin Monitoring Program (KBMP) 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 website³. 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.

³ <http://kbmp.net/collaboration/klamath-hydroelectric-settlement-agreement-monitoring>

Baseline Program Water Quality Sampling

In 2012, 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.

Discreet 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 (RM254.4), Klamath River above Keno Dam (RM 234.9), Klamath River below Iron Gate Dam (RM189.7), Klamath River at Seiad Valley (RM128.5), Klamath River at Weitchpec (RM043.5), and Klamath River above Turwar (RM008.0). Grab samples of all other baseline water quality constituents were collected monthly, except 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.

For the grab samples, 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 CBOD. Phytoplankton species samples were also collected. All sites did not have each parameter analyzed. Refer to Table 1 for the parameters analyzed for each site. The results from the 2012 baseline grab samples are presented in Appendix B.

In 2012, the Yurok Tribe collected continuous water temperature data at four locations in the Klamath River Estuary. The four locations included: upper estuary adjacent to Cat's RV Park, middle estuary, lower estuary adjacent to estuary gage, and lower estuary adjacent to South Slough. Water temperature was collected at the surface and at the bottom of each location. A temperature probe (HOBO Water Temp Pro V2) was deployed at each location from March to November 2012. The Yurok Tribe also collected grab samples at the Klamath River at Weitchpec. The samples were analyzed using liquid chromatography tandem mass spectrometry (LC-MS/MS) to test for algal related toxins.

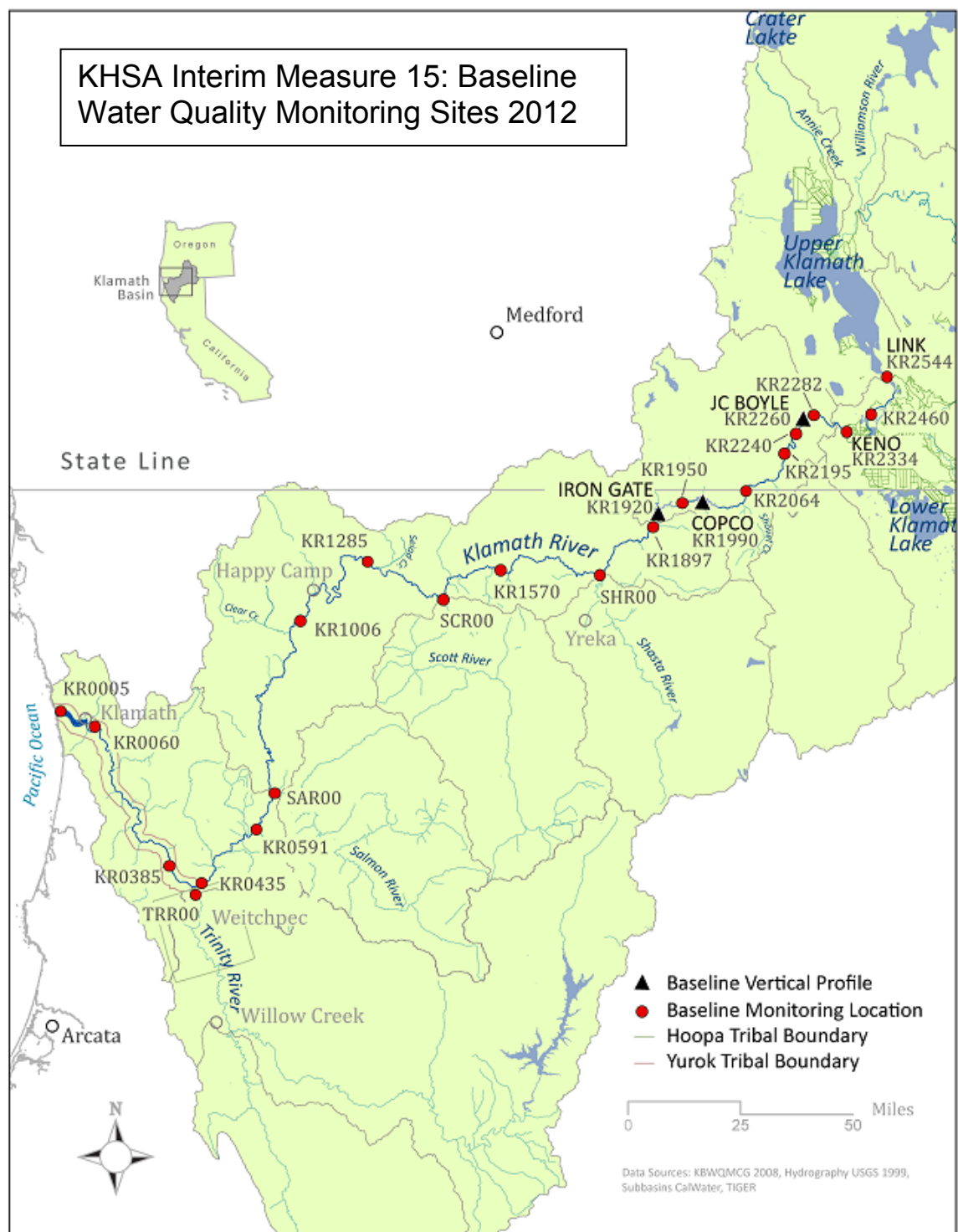


Figure 1. 2012 KHSA Klamath River baseline monitoring sampling sites.

Table 1. 2012 Baseline monitoring locations, constituents, sampling frequency, and sampling entity.

Monitoring Location		Temperature (oC)	Dissolved Oxygen (mg/l)	pH (log[H ⁺])	Specific Conductivity (uS/cm)	Inorganic/Organic N (mg/l)	Inorganic/Organic P (mg/l)	Dissolved Organic Carbon (mg/l)	Particulate N (mg/l)	TSS/VSS (mg/l)	Alkalinity (mg/l)	Water Column Chl_a/Pheo (ug/l)	Phytoplankton species	Microcystin (ug/l)	LC-MS confirmation of Microcystin	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	
KR2544	Link Dam	H	H	H	H	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	H	H	H	H	M	M	M	-	M	M	M	M	M/S	-	M	M	USBR
KR2330	Klamath River below Keno Dam	H	D	D	D	M2/BM2	M2/BM2	M	M	M	M2/BM2**	M	M	M/S	-	M2/BM2	M2/BM2**	USBR
KR2282	Klamath River above J.C. Boyle Dam	H	D	D	D	M	M	M	-	M	M	M	M-	-	-	-	-	PacifiCorp
KR2260	J.C. Boyle Reservoir ^a	VP	VP	VP	VP	-	-	-	-	-	-	M/S	M/S	M/S	-	-	-	PacifiCorp
KR2240	Klamath River below J.C. Boyle Dam	H	D	D	D	M	M	M	-	M	M	M	M-	-	-	-	-	PacifiCorp
KR2195	Klamath River below USGS Gage	H	D	D	D	M	M	M	-	M	M	M	M	M/S	-	-	M	PacifiCorp
KR2064	KR above Shovel Creek (Stateline)	H	D	D	D	M2/BM2	M2/BM2	M	M	M	M	M	M	M/S	-	M2/BM2	M	PacifiCorp
KR1990	Copco Reservoir ^b	VP	VP	VP	VP	M	M	M	-	M	M	M	M-	M/S	-	-	-	PacifiCorp
KR1950	Klamath River below Copco Dam	H	D	D	D	M	M	M	-	M	M	M	M-	M/S	-	-	-	PacifiCorp
KR1920	Iron Gate Reservoir ^c	VP	VP	VP	VP	M	M	M	-	M	M	M	M-	M/S	-	-	-	PacifiCorp
KR1897	Klamath River below Iron Gate Dam	H	H	H	H	M/BM	M/BM	M/BM	M/BM	M/BM	M/BM	M/BM	M/BM	BM/S	-	M2/BM2	M/BM	PacifiCorp
KR1560	Klamath River at Walker Bridge Road	H	D	D	D	M	M	M	-	M	*	M	M-	M/S	-	-	-	Karuk
KR1285	Klamath River below Seiad Valley	H	H	H	H	M	M	M	M	M	*	M	M	M/S	-	M	M	Karuk
KR1006	Klamath River near Happy Camp	H	D	D	D	M	M	M	-	M	*	M	M-	M/S	-	-	-	Karuk
KR0591	Klamath River at Orleans (USGS)	H	H	H	H	M	M	M	-	M	M	M	M	M/S	-	-	M	Karuk
KR0435	Klamath River at Weitchpec	H	H	H	H	M	M	M	-	M	*	M	M-	M/S	S2	-	-	Yurok
KR0385	Klamath River below Trinity River	H	H	H	H	M	M	M	-	M	*	M	M-	M/S	-	-	-	Yurok
KR0060	Klamath River near Klamath	H	H	H	H	M	M	M	M	M	*	M	M	M/S	-	-	M	Yurok
KR0005	Klamath River Estuary ^d	HP	D	D	D	M	M	M	-	M	*	M	M-	M/S	-	-	-	Yurok
SHR00	Shasta River near mouth	H	H	H	H	M	M	M	-	M	*	M	*	-	-	-	M	Karuk
SCR00	Scott River near mouth	H	H	H	H	M	M	M	-	M	*	M	*	-	-	-	M	Karuk
SAR00	Salmon River near mouth	H	H	H	H	M	M	M	-	M	*	M	*	-	-	-	M	Karuk
TRR00	Trinity River near mouth	H	H	H	H	M	M	M	-	M	*	M	*	-	-	-	M	Yurok
<u>Notes:</u>																		
^a Sampling at one depth in J.C. Boyle reservoir (0.5 m depth = surface)																		

1. Water Quality Sample Collection

Water samples were collected included both water quality probe data (temperature, dissolved oxygen, specific conductivity, and pH) and grab samples. Grab samples (i.e., other physical constituents and chemical constituents listed in Table 1) were sent to laboratories for analysis.

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).

The following seven laboratories completed the analytical work during the 2012 field season:

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

1.2. Physical Measurements

At a minimum, 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. In 2012, the sampling location was changed to the Klamath River near Weitchpec. The location was moved because the concentrations of several constituents were too low to be detected in the Klamath River Estuary (i.e., below the method detection limit). Triplicate samples were collected on three occasions (April 14th, August 8th, and November 14th) and submitted for analysis to three laboratories: Aquatic Research, Basic Laboratory, and CH2MHill. Details on the 2012 laboratory comparisons are presented in Appendix E.

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 LCMS/MS for selected locations.

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

Constituent Name	Constituent ID	Basic			CH2MHill			Aquatic Research			CBL		
		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	0.065	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	0.0028	0.010	SM18 4500N03F	0.005	0.01	SM1845 00N03F	0.005	-
Total Nitrogen	TN	EPA 351.2	(calc)	0.20	SM4500-N C	0.062	0.20	SM204500 NC	.03	0.05	SM2045 00NC	0.03	-
Ortho-phosphate	OPO4	SM 4500P-E	0.01	0.05	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	n/a	2.00	SM20 2540D	0.1	0.5	SM20 2540D	0.1	-
Volatile Suspended Solids	VSS	SM 2540D	1.0	5.0	EPA 160.4	n/a	2.00	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	0.0633	-
Particulate Inorganic Carbon	PIC	-	-	-	-	-	-	-	-	-	EPA 440.0	0.0633	-
Particulate Organic Carbon	POC	-	-	-	-	-	-	-	-	-	EPA 440.0	0.0633	-
Particulate Nitrogen	PN	-	-	-	-	-	-	-	-	-	EPA 440.0	0.0105	-
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 2012 IM 15 baseline water quality monitoring program were collected from February through December in 2012. 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, though there were occasional periods when one or more sites were omitted or one or more constituents were not sampled. All data are included in appendices.

2.1. Data Summary

Physical measurements collected include at a minimum 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.

Selected data are summarized herein to illustrate general spatial and temporal patterns during the 2012 sampling period. Data are presented in three formats: (1) longitudinal patterns based on seasonal grab sample data (“box plots”), (2) time series at specific locations, and (3) charts and bar graphs representing the types of algae and their respective biovolumes at the sampling location. The first two formats are presented in the main report while the third format is presented in Appendix C. Longitudinal patterns are presented as box and whisker plots⁴ and encompass the data at each mainstem Klamath River site. 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 USGS flow gages (<http://water.usgs.gov/>). Time series constituent data at USGS flow gage locations are presented in Table 3. While algae data are available for the May to October period, herein September percent biovolume are presented for eight locations: Link River, Klamath River below Keno Dam, Copco Reservoir near Copco Dam, Hatchery Bridge, Klamath River near Seiad Valley, Klamath River near Orleans, Klamath River at Weitchpec, and Klamath River Estuary (Figure 2). Other plots representing algae species by percentage and biovolumes for a subset of 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.



Figure 2. Phytoplankton species percent biovolume for the eight locations in the Klamath River: September 2012.

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 measurements collected at the time of the grab sample (e.g., water temperature and dissolved oxygen) are shown in the figures mentioned in Table 4. Not all measurements for individual constituents occur on the same date or time. These illustrations are not intended to be comprehensive, but rather to present general conditions throughout the river during the 2012 field season. The complete data set is available at the KBMP website (<http://www.kbmp.net/>). The inter-laboratory comparison report is presented in Appendix E.

Table 4. List of figures and data presented. KR = Klamath River

Figure	Data Type	Constituent/Location
Figure 3	Box plot	Dissolved oxygen readings in the KR from Link River to the KR Estuary
Figure 4	Box plot	Dissolved organic carbon sample results in the KR from Link River to the KR Estuary
Figure 5	Box plot	Total nitrogen sample results in the KR from Link River to the KR Estuary
Figure 6	Box plot	Total phosphorus sample results in the KR from Link River to the KR Estuary
Figure 7	Box plot	Microcystin sample results in the KR from Link River to the KR Estuary
Figure 8	Box plot	Dissolved oxygen, dissolved organic carbon, total nitrogen, total phosphorus for the Shasta, Scott, Salmon, and Trinity Rivers
Figure 9	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 10	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 11	Time series	Water temperature, dissolved oxygen, and pH data at major tributary locations: Shasta River, Scott River, Salmon River, and Trinity River.
Figure 12	Time series	Dissolved oxygen readings and daily flow at USGS flow gage locations for the KR.
Figure 13	Time series	Dissolved organic carbon and daily flow at USGS flow gage locations for the KR.
Figure 14	Time series	Nitrogen and daily flow at USGS flow gage locations for the KR.
Figure 15	Time series	Phosphorus and daily flow at USGS flow gage locations for the KR.
Figure 16	Time series	Microcystin and daily flow at USGS flow gage locations for the KR.

2.1.1. Mainstem locations

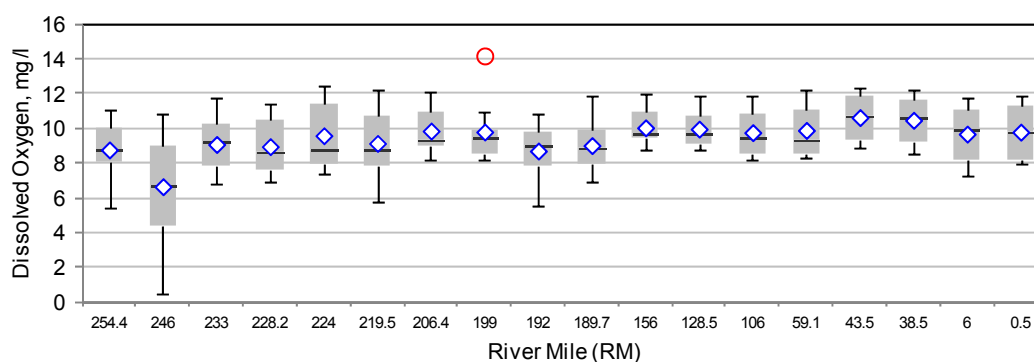


Figure 3. Dissolved oxygen from Link River to the Klamath River Estuary with median (—), mean (◇), outliers(*), and extreme outliers (○) identified (February 2012 – December 2012). Note: Miller Island at Keno Reservoir (RM 246), Copco Reservoir (RM 199), and Iron Gate Reservoir (RM 192). River mile on x-axis not to scale.

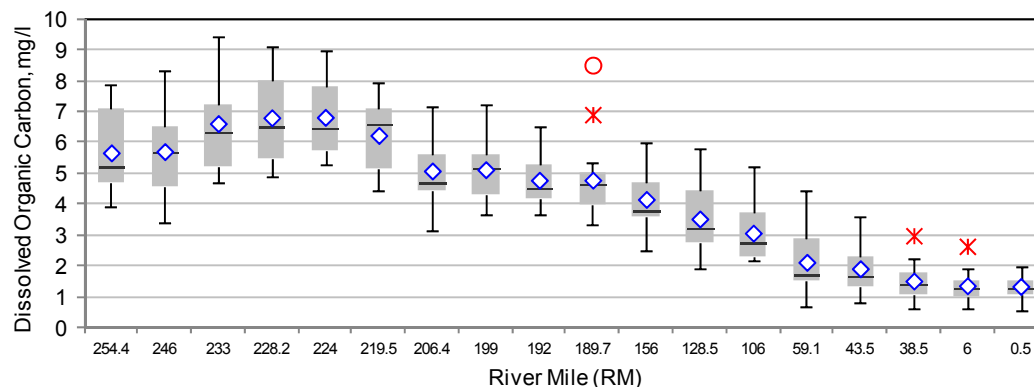


Figure 4. Dissolved organic carbon from Link River to the Klamath River Estuary with median (—), mean (◇), outliers(*), and extreme outliers (○) identified (February 2012 – December 2012). Note: Miller Island at Keno Reservoir (RM 246), Copco Reservoir (RM 199), and Iron Gate Reservoir (RM 192). River mile on x-axis not to scale.

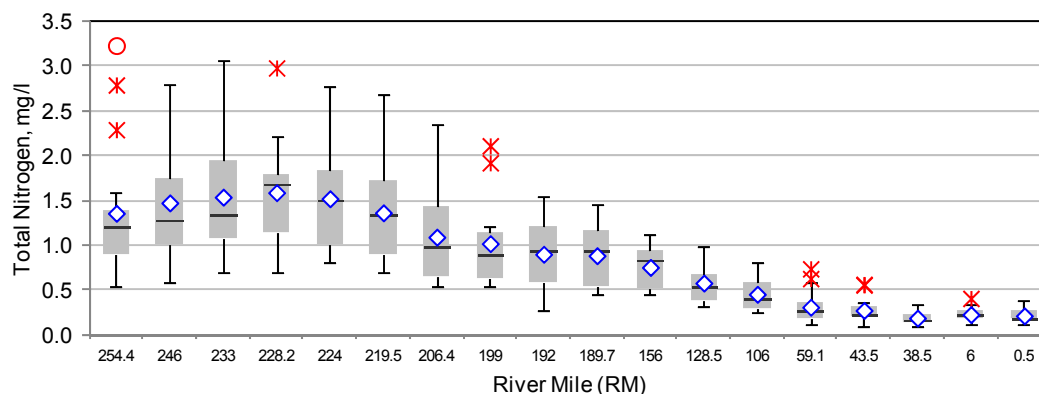


Figure 5. Total nitrogen from Link River to the Klamath River estuary with median (—), mean (◇), outliers(*), and extreme outliers (○) identified (February 2012 – December 2012). Note: Miller Island at Keno Reservoir (RM 246), Copco Reservoir (RM 199), and Iron Gate Reservoir (RM 192). River mile on x-axis not to scale.

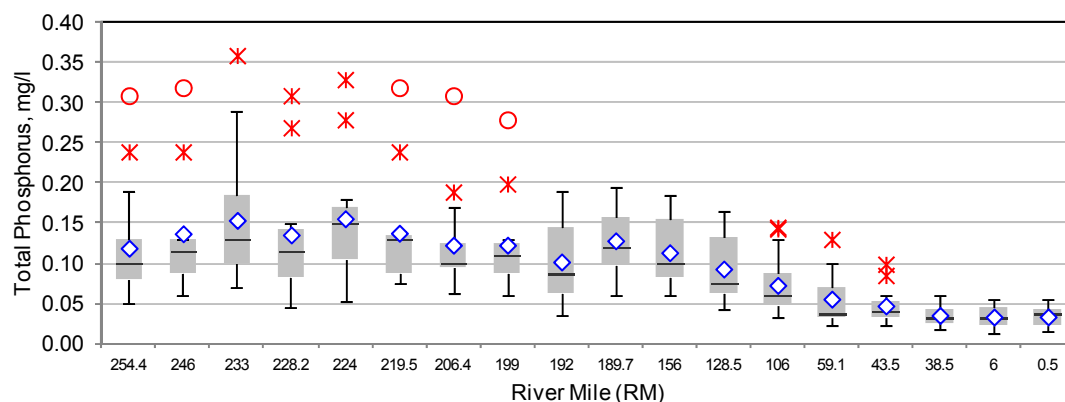


Figure 6. Total phosphorus from Link River to the Klamath River Estuary with median (—), mean (◊), outliers (*), and extreme outliers (◊) identified (February 2012 – December 2012). Note: Miller Island at Keno Reservoir (RM 246), Copco Reservoir (RM 199), and Iron Gate Reservoir (RM 192). River mile on x-axis not to scale.

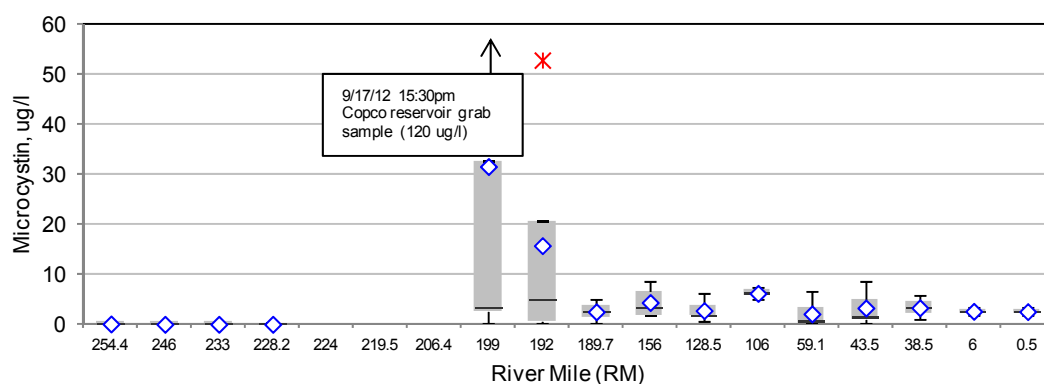


Figure 7. Microcystin from Link River to the Klamath River Estuary with median (—), mean (◊), outliers (*), and extreme outliers (◊) identified (February 2012 – December 2012). Note: Miller Island at Keno Reservoir (RM 246), Copco Reservoir (RM 199), and Iron Gate Reservoir (RM 192). River mile on x-axis not to scale.

2.1.2. Major tributaries

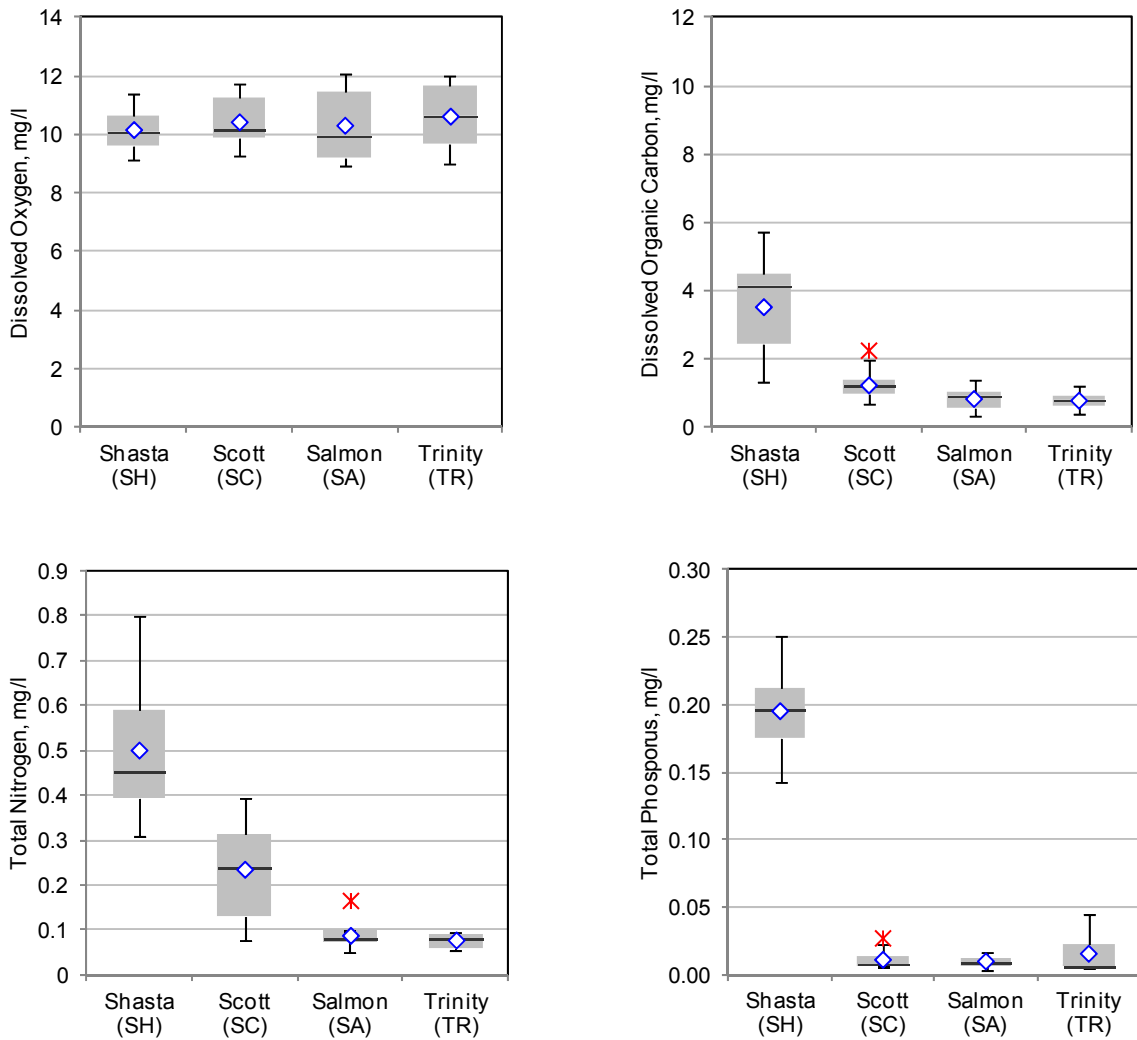


Figure 8. Baseline data for dissolved oxygen, dissolved organic carbon, total nitrogen, and total phosphorus for the Shasta, Scott, Salmon, and Trinity Rivers with median (—), mean (◊), outliers (*), and extreme outliers (◉) identified (February 2012 – December 2012).

2.1.3. Mainstem Locations

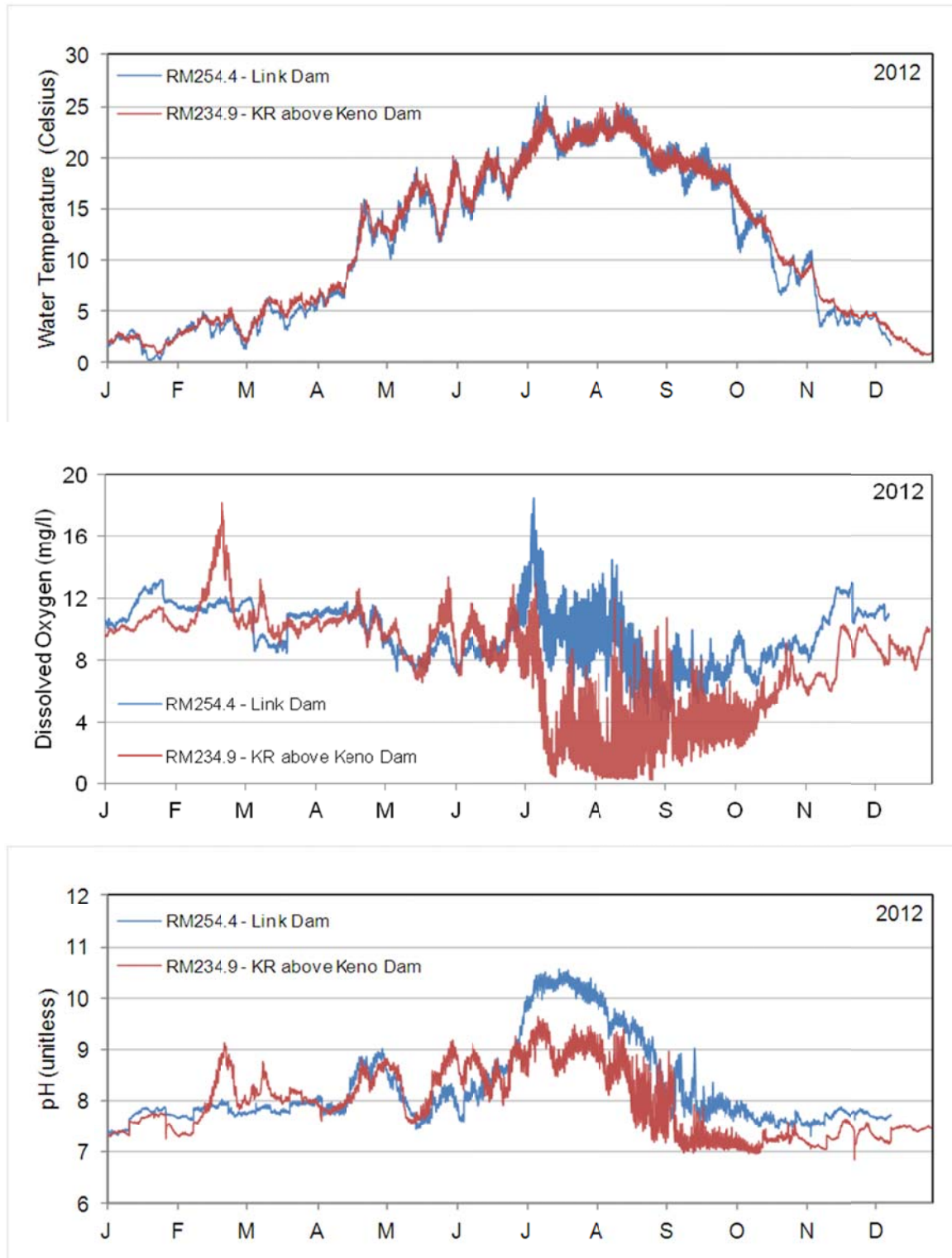


Figure 9. 2012 Water temperature, dissolved oxygen, and pH data for the upper Klamath River at Link Dam and Klamath River above Keno Dam (near surface). Continuous data was collected using datasondes.

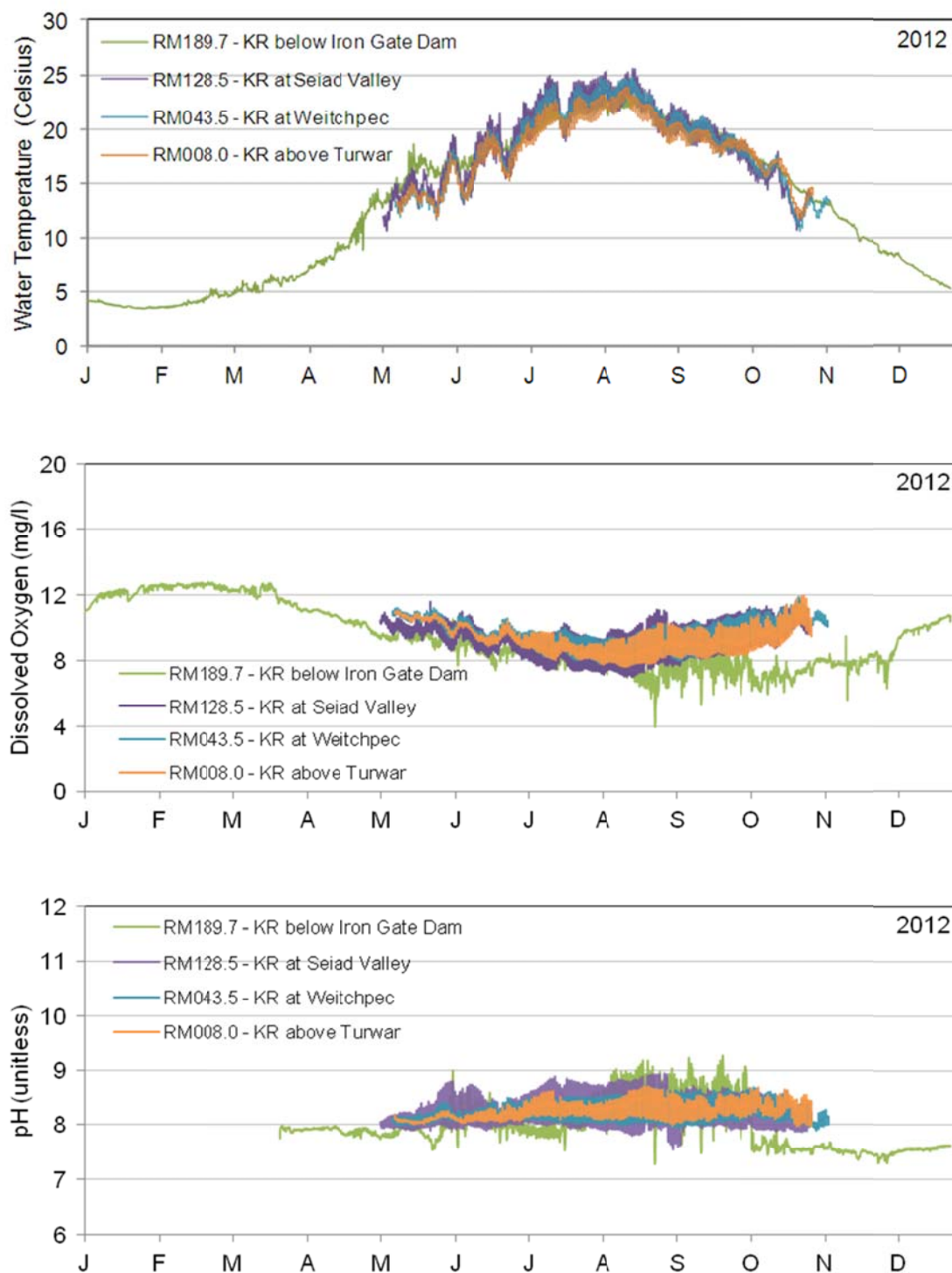


Figure 10. 2012 Water temperature, dissolved oxygen, and pH data for the lower Klamath River at Klamath River below Iron Gate Dam, Klamath River near Seiad Valley, Klamath River at Weitchpec, and Klamath River above Turwar. Continuous data was collected using datasondes.

2.1.4. Major Tributaries

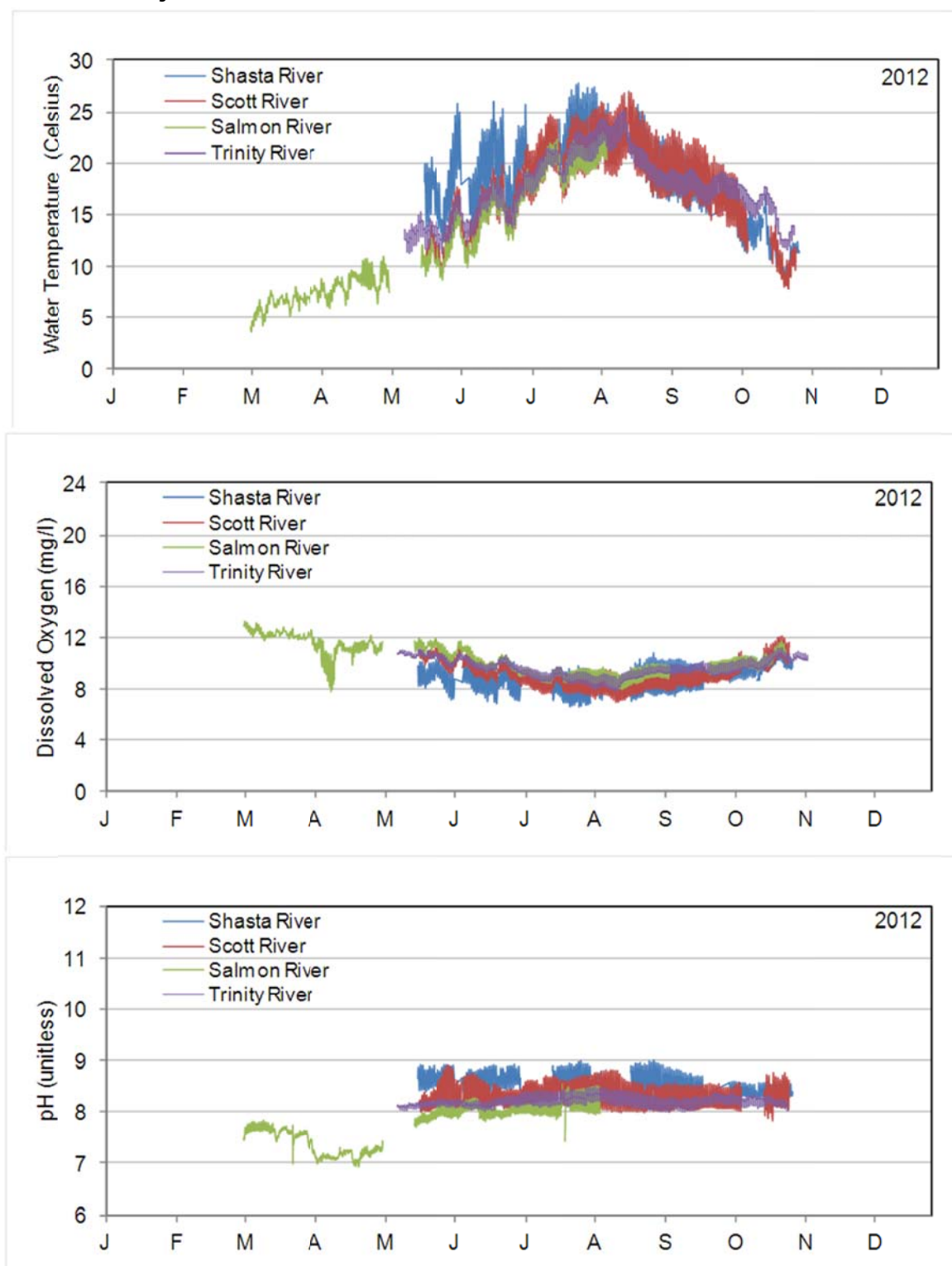


Figure 11. 2012 Water temperature, dissolved oxygen, and pH for the Shasta River, Scott River, Salmon River, and Trinity River. Continuous data was collected using datasondes. Salmon River data was collected from March to May.

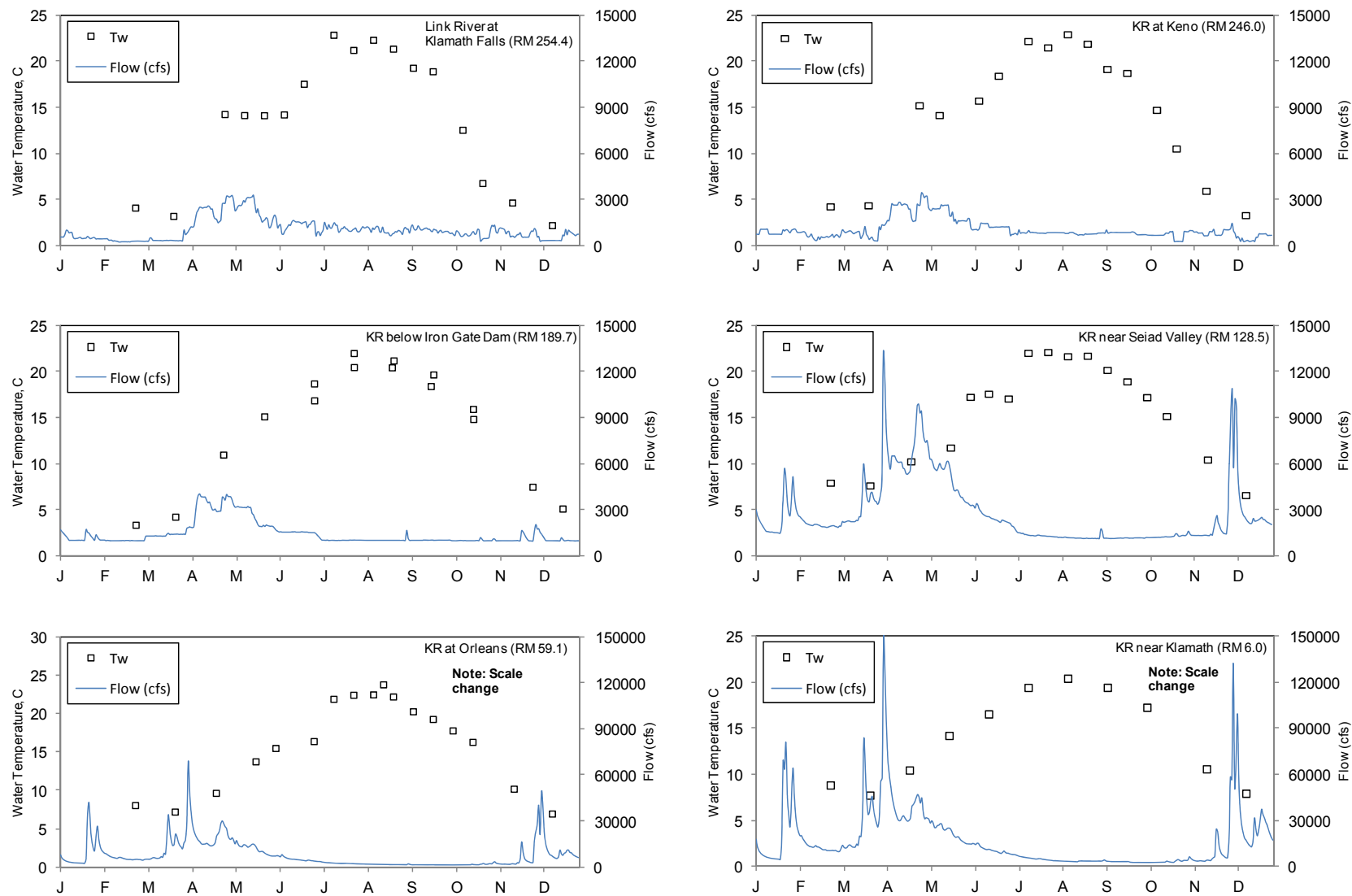


Figure 12. 2012 Water temperature (T_w) and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers. Note the scale change for the secondary y-axis at Orleans and Klamath.

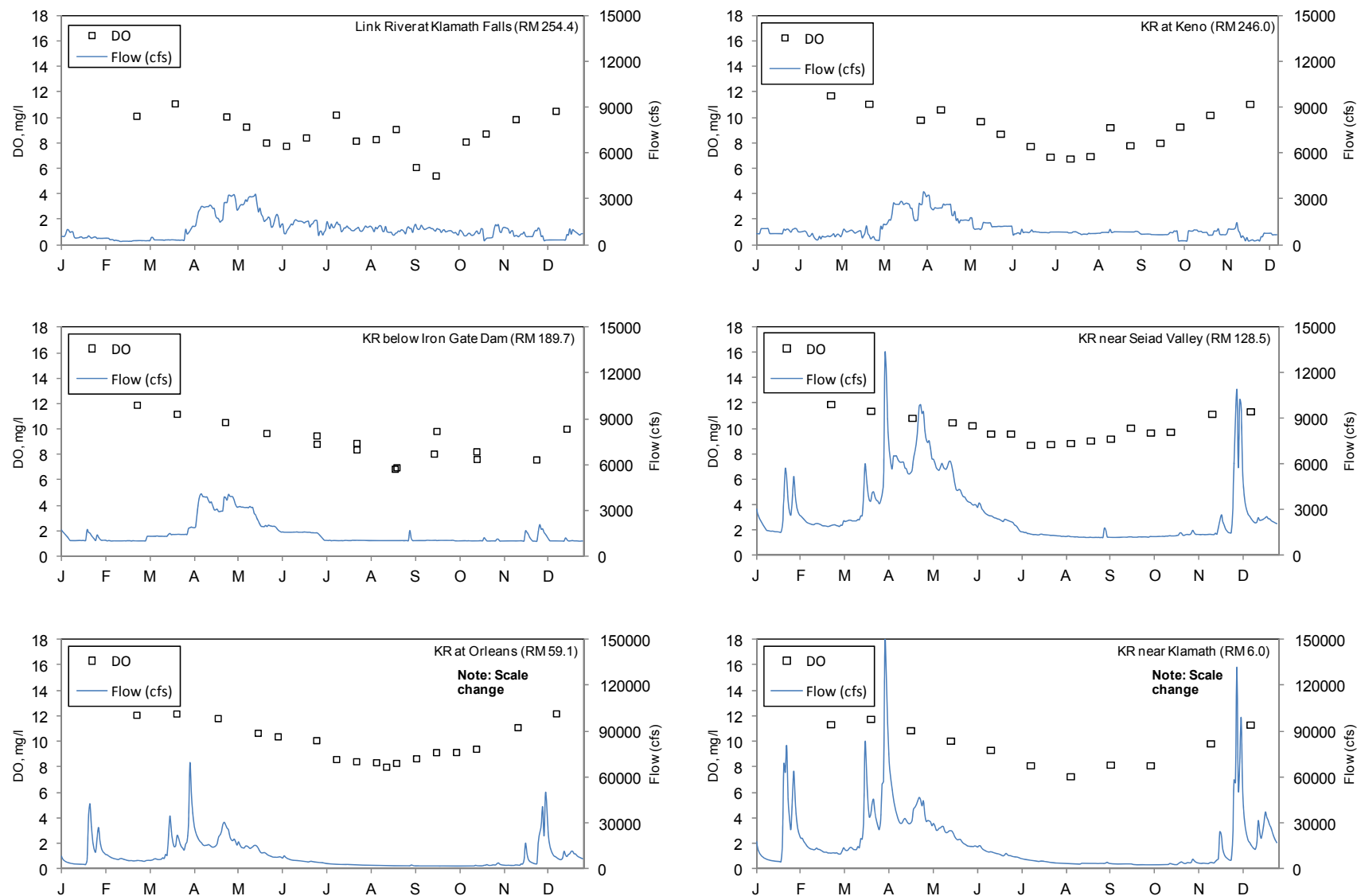


Figure 13. 2012 Dissolved oxygen (DO) and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers. Note the scale change for the secondary y-axis at Orleans and Klamath.

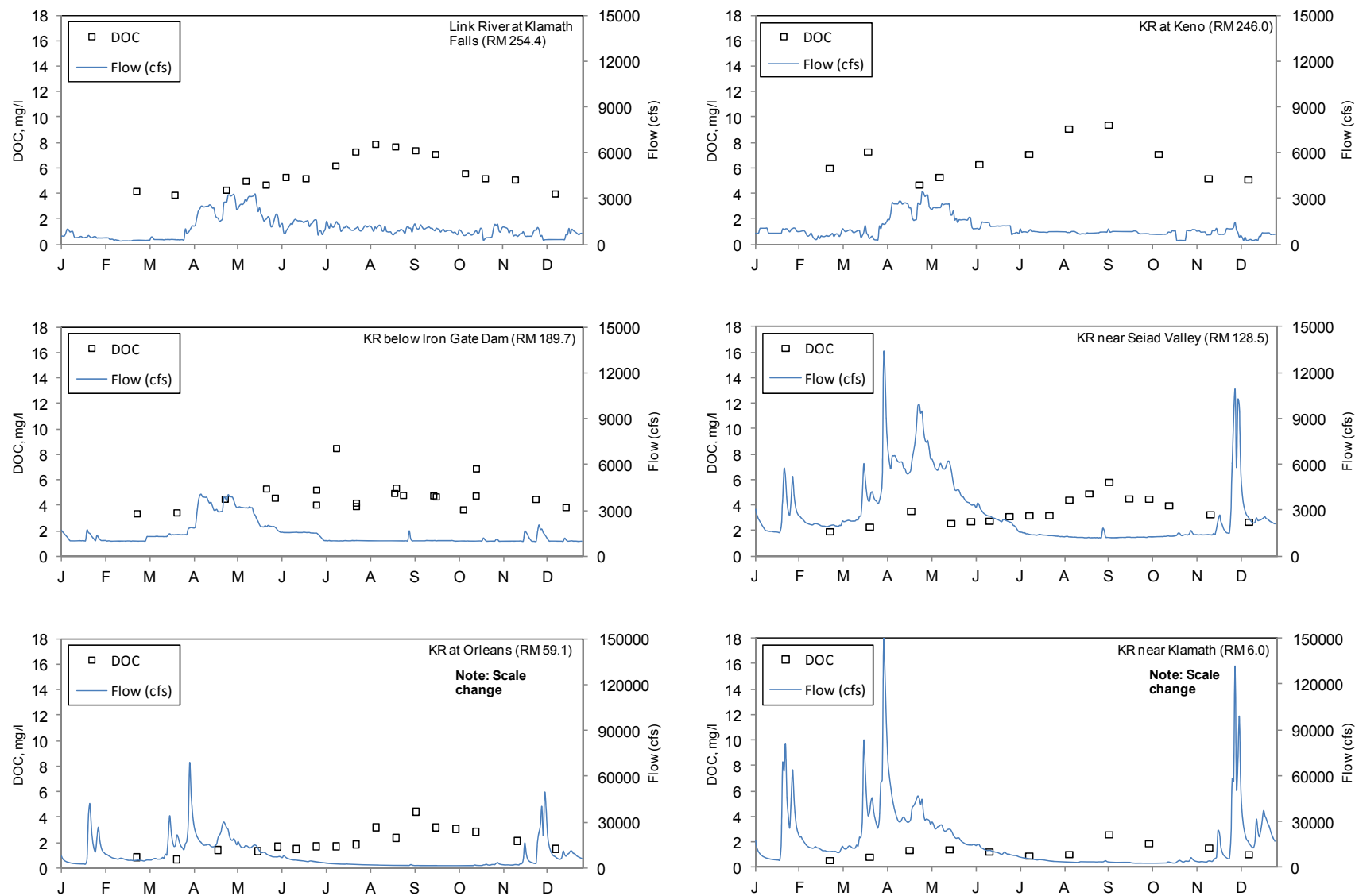


Figure 14. 2012 Dissolved organic carbon (DOC) and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers. Note the scale change for the secondary y-axis at Orleans and Klamath.

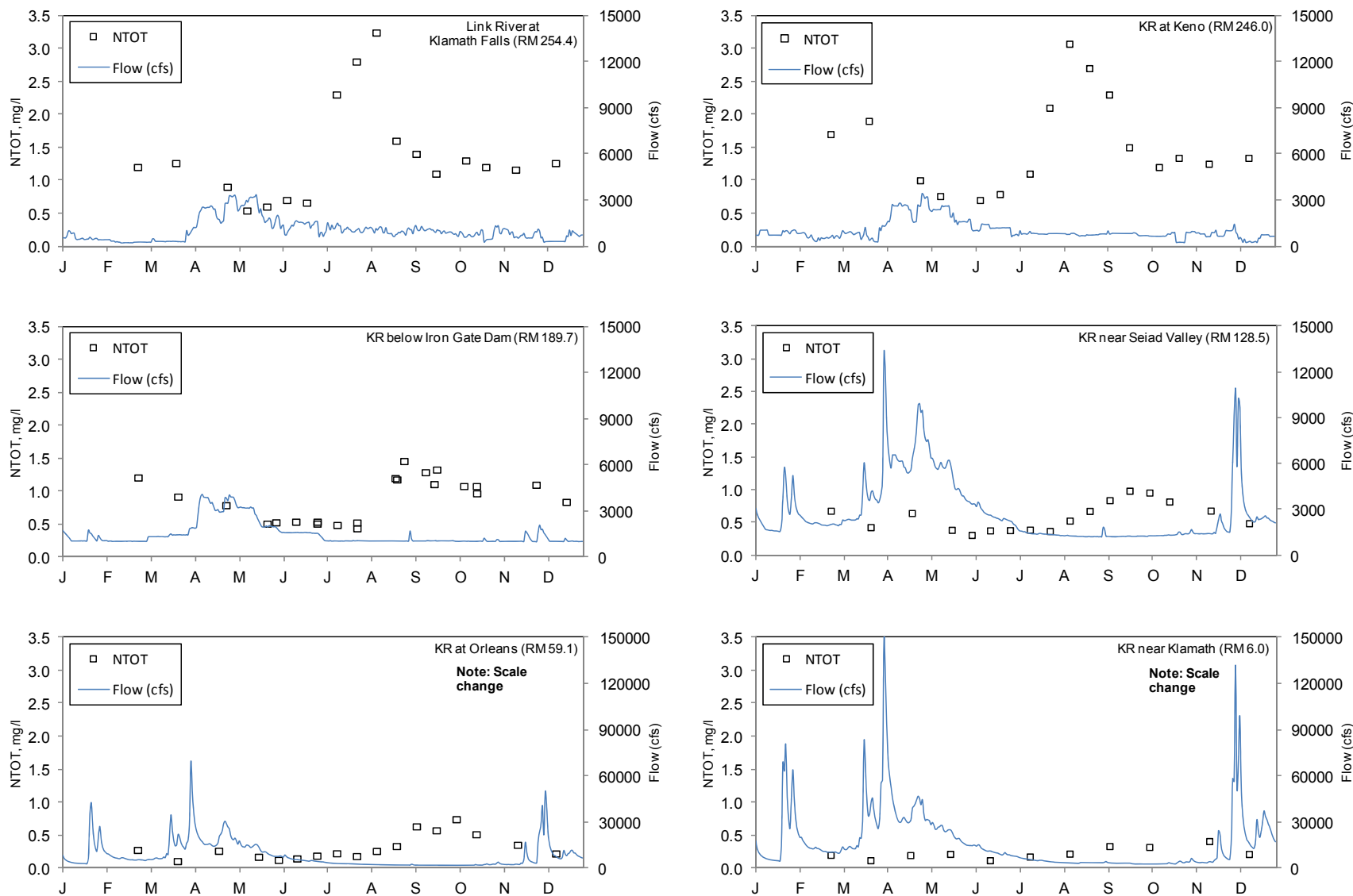


Figure 15. 2012 Total nitrogen (NTOT) and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers. Note the scale change for the secondary y-axis at Orleans and Klamath.

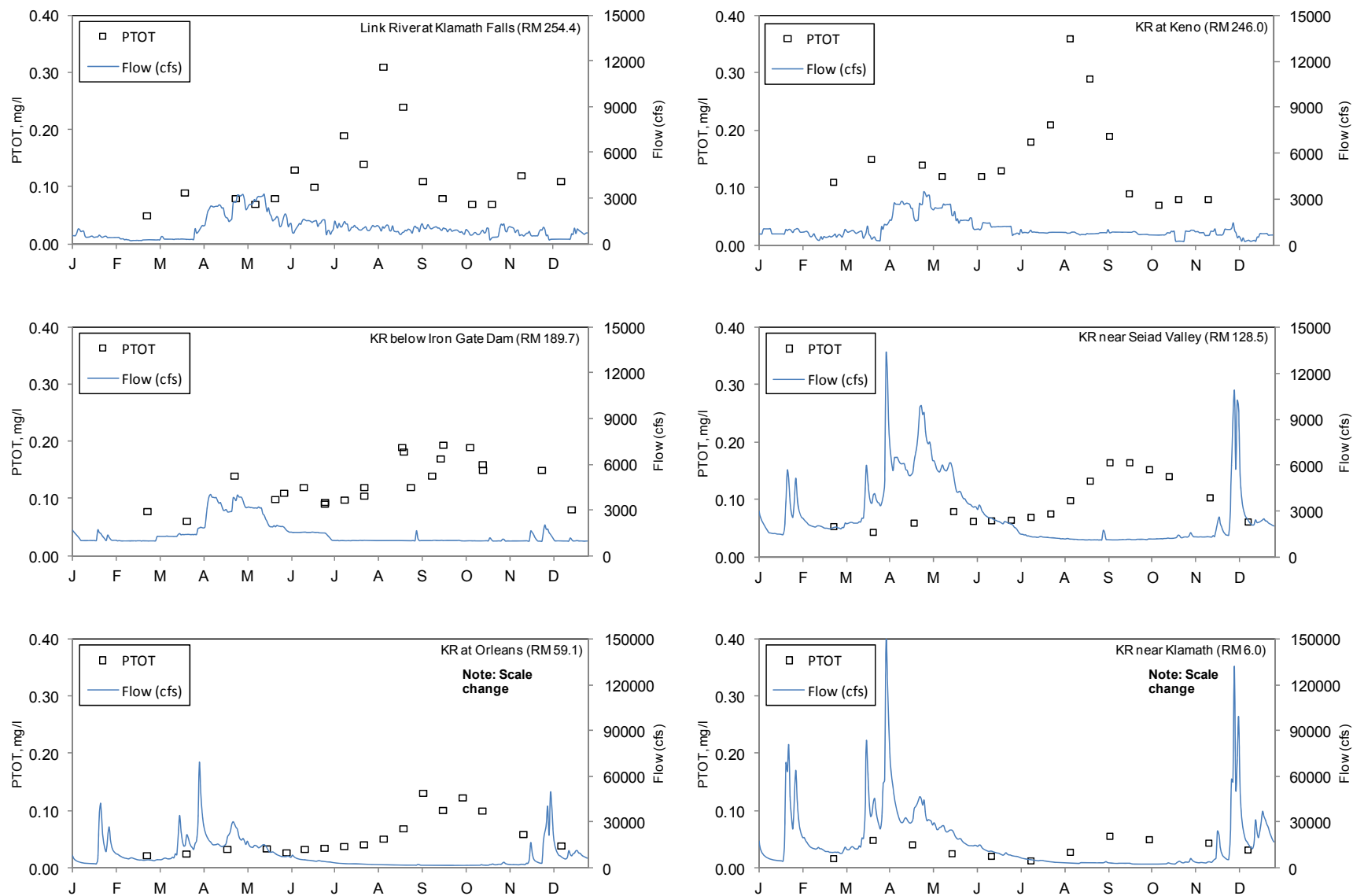


Figure 16. 2012 Total phosphorus (PTOT) and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers. Note the scale change for the secondary y-axis at Orleans and Klamath.

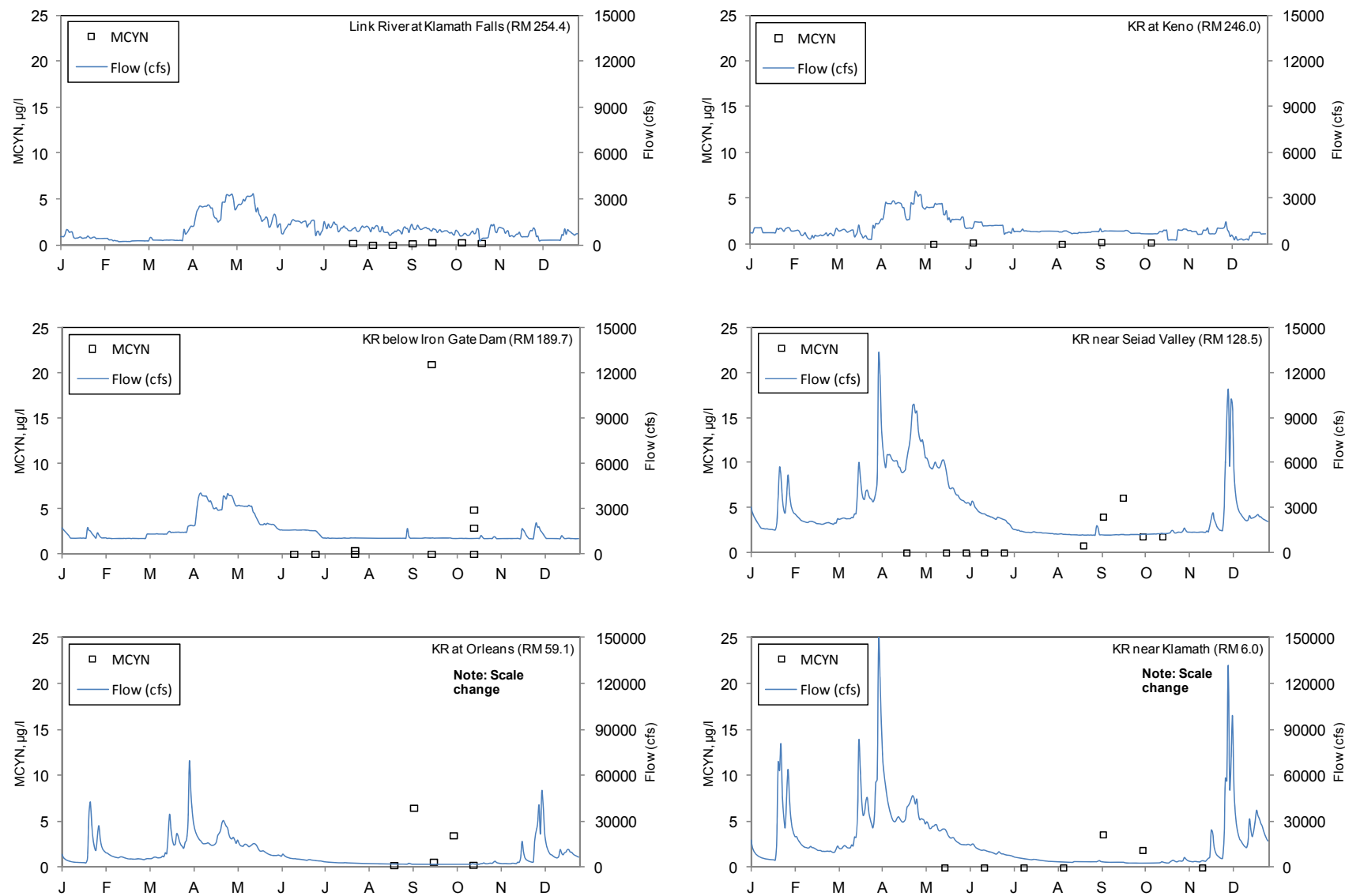


Figure 17. 2012 Microcystin (MCYN) and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers. Only surface samples are taken in consideration. Non-detect values are presented as zeros. Note the scale change for the secondary y-axis at Orleans and Klamath.

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 2012 KHSA Interim Measure 15 Monitoring Plan is also available at the KBMP website.

4. References

Karuk Tribe (Karuk). 2009. Mid-Klamath River Nutrient, Periphyton, Phytoplankton and Algal Toxin Sampling Analysis Plan (SAP). February.

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PacifiCorp. 2008. Quality Assurance Project Plan. 2009 Baseline Water Quality Monitoring by PacifiCorp, Interim Measure 12, Part 2.

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. 2012 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 (3 depths)	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 (3 depths)	Reservoir	198.7	PacifiCorp
KR1950	Klamath River below Copco Dam	Mainstem	195.0	PacifiCorp
KR1920	Iron Gate Reservoir (3 depths)	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 dataset for the 2012 KHSa baseline sampling is presented. The four sampling entities include: 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.

Table B-1. 2012 Klamath River Data Summary (mainstem). KR = Klamath River

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	Water Temperature C	pH -log[H ⁺]	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon ppm	Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen ppm	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Turbidity NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
KHSA2012-003	2/22/12	10:30	KR254.4	Link Dam	USBR	0.5	R	4.11	7.69	110	10.12	6j	-	48	4.2	1.34	-	0.2	0.39		0.8	1.2	-	0.05	9.45	7	-	
KHSA2012-008	3/20/12	8:00	KR254.4	Link Dam	USBR	0.5	R	3.21	7.81	111	11.09	14	8j	45	3.9	2.76	-	0.09	0.38		0.9	1.26	-	0.09	27.06	44	7	
KHSA2012-015	4/25/12	12:00	KR254.4	Link Dam	USBR	0.3	R	14.27	8.43	109	10.07	0.062	4j	46	4.3	3.12	3	0.11	0.11		0.8	0.9	-	0.08	20.97	33.2	6.8	
KHSA2012-019	5/9/12	7:30	KR254.4	Link Dam	USBR	0.5	R	14.15	8.02	106	9.27	6j	2j	47	5	1.61	-	0.03j	-		0.5	0.54	0.019j	0.07	11.7	9	3j	
KHSA2012-025	5/23/12	7:40	KR254.4	Link Dam	USBR	0.5	R	14.14	7.84	107	8.02	6j	-	48	4.7	1.47	-	0.03j	0.06	0.258	5	0.6	0.021j	0.08	7.89	4.3j	2.7j	
KHSA2012-029	6/6/12	7:30	KR254.4	Link Dam	USBR	0.5	R	14.22	7.66	105	7.77	4j	4j	48	5.3	2.62	-	0.06	0.05	0.479	0.7	0.7	0.039j	0.13	12.32	6.7	3.4j	
KHSA2012-035	6/20/12	8:00	KR254.4	Link Dam	USBR	0.5	R	17.55	8.48	109	8.42	10	-	50	5.2	2.27	-	0.08	-	0.231	0.7	0.66	0.032j	0.1	10.06	17.7	5	
KHSA2012-040	7/11/12	7:00	KR254.4	Link Dam	USBR	0.5	R	22.87	9.73	122	10.21	187	-	51	6.2	11.80	8	0.09	0.03j	2.45	2.3	2.3	-	0.19	16.63	15.7	9.3	
KHSA2012-046	7/25/12	6:50	KR254.4	Link Dam	USBR	0.5	R	21.22	10.14	119	8.17	370	-	50	7.3	11.30	17	0.16	-	2.21	2.8	2.8	0.1	0.14	34.23	21	10.3	0.2
KHSA2012-051	8/8/12	6:20	KR254.4	Link Dam	USBR	0.5	R	22.32	9.66	108	8.29	276	-	48	7.9	11.70	17	0.13	0.02j	2.34	3.2	3.24	0.113	0.31	24.27	19.7	10.7	-
KHSA2012-057	8/22/12	7:05	KR254.4	Link Dam	USBR	0.5	R	21.36	5.5	107	9.08	72	-	49	7.7	4.63	7	0.16	0.05	0.982	1.5	1.6	0.99	0.24	13.07	15.7	4.7j	-
KHSA2012-062	9/5/12	8:50	KR254.4	Link Dam	USBR	0.5	R	19.29	7.95	115	6.1	19	2j	52	7.4	1.95	3	0.16	0.24	0.389	1.2	1.4	0.029j	0.11	10.15	9.3	3j	0.17j
KHSA2012-068	9/19/12	7:00	KR254.4	Link Dam	USBR	0.5	R	18.91	7.48	122	5.44	13	-	53	7.1	2.97	3	0.04	0.2	0.601	0.9	1.1	0.01j	0.08	9.9	5.7	2j	0.29
KHSA2012-073	10/10/12	6:45	KR254.4	Link Dam	USBR	0.5	R	12.56	7.58	122	8.1	7	-	53	5.6	1.57	-	0.15	0.21	0.266	1.1	1.3	0.007j	0.07	13.53	6.4	1.7j	0.28
KHSA2012-079	10/24/12	7:45	KR254.4	Link Dam	USBR	0.5	R	6.78	7.74	126	8.73	4j	2j	53	5.2	1.77		0.22	0.3	0.306	0.9	1.2	0.012j	0.07	14.4	9	2j	0.2
KHSA2012-084	11/14/12	7:30	KR254.4	Link Dam	USBR	0.5	R	4.66	7.08	128	9.86	11	-	54	5.1	1.93	-	0.32	0.36	0.33	0.8	1.16	-	0.12	25.8	21.3	4.4j	
KHSA2012-090	12/12/12	9:00	KR254.4	Link Dam	USBR	0.5	R	2.21	7.47	122	10.51	6j	-	48	4		-	0.39	0.44		0.8	1.26	0.014j	0.11	59	75	8.7	
KHSA2012-001	2/22/12	12:00	KR246.0	KR at Miller Island	USBR	0.5	R	4.65	8.07	168	10.79	24	7j	70	3.4	1.74	3	0.3	0.47		1.2	1.6	0.03j	0.11	11.27	8	3j	
KHSA2012-009	3/20/12	10:05	KR246.0	KR at Miller Island	USBR	0.5	R	4.91	8.14	277	10.8	13	11j	98	4	2.00	-	0.22	0.38		0.9	1.28	0.049j	0.13	16.06	22	4j	
KHSA2012-013	4/25/12	11:00	KR246.0	KR at Miller Island	USBR	0.5	R	14.7	8.36	131	8.98	29	-	56	4.4	4.01	3	0.11	0.13		0.9	1	-	0.13	19.26	30.7	8	
KHSA2012-020	5/9/12	9:10	KR246.0	KR at Miller Island	USBR	0.5	R	14.58	7.95	112	9.12	8	2j	48	5	1.42	-	0.03j	-		0.5	0.58	0.032j	0.08	13.7	9	3j	-
KHSA2012-032	6/6/12	9:00	KR246.0	KR at Miller Island	USBR	0.5	R	16.29	8.26	111	9	9	-	49	5.7	1.40	-	0.04	0.04	0.21	0.6	0.6	0.031j	0.11	8.91	5.8	2.7j	0.15j
KHSA2012-043	7/11/12	9:15	KR246.0	KR at Miller Island	USBR	0.5	R	23.93	9.51	123	5.61	143	-	55	6.9	9.04	9	0.51	0.03j	1.87	2.8	2.8	0.039j	0.24		10.2	9.4	
KHSA2012-054	8/8/12	9:05	KR246.0	KR at Miller Island	USBR	0.5	R	23.2	9.02	113	0.51	48	-	52	8.3	6.48	9	0.83	-	1.42	2.7	2.71	0.117	0.32	12.23	10.8	7.2	-

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	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	-log[H ⁺]	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	
KHSA2012-065	9/5/12	8:05	KR246.0	KR at Miller Island	USBR	0.5	R	18.94	7.49	140	2.52	17	3j	62	8	2.24	4	0.48	0.1	0.436	1.8	1.9	0.027j	0.12	8.07	8.4	2.8j	0.16j	
KHSA2012-076	10/10/12	9:00	KR246.0	KR at Miller Island	USBR	0.5	R	12.93	7.2	154	3.15	8	3j	66	6.1	0.76	-	0.11	0.32	0.124	0.7	1	0.022j	0.06	10.7	3.3j	1.2j	0.15j	
KHSA2012-087	11/14/12	9:55	KR246.0	KR at Miller Island	USBR	0.5	R	5.66	7.06	135	6.12	-	14	53	4.8	1.72	-	0.22	0.55	0.292	0.7	1.27	0.016j	0.08	19.57	14	1.3j		
KHSA2012-093	12/12/12	10:20	KR246.0	KR at Miller Island	USBR	0.5	R	2.78	7.19	192	6.71	6j	6j	78	6		-	0.37	0.62		1	1.57	0.114		49.23	29.3	6.4		
KHSA2012-002	2/22/12	9:15	KR233.0	KR below Keno Dam	USBR	0.3	R	4.24	8.77	203	11.72	64	10j	73	6	3.81	5	0.08	0.42		1.2	1.7	-	0.11	14.87	20	8		
KHSA2012-007	3/20/12	6:55	KR233.0	KR below Keno Dam	USBR	0.3	R	4.36	7.92	254	11.06	26	9j	94	7.3	3.72	-	0.25	0.36		1.5	1.9	0.024j	0.15	26.3	33	8		
KHSA2012-014	4/25/12	7:30	KR233.0	KR below Keno Dam	USBR	0.5	R	15.21	8.34	131	9.81	31	6j	53	4.7	4.69	-	0.11	0.13		0.9	1	0.013j	0.14	27.9	47.8	9.8		
KHSA2012-021	5/9/12	11:48	KR233.0	KR below Keno Dam	USBR	0.5	R	14.15	8.13	129	10.62	10	3j	53	5.3	2.41	-	0.04	-		0.8	0.76	0.043j	0.12	19	28.6	5.8	-	
KHSA2012-033	6/6/12	10:40	KR233.0	KR below Keno Dam	USBR	0.5	R	15.72	8.46	133	9.7	13	5j	56	6.3	1.68	-	0.03j	0.02j	0.25	0.7	0.7	0.051	0.12	9.63	12	2.6j	0.15j	
KHSA2012-038	6/20/12	10:00	KR233.0	KR below Keno Dam	USBR	1.3	R	18.42	8.21	138	8.71			59			-	0.05	0.02j		0.8	0.79	0.066	0.13	7.58				
KHSA2012-044	7/11/12	10:30	KR233.0	KR below Keno Dam	USBR	0.6	R	22.19	9.05	137	7.75	15	6j	61	7.1	2.02	-	0.16	0.03j	0.351	1.1	1.1	0.092	0.18	4.32	5.4	2.8j		
KHSA2012-049	7/25/12	8:25	KR233.0	KR below Keno Dam	USBR	0.7	R	21.49	8.98	138	6.91			61			4	0.66	0.03j		2.1	2.1	0.155	0.21	6.55				
KHSA2012-055	8/8/12	8:00	KR233.0	KR below Keno Dam	USBR	0.4	R	22.92	8.78	132	6.77	122	-	58	9.1	5.97	11	0.84	-	1.31	3.1	3.07	0.183	0.36	14.63	10.8	7.2	-	
KHSA2012-060	8/22/12	8:30	KR233.0	KR below Keno Dam	USBR	0.3	R	21.89	7.76	144	6.96			61			6	0.95	-		2.7	2.7	0.115	0.29	7.17				
KHSA2012-066	9/5/12	6:50	KR233.0	KR below Keno Dam	USBR	0.2	R	19.15	8.01	156	9.22	56	6j	67	9.4	3.89	9	0.41	0.04	0.827	2.3	2.3	0.05	0.19	13.27	8.2	6.2	0.19	
KHSA2012-071	9/19/12	8:30	KR233.0	KR below Keno Dam	USBR	0.3	R	18.72	7.38	158	7.81			67			4	0.29	0.11		1.3	1.5	-	0.09	6.75				
KHSA2012-077	10/10/12	8:10	KR233.0	KR below Keno Dam	USBR	0.2	R	14.72	7.27	162	8	10	9j	69	7.1	1.10	-	0.14	0.13	0.202	1	1.2	-	0.07	8.82	4j	1.6j	0.15j	
KHSA2012-082	10/24/12	6:45	KR233.0	KR below Keno Dam	USBR	0.2	R	10.52	7.49	106	9.27			70				0.12	0.32		1	1.34	0.021j	0.08	12.8				
KHSA2012-088	11/14/12	9:00	KR233.0	KR below Keno Dam	USBR	0.3	R	5.94	7.13	137	10.19	16	-	54	5.2	1.17	-	0.16	0.35	0.165	0.7	1.25	-	0.08	21.57	12.2	2.4j		
KHSA2012-094	12/12/12	8:10	KR233.0	KR below Keno Dam	USBR	0.1	R	3.30	7.42	180	11.05	10	9j	68.0	5.10		-	0.30	0.59		0.8	1.34	0.041j		38.1	33	4.8j		
KR12002	2/23/12	11:00	KR228.2	KR above JCB reservoir	PacifiCorp	0.5	R	2.64	8.40	231	11.38			70.4	5.61			-	0.420		0.98	1.810	0.031	0.046j		22	8.8		
KR12024	3/20/12	15:30	KR228.2	KR above JCB reservoir	PacifiCorp	0.5	R	4.45	7.74	254	10.48			89.4	8.02			0.130	0.550		1.42	1.770	0.110	0.150		19	3.3		
KR12046	4/23/12	15:00	KR228.2	KR above JCB reservoir	PacifiCorp	0.5	R				8.66	8.26	8.56	57.5	5.11	1.9		0.039	0.150	0.262	0.59	1.130	0.051	0.066		43.6	8.4		
KR12068	5/22/12	15:00	KR228.2	KR above JCB reservoir	PacifiCorp	0.5	R							53.5	5.48			0.016	0.11		0.8	0.69	0.075	0.12		10.8	3.2		
KR12094	6/26/12	16:50	KR228.2	KR above JCB reservoir	PacifiCorp	0.5	R	16.74	7.9	134	8.26	4.67	3.8	55.6	6.4	0.746		-	0.055	0.107	0.78	0.86	0.078	0.12		9.2	2.4	-	
KR12118	7/24/12	13:10	KR228.2	KR above JCB reservoir	PacifiCorp	0.5	R	21.91	8.04	139	7.18	1.83	2.71	54	9.11	1.06		0.13	0.72	0.152	1.56	2.21	0.18	0.27		4.8	4	-	
KR12140	8/22/12	11:25	KR228.2	KR above JCB reservoir	PacifiCorp	0.5	R	20.71	7.71	141	6.95	6.66	10	52	8.7	1.55		0.2	1.06	0.232	1.59	2.99	0.19	0.31		4.6	3.2		
KR12166	9/16/12	15:45	KR228.2	KR above JCB reservoir	PacifiCorp	0.5	R	19.14	7.18	152	7.59	2.21	3.51	60.1	6.65	0.67		0.049	0.61	0.0846	1.19	1.78	0.062	0.094		4	2.2	0.15	
KR12190	10/18/12	13:10	KR228.2	KR above JCB reservoir	PacifiCorp	0.5	R	12.18	8.32	173	9.22	1.24	1.78	68.9	7.87	0.875		-	0.350	0.127	1.01	1.150	0.035	0.079		7	1.2j	-	
KR12212	11/27/12	15:00	KR228.2	KR above JCB reservoir	PacifiCorp	0.5	R	3.51	7.62	169	11.02	10.35	7.50	62.1	4.92	0.97		0.021j	0.630	0.153	1.07	1.570	0.055	0.110		18	3.2		
KR12003	2/23/12	NS	KR226.0	JCB reservoir (0.5 m)	PacifiCorp	0.5	R	3.57	8.68	219	13.35																		

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon ppm	Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen ppm	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Turbidity NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
KR12025	3/20/12	NS	KR226.0	JCB reservoir (0.5 m)	PacifiCorp	0.5	R	3.02	7.94	283	10.18																	
KR12047	4/23/12	NS	KR226.0	JCB reservoir (0.5 m)	PacifiCorp	0.5	R																					
KR12069	5/22/12	14:15	KR226.0	JCB reservoir (0.5 m)	PacifiCorp	0.5	R																					
KR12095	6/26/12	NS	KR226.0	JCB reservoir (0.5 m)	PacifiCorp	0.5	R																					
KR12119	7/24/12	14:10	KR226.0	JCB reservoir (0.5 m)	PacifiCorp	0.5	R	21.31	8.17	135	7.87	0.54	0.63			0.142				0.022								-
KR12141	8/22/12	10:40	KR226.0	JCB reservoir (0.5 m)	PacifiCorp	0.5	R	21.26	7.19	141	5.30	2.60	3.48			0.592				0.076								
KR12167	9/16/12	17:00	KR226.0	JCB reservoir (0.5 m)	PacifiCorp	0.5	R	18.46	7.1	152	7.12	0.60	0.76			0.205				0.020								-
KR12191	10/18/12	12:25	KR226.0	JCB reservoir (0.5 m)	PacifiCorp	0.5	R	11.88	7.94	170	8.53	2.25	3.57			0.72				0.0894								-
KR12004	2/23/12	NS	KR226.0	JCB reservoir (8.0 m)	PacifiCorp	8	R																					
KR12026	3/20/12	NS	KR226.0	JCB reservoir (8.0 m)	PacifiCorp	8	R																					
KR12048	4/23/12	NS	KR226.0	JCB reservoir (8.0 m)	PacifiCorp	8	R																					
KR12070	5/22/12	14:30	KR226.0	JCB reservoir (8.0 m)	PacifiCorp	8	R																					
KR12096	6/26/12	NS	KR226.0	JCB reservoir (8.0 m)	PacifiCorp	8	R																					
KR12120	7/24/12	14:30	KR226.0	JCB reservoir (8.0 m)	PacifiCorp	8	R					0.81	1.13			0.207				0.0309								-
KR12142	8/22/12	10:50	KR226.0	JCB reservoir (8.0 m)	PacifiCorp	8	R					4.64	6.99			0.877				0.116								
KR12168	9/16/12	17:10	KR226.0	JCB reservoir (8.0 m)	PacifiCorp	8	R					0.63	0.82			0.255				0.02								-
KR12192	10/18/12	0:524	KR226.0	JCB reservoir (8.0 m)	PacifiCorp	8	R					1.51	2.41			0.597				0.0782								-
KR12001	2/23/12	9:40	KR224.0	KR below JCB dam	PacifiCorp	0.5	R	3.00	8.46	222	11.83			72.1	5.91			-	0.380		0.94	1.630	0.025	0.052		15	6.5	
KR12023	3/20/12	17:45	KR224.0	KR below JCB dam	PacifiCorp	0.5	R	2.68	8.06	291	11.35	7.45	8.62	101.0	8.56	2.23		0.200	0.430	0.263	1.58	1.820	0.100	0.150		26	2.4	
KR12045	4/23/12	14:00	KR224.0	KR below JCB dam	PacifiCorp	0.5	R	12.05	7.93	147	9			56.8	5.30			0.073	0.180		1.09	0.960	0.078	0.180		34	6.8	
KR12067	5/22/12	13:20	KR224.0	KR below JCB dam	PacifiCorp	0.5	R	15.13	7.80	136	8.6			54.3	5.56			0.052	0.150		0.82	0.800	0.079	0.120		12	3.6	
KR12093	6/26/12	18:40	KR224.0	KR below JCB dam	PacifiCorp	0.5	R	15.41	7.70	137	8.56	6.28	4.77	57.3	6.56	0.678		-	0.074	0.096	0.77	0.930	0.086	0.130		9	-	
KR12117	7/24/12	15:50	KR224.0	KR below JCB dam	PacifiCorp	0.5	R	20.64	7.84	136	7.57	1.34	1.86	54	7.03	0.424		0.180	0.750	0.064	1.34	2.010	0.180	0.280		3.6	2.0	
KR12139	8/22/12	8:50	KR224.0	KR below JCB dam	PacifiCorp	0.5	R	20.71	7.47	141	7.41	3.92	5.73	53.6	8.99	0.852		0.28	0.97	0.123	1.42	2.77	0.24	0.33		3.4	1.6j	
KR12165	9/16/12	18:15	KR224.0	KR below JCB dam	PacifiCorp	0.5	R	17.8	7.61	154	7.83	1.74	2.58	61.2	6.46	0.488		0.22	0.64	0.0623	1.19	1.86	0.088	0.16		3.1	2	
KR12189	10/18/12	10:20	KR224.0	KR below JCB dam	PacifiCorp	0.5	R					3.38	4.88	68.8	8.99	0.459		-	0.31	0.0559	1.08	1.06	0.041	0.083		6	0.6j	
KR12211	11/27/12	14:05	KR224.0	KR below JCB dam	PacifiCorp	0.5	R	3.22	7.56	1	11.41	7.75	6.24	63.3	5.31	0.95		0.042j	0.62	0.135	0.91	1.47	0.058	0.089		15.8	2.6	
KR12233	12/26/12	16:45	KR224.0	KR below JCB dam	PacifiCorp	0.5	R	-0.75	7.83	293	12.43	3.92	4.46	99.5	6.15	1.06		0.19	0.76	0.13	1.21	1.51	0.13	0.15		18.7	2.2	
KR12005	2/23/12	9:00	KR219.5	KR bel. USGS Gage (Spring Island)	PacifiCorp	0.5	R	2.94	8.44	223	12.24			73.1	6.59		5	-	0.400		0.59	1.640	0.025	0.076	9.56	15	6.4	
KR12027	3/20/12	17:15	KR219.5	KR bel. USGS Gage (Spring Island)	PacifiCorp	0.5	R	7.42	8.26	194	10.27	2.40	3.20	80.4	4.42	0.737		-	0.320	0.071	0.5	0.690	0.063	0.075	6.4	5	0.8j	
KR12054	4/23/12	12:45	KR219.5	KR bel. USGS Gage (Spring Island)	PacifiCorp	0.5	R	12.02	7.78	147	8.76	8.97	8.14	56.7	4.69	0.688		0.064	0.180	0.086	0.93	0.920	0.064	0.140	20	34	7.6	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	Water Temperature C	pH -log[H ⁺]	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon ppm	Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen ppm	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Turbidity NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
KR12071	5/22/12	12:00	KR219.5	KR bel. USGS Gage (Spring Island)	PacifiCorp	0.5	R	15.35	7.59	136	8.26			54.5	5.18			0.068	0.150		0.74	0.730	0.080	0.130	8.4	10	2.8	
KR12097	6/26/12	18:05	KR219.5	KR bel. USGS Gage (Spring Island)	PacifiCorp	0.5	R	15.15	7.6	137	8.19	5.43	4.22	57.4	6.85	0.705		-	0.075	0.107	0.74	0.870	0.084	0.130	5.7	8.0	1.6j	-
KR12121	7/24/12	15:15	KR219.5	KR bel. USGS Gage (Spring Island)	PacifiCorp	0.5	R	20.67	7.93	135	7.51	1.07	1.59	53.5	7.97	0.2		0.14	0.75	0.0331	1.25	1.92	0.18	0.24	2.5	3.4	2.4	-
KR12143	8/22/12	10:00	KR219.5	KR bel. USGS Gage (Spring Island)	PacifiCorp	0.5	R	19.54	7.08	142	5.73	4.12	6.45	53.9	7.73	1.14		0.21	1	0.163	1.39	2.68	0.23	0.32	2.5	3.6	1j	
KR12169	9/16/12	17:50	KR219.5	KR bel. USGS Gage (Spring Island)	PacifiCorp	0.5	R	17.77	7.6	153	7.4	0.71	0.75	60.7	6.85	0.556		0.120	0.65	0.0579	1.19	1.82	0.084	0.11	3.5	3.4	2.2	-
KR12193	10/18/12	11:40	KR219.5	KR bel. USGS Gage (Spring Island)	PacifiCorp	0.5	R	11.71	7.92	170	9.09	3.25	4.66	68.3	7.41	0.493		-	0.32	0.0648	1.06	1.04	0.039	0.085	7.3	6.4	1.4j	-
KR12215	11/27/12	13:20	KR219.5	KR bel. USGS Gage (Spring Island)	PacifiCorp	0.5	R	3.3	7.27	166	11.14	7.98	5.92	63	5.1	0.652		0.022j	0.62	0.104	0.95	1.34	0.055	0.089	17	16.6	2.6	
KR12237	12/26/12	16:00	KR219.5	KR bel. USGS Gage (Spring Island)	PacifiCorp	0.5	R	0.04	7.86	283	12.13	4.18	4.17	93.3	5.56	1.08		0.170	0.740	0.144	0.92	1.440	0.120	0.130	21	20.2	1.3j	
KR12010	2/22/12	15:40	KR206.4	KR above Shovel Creek (stateline)	PacifiCorp	0.5	R	5.11	8.25	217	11.63			72.8	4.59		6.3	-	0.410		0.55	1.400	0.020	0.090	8.13	14	5.6	
KR12032	3/21/12	17:20	KR206.4	KR above Shovel Creek (stateline)	PacifiCorp	0.5	R	6.59	8.50	262	10.83	4.99	6.85	94.0	6.80	1.62	4.9	0.035	0.500	0.183	1.15	1.470	0.079	0.110	15.4	11	2.0	
KR12049	4/24/12	17:00	KR206.4	KR above Shovel Creek (stateline)	PacifiCorp	0.5	R	14.16	8.31	145	9.18			56.5	4.73		0.4j	0.018	0.190		0.7	0.840	0.069	0.120	19	35	7.6	
KR12076	5/23/12	9:05	KR206.4	KR above Shovel Creek (stateline)	PacifiCorp	0.5	R	13.43	7.96	137	9.24			56.5	4.68		-	-	0.180		0.58	0.550	0.072	0.100	7.3	9	4.4	
KR12092	6/12/12	15:20	KR206.4	KR above Shovel Creek (stateline)	PacifiCorp	0.5	R					5.45	2.95		5.54	0.8	5	-	0.042	0.124	0.78	0.610	0.052	0.091				-
KR12102	6/27/12	10:30	KR206.4	KR above Shovel Creek (stateline)	PacifiCorp	0.5	R	13.1	8.15	142	9.61	2.78	2.59	61.3	4.38	0.567	1.3j	-	0.130	0.080	0.53	0.630	0.078	0.100	4.4	8.4	4.4	-
KR12116	7/11/12	11:10	KR206.4	KR above Shovel Creek (stateline)	PacifiCorp	0.5	R					10.57	5.47			0.904	6.2	-	0.16	0.164	0.57	0.66	0.11	0.12				
KR12126	7/25/12	9:40	KR206.4	KR above Shovel Creek (stateline)	PacifiCorp	0.5	R	17.68	8	143	8.78	0.45	0.65	57.9	5.58	0.28	5.1	-	0.73	0.0331	0.72	1.41	0.14	0.17	1.6	2j	1j	-
KR12148	8/21/12	17:00	KR206.4	KR above Shovel Creek (stateline)	PacifiCorp	0.5	R	19.64	8.25	140	8.17	2.99	4.09	55.3	7.15	0.896	1.4j	0.016	1.02	0.122	0.98	2.34	0.2	0.31	2.7	4.8	2	
KR12161	8/27/12	13:10	KR206.4	KR above Shovel Creek (stateline)	PacifiCorp	0.5	R					2.02	2.73			0.672	6.9	-	0.62	0.0872	0.6	1.47	0.13	0.14				
KR12164	9/11/12	13:15	KR206.4	KR above Shovel Creek (stateline)	PacifiCorp	0.5	R							62.4	4.47		15.2	0.075	0.23		1.2	1.15	0.13	0.19	3.9	3.9	2.8	
KR12174	9/17/12	17:40	KR206.4	KR above Shovel Creek (stateline)	PacifiCorp	0.5	R	16.97	8.18	151	8.42	1.64	2.34	61.8	5.61	0.865	1.3j	0.073	0.61	0.114	1.13	1.52	0.076	0.096	3.4	4.8	1j	-
KR12188	10/8/12	15:00	KR206.4	KR above Shovel Creek (stateline)	PacifiCorp	0.5	R										3.7	-	0.21		0.58	0.66	0.055	0.1				
KR12198	10/18/12	9:00	KR206.4	KR above Shovel Creek (stateline)	PacifiCorp	0.5	R	11.6	7.91	170	9.39			69.2	5.65		1.4j	-	0.34		0.79	0.94	0.049	0.081	4.8	2.8j	0.8j	-
KR12220	11/28/12	10:50	KR206.4	KR above Shovel Creek (stateline)	PacifiCorp	0.5	R	4.85	7.81	158	11.2	4.21	4.27	69.8	3.16	0.552	0.8j	-	0.48	0.0754	0.58	1.03	0.054	0.1	9	6.4	1.4j	
KR12242	12/19/12	13:20	KR206.4	KR above Shovel Creek (stateline)	PacifiCorp	0.5	R	2.47	8.02	187	12.16	2.23	2.60	76.4	3.51	0.616	-	-	0.570	0.080	0.58	0.920	0.110	0.063	15	16.4	1.2j	
KR12012	2/22/12	11:40	KR199.0	Copco Res. (0.5 m)	PacifiCorp	0.5	R	4.4	7.71	195	10.94			68.7	3.70			0.049	0.630		0.64	1.100	0.061	0.120		2.8j	0.4j	
KR12034	3/21/12	12:15	KR199.0	Copco Res. (0.5 m)	PacifiCorp	0.5	R	5.28	7.99	206	9.87			78.1	5.33			0.091	0.340		0.67	0.910	0.037	0.061		-	-	
KR12056	4/24/12	14:40	KR199.0	Copco Res. (0.5 m)	PacifiCorp	0.5	R	14.00	7.95	153	9.44	2.15	1.47	57.0	5.16	0.532		0.039	0.240	0.064	0.67	0.650	0.046	0.077		4	1.6j	
KR12078	5/23/12	14:00	KR199.0	Copco Res. (0.5 m)	PacifiCorp	0.5	R	16.61	7.89	133	8.21			54.0	4.49			0.043	0.170		0.51	0.530	0.086	0.110		1.2j	1.6j	
KR12104	6/27/12	12:50	KR199.0	Copco Res. (0.5 m)	PacifiCorp	0.5	R	18.40	8.19	140	8.49	2.02	0.91	60.3	5.29	0.262		-	0.050	0.049	0.58	0.550	0.075	0.100		0.8j	-	0.23
KR12128	7/25/12	15:40	KR199.0	Copco Res. (0.5 m)	PacifiCorp	0.5	R					0.54	0.61	62.1	7.22	0.143		-	0.0032j	0.020	0.75	0.620	0.071	0.130		4.8	3.4	3.4
KR12150	8/21/12	15:10	KR199.0	Copco Res. (0.5 m)	PacifiCorp	0.5	R					17.16	6.42	61.7	5.91	1.84		-	0.017	0.315	1.74	1.930	0.092	0.280		15	12.8	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	Water Temperature C	pH -log[H ⁺]	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon ppm	Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen ppm	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Turbidity NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
KR12176	9/17/12	15:30	KR199.0	Copco Res. (0.5 m)	PacifiCorp	0.5	R	18.35	9.01	149	14.2	2.40	3.55	66.1	5.01	1.13		0.018	0.160	0.158	1.91	2.120	0.085	0.200		18	14.4	120
KR12200	10/17/12	15:55	KR199.0	Copco Res. (0.5 m)	PacifiCorp	0.5	R	14.58	8.15	160	8.18	0.88	0.49	67.7	5.94	0.509		0.024	0.200	0.072	0.86	0.790	0.076	0.110		2.8j	1.2j	3.2
KR12222	11/28/12	15:20	KR199.0	Copco Res. (0.5 m)	PacifiCorp	0.5	R	6.28	7.62	159	9.36	1.27	1.33	66.1	3.93	0.309		0.057	0.380	0.038	0.82	1.200	0.057	0.100		1.4j	-	
KR12244	12/19/12	11:40	KR199.0	Copco Res. (0.5 m)	PacifiCorp	0.5	R	3.81	7.36	157	9.67	1.41	1.74	60.4	4.18	0.574		0.059	0.440	0.067	0.71	0.900	0.068	0.074		4	2.2	
KR12014	2/22/12	12:00	KR199.0	Copco Res. (1.0 m from bottom)	PacifiCorp	26	R							68.0	4.33			0.120	0.660		0.63	1.250	0.068	0.120		2j	1j	
KR12036	3/21/12	12:30	KR199.0	Copco Res. (1.0 m from bottom)	PacifiCorp	28	R								4.76			0.130	0.320		0.67	0.980	0.052	0.071		1.2j	-	
KR12058	4/24/12	15:00	KR199.0	Copco Res. (1.0 m from bottom)	PacifiCorp	28	R							60.0	5.13			0.260	0.290		0.95	0.980	0.140	0.170		9	30.8	
KR12080	5/23/12	14:45	KR199.0	Copco Res. (1.0 m from bottom)	PacifiCorp	27	R							63.6	4.38			0.600	0.077		1.2	1.090	0.360	0.390		4.0	2.0	
KR12106	6/27/12	13:15	KR199.0	Copco Res. (1.0 m from bottom)	PacifiCorp	28.5	R							66.2	5.19			0.680	0.049		1.19	1.360	0.410	0.450		4.4	2.4	
KR12130	7/25/12	16:10	KR199.0	Copco Res. (1.0 m from bottom)	PacifiCorp	28.5	R							65.9	4.99			0.900	0.011		1.39	1.280	0.530	0.580		2.4j	0.4j	
KR12152	8/21/12	15:30	KR199.0	Copco Res. (1.0 m from bottom)	PacifiCorp	28	R							68.9	4.43			0.960	0.029		1.37	1.61	0.6	0.68		6.2	1.4j	
KR12178	9/17/12	15:50	KR199.0	Copco Res. (1.0 m from bottom)	PacifiCorp	30	R							72.9	4.15			1.49	0.025		1.95	2.37	0.93	0.96		2.8j	2.6	
KR12202	10/17/12	16:10	KR199.0	Copco Res. (1.0 m from bottom)	PacifiCorp	28	R					0.89	1.35	70.3	5.74	0.417		0.25	0.18	0.0469	1.09	1	0.084	0.14		0.9j	-	
KR12224	11/28/12	15:45	KR199.0	Copco Res. (1.0 m from bottom)	PacifiCorp	30	R							62.3	3.46			0.120	0.4		0.92	1.38	0.061	0.084		4.8	1.2j	
KR12246	12/19/12	12:00	KR199.0	Copco Res. (1.0 m from bottom)	PacifiCorp	29	R							61	4.37			0.044j	0.45		0.61	0.9	0.067	0.065		3.6	0.6j	
KR12013	2/22/12	11:50	KR199.0	Copco Res. Thermocline	PacifiCorp	13	R							67.7	3.89			0.071	0.64		0.53	1.29	0.063	0.086		0.8j	0.8j	
KR12035	3/21/12	12:45	KR199.0	Copco Res. Thermocline	PacifiCorp	7	R					0.72	1.2	78.4	4.83	0.403		0.100	0.34	0.0289	0.7	0.89	0.04	0.064		0.4j	0.8j	
KR12057	4/24/12	15:20	KR199.0	Copco Res. Thermocline	PacifiCorp	5	R							55.4	4.66			0.033	0.25		0.65	0.97	0.053	0.1		8.0	3.2	
KR12079	5/23/12	14:30	KR199.0	Copco Res. Thermocline	PacifiCorp	11	R							53.7	4.4			0.045	0.16		0.55	0.56	0.092	0.12		1.2j	1.2j	
KR12105	6/27/12	13:25	KR199.0	Copco Res. Thermocline	PacifiCorp	14.5	R							59.7	4.97			0.087	0.14		0.64	0.69	0.13	0.16		2j	1.6j	
KR12129	7/25/12	16:30	KR199.0	Copco Res. Thermocline	PacifiCorp	14.5	R					0.42	0.63	59.3	4.44	0.349		0.052	0.29	0.0331	0.58	0.66	0.21	0.24		1.2j	-	
KR12151	8/21/12	16:00	KR199.0	Copco Res. Thermocline	PacifiCorp	18	R					0.82	1.01	62.3	4.54	0.687		0.17	0.18	0.0559	0.56	0.98	0.25	0.32		4.6	1.6j	
KR12177	9/17/12	16:00	KR199.0	Copco Res. Thermocline	PacifiCorp	18	R					0.32	0.53	68.4	4.44	0.333		0.35	0.31	0.0334	1.01	1.37	0.21	0.23		2.4j	1.8j	
KR12201	10/17/12	16:20	KR199.0	Copco Res. Thermocline	PacifiCorp	12	R					0.98	0.84	68.5	5.9	0.264		0.014	0.2	0.0335	0.94	1.19	0.076	0.12		2.2j	1.6j	
KR12223	11/28/12	15:35	KR199.0	Copco Res. Thermocline	PacifiCorp	16	R					1.34	1.43	67.7	4.15	0.327		0.058	0.4	0.0377	0.78	1.02	0.057	0.084		2.6j	-	
KR12245	12/19/12	12:20	KR199.0	Copco Res. Thermocline	PacifiCorp	14	R					1.28	1.49	63	4.28	0.668		0.055	0.450	0.098	0.71	0.880	0.066	0.067		3.4	0.6j	
KR12015	2/22/12	12:55	KR195.0	KR below Copco Dam	PacifiCorp	0.5	R	3.88	7.82	193	10.67			68.0	3.56			0.065	0.630		0.63	1.240	0.063	0.096		1.2j	-	
KR12037	3/21/12	13:30	KR195.0	KR below Copco Dam	PacifiCorp	0.5	R	5.19	8.12	207	9.90	1.16	1.65	78.1	4.82	0.476		0.080	0.340	0.042	0.71	0.900	0.039	0.059		-	-	
KR12059	4/24/12	10:00	KR195.0	KR below Copco Dam	PacifiCorp	0.5	R	11.05	7.64	151	9.03			55.5	5.27			0.081	0.280		0.78	0.760	0.059	0.077		8	1.6j	
KR12081	5/29/12	14:00	KR195.0	KR below Copco Dam	PacifiCorp	0.5	R							56.6	5.75			0.071	0.140		0.59	0.600	0.094	0.110		4	3.6	-
KR12107	6/27/12	15:00	KR195.0	KR below Copco Dam	PacifiCorp	0.5	R	16.59	7.71	143	7.20	1.52	1.10	60.2	4.81	0.432		-	0.089	0.067	0.59	0.670	0.100	0.130		2.4j	0.8j	-

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	Water Temperature C	pH -log[H ⁺]	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon ppm	Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen ppm	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Turbidity NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
KR12131	7/25/12	15:00	KR195.0	KR below Copco Dam	PacifiCorp	0.5	R	19.82	8.33	146	7.99	0.38	0.47	61.4	5.17	0.221		0.034	0.15	0.0265	0.8	0.7	0.11	0.16		1.8j	1.2j	1.9
KR12153	8/21/12	14:00	KR195.0	KR below Copco Dam	PacifiCorp	0.5	R	20.44	8.82	143	8.8	2.19	2.77	59.7	6.13	0.48		-	0.33	0.0693	1	1.74	0.14	0.23		6.2	5.4	
KR12179	9/17/12	14:40	KR195.0	KR below Copco Dam	PacifiCorp	0.5	R	17.55	8.75	700	9.76	1.2	2.03	63.3	5.08	0.63		-	0.24	0.0802	1.13	1.5	0.11	0.16		6.4	5.2	31
KR12203	10/17/12	15:00	KR195.0	KR below Copco Dam	PacifiCorp	0.5	R					1.94	0.86	67.3	6.24	0.361		0.026	0.22	0.0492	1.01	0.9	0.077	0.085		2.2j	0.2j	3.4
KR12225	11/28/12	14:45	KR195.0	KR below Copco Dam	PacifiCorp	0.5	R	6.15	7.39	157	9.09	1.21	1.63	64.3	3.83	0.154		0.068	0.4	0.0244	0.61	1.13	0.061	-		2.2j	-	
KR12247	12/19/12	10:35	KR195.0	KR below Copco Dam	PacifiCorp	0.5	R	3.82	7.17	157	9.98	1.58	1.97	61.4	4.040	0.492		0.047j	0.460	0.056	0.6	0.830	0.067	0.049		3.6	0.6j	
KR12017	2/22/12	14:00	KR192.0	Iron Gate Res. (0.5 m)	PacifiCorp	0.5	R	3.65	7.83	176	10.86			66.0	3.64			0.140	0.600		0.52	1.260	0.046	0.056		0.4j	-	
KR12039	3/21/12	14:50	KR192.0	Iron Gate Res. (0.5 m)	PacifiCorp	0.5	R	4.54	8.16	177	10.46	1.55	1.90		4.07	0.457		0.046	0.380	0.053	0.56	0.830		0.050				
KR12061	4/24/12	12:30	KR192.0	Iron Gate Res. (0.5 m)	PacifiCorp	0.5	R	13.43	8.03	146	9.39	1.03	1.23	57.6	5.43	0.466		-	0.280	0.060	0.71	0.640	0.039	0.070		8	2.4	
KR12083	5/23/12	12:00	KR192.0	Iron Gate Res. (0.5 m)	PacifiCorp	0.5	R	15.47	8.00	136	8.61			54.7	4.79			-	0.130		0.72	0.540	0.075	0.110		1.2j	0.8j	
KR12109	6/30/12	15:00	KR192.0	Iron Gate Res. (0.5 m)	PacifiCorp	0.5	R	20.88	8.22	142	9.61	1.74	0.60	62.9	5.74	0.303		-	-	0.047	0.48	0.380	0.045	0.073		0.4j	1.6j	0.22
KR12133	7/25/12	12:00	KR192.0	Iron Gate Res. (0.5 m)	PacifiCorp	0.5	R					0.18	0.23	61.6	4.22	0.135		-	-	0.018	0.59	0.280	0.053	0.087		0.6j	0.6j	0.64
KR12155	8/21/12	11:50	KR192.0	Iron Gate Res. (0.5 m)	PacifiCorp	0.5	R					1.44	0.52	65.3	5.10	0.338		-	0.003j	0.480	0.91	1.140	0.050	0.130		6	5.6	
KR12181	9/17/12	13:00	KR192.0	Iron Gate Res. (0.5 m)	PacifiCorp	0.5	R					0.96	1.26	64.6	4.13	0.948		-	-	0.135	1.41	1.550	0.082	0.190		5	13.6	53
KR12205	10/17/12	13:15	KR192.0	Iron Gate Res. (0.5 m)	PacifiCorp	0.5	R	15.54	7.98	152	7.07	2.55	1.85	65.0	6.52	0.419		-	0.260	0.067	1.06	1.080	0.096	0.160		4	3.2	9.7
KR12227	11/28/12	13:15	KR192.0	Iron Gate Res. (0.5 m)	PacifiCorp	0.5	R	7.89	7.27	168	5.58	0.50	0.63	71.9	4.28	0.146		0.110	0.330	0.020	0.56	0.940	0.100	0.036j		1j	0.2j	
KR12249	12/19/12	14:40	KR192.0	Iron Gate Res. (0.5 m)	PacifiCorp	0.5	R	5.34	7.62	159	8.18	0.23	0.35	63.4	4.50	3.62		-	0.470	0.710	1.34	1.360	0.077	0.170		3	2.8	
KR12019	2/22/12	14:30	KR192.0	Iron Gate Res. (1.0 from bottom)	PacifiCorp	44	R							67.6	3.53			0.240	0.560		0.94	1.290	0.069	0.410		2.8j	-	
KR12040	3/21/12	15:15	KR192.0	Iron Gate Res. (1.0 from bottom)	PacifiCorp	44	R					1.42	1.73	67.3	3.73	0.462		0.086	0.510	0.059	0.43	0.950	0.048	0.062		-	-	
KR12063	4/24/12	12:50	KR192.0	Iron Gate Res. (1.0 from bottom)	PacifiCorp	47	R							72.9	4.30			-	0.510		0.48	0.790	0.091	0.130		3.6	3.2	
KR12085	5/23/12	12:30	KR192.0	Iron Gate Res. (1.0 from bottom)	PacifiCorp	43	R							72.8	4.43			0.042	0.65		0.48	0.990	0.120	0.130		0.8j	0.4j	
KR12111	6/30/12	15:20	KR192.0	Iron Gate Res. (1.0 from bottom)	PacifiCorp	44	R							74.4	4.72			0.130	0.600		0.73	1.290	0.140	0.170		3.2	1.2j	
KR12135	7/25/12	12:20	KR192.0	Iron Gate Res. (1.0 from bottom)	PacifiCorp	44	R							74	5.38			0.25	0.58		0.76	1.2	0.2	0.23		3.0	0.8j	
KR12157	8/21/12	12:20	KR192.0	Iron Gate Res. (1.0 from bottom)	PacifiCorp	44	R							77.9	-			0.340	0.46		0.7	1.49	0.23	0.28		4.2	1.2j	
KR12183	9/17/12	NS	KR192.0	Iron Gate Res. (1.0 from bottom)	PacifiCorp		R																					
KR12207	10/17/12	13:30	KR192.0	Iron Gate Res. (1.0 from bottom)	PacifiCorp	44	R							77.5				0.75	0.21		1.44	1.53	0.32	0.37		5.5	3.8	
KR12229	11/28/12	13:25	KR192.0	Iron Gate Res. (1.0 from bottom)	PacifiCorp	44	R							77	4.16			0.610	0.2		1.19	1.25	0.21	0.25		4.6	1.7j	
KR12251	12/19/12	15:00	KR192.0	Iron Gate Res. (1.0 from bottom)	PacifiCorp	44	R							63.8	3.8			0.05	0.44		0.48	0.88	0.087	0.074		3.2	0.6j	
KR12018	2/22/12	14:15	KR192.0	Iron Gate Res. Thermocline	PacifiCorp	6	R							66.8	3.61			0.17	0.57		0.61	1.34	0.053	0.09		1.2j	-	
KR12041	3/21/12	15:30	KR192.0	Iron Gate Res. Thermocline	PacifiCorp	6	R							69.3	3.69			0.047	0.4		0.47	0.83	0.031	0.048j		-	-	
KR12062	4/24/12	13:20	KR192.0	Iron Gate Res. Thermocline	PacifiCorp	6	R							58.2	4.78			0.046	0.29		0.7	0.72	0.052	0.077		9.6	4.4	

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	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
KR12084	5/23/12	12:10	KR192.0	Iron Gate Res. Thermocline	PacifiCorp	10	R							54.4	4.17			0.023	0.14		0.48	0.46	0.079	0.1		1.6j	2	
KR12110	6/30/12	15:35	KR192.0	Iron Gate Res. Thermocline	PacifiCorp	14.5	R					1.3	0.94	58.4	4.67	0.217		-	0.19	0.04	0.42	0.6	0.081	0.096		1.2j	1.6j	
KR12134	7/25/12	12:30	KR192.0	Iron Gate Res. Thermocline	PacifiCorp	14.5	R					0.35	0.51	57.7	3.56	0.109		-	0.34	0.0154	0.42	0.57	0.1	0.12		1.2j	0.2j	
KR12156	8/21/12	13:00	KR192.0	Iron Gate Res. Thermocline	PacifiCorp	17	R					0.85	0.86	58.8	4.09	0.26		-	0.29	0.0335	0.36	0.9	0.11	0.15		1.6j	-	
KR12182	9/17/12	14:00	KR192.0	Iron Gate Res. Thermocline	PacifiCorp	19	R					0.2	0.31	60.2	3.23	0.314		0.17	0.26	0.0245	0.43	0.76	0.16	0.17		1.8j	1j	
KR12206	10/17/12	13:40	KR192.0	Iron Gate Res. Thermocline	PacifiCorp	8	R					0.42	0.53	65	7.58	0.905		-	0.29	0.161	0.88	0.94	0.1	0.17		2.4j	1.4j	
KR12228	11/28/12	13:35	KR192.0	Iron Gate Res. Thermocline	PacifiCorp	23	R					0.59	0.87	72.4	3.88	0.0633		0.12	0.35	0.0133	0.86	0.89	0.092	0.13		1j	-	
KR12250	12/19/12	15:20	KR192.0	Iron Gate Res. Thermocline	PacifiCorp	21	R					1.17	1.54	63.0	3.96	0.31		0.016j	0.460	0.038	0.85	0.810	0.072	0.067		2.7j	0.9j	
KR12009	2/22/12	16:35	KR189.7	KR below Iron Gate Dam	PacifiCorp	0.5	R	3.35	7.81	178	11.92			67.5	3.37			0.100	0.610		0.59	1.210	0.046	0.078	3.68	-	1.2j	
KR12031	3/21/12	16:10	KR189.7	KR below Iron Gate Dam	PacifiCorp	0.5	R	4.23	7.88	172	11.21	1.22	1.50	69.7	3.44	0.497		0.022	0.470	0.056	0.59	0.920	0.041	0.061	3.7	-	0.4j	
KR12053	4/24/12	11:40	KR189.7	KR below Iron Gate Dam	PacifiCorp	0.5	R	10.97	7.98	153	10.56	4.30	3.12	58.1	4.51	1.76		0.043	0.300	0.245	0.86	0.790	0.047	0.140	9.1	6	3.2	
KR12075	5/23/12	10:00	KR189.7	KR below Iron Gate Dam	PacifiCorp	0.5	R	15.12	8.06	137	9.70			55.7	5.31			-	0.130		0.54	0.510	0.078	0.099	4.4	2.8j	3.6	
KR12089	5/29/12	15:00	KR189.7	KR below Iron Gate Dam	PacifiCorp	0.5	R							55.2	4.59			-	0.110		0.56	0.530	0.075	0.110	4.5	4.4	2.4	
KR12091	6/12/12	14:10	KR189.7	KR below Iron Gate Dam	PacifiCorp	0.5	R					3.27	2.73	60.7		0.498		-	-	0.076	0.77	0.540	0.035	0.120	5.4	96.7		-
KR12101	6/27/12	15:40	KR189.7	KR below Iron Gate Dam	PacifiCorp	0.5	R	16.85	7.88	142	8.85	4.96	1.81	59.5	5.22	0.327		-	0.061	0.047	0.51	0.540	0.065	0.094	2.1	1.6j	2.0	-
KR12115	7/11/12	14:30	KR189.7	KR below Iron Gate Dam	PacifiCorp	0.5	R					1.33	0.66	61	8.49	0.211		0.039	0.068	0.0355	0.48	0.49	0.078	0.098	1.3	1.6j	-	
KR12125	7/25/12	13:45	KR189.7	KR below Iron Gate Dam	PacifiCorp	0.5	R	20.47	8.11	147	8.41	0.33	0.49	61.4	4.2	0.0865		0.02	0.07	0.0132	0.63	0.44	0.083	0.12	1.1	-	0.2j	0.4
KR12147	8/21/12	10:05	KR189.7	KR below Iron Gate Dam	PacifiCorp	0.5	R	20.44	8.29	147	6.89	6.6	1.98	63	4.96	0.744		0.032	0.18	0.141	0.76	1.2	0.12	0.19	3.2	3.2	4	
KR12162	8/27/12	14:20	KR189.7	KR below Iron Gate Dam	PacifiCorp	0.5	R					3.36	1.94	50.2	4.8	0.725		0.045	0.22	0.118	0.87	1.46	0.12	0.12		4.4	2.4	
KR12163	9/11/12	15:50	KR189.7	KR below Iron Gate Dam	PacifiCorp	0.5	R											0.051	0.63		0.77	1.29	0.1	0.14				
KR12173	9/17/12	18:45	KR189.7	KR below Iron Gate Dam	PacifiCorp	0.5	R	18.41	8.7	149	8.08	13.9	1.87	63.3	4.77	1.24		0.025	0.26	0.234	0.96	1.11	0.12	0.17	4.4	5.4	5.6	
KR12187	10/8/12	16:00	KR189.7	KR below Iron Gate Dam	PacifiCorp	0.5	R					2.65	1.66	67.7	3.67	0.471		0.029	0.27	0.0738	0.92	1.08	0.12	0.19	2.8	4	1.3j	
KR12197	10/17/12	17:50	KR189.7	KR below Iron Gate Dam	PacifiCorp	0.5	R	14.83	7.72	156	7.66	2.9	1.42	65.4	6.89	0.498		-	0.3	0.0704	0.89	0.97	0.11	0.15	1.7	3.4	2.0	4.9
KR12219	11/28/12	12:10	KR189.7	KR below Iron Gate Dam	PacifiCorp	0.5	R	7.48	7.08	169	7.62	0.71	1.05	69.2	4.49	0.124		0.18	0.32	0.02	0.86	1.1	0.11	0.15	3.7	-	-	
KR12241	12/19/12	16:00	KR189.7	KR below Iron Gate Dam	PacifiCorp	0.5	R	5.11	7.50	161	10.04	1	1.33	62.8	3.85	0.418		-	0.47	0.0488	0.51	0.84	0.071	0.081	6.9	2j	0.8j	
IG062712-OC	6/27/12	13:30	KR189.7	KR below Iron Gate Dam	Karuk	0.5	R	18.69	8.56	102	9.51	7	2.2	67.1	4.05	0.557		0.011	0.052			0.511	0.058	0.091	0.99	3	0.67	
IG072512-OC	7/25/12	12:58	KR189.7	KR below Iron Gate Dam	Karuk	0.5	R	21.99	8.43	149	8.92	5	0.6	69.4	3.93			0.019	0.064			0.527	0.084	0.105	0.76	1.7	1.3	
IG082212-OC	8/22/12	13:57	KR189.7	KR below Iron Gate Dam	Karuk	0.5	R	21.19	8.53	149	7	12.00	2.30	66.9	5.38	1.38		0.02	0.262			1.18	0.132	0.182	1.7	3.5	3	
IG091912-OC	9/19/12	14:25	KR189.7	KR below Iron Gate Dam	Karuk	0.5	R	19.67	9	148	9.86	22.00	5.80	73.6	4.69	3.55		<0.010	0.204			1.33	0.127	0.194	3.4	10	7.3	
IG101712-OC	10/17/12	13:26	KR189.7	KR below Iron Gate Dam	Karuk	0.5	R	15.92	7.93	157	8.26	11.00	3.20	73.8	4.76	0.993		0.02	0.333			1.08	0.1	0.16	1.7	3	2.5	
WA022212-OC	2/22/12	12:03	KR156.0	KR at Walker Bridge	Karuk	0.5	R	7.17	8.24	215	11.95	3.70	1.50		2.52	0.664		<0.010	0.562			0.942	0.051	0.075		5	1.7	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	Water Temperature C	pH -log[H ⁺]	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon ppm	Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen ppm	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Turbidity NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
WA032112-OC	3/21/12	12:09	KR156.0	KR at Walker Bridge	Karuk	0.5	R	7.21	7.93	231	11.38	4.80	7.90		3.14	0.749		<0.010	0.303			0.656	0.037	0.06		7.3	2.5	
WA041912-OC	4/19/12	12:31	KR156.0	KR at Walker Bridge	Karuk	0.5	R	10.25	7.67	199	10.8	5.30	6.60		4.68	0.956		0.026	0.308			0.975	0.045	0.083		12	3.5	
WA051712-OC	5/17/12	12:32	KR156.0	KR at Walker Bridge	Karuk	0.5	R	15.67	8.03	149	9.52	3.20	2.80		3.7	0.318		0.012	0.13			0.539	0.063	0.087		7.2	2.2	
WA061312-OC	6/13/12	12:08	KR156.0	KR at Walker Bridge	Karuk	0.5	R	17.87	6.23	161	9.57	2.10	2.70		3.54	0.614		0.012	0.052			0.466	0.044	0.07		3.7	<0.50	
WA062712-OC	6/27/12	11:51	KR156.0	KR at Walker Bridge	Karuk	0.5	R	17.67	8.29	162	9.74	2.10	2.70	75.6	3.85	0.239		<0.010	0.049			0.451	0.058	0.083	1.7	3.3	1.2	
WA071112-OC	7/11/12	11:24	KR156.0	KR at Walker Bridge	Karuk	0.5	R	22.43	8.46	163		0.80	1.30		3.75	0.484		<0.010	0.047			0.467	0.078	0.088		2	0.75	
WA072512-OC	7/25/12	11:30	KR156.0	KR at Walker Bridge	Karuk	0.5	R	22.7	8.35	164	8.81	1.60	1.00	76.7	3.7	0.337		<0.010	0.035			0.45	0.085	0.102	0.71	1.5	0.75	
WA080812-OC	8/8/12	11:27	KR156.0	KR at Walker Bridge	Karuk	0.5	R	22.38	8.35	169	8.92	2.40	2.60		5.3	0.428		<0.010	0.087			0.694	0.107	0.121		2	1.1	
WA082212-OC	8/22/12	11:49	KR156.0	KR at Walker Bridge	Karuk	0.5	R	22.31	8.36	171	9.1	3.70	2.20	77.1	5.4	0.658		<0.010	0.248	0.388		0.892	0.13	0.157	0.71	2.3	1.7	1.7
WA090512-OC	9/5/12	11:55	KR156.0	KR at Walker Bridge	Karuk	0.5	R	20.84	8.43	172	9.34	7.50	4.00		6	1.17		0.013	0.273			0.929	0.136	0.185		2.8	1.3	3.6
WA091912-OC	9/19/12	12:48	KR156.0	KR at Walker Bridge	Karuk	0.5	R	19.8	8.55	181	10.07	9.60	3.10	87.7	4.63	1		<0.010	0.267			1.11	0.151	0.185	2.4	3.8	3.5	8.7
WA100312-OC	10/3/12	12:00	KR156.0	KR at Walker Bridge	Karuk	0.5	R	17.89	8.40	194	9.5	6.90	3.50		4.68	0.93		<0.010	0.309			1.09	0.123	0.162		3.3	2.5	6.7
WA101712-OC	10/17/12	11:21	KR156.0	KR at Walker Bridge	Karuk	0.5	R	15.1	8.28	194	9.75	4.30	2.50	92.3	4.54	0.679		0.012	0.343			0.866	0.112	0.153	0.86	2.3	<0.50	1.8
WA111512-OC	11/15/12	12:13	KR156.0	KR at Walker Bridge	Karuk	0.5	R	10.21	8.43	209	11.03	1.10	2.30		3.61	0.32		0.01	0.361			0.786	0.098	0.12		2.3	1.1	
WA121212-OC	12/12/12	12:07	KR156.0	KR at Walker Bridge	Karuk	0.5	R	6.98	8.22	226	11.34	1.1	2.3		3.3	0.425		0.023	0.435			0.871	0.08	0.1		4.3	1.7	
SV022212-OC	2/22/12	10:55	KR128.5	KR below Seiad Valley	Karuk	0.5	R	7.92	8.17	208	11.94	4.30	1.00		1.95	0.496	<2.00	<0.010	0.443	0.0702		0.681	0.038	0.054	2	5.1	1.4	
SV032112-OC	3/21/12	11:03	KR128.5	KR below Seiad Valley	Karuk	0.5	R	7.62	7.90	201	11.41	3.20	5.80		2.31	0.709	<2.00	<0.010	0.214	0.0869		0.43	0.024	0.044	2.6	7.3	2	
SV041912-OC	4/19/12	11:08	KR128.5	KR below Seiad Valley	Karuk	0.5	R	10.23	7.75	186	10.85	4.80	3.00		3.55	1.11		0.01	0.25	0.112		0.646	0.031	0.06	5.2	12	2.3	<2.00
SV051712-OC	5/17/12	11:58	KR128.5	KR below Seiad Valley	Karuk	0.5	R	11.73	8.17	91	10.5	4.80	1.90		2.60	1.1		0.011	0.085	0.034		0.389	0.035	0.080	4.6	26.0	3.2	<2.00
SV053112-OC	5/31/12	11:41	KR128.5	KR below Seiad Valley	Karuk	0.5	R	17.23	8.36	149	10.26	8.30	4.20	70.8	2.74	1		<0.010	0.036	0.087		0.311	0.033	0.063	2.1	15	1.8	<2.00
SV061312-OC	6/13/12	10:37	KR128.5	KR below Seiad Valley	Karuk	0.5	R	17.57	7.96	166	9.61	3.70	4.10		2.78	0.6		<0.010	0.041	0.069		0.380	0.033	0.064	2.2	5.7	0.8	<2.00
SV062712-OC	6/27/12	10:30	KR128.5	KR below Seiad Valley	Karuk	0.5	R	17.05	8.17	169	9.61	1.90	2.20	79.4	3.14	0.7		<0.010	0.055	0.056		0.384	0.043	0.065	0.98	4.0	1.8	<2.00
SV071112-OC	7/11/12	9:37	KR128.5	KR below Seiad Valley	Karuk	0.5	R	22.01	8.29	178	8.72	1.10	1.40	86.1	3.20	0.4		<0.010	0.035	0.029		0.392	0.063	0.070	0.79	2.8	0.8	
SV072512-OC	7/25/12	10:05	KR128.5	KR below Seiad Valley	Karuk	0.5	R	22.1	8.25	177	8.78	2	1.2	84	3.21	0.336		<0.010	<0.010	0.0418		0.371	0.06	0.076	0.65	1.3	1	
SV080812-OC	8/8/12	9:48	KR128.5	KR below Seiad Valley	Karuk	0.5	R	21.64	8	152	8.86	3	1.7		4.43	0.493		<0.010	<0.027	0.0602		0.53	0.086	0.099	0.79	2.3	1.3	
SV082212-OC	8/22/12	10:09	KR128.5	KR below Seiad Valley	Karuk	0.5	R	21.7	8	177	9.06	6.4	4.4	81.8	4.93	0.772		<0.010	0.133	0.106		0.678	0.108	0.133	0.35	3	1.8	0.79
SV090512-OC	9/5/12	10:18	KR128.5	KR below Seiad Valley	Karuk	0.5	R	20.16	8.31	179	9.21	7.80	4.40		5.83	1.10		0.012	0.229			0.842	0.121	0.165	1.9	4.20	2.00	4.00
SV091912-OC	9/19/12	10:55	KR128.5	KR below Seiad Valley	Karuk	0.5	R	18.91	8.43	177	10.07	8.00	4.30	90.3	4.53	1.6		0.015	0.199	0.261		0.987	0.133	0.165	2	4.3	2.3	6.10
SV100312-OC	10/3/12	10:33	KR128.5	KR below Seiad Valley	Karuk	0.5	R	17.20	8.35	165	9.69	4	2.8		4.51	0.689		<0.010	0.341	0.14		0.959	0.127	0.153	0.75	3.3	2	1.8
SV101712-OC	10/17/12	10:02	KR128.5	KR below Seiad Valley	Karuk	0.5	R	15.15	8.27	199	9.75	5	4.4	97	3.99	0.75		<0.010	0.339	0.0978		0.822	0.102	0.141	0.81	3.3	1.8	1.8
SV111512-OC	11/15/12	11:04	KR128.5	KR below Seiad Valley	Karuk	0.5	R	10.43	8.41	216	11.17	2	3.3		3.29	0.381		<0.010	0.326	0.0578		0.683	0.087	0.104	0.61	2.5	1.1	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	Water Temperature C	pH -log[H ⁺]	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon ppm	Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen ppm	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Turbidity NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
SV121212-OC	12/12/12	10:59	KR128.5	KR below Seiad Valley	Karuk	0.5	R	6.57	8	195	11.37	1.10	1.50		2.7	0.438		0.018	0.326	0.0415		0.49	0.049	0.062	2.5	4.5	1.5	
HC022212-OC	2/22/12	10:00	KR106.0	KR below Happy Camp	Karuk	0.5	R	7.8	8.01	183	11.89	2.70	2.20		2.25	0.445		<0.010	0.305			0.515	0.028	0.039		3.5	1.1	
HC032112-OC	3/21/12	10:16	KR106.0	KR below Happy Camp	Karuk	0.5	R	6.87	7.64	165	11.78	3.70	2.60		2.33	0.626		<0.010	0.129			0.245	0.015	0.032		5.8	1.3	
HC041912-OC	4/19/12	10:33	KR106.0	KR below Happy Camp	Karuk	0.5	R	9.6	7.71	162	11.2	4.30	1.00		2.95	0.546		<0.010	0.17			0.487	0.025	0.043		11	1.3	
HC051712-OC	5/17/12	10:35	KR106.0	KR below Happy Camp	Karuk	0.5	R	14.16	8.02	117	10.1	4.30	1.30		2.20	0.7		<0.010	0.059			0.275	0.025	0.052		10.0	2.0	
HC053112-OC	5/31/12	10:42	KR106.0	KR below Happy Camp	Karuk	0.5	R	16.09	8.14	146	10.08	8.30	3.90	73.0	2.28	0.7		<0.010	<0.010			0.257	0.021	0.052	2.2	9.5	3.00	
HC061312-OC	6/13/12	9:49	KR106.0	KR below Happy Camp	Karuk	0.5	R	17.18	7.82	165	9.48	4.30	6.00		2.41	1.0		<0.010	0.024			0.291	0.025	0.059		7.2	1.5	
HC062712-OC	6/27/12	9:45	KR106.0	KR below Happy Camp	Karuk	0.5	R	16.63	8.09	167	9.68	2.10	1.60	82.1	2.64	0.6		0.011	0.036			0.313	0.037	0.059	0.96	4.8	1.8	
HC071112-OC	7/11/12	8:52	KR106.0	KR below Happy Camp	Karuk	0.5	R	21.9	8.17	178		1.30	0.50		3.19	0.4		<0.010	0.020			0.339	0.054	0.059		2.8	1.3	
HC080812-OC	8/8/12	8:56	KR106.0	KR below Happy Camp	Karuk	0.5	R	21.7	8	181	8.56	1	0.90		4.27	0.297		<0.010	<0.010			0.338	0.07	0.079		1.9	1.1	
HC090512-OC	9/5/12	9:21	KR106.0	KR below Happy Camp	Karuk	0.5	R	19.88	8	176	8.73	11.00	6.40		5.23			0.042	0.14			0.72	0.103	0.146		4.7	2.7	5.2
HC091912-OC	9/19/12	9:41	KR106.0	KR below Happy Camp	Karuk	0.5	R	18.4	8.15	183	9.32	9.60	4.60	91.8	3.93			0.024	0.126			0.808	0.109	0.144	2.1	5.0	3.3	
HC100312-OC	10/3/12	9:49	KR106.0	KR below Happy Camp	Karuk	0.5	R	17.13	8.16	188	9.13	9	6.6		3.99	1.02		<0.010	0.158			0.8	0.093	0.131		4.5	2.5	7.5
HC111512-OC	11/15/12	10:16	KR106.0	KR below Happy Camp	Karuk	0.5	R	10.44	8	209	10.83	2	4.2		2.94	0.358		<0.010	0.243			0.61	0.071	0.089		2.4	1	
HC121212-OC	12/12/12	10:11	KR106.0	KR below Happy Camp	Karuk	0.5	R	6.47	8.03	166	11.73	1.80	<0.1		2.16	0.217		0.016	0.227			0.454	0.036	0.047		2.8	0.67	
OR022212-OC	2/22/12	8:40	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	8.08	7.94	147	12.12	1.60	0.60	74.6	0.871	0.286		<0.010	0.164			0.28	0.016	0.022	0.66	1.8	0.63	
OR032112-OC	3/21/12	8:52	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	7.23	6.93	121	12.22	2.10	1.60	64.1	0.7	0.4		<0.010	0.056			0.111	0.011	0.025	0.88	7.2	1	
OR041912-OC	4/19/12	8:34	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	9.67	7.05	125	11.86	4.80	1.50	63	1.44	0.354		<0.010	0.085			0.267	0.014	0.033	5.1	10	1.3	
OR051712-OC	5/17/12	8:40	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	13.78	8.39	87	10.71	6.40	0.30	48	1.35	0.311		<0.010	0.035			0.176	0.013	0.034	3.1	9.7	2	
OR053112-OC	5/31/12	9:03	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	15.51	8.32	128	10.43	5.30	1.60	59.6	1.71	0.362		<0.010	<0.010			0.129	0.013	0.027	0.93	3.9	0.88	
OR061312-OC	6/13/12	8:08	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R					2.10	1.80	64.6	1.52	0.296		<0.010	<0.010			0.151	0.015	0.033	0.88	2.9	<0.50	
OR062712-OC	6/27/12	8:11	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	16.41	8.28	141	10.13	3.20	1.30	70.8	1.73	0.396		<0.010	0.01			0.193	0.024	0.035	0.64	3.3	1	
OR071112-OC	7/11/12	7:04	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	21.92	8.22	153	8.65	0.50	1.10	79.7	1.73	0.295		<0.010	0.011			0.229	0.038	0.038	0.26	2.1	0.87	
OR072512-OC	7/25/12	7:36	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	22.45	8.22	162	8.48	1.40	<0.1	80.8	1.88	0.295		<0.010	<0.010			0.187	0.032	0.041	0.36	0.87	0.5	
OR080812-OC	8/8/12	7:10	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	22.49	8.54	164	8.40	1	1.1	78.7	3.22	0.276		<0.010	<0.010			0.265	0.042	0.051	0.46	1.6	0.87	
OR082212-OC	8/22/12	7:46	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	22.22	8.71	167	8.35	3.70	3.70	77	2.39	0.512		<0.010	<0.010			0.339	0.049	0.069	0.61	3.7	1.3	0.25
OR090512-OC	9/5/12	7:45	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	20.3	9.05	166	8.71	20.00	11.00	77.4	4.45	1.19		0.016	<0.010	0.207		0.637	0.061	0.131	4.6	31	8	6.5
OR091912-OC	9/19/12	7:47	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	19.29	8.29	168	9.19	2.70	1.80	88.1	3.21	1.5		0.034	0.144			0.578	0.093	0.101	0.45	2.9	1.4	0.62
OR100312-OC	10/3/12	7:52	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	17.8	8.38	166	9.2	13.00	11.00	87.8	3.09	1.04		0.012	0.037			0.746	0.06	0.123	3.6	16	6	3.5
OR101712-OC	10/17/12	8:04	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	16.31	8.22	146	9.46	11.00	11.00	89.8	2.87	0.854		0.013	0.142			0.518	0.066	0.1	0.76	7.5	2.5	0.28
OR111512-OC	11/15/12	9:37	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	10.21	8.22	179	11.15	2	3.8	85	2.15	0.454		<0.010	0.143			0.358	0.046	0.059	0.42	2.3	1	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	Water Temperature C	pH -log[H ⁺]	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon ppm	Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen ppm	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Turbidity NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
OR121212-OC	12/12/12	8:34	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	6.98	8.07	131	12.23	1.50	<0.1	66.8	1.53	0.473		0.014	0.124			0.226	0.021	0.039	3.5	15	2.2	
WE022212-OC	2/22/12	11:17	KR043.5	KR near Weitchpec	Yurok	0.5	R	8.19	8.12	142	12.16	1.60	0.27		0.8045	0.238		<0.010	0.150			0.250	0.015	0.023	0.72	3.25	0.625	
WE032112-OC	3/21/12	11:27	KR043.5	KR near Weitchpec	Yurok	0.5	R	7.37	8.02	115	12.35	2.14	0.48		1.035	0.638		<0.010	0.049			0.104	0.013	0.040	4.8	18	2	
WE041812-OC	4/18/12	11:23	KR043.5	KR near Weitchpec	Yurok	0.5	R	9.8	8.08	133	11.65	2.70	0.70		2.32	0.434	<2.00	<0.010	0.109			0.210	0.017	0.043	4	11	<0.50	
WE051612-OC	5/16/12	12:14	KR043.5	KR near Weitchpec	Yurok	0.5	R	14.19	7.81	91	10.77	3.00	<0.1		1.55	0.628		<0.010	0.027			0.234	0.015	0.034	4	14	3	-
WE061312-OC	6/13/12	11:40	KR043.5	KR near Weitchpec	Yurok	0.5	R	17.42	8.27	131	9.75	2.40	1.70		1.38	0.532		<0.010	<0.010			0.161	0.015	0.035	0.93	4.1	0.87	-
WE071112-OC	7/11/12	11:41	KR043.5	KR near Weitchpec	Yurok	0.5	R	22.07	8.36	156	9.14	2.4	0.4		1.69	0.33		0.013	<0.010			0.23	0.032	0.033	0.49	2	0.5	-
WE080812-OC	8/8/12	11:07	KR043.5	KR near Weitchpec	Yurok	0.5	R	21.91	8.55	168	8.86	2.90	0.60		2.32	0.226	<2.00	<0.010	0.011			0.216	0.036	0.045	0.27	1.9	0.63	0.15
WE090512-OC	9/5/12	12:04	KR043.5	KR near Weitchpec	Yurok	0.5	R	19.85	8.39	168	9.4	15.00	4.10		3.61	1.82		<0.010	<0.010			0.572	0.054	0.1	2.6	6.3	5.3	8.6
WE100312-OC	10/3/12	10:45	KR043.5	KR near Weitchpec	Yurok	0.5	R	17.28	8.29	182	9.39	6	4.6		2.82	0.921		<0.010	0.041			0.566	0.056	0.086	0.8	5.7	3.2	1.5
WE111412-OC	11/14/12	12:38	KR043.5	KR near Weitchpec	Yurok	0.5	R	10.2	8.50	182	11.56	2.70	3.10		2.08	0.0413	<2.00	<0.010	0.138			0.364	0.048	0.059	0.5	3	1.5	-
WE121212-OC	12/12/12	11:26	KR043.5	KR near Weitchpec	Yurok	0.5	R	7.19	8.08	128	12.1	0.70	<0.1		1.31	0.235		<0.010	0.108			0.192	0.02	0.031	2.4	6.7	0.83	
TC022212-OC	2/22/12	10:33	KR038.5	KR below Trinity River	Yurok	0.5	R	8.46	8.04	146	11.99	1.70	<0.1		0.61	0.2		<0.010	0.103			0.205	0.011	0.019	0.59	3.5	1.3	
TC032112-OC	3/21/12	10:42	KR038.5	KR below Trinity River	Yurok	0.5	R	7.33	8.02	119	12.22	2.14	0.11		0.78	0.6		0.010	0.047			0.098	0.010	0.042	21	41.3	2.5	
TC041812-OC	4/18/12	10:26	KR038.5	KR below Trinity River	Yurok	0.5	R	9.94	8	136	11.46	4	0.2		1.5	0.586		<0.010	0.084			0.153	0.013	0.041	8	24	2.8	
TC051612-OC	5/16/12	11:20	KR038.5	KR below Trinity River	Yurok	0.5	R	13.73	8	97	10.66	2	0.481		1.242	0.537		<0.010	0.021			0.170	0.011	0.029	5.4	17.75	1.75	-
TC061312-OC	6/13/12	10:34	KR038.5	KR below Trinity River	Yurok	0.5	R	16.64	8	127	9.74	1.60	1.40		1.04	0.409		<0.010	0.011			0.128	0.013	0.024	0.91	4.9	1.3	-
TC071112-OC	7/11/12	10:54	KR038.5	KR below Trinity River	Yurok	0.5	R	20.88	8	146	9.01	1.90	0.70		1.11	0.292		<0.010	0.013			0.133	0.018	0.019	0.47	2	0.87	-
TC080812-OC	8/8/12	10:11	KR038.5	KR below Trinity River	Yurok	0.5	R	21.76	8.50	166	8.55	1.30	1.30		1.72	0.3		<0.010	0.011			0.184	0.027	0.033	0.34	2.1	0.8	-
TC090512-OC	9/5/12	11:14	KR038.5	KR below Trinity River	Yurok	0.5	R	19.12	8.35	152	9.35	8.50	2.30		2.97	1.1		<0.010	<0.010			0.336	0.032	0.058	0.21	3.8	1.8	5.80
TC100312-OC	10/3/12	10:01	KR038.5	KR below Trinity River	Yurok	0.5	R	17.63	8.36	173	9.12	4.30	1.70		2.27	1		<0.010	0.021			0.320	0.040	0.060	0.25	2	1.5	1.1
TC111412-OC	11/14/12	11:10	KR038.5	KR below Trinity River	Yurok	0.5	R	10.18	8.38	180	11.38	2	2.1		1.92	0.267		<0.010	0.104			0.269	0.037	0.044	0.2	2	0.87	
TC121212-OC	12/12/12	10:30	KR038.5	KR below Trinity River	Yurok	0.5	R	7.43	8.09	134	11.91	1	<0.1		1.4	0.251		0.011	0.092			0.151	0.015	0.03	5.1	8.5	0.83	
TG022212-OC	2/22/12	8:26	KR006.0	KR near Klamath	Yurok	0.5	R	8.79	7.99	142	11.38	1	<0.1		0.606	0.189		<0.010	0.119	0.0172		0.206	0.010	0.017		4.25	0.875	
TG032112-OC	3/21/12	8:29	KR006.0	KR near Klamath	Yurok	0.5	R	7.69	7.85	113	11.8	2	3.47		0.867	0.593		0.011	0.076	0.0567		0.124	0.012	0.049		29	2.75	
TG041812-OC	4/18/12	8:15	KR006.0	KR near Klamath	Yurok	0.5	R	10.41	7.90	136	10.91	2.70	0.10		1.4	0.459		<0.010	0.096	0.0625		0.202	0.013	0.041		19	2	
TG051612-OC	5/16/12	8:33	KR006.0	KR near Klamath	Yurok	0.5	R	14.16	8.19	104	10.09	2.14	1.23		1.451	0.176		<0.010	0.036	0.0362		0.221	0.010	0.025		11.5	2	-
TG061312-OC	6/13/12	7:57	KR006.0	KR near Klamath	Yurok	0.5	R	16.5	8.18	130	9.37	1.90	0.60		1.28	0.299		<0.010	0.019	0.0522		0.124	0.011	0.021		4	0.88	-
TG071112-OC	7/11/12	7:53	KR006.0	KR near Klamath	Yurok	0.5	R	19.37	7.97	149	8.16	2.90	0.80		0.964	0.27		<0.010	0.034	0.0306		0.180	0.007	0.013		1.6	0.87	-
TG080812-OC	8/8/12	7:19	KR006.0	KR near Klamath	Yurok	0.5	R	20.37	7.89	169	7.3	2.40	1.90		1.08	0.314		<0.010	0.070	0.0359		0.224	0.016	0.028		2.5	0.5	-
TG090512-OC	9/5/12	8:29	KR006.0	KR near Klamath	Yurok	0.5	R	19.38	8.28	155	8.21	9.80	2.90		2.63	1.2		<0.010	<0.010	0.207		0.339	0.026	0.056		5.8	2.8	3.6

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	Water Temperature C	pH -log[H ⁺]	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon ppm	Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen ppm	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Turbidity NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
TG100312-OC	10/3/12	7:59	KR006.0	KR near Klamath	Yurok	0.5	R	17.22	8.15	172	8.16	6.70	2.50		1.93	0.608		<0.010	0.018	0.104		0.325	0.028	0.050		3.1	1.5	1.9
TG111412-OC	11/14/12	12:05	KR006.0	KR near Klamath	Yurok	0.5	R	10.54	7.83	176	9.88	2.10	2.30		1.59	0.28		<0.010	0.135	0.0307		0.415	0.038	0.044		2	1.1	-
TG121212-OC	12/12/12	8:08	KR006.0	KR near Klamath	Yurok	0.5	R	7.89	8.02	128	11.35	1.50	<0.1		1.07	0.125		0.011	0.111	0.0239		0.219	0.015	0.032		13	2.5	
LE502212-OC	2/22/12	7:31	KR000.5	KR Lower Estuary	Yurok	0.5	R	8.57	7.82	141	11.54	0.9	<0.1		0.5441	0.188		<0.010	0.119			0.193	0.010	0.015	0.8	2.625	1	
LE503212-OC	3/21/12	7:14	KR000.5	KR Lower Estuary	Yurok	0.5	R	7.63	8.04	111	11.84	3.20	2.40		1.135	0.497		0.010	0.103			0.166	0.011	0.056	20	38.5	3	
LE5041812-OC	4/18/12	7:13	KR000.5	KR Lower Estuary	Yurok	0.5	R	10.34	7.91	135	11.02	2.70	0.10		1.28	0.488		0.011	0.089			0.182	0.013	0.041	8.1	22	1.8	
LE5051612-OC	5/16/12	7:30	KR000.5	KR Lower Estuary	Yurok	0.5	R	14.19	8.24	103	10.19	4	0.3738		1.541	0.666		0.011	0.023			0.192	0.012	0.034	6	17.75	3	-
LE5061312-OC	6/13/12	7:09	KR000.5	KR Lower Estuary	Yurok	0.5	R	16.31	8.16	137	9.34	1.60	0.60		1.05	0.294		<0.010	0.013			0.119	0.01	0.02	0.94	2.8	0.05	-
LE5071112-OC	7/11/12	7:11	KR000.5	KR Lower Estuary	Yurok	0.5	R	20.35	8.15	354	7.94	9.90	1.30		1.08	0.422		<0.010	<0.010			0.169	0.007	0.018	0.98	3.1	0.88	-
LE5080812-OC	8/8/12	6:27	KR000.5	KR Lower Estuary	Yurok	0.5	R	20.54	8.33	2405	7.96	1.60	0.60		1.48	0.217		<0.010	0.025			0.176	0.018	0.024	0.45	1.3	0.75	-
LE5090512-OC	9/5/12	7:43	KR000.5	KR Lower Estuary	Yurok	0.5	R	19.27	8.20	810	8.03	6.80	2.20		1.88	0.833		<0.010	<0.010			0.306	0.023	0.046	1.5	3.5	1.8	3.6
LE5100312-OC	10/3/12	7:19	KR000.5	KR Lower Estuary	Yurok	0.5	R	16.93	8.19	3128	8.75	6.10	1.50		2.01	0.6		<0.010	0.013			0.382	0.026	0.049	0.76	2.1	1.1	1.80
LE5111412-OC	11/14/12	7:20	KR000.5	KR Lower Estuary	Yurok	0.5	R					1.30	1.50		1.52	0		0.020	0.118			0.292	0.032	0.037	0.43	2	1.3	-
LE5121212-OC	12/12/12	7:39	KR000.5	KR Lower Estuary	Yurok	0.5	R	7.89	7.91	132	11.47	2.10	0.10		1.11	0.5		0.013	0.126			0.243	0.014	0.039	6.2	17.0	2.00	

Non-detect (ND) values were replaced with “-”

USBR and PacifiCorp values below the reporting limit (RL) are j-flagged (“j” is added next to the value).

Karuk Tribe and Yurok Tribe values below the method detection limit (MDL) are presented as “<” and the MDL value.

Table B-2. 2012 Klamath River Data Summary (major tributaries)

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	Water Temperature C	pH -log[H ⁺]	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon ppm	Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen ppm	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Turbidity NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
SA022212-OC	2/22/12	9:08	SA	Salmon River	Karuk	0.5	R	7.70	7.95	98	11.96	0.90	<0.1		0.635	0.20		<0.010	0.018			0.080	0.002	0.004	0.21	0.75	<0.50	
SA032112-OC	3/21/12	9:22	SA	Salmon River	Karuk	0.5	R	7.00	7.38	90	12.1	1.50	<0.1		0.59	0		<0.010	0.021			<0.050	0.003	0.013	0.69	3	0.8	
SA041912-OC	4/19/12	9:16	SA	Salmon River	Karuk	0.5	R	8.49	7.38	85	11.91	1.50	<0.1		0.98	0.1		<0.010	0.015			0.098	0.005	0.016	1.9	8.2	1.7	
SA051712-OC	5/17/12	9:15	SA	Salmon River	Karuk	0.5	R	10.27	8.25	55	11.32	1.10	<0.1		1.36	0.3		<0.010	0.023			0.099	<0.001	0.012	0.89	6.5	2.0	
SA053112-OC	5/31/12	9:40	SA	Salmon River	Karuk	0.5	R	12.95	8.31	72		1	<0.1	37.2	1.13	0.232		<0.010	<0.010			<0.050	<0.001	0.007	0.42	1.9	0.87	
SA061312-OC	6/13/12	8:44	SA	Salmon River	Karuk	0.5	R	14.46	8	66	10.19	2	<0.1		0.898	0.282		<0.010	<0.010			<0.050	<0.001	0.007	0.42	1.4	<0.50	
SA062712-OC	6/27/12	8:52	SA	Salmon River	Karuk	0.5	R	13.49	8	92	10.36	1	<0.1	45.4	0.574	0.249		<0.010	<0.010			0.053	0.006	0.006	0.28	1.1	<0.50	
SA071112-OC	7/11/12	7:47	SA	Salmon River	Karuk	0.5	R	19.3	8	105	9.1	2	14		0.502	0.832		<0.010	<0.010			0.165	0.005	0.013	0.43	8.9	1.6	
SA072512-OC	7/25/12	8:09	SA	Salmon River	Karuk	0.5	R	19.31	8.14	119	9.01	1	<0.1	61.7	0.279	0.151		<0.010	<0.010			<0.50	0.002	0.006	0.2	<0.50	<0.50	
SA080812-OC	8/8/12	7:47	SA	Salmon River	Karuk	0.5	R	19.48	8.14	128	8.91	0.50	0.60		1.98	0.212		<0.010	<0.010			<0.050	0.004	0.008	0.35	<0.50	<0.50	
SA082212-OC	8/22/12	8:15	SA	Salmon River	Karuk	0.5	R	19.25	8	134	8.91	1.10	<0.1	66	0.885	0.159		<0.010	<0.010			0.081	0.003	0.009	0.17	0.5	<0.50	
SA090512-OC	9/5/12	8:17	SA	Salmon River	Karuk	0.5	R	17.38	8	139	9.23	1.60	1.20		1.04	1.62		0.017	<0.010			0.083	0.002	0.013	0.79	6.5	1.7	
SA091912-OC	9/19/12	8:32	SA	Salmon River	Karuk	0.5	R	16.26	8	144	9.7	0.70	<0.1	76	0.559	0.375		<0.010	<0.010			0.052	0.008	0.009	1.9	0.75	<0.50	
SA100312-OC	10/3/12	8:34	SA	Salmon River	Karuk	0.5	R	14.96	8.03	146	9.47	2.20	<0.1		0.33	0		<0.010	<0.010			0.074	0.002	0.008	0.28	3	0.9	
SA101712-OC	10/17/12	8:31	SA	Salmon River	Karuk	0.5	R	14.28	8.12	134	9.74	3.70	0.70	73.3	1.28	0.5		<0.010	<0.010			0.091	0.002	0.014	0.4	3.7	1.3	
SA111512-OC	11/15/12	9:08	SA	Salmon River	Karuk	0.5	R	8.88	8.14	125	11.32	3.20	1.70		0.86	1		<0.010	<0.010			0.073	0.003	0.015	0.22	7	2.4	
SA121212-OC	12/12/12	9:14	SA	Salmon River	Karuk	0.5	R	6.44	8.16	90	11.98	<0.1	<0.1		1.06	0.20		0.014	0.044			0.099	0.005	0.010	0.41	3.30	<0.50	
SC022212-OC	2/22/12	11:30	SC	Scott River	Karuk	0.5	R	8.49	8.31	182	11.55	1.90	<0.1		0.790	0.17		<0.010	0.249			0.306	0.003	0.008	0.35	1.10	0.63	
SC032112-OC	3/21/12	11:36	SC	Scott River	Karuk	0.5	R	7.69	7.56	150	11.36	3	0.9		1.39	0.605		<0.010	0.128			0.183	0.006	0.019	1.8	5.7	1.5	
SC041912-OC	4/19/12	11:52	SC	Scott River	Karuk	0.5	R	9.69	7.79	156	11.10	3	<0.1		1.98	0.0627		<0.010	0.13			0.297	0.004	0.023	3.6	12	1.8	
SC051712-OC	5/17/12	11:58	SC	Scott River	Karuk	0.5	R	11.73	8.17	91	10.50	3	<0.1		1.85	0.554		<0.010	0.048			0.133	<0.001	0.027	5.1	17	2.7	
SC061312-OC	6/13/12	11:29	SC	Scott River	Karuk	0.5	R	15.87	8.36	157	10.00	4	0.7		1.13	0.344		<0.010	0.106			0.217	<0.001	0.013	0.74	2.8	<0.50	
SC062712-OC	6/27/12	11:20	SC	Scott River	Karuk	0.5	R	15.44	8.39	184	9.98	3	0.8	101	1.23	0.563		<0.010	0.108			0.26	0.005	0.008	0.44	7.5	1	
SC071112-OC	7/11/12	10:21	SC	Scott River	Karuk	0.5	R	20.6	9	221		2	<0.1		2.26	0.492		<0.010	0.257			0.352	<0.001	0.006	0.46	0.88	<0.50	
SC072512-OC	7/25/12	10:45	SC	Scott River	Karuk	0.5	R	20.81	8	240	9.35	1	<0.1	124	0.75	0.287		<0.010	0.291			0.392	<0.001	0.007	0.34	0.75	0.63	
SC080812-OC	8/8/12	10:34	SC	Scott River	Karuk	0.5	R	20.68	8.37	236	9.81	1.70	<0.1		1.22	0.29		<0.010	0.085			0.206	0.002	0.006	0.35	1	0.75	
SC082212-OC	8/22/12	10:52	SC	Scott River	Karuk	0.5	R	20.47	8.38	214	9.28	2.10	0.10	118	1.37	0.219		<0.010	<0.010			0.125	0.004	0.01	0.27	1.6	0.75	
SC090512-OC	9/5/12	10:55	SC	Scott River	Karuk	0.5	R	19.24	8.33	243	9.44	0.50	0.30		1.29	0.353		<0.010	<0.010			0.078	<0.001	0.008	0.25	0.75	0.5	
SC091912-OC	9/19/12	11:51	SC	Scott River	Karuk	0.5	R	18.94	8.50	252	10.16	0.40	<0.1	132	0.708	0.259		<0.010	<0.010			0.077	0.007	0.007	0.15	0.63	<0.50	
SC100312-OC	10/3/12	11:05	SC	Scott River	Karuk	0.5	R	15.65	8.43	216	9.97	0.90	<0.1		0.681	0.29		<0.010	<0.010	<0.1		0.106	0.002	0.008	0.17	0.75	<0.50	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon ppm	Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen ppm	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Turbidity NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
SC101712-OC	10/17/12	10:36	SC	Scott River	Karuk	0.5	R	12.89	8.58	272	10.89	4.80	<0.1	136	1.15	1.69		<0.010	0.275			0.32	<0.001	0.008	0.27	1.7	<0.50	
SC111512-OC	11/15/12	11:34	SC	Scott River	Karuk	0.5	R	8.08	8.60	260	11.73	3.20	0.20		1.01	0.323		<0.010	0.301			0.389	0.001	0.006	0.17	1	1	
SC121212-OC	12/12/12	11:52	SC	Scott River	Karuk	0.5	R	6.03	8.13	147	11.52	1.10	<0.1		1.89	0.221		0.015	0.236			0.309	0.007	0.015	2	4.4	1	
SH022212-OC	2/22/12	12:47	SH	Shasta River	Karuk	0.5	R	10.03	8.57	463	11.27	6.40	5.90		1.34	2.77		<0.010	0.295			0.652	0.154	0.216	8.4	33	7	
SH032112-OC	3/21/12	12:57	SH	Shasta River	Karuk	0.5	R	8.73	8.41	520	10.93	8.50	9.40		2.56	3.05		<0.010	0.264			0.711	0.14	0.209	5.6	40	11	
SH041912-OC	4/19/12	13:17	SH	Shasta River	Karuk	0.5	R	13.23	8.56	530	10.3	6.40	5.60		4.91	1.15		<0.010	0.163			0.704	0.131	0.219	1.9	19	4.7	
SH051712-OC	5/17/12	13:17	SH	Shasta River	Karuk	0.5	R	17.89	8.50	550	9.54	2.10	2.30		4.31	0.557		<0.010	<0.010			0.395	1.14	0.212	0.92	5.5	1.7	
SH161312-OC	6/13/12	13:03	SH	Shasta River	Karuk	0.5	R	20.94	8.59	564	9.46	3.70	2.60			0.848		<0.010	0.015			0.551	0.139	0.191	0.83			
SH062712-OC	6/27/12	12:50	SH	Shasta River	Karuk	0.5	R	18.45	8.68	565	10.1	1.30	2.00	300	4.25	0.65		<0.010	<0.010			0.408	0.116	0.143	5.6	3.5	1.5	
SH071112-OC	7/11/12	12:10	SH	Shasta River	Karuk	0.5	R	23.98	8.69	565		1.50	<0.1		5.25	0.655		0.011	0.011			0.8	0.188	0.251	0.97	49	11	
SH072512-OC	7/25/12	12:26	SH	Shasta River	Karuk	0.5	R	23.45	8.61	556	9.16	2.3	<0.1	287	4.63	0.412		<0.010	<0.010			0.473	0.186	0.2	1.7	5.7	2.2	
SH080812-OC	8/8/12	12:18	SH	Shasta River	Karuk	0.5	R	21.6	8.53	523	9.53	3.80	<0.1		4.2	0.565		<0.010	<0.010			0.47	0.159	0.171	0.45	8.5	2	
SH082212-OC	8/22/12	12:36	SH	Shasta River	Karuk	0.5	R	21.35	8.54	500	9.79	2.10	0.50	256	4.12	0.29		<0.010	<0.010			0.336	0.162	0.168	0.63	1.7	0.83	
SH090512-OC	9/5/12	12:59	SH	Shasta River	Karuk	0.5	R	19.44	8.57	502	10.07	2.40	0.20		5.71	0.284		<0.010	<0.010			0.387	0.147	0.175	0.75	1.3	<0.50	
SH091912-OC	9/19/12	15:05	SH	Shasta River	Karuk	0.5	R	19.53	8.79	458	10	4.30	2.10	278	3.59	0.6		<0.010	<0.010			0.406	0.182	0.197	2.5	11.00	2.50	
SH100312-OC	10/3/12	13:15	SH	Shasta River	Karuk	0.5	R	15.59	8.64	495	9.68	1.60	1.40		2.27	0.461		<0.010	0.015			0.307	0.146	0.175	1.8	9.20	3.70	
SH101712-OC	10/17/12	12:08	SH	Shasta River	Karuk	0.5	R	12.75	8.6	447	10.26	2.70	2.90	232	1.57	0.747		0.049	0.245			0.434	0.171	0.213	0.55	7.00	2.80	
SH111512-OC	11/15/12	13:04	SH	Shasta River	Karuk	0.5	R	8.64	8.68	430	11.21	2.10	2.00		1.45	0.497		<0.010	0.254			0.394	0.179	0.191	2	4.00	1.10	
SH121212-OC	12/12/12	13:39	SH	Shasta River	Karuk	0.5	R	6.48	8.53	503	11.36	2.70	0.30		2.90	0.626		0.029	0.400			0.569	0.179	0.195	2.6	6.50	2.30	
TR022212-OC	2/22/12	11:33	TR	Trinity River	Yurok	0.5	R	9.16	8.25	156	11.85	1.70	<0.1		0.40822	0.148		<0.010	<0.010			0.093	0.0028	0.0061	0.59	1.75	0.50	
TR032112-OC	3/21/12	11:44	TR	Trinity River	Yurok	0.5	R	7.39	8.06	132	12.04	1.07	2.30		0.61	0.595		0.016	0.042			0.082	0.008	0.045	21	38.50	1.50	
TR041812-OC	4/18/12	12:04	TR	Trinity River	Yurok	0.5	R	10.08	8.12	141	11.33	3.20	0.20		0.80	0.299		0.012	0.037			<0.050	0.006	0.038	8	25.00	1.30	
TR051612-OC	5/16/12	12:31	TR	Trinity River	Yurok	0.5	R	13.71	7.76	106	10.62	1.50	<0.1		1.10	0.296		<0.010	<0.010			0.092	0.004	0.018	5.4	18.00	2.00	
TR061312-OC	6/13/12	12:03	TR	Trinity River	Yurok	0.5	R	15.95	8.19	121	10.04	0.80	0.10		0.60	0.192		<0.010	<0.010			<0.050	0.003	0.008	0.91	2.90	0.50	
TR071112-OC	7/11/12	12:06	TR	Trinity River	Yurok	0.5	R	19.79	7.98	131	9.35	0.90	<0.1		0.59	0.2		<0.010	<0.010			0.097	0.002	0.005	0.47	1.30	0.62	
TR080812-OC	8/8/12	11:50	TR	Trinity River	Yurok	0.5	R	21.76	8.21	163	8.99	0.50	0.20		0.86	0.1		<0.010	0.012			0.068	0.002	0.006	0.34	1.00	0.75	
TR090512-OC	9/5/12	12:26	TR	Trinity River	Yurok	0.5	R	18.28	8.2	129	9.66	0.80	0.30		1.20	0.2		<0.010	<0.010			0.056	<0.001	0.006	0.21	1.00	0.75	
TR100312-OC	10/3/12	11:09	TR	Trinity River	Yurok	0.5	R	16.7	8.32	151	9.77	0.90	<0.1		0.87	0.1		<0.010	<0.010			0.053	0.002	0.007	0.25	0.63	<0.50	
TR111412-OC	11/14/12	12:47	TR	Trinity River	Yurok	0.5	R	10.54	8.47	175	11.61	1.10	<0.1		0.80	0.1		<0.010	0.010			0.059	0.004	0.007	0.2	0.63	0.63	
TR121212-OC	12/12/12	11:43	TR	Trinity River	Yurok	0.5	R	7.84	8.14	149	11.73	1.10	0.80		0.919	0.2		0.010	0.064			0.092	0.008	0.026	5.1	12.0	1.5	

Non-detect (ND) values were replaced with "-"

Karuk Tribe and Yurok Tribe values below the method detection limit (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). ND = non-detect. R = rejected (did not meet internal quality assurance guidelines).

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
WE071112-OC	DFG	7/11/2012	11:48	WE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
WE090512-OC	DFG	9/5/2012	12:04	WE	ND	ND	ND	ND	ND	14.3	ND	ND	ND	14	ND	ND
WE091912-OC	DFG	9/19/2012	12:00	WE	ND	ND	ND	ND	ND	3.86	ND	ND	ND	R	ND	ND
WE100312-OC	DFG	10/3/2012	10:45	WE	ND	ND	ND	ND	ND	3.83	ND	ND	ND	R	ND	ND

Appendix C. Lower Estuary Sonde Locations

The Yurok Tribe deployed continuous water temperature data at four locations near the Klamath River Estuary. The four locations included: upper estuary adjacent to Cat's RV Park (UE1), middle estuary (ME1), lower estuary adjacent to estuary gage (LE2), and lower estuary adjacent to South Slough (LE1) (Figure C-1). A temperature probe (HOBO Water Temp Pro V2) was deployed of each location from March to November 2012. Water temperature was collected at the surface and at the bottom at each location. The results are presented graphically in (Figure C-2).



Figure C-1. Map of the four continuous sonde locations at the Klamath River Estuary. Locations included: upper estuary adjacent to Cat's RV Park (UE1), middle estuary (ME1), lower estuary adjacent to estuary gage (LE2), and lower estuary adjacent to South Slough (LE1). Figure provided by the Yurok Tribe.

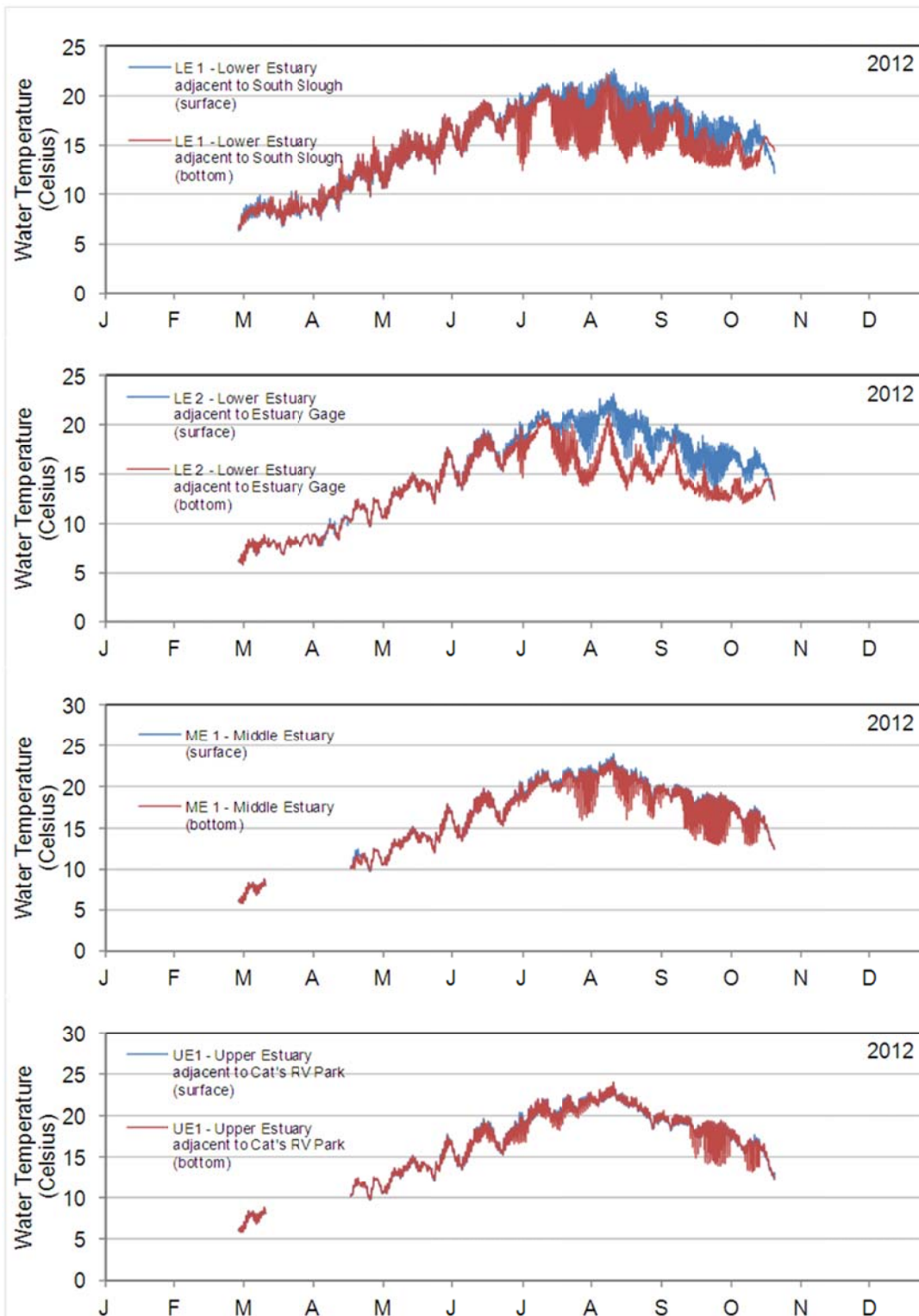


Figure C-2. Water temperature data at four locations near the Klamath River Estuary. Surface and bottom water temperatures were recorded at each location. Probe data was managed by the Yurok Tribe in 2012.

Appendix D. Phytoplankton Charts

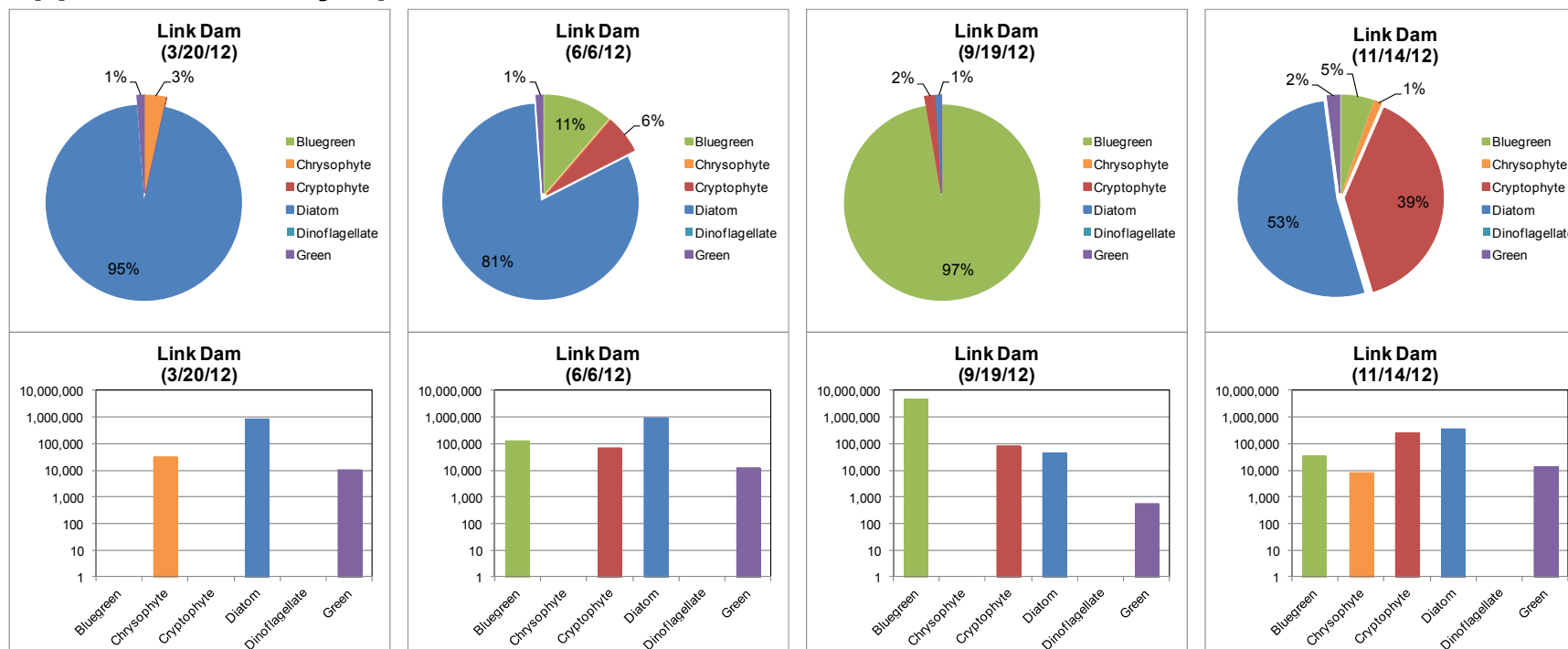


Chart D-1. Phytoplankton species (top) and biovolume (bottom) at Link River for 3/20/12, 6/6/12, 9/19/12, and 11/14/12. Note: y-axis in logarithmic scale.

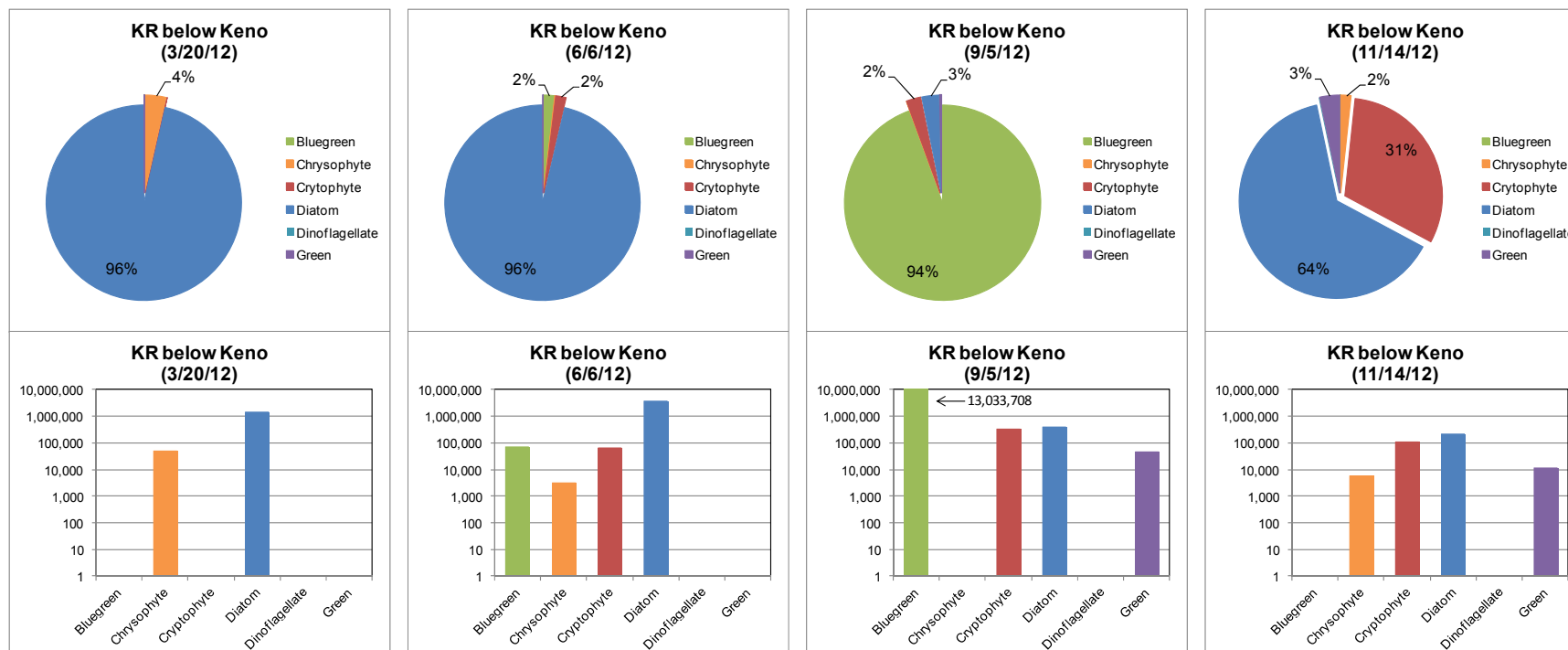


Chart D-2. Phytoplankton species (top) and biovolume (bottom) at Klamath River below Keno Dam for 3/20/12, 6/6/12, 9/5/12, and 11/14/12. Note: y-axis in logarithmic scale.

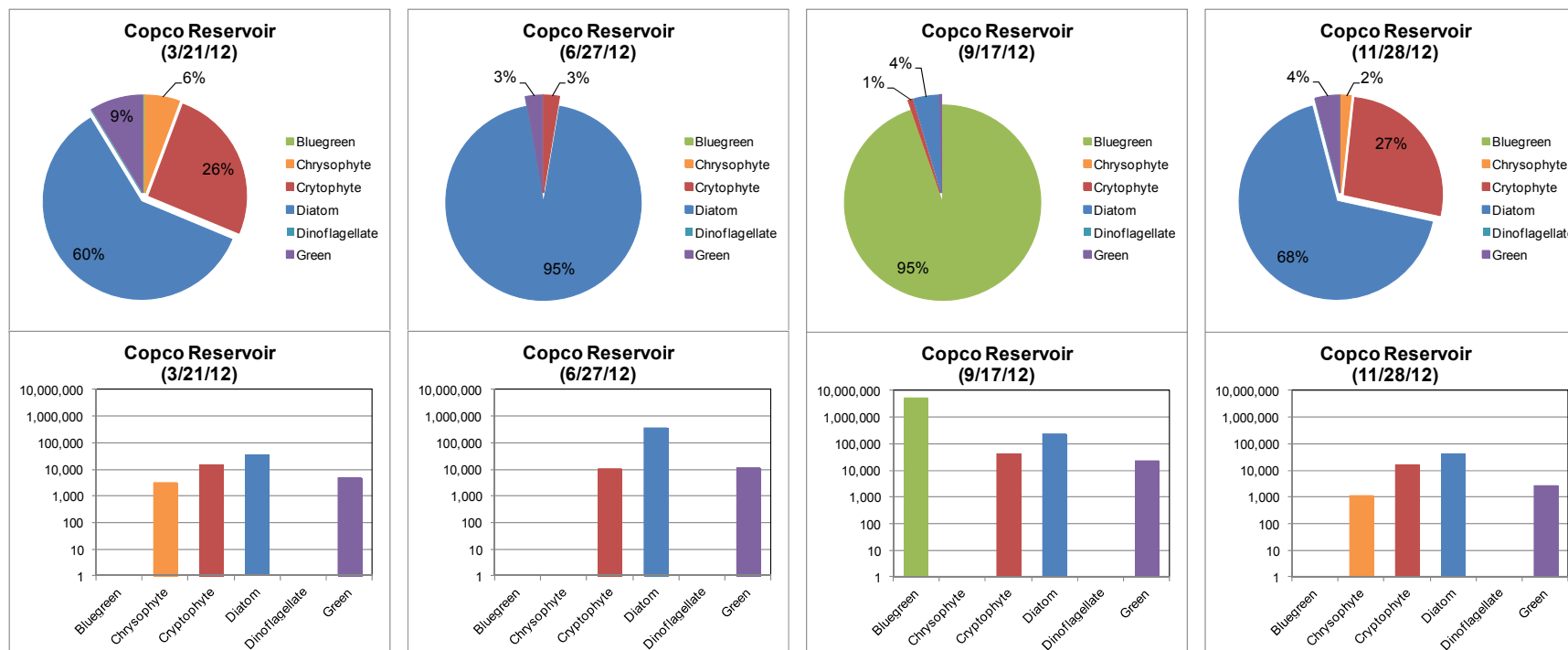


Chart D-3. Phytoplankton species (top) and biovolume (bottom) at Copco Reservoir near dam for 3/21/12, 6/27/12, 9/17/12, and 11/28/12. Note: y-axis in logarithmic scale.

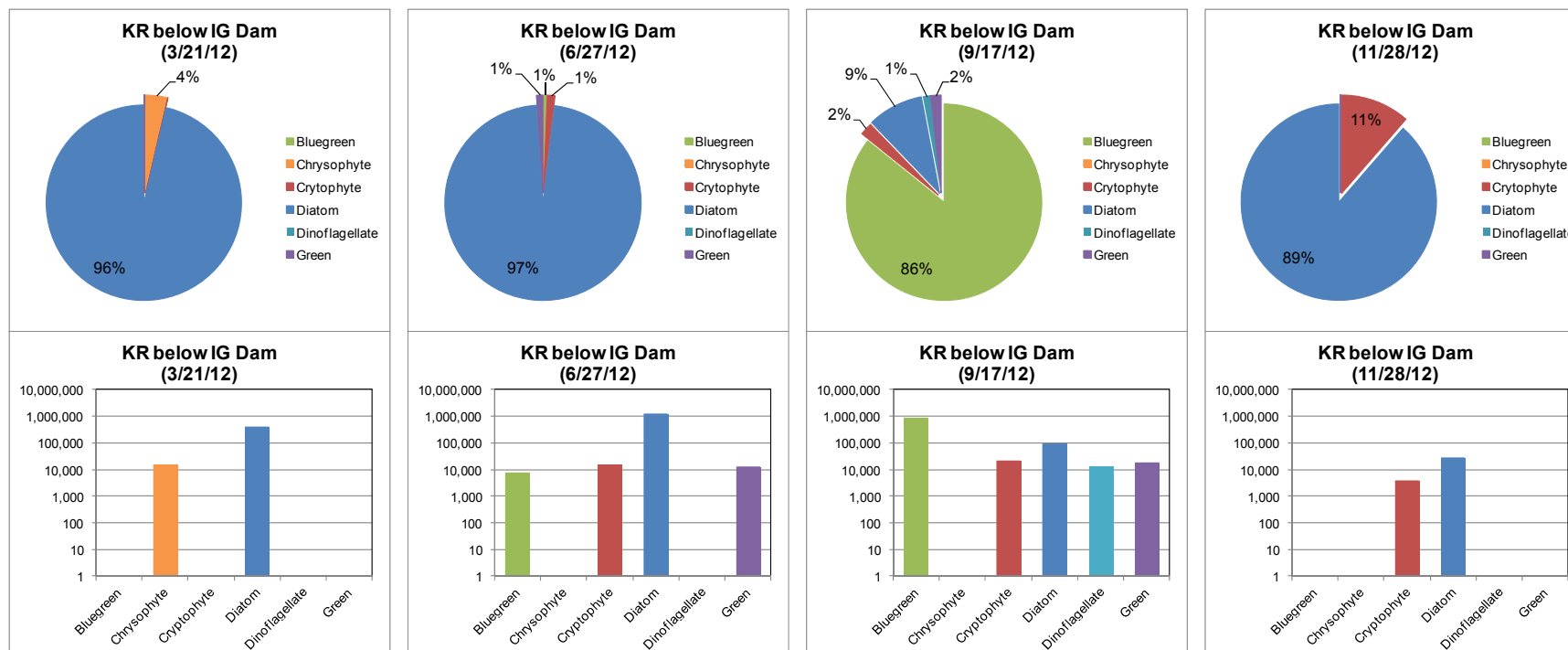


Chart D-4. Phytoplankton species (top) and biovolume (bottom) at Klamath River below Iron Gate Dam (near Hatchery Bridge) for 3/21/12, 6/27/12, 9/17/12, and 11/28/12. Note: y-axis in logarithmic scale.

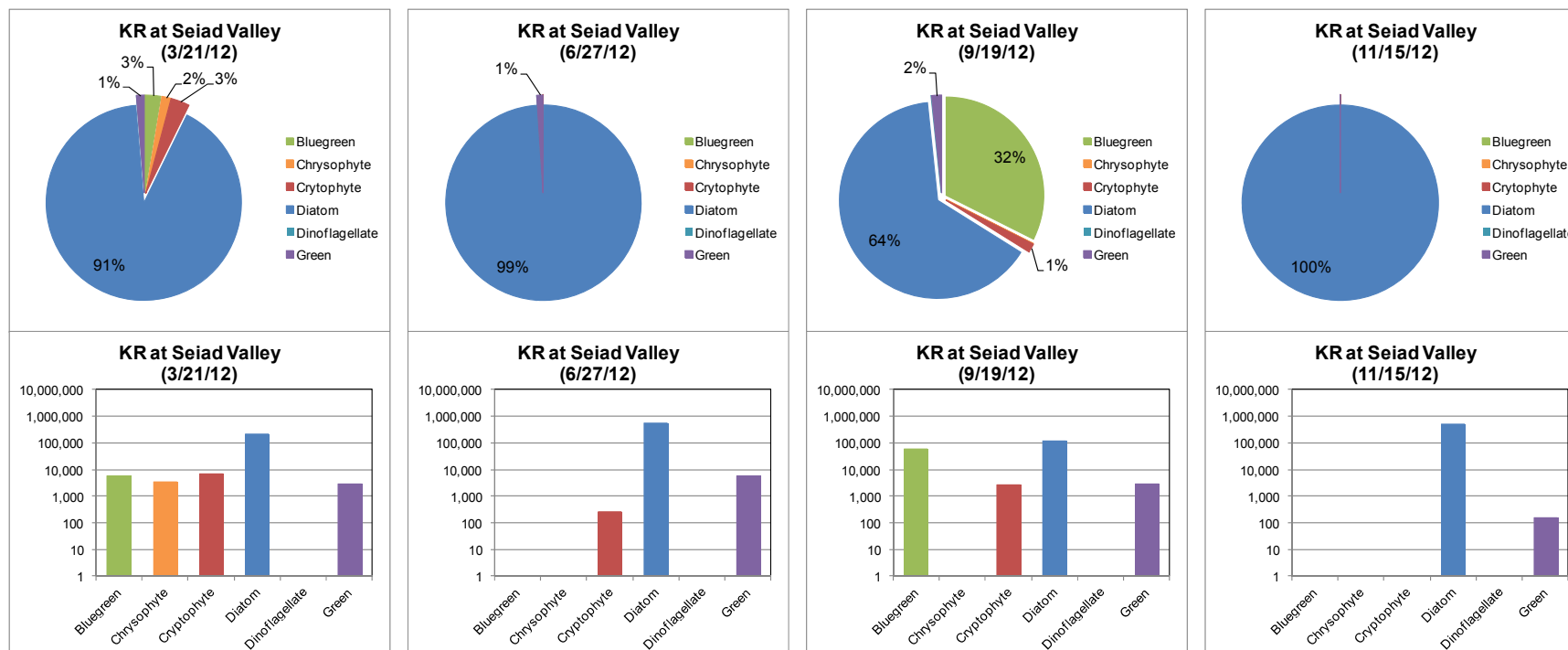


Chart D-5. Phytoplankton species (top) and biovolume (bottom) at Klamath River near below Seiad Valley for 3/21/12, 6/27/12, 9/19/12, and 11/15/12.
Note: y-axis in logarithmic scale.

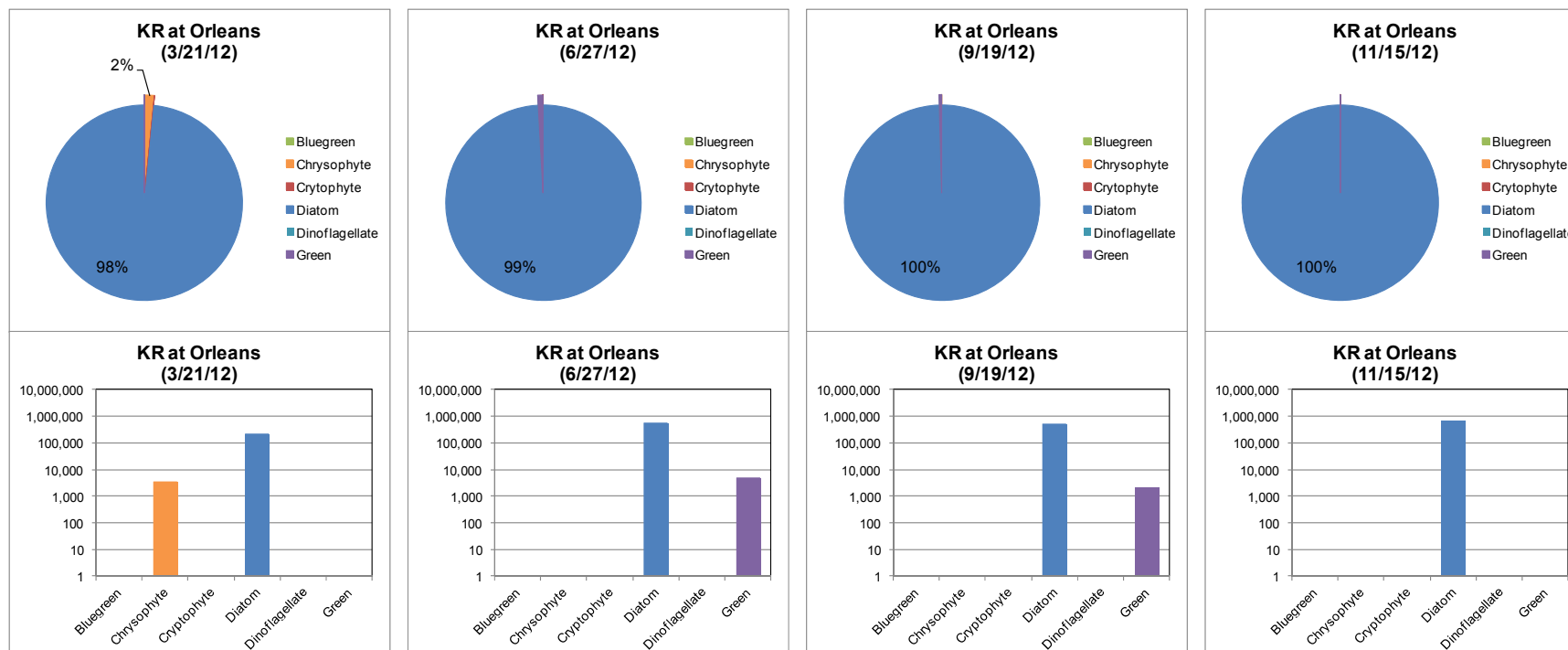


Chart D-6. Phytoplankton species (top) and biovolume (bottom) at Klamath River at Orleans for 3/21/12, 6/27/12, 9/19/12, and 11/15/12. Note: y-axis in logarithmic scale.



Chart D-7. Phytoplankton species (top) and biovolume (bottom) at Klamath River at Weitchpec for 3/21/12, 6/27/12, 9/19/12, and 11/14/12. Note: y-axis in logarithmic scale.

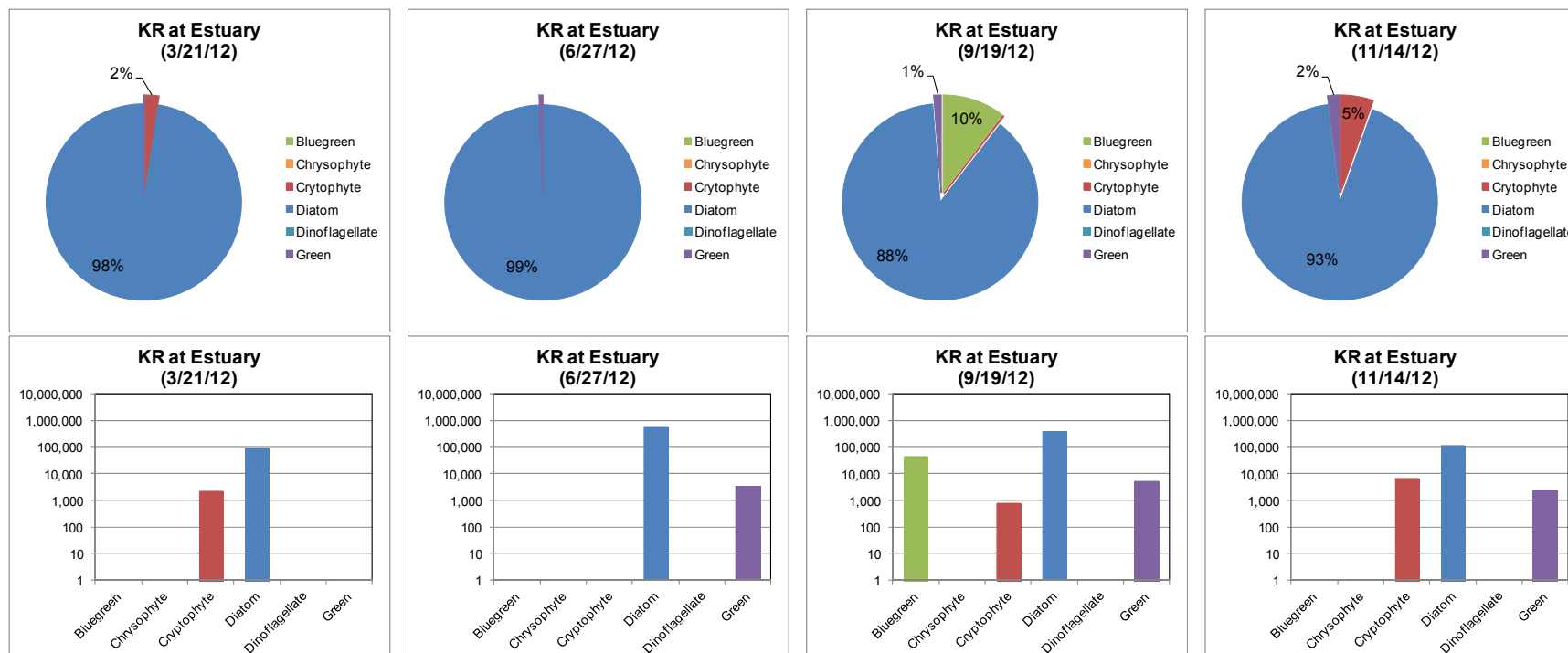


Chart D-8. Phytoplankton species (top) and biovolume (bottom) at Klamath River near Estuary 3/21/12, 6/27/12, 9/19/12, and 11/14/12. Note: y-axis in logarithmic scale.

Appendix E. 2012 Laboratory Cross Comparison



Technical Memorandum

Date: March 21, 2013

To: Crystal Bowman, Karuk Tribe
Rick Carlson, U.S. Bureau of Reclamation
Clayton Creager, North Coast Regional Water Quality Control Board
Ken Fetcho, Yurok Tribe
Sue Keydel, U.S. Environmental Protection Agency, Region 9
Steve Kirk, 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: 2012 KHSA Laboratory Cross Comparison Memo

Introduction

Three laboratory cross comparisons sampling events occurred during the 2012 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 near Weitchpec on April 18, August 8, and November 14. 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

2012 was the fourth 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).

Although the timing of sample collection did not occur on the same Julian day or under the same conditions for 2011 and 2012, examining the overall trends in Figure E-1 for TN, TP, and DOC suggests higher concentrations near Weitchpec than at the estuary (but lower concentrations compared to Link Dam). The TSS concentrations were lower near Weitchpec than at the estuary.

In 2012, the 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)⁵. The RL can be defined as lowest constituent concentration in a sample that can be quantitatively determined with statistical rigor.

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 in Table E-1.

⁵ 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).

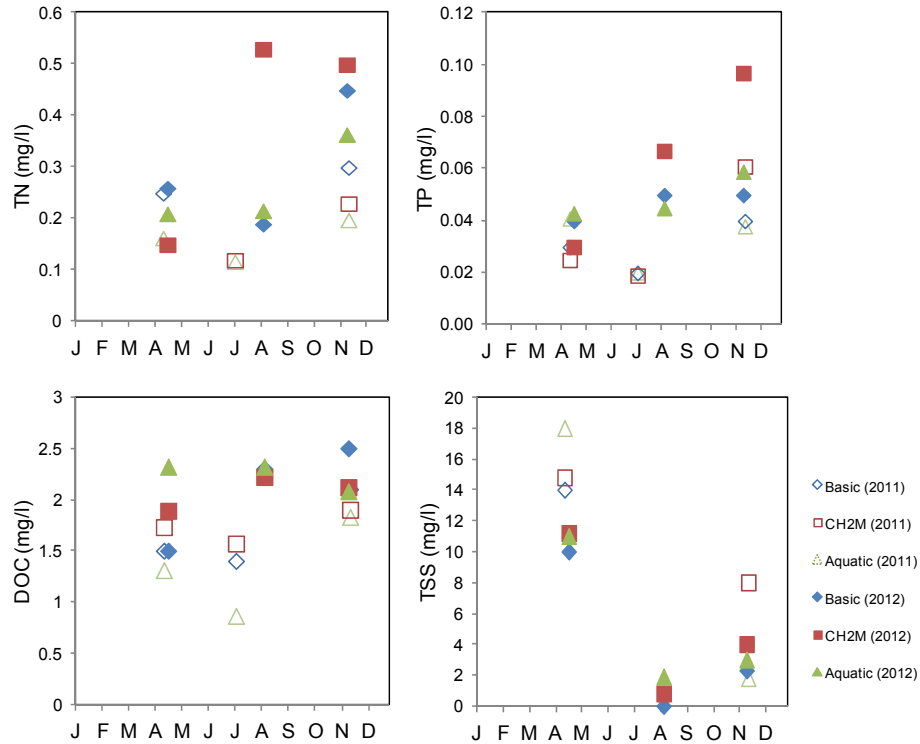


Figure E-1. 2011 (estuary – outlined symbols) and 2012 (Weitchpec – solid symbols) laboratory results for total nitrogen (TN), total phosphorus (TP), dissolved organic carbon (DOC), and total suspended solids (TSS).

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

Constituent	units	Method	MDL	Basic Laboratory	
				RL	
Alkalinity	mg/l	SM2320B	1	5	
NH ₄	mg/l	EPA 350.1	0.03	0.05	
CBOD ₅ ^a	mg/l	SM5210	3	3	
DOC	mg/l	SM5310C	0.2	0.5	
NO ₃ +NO ₂	mg/l	EPA 353.2	0.02	0.05	
TN	mg/l	EPA 351.2	0.1	0.2	
OPO ₄	mg/l	SM 4500P-E	0.01	0.05	
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	SM 2540D	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 E-2. Laboratory methods, method detection limits (MDL), and reporting limits (RL) for CH2M Hill.

Constituent	units	Method	MDL	CH2M Hill
				RL
Alkalinity	mg/l	E310.1	N/A	5
NH ₄	mg/l	E350.1	0.014	0.05
CBOD ₅	mg/l	SM5210B	N/A	2
DOC	mg/l	SM5310B	0.065	0.5
NO ₃ +NO ₂	mg/l	E353.2	0.0028	0.01
TN	mg/l	SM4500-N C	0.062	0.2
OPO ₄	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	N/A	2
VSS	mg/l	E160.4	N/A	2
Chlor-a ^a	µg/l	EPA 445.0	0.21	0.21

^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 (CBL) for analysis.

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

Constituent	units	Method	MDL	Aquatic Research
				RL
Alkalinity	mg/l	SM18 2320B	0.2	1
NH ₄	mg/l	SM184500NH3H	0.006	0.01
CBOD ₅ ^a	mg/l	SM205210B	2	2
DOC	mg/l	SM205310B	0.095	0.25
NO ₃ +NO ₂	mg/l	SM184500N03F	0.005	0.01
TN	mg/l	SM204500NC	0.03	0.05
OPO ₄	mg/l	SM18 4500PF	0.001	0.001 ^b
TP	mg/l	SM18 4500PF	0.002	0.002 ^c
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 ^d	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 at the same concentration for OPO₄ at Aquatic Research.

^c The MDL and RL values were set at the same concentration for TP at Aquatic Research.

^d The MDL and RL values were set at the same concentration for Chlor-a at Aquatic Research.

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.

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 E-4, Table E-6, and Table E-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:

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

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

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

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

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

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

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 E-5, Table E-7, Table E-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 E-2.

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 (see Table E-10).

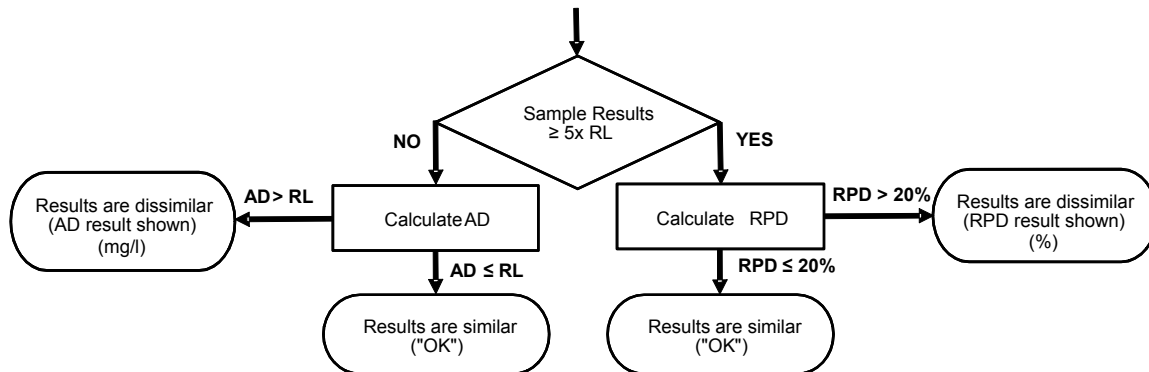


Figure E-2. Flow diagram of the comparison process. RPD = relative percent difference. RL = reporting limit. AD = absolute difference.

Chlorophyll-a (2012)

In 2012, 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. For the April chlorophyll-a samples, the comparison was not considered because the value for CH2M Hill (or CBL) was less than 5 times the reporting limit. The August and November samples both met the requirements for comparison.

Table E-4. Data used to determine relative percent difference (RPD) or absolute difference (AD) for April 18, 2012. RL = reporting limit

	Laboratory	Basic Laboratory (BASIC)	CH2M Hill Applied Sciences (CH2M)	Aquatic Research, Inc. (ARI)
	Sample ID:	2040747-01	L153701	YUR002-16
	Unit			
Alkalinity	mg/l	62	61.4	n/a
NH4	mg/l	0.07	(0.05) ^a	(0.01) ^b
CBOD5	mg/l	(3) ^c	2	(2) ^d
DOC	mg/l	1.5	1.89	2.32
NO3+NO2	mg/l	0.13	0.11	0.109
TN	mg/l	0.26	(0.2) ^e	0.21
OPO4	mg/l	(0.05) ^f	0.024	0.017
TP	mg/l	(0.05) ^g	(0.05) ^h	0.043
TKN	mg/l	(0.2) ⁱ	(0.2) ^j	(0.2) ^k
TSS	mg/l	10	11.2	11
VSS	mg/l	(5) ^l	2	(0.5) ^m
Chlor-a	µg/l	(6) ⁿ	0.51 *	2.7

^a CH2M result for NH4: -0.0031 mg/l. Replaced with lab RL.^b ARI result for NH4: "<0.01". Replaced with lab RL.^c BASIC result for CBOD5: "ND". Replaced with lab RL.^d ARI result for CBOD5: "<2". Replaced with lab RL.^e CH2M result for TN: 0.15 mg/l. Replaced with lab RL.^f BASIC result for OPO4: 0.015 mg/l. Replaced with lab RL.^g BASIC result for TP: 0.04 mg/l. Replaced with lab RL.^h CH2M result for TP: 0.03 mg/l. Replaced with lab RL.ⁱ BASIC result for TKN: 0.1 mg/l. Replaced with lab RL.^j CH2M result for TKN: 0.19 mg/l. Replaced with lab RL.^k ARI result for TKN: "<.2". Replaced with lab RL.^l BASIC result for VSS: 2 mg/l. Replaced with lab RL.^m ARI result for VSS: "<.5" mg/l. Replaced with lab RL.ⁿ BASIC result for Chlor-a: "ND". Replaced with lab RL.

* Sample sent to Chesapeake Biological Laboratory (CBL) for chlorophyll-a analysis.

Table E-5. Results for paired laboratory comparisons: April 18, 2012.

Constituent	BASIC versus CH2M Hill	BASIC versus Aquatic Research, Inc.	CH2M Hill versus Aquatic Research, Inc.
Alkalinity	OK	OK	n/a
NH4	OK	(0.06 mg/l) ^a	censored
CBOD5	OK	censored	OK
DOC	OK	(0.82 mg/l) ^b	OK
NO3+NO2	OK	OK	OK
TN	OK	OK	OK
OPO4	OK	OK	OK
TP	censored	OK	OK
TKN	censored	censored	censored
TSS	OK	OK	OK
VSS	OK	OK	OK
Chlor-a	n/a	n/a	n/a

^a BASIC RL result for NH4: 0.05 mg/l.^b BASIC RL result for DOC: 0.5 mg/l.

Table E-6. Results used to determine RPD or AD for August 8, 2012. Alkalinity and TKN were not analyzed for this sampling event. RL = reporting limit

	Laboratory	Basic Laboratory (BASIC)	CH2M Hill Applied Sciences (CH2M)	Aquatic Research, Inc. (ARI)
	Sample ID	2080420-01	L219101	YUR002-25
	Units			
Alkalinity	mg/l	n/a	n/a	n/a
NH4	mg/l	0.06	0.055	(0.01) ^a
CBOD5 ^c	mg/l	(3) ^b	3.7	(2) ^c
DOC	mg/l	2.3	2.22	2.32
NO3+NO2	mg/l	(0.05) ^d	(0.01) ^e	0.011
TN	mg/l	(0.2) ^f	0.53	0.216
OPO4	mg/l	(0.5) ^g	0.029	0.036
TP	mg/l	0.05	0.067	0.045
TKN	mg/l	n/a	n/a	n/a
TSS	mg/l	(5) ^h	(2) ⁱ	1.9
VSS	mg/l	(5) ^j	(2) ^k	0.63
Chlor-a	µg/l	(6) ^l	1.38 *	2.9

^a ARI result for NH4: "<0.01". Replaced with lab RL.^b BASIC result for CBOD5: "ND". Replaced with lab RL.^c ARI result for CBOD5: "<2". Replaced with lab RL.^d BASIC result for NO3+NO2: "ND". Replaced with lab RL.^e CH2M result for NO3+NO2: 0.0045 mg/l. Replaced with lab RL.^f BASIC result for TN: 0.19 mg/l. Replaced with lab RL.^g BASIC result for OPO4: 0.033 mg/l. Replaced with lab RL.^h BASIC result for TSS: "ND". Replaced with lab RL.ⁱ CH2M result for TSS: 0.8 mg/l. Replaced with lab RL.^j BASIC result for VSS: "ND". Replaced with lab RL.^k CH2M result for VSS: 1.2 mg/l. Replaced with lab RL.^l BASIC result for Chlor-a: 2 ug/l. Replaced with lab RL.

* Sample sent to Chesapeake Biological Laboratory (CBL) for chlorophyll-a analysis.

Table E-7. Comparison of result pairs for August 8, 2012. Alkalinity and TKN were not analyzed for this sampling event.

Constituent	BASIC versus CH2M Hill	BASIC versus Aquatic Research, Inc.	CH2M Hill versus Aquatic Research, Inc.
Alkalinity	n/a	n/a	n/a
NH4	OK	OK	OK
CBOD5	OK	censored	OK
DOC	OK	OK	OK
NO3+NO2	censored	OK	OK
TN	(0.314 mg/l) ^a	OK	(0.330 mg/l) ^b
OPO4	OK	OK	OK
TP	OK	OK	OK
TKN	n/a	n/a	n/a
TSS	censored	OK	OK
VSS	censored	OK	OK
Chlor-a	n/a	n/a	(71%)

^a BASIC RL result for TN: 0.2 mg/l.^b CH2M RL result for TN: 0.2 mg/l.

Table E-8. Results used to determine RPD or AD for November 14, 2012. Alkalinity and TKN were not analyzed for this sampling event. RL = reporting limit

	Laboratory	Basic Laboratory (BASIC)	CH2M Hill Applied Sciences (CH2M)	Aquatic Research, Inc. (ARI)
	Sample ID	2110627-01	L283701	YUR002-36
	Units			
Alkalinity	mg/l	80	n/a	n/a
NH4	mg/l	0.05	(0.05) ^a	(0.01) ^b
CBOD5	mg/l	(3) ^c	(2) ^d	(2) ^e
DOC	mg/l	2.5	2.12	2.08
NO3+NO2	mg/l	0.14	0.13	0.138
TN	mg/l	0.45	0.5	0.364
OPO4	mg/l	(0.05) ^f	0.043	0.048
TP	mg/l	0.05	0.097	0.059
TKN	mg/l	0.3	n/a	n/a
TSS	mg/l	(5) ^g	4	3
VSS	mg/l	(5) ^h	(2) ⁱ	1.5
Chlor-a	µg/l	(6) ^j	2.78 *	2.7

^a CH2M result for NH4: -0.0028 mg/l. Replaced with lab RL.^b ARI result for NH4: "<0.01". Replaced with lab RL.^c BASIC result for CBOD5: "ND". Replaced with lab RL.^d CH2M result for CBOD5: 1.7 mg/l. Replaced with lab RL.^e ARI result for CBOD5: "<2". Replaced with lab RL.^f BASIC result for OPO4: 0.041 mg/l. Replaced with lab RL.^g BASIC result for TSS: 2.3 mg/l. Replaced with lab RL.^h BASIC result for VSS: 1.3 mg/l. Replaced with lab RL.ⁱ CH2M result for VSS: 0.4 mg/l. Replaced with lab RL.^j BASIC result for Chlor-a: 4 µg/l. Replaced with lab RL.

* Sample sent to Chesapeake Biological Laboratory (CBL) for chlorophyll-a analysis.

Table E-9. Comparison of result pairs for November 14, 2012. Alkalinity and TKN were not analyzed for this sampling event. When laboratory reporting limits (RL) is compared, the comparison is considered censored.

Constituent	BASIC versus CH2M Hill	BASIC versus Aquatic Research, Inc.	CH2M Hill versus Aquatic Research, Inc.
Alkalinity	n/a	n/a	n/a
NH4	OK	OK	censored
CBOD5	censored	censored	censored
DOC	OK	OK	OK
NO3+NO2	OK	OK	OK
TN	OK	OK	OK
OPO4	OK	OK	OK
TP	OK	OK	OK
TKN	n/a	n/a	n/a
TSS	OK	OK	OK
VSS	censored	OK	OK
Chlor-a	n/a	n/a	OK

Comparison Summary

For the 2012 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 87 laboratory cross comparisons were considered. Alkalinity and TKN were not analyzed for August 8 and November 14 sampling event.

There were 66 similar pairs of results, 6 dissimilar pair of results, and 15 censored data pairs. The 5 dissimilar pairs included: (2) TN, (1) DOC, (1) NH4, (1) TSS, (1) Chlor-a pair. Of the 15 censored pairs, VSS, NH4, TKN, TP, and CBOD5 results were replaced by the reporting limit (RL) due to low concentrations (and relatively higher reporting limits). Additional comparison details are presented in Table E-10.

Based on suggestions from the water quality monitoring group, comparison pairs for each constituent are plotted. A trend line and linear regression equation were included in the figures to indicate how a linear fit to the data compared to the 1:1 line. The graphical comparisons for each constituent are shown in Appendix B (Figure E-3 to Figure E-14) for the 2012 sampling season. Observations from these comparisons include:

- Certain constituent data illustrate more scatter than others (e.g., TSS and VSS (Figure E-4 and Figure E-5)) illustrate greater scatter than, for example, TP (Figure E-6).
- Certain constituent data illustrate more scatter than others between specific laboratories (e.g., CBOD between Basic and Aquatic Research illustrate less scatter than between Basic and CH2M Hill).
- For certain constituents there are times when one lab generally produces a higher or lower than another, and vice versa, indicating the typical variability that occurs within production analytical laboratories.

The laboratory results for the 2012 sampling location (Weitchpec) are consistent with previous years (based on the 1:1 line). Caution should be used when interpreting the data because the sample size is small.

Table E-10. Total number of similar and dissimilar pairs per constituent. Chlorophyll-a (Chlor-a) added in 2012.

	Alkalinity	CBOD5	DOC	NH4	NO3+ NO2	TN	TKN	OPO4	TP	TSS	VSS	Chlor-A*	Totals
Total Number of similar pairs of results	1	4	8	6	8	7	0	9	8	8	6	1	66
Total number of dissimilar pairs of results	0	0	1	1	0	2	0	0	0	1	0	1	6
<i>Basic and CH2M Hill</i>	0	0	0	0	0	1	0	0	0	1	0	n/a	2
<i>Basic and Aquatic Research</i>	0	0	1	1	0	0	0	0	0	0	0	n/a	2
<i>CH2M Hill and Aquatic Research</i>	0	0	0	0	0	1	0	0	0	0	0	1	2
Total number of pairs excluded due to censored data	0	5	0	2	1	0	3	0	1	0	3	0	15
<i>Basic and CH2M Hill</i>	0	1	0	0	1	0	1	0	1	0	2	0	6
<i>Basic and Aquatic Research</i>	0	3	0	0	0	0	1	0	0	0	1	0	5
<i>CH2M Hill and Aquatic Research</i>	0	1	0	2	0	0	1	0	0	0	0	0	4

* See discussion above on Chlorophyll-a

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.

2009-2012 Constituent Plots

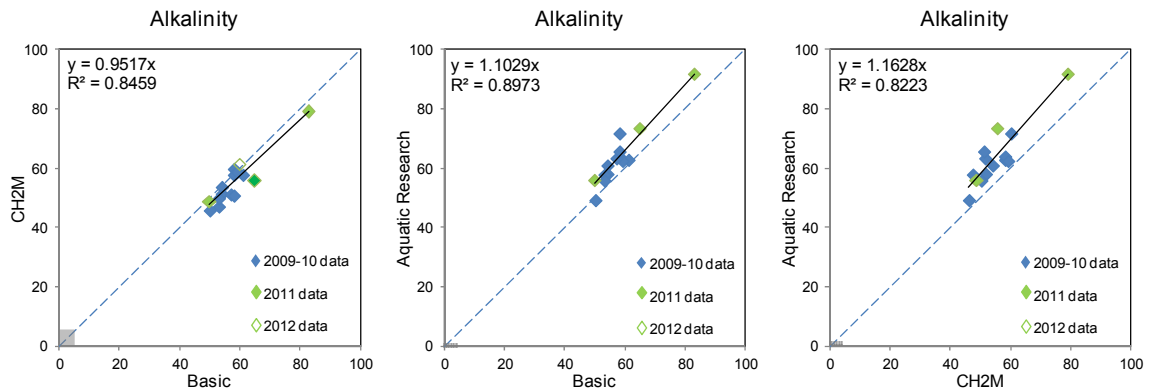


Figure E-3. KHSA inter-laboratory plots from 2009-2012 for Alkalinity. Units in milligrams per liter (mg/l). Grey region in lower left corner of each plot depicts concentrations below the reporting limits for respective laboratories in 2012 (data below RLs are not shown).

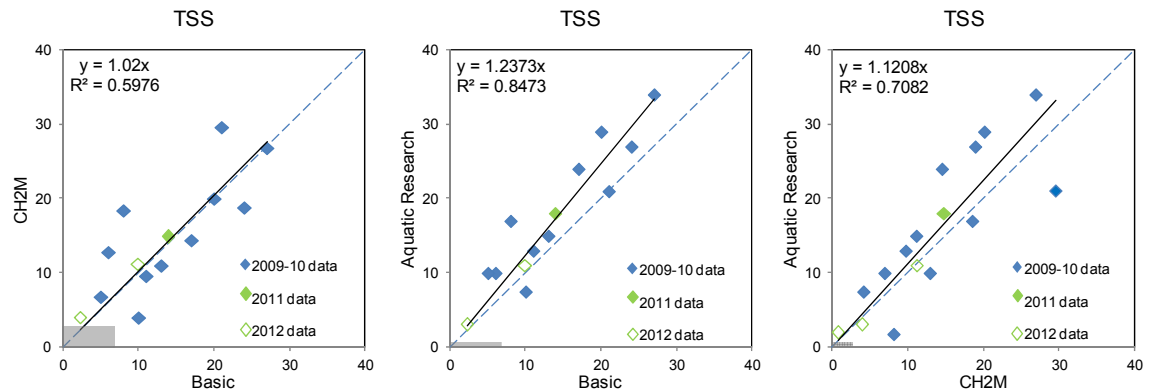


Figure E-4. KHSA inter-laboratory plots from 2009-2012 for Total Suspended Solids. Units in milligrams per liter (mg/l). Grey region in lower left corner of each plot depicts concentrations below the reporting limits for respective laboratories in 2012 (data below RLs are not shown).

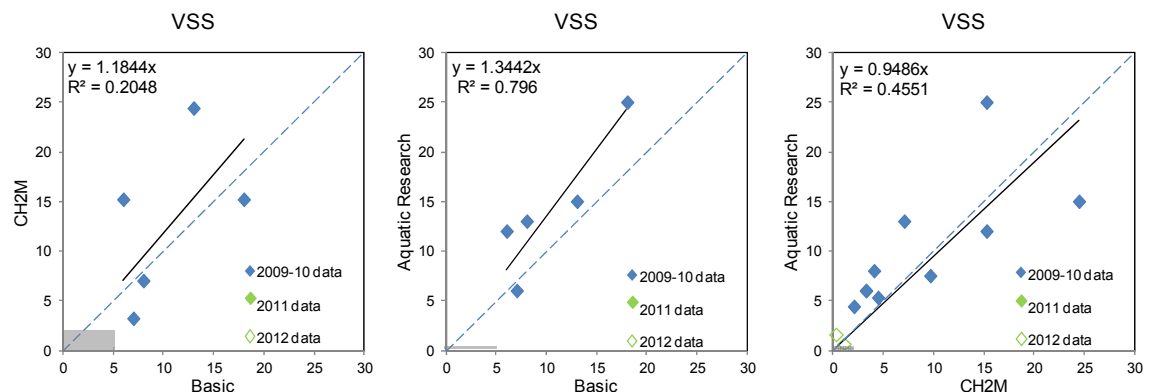


Figure E-5. KHSA inter-laboratory plots from 2009-2012 for Volatile Suspended Solids. Units in milligrams per liter (mg/l). Grey region in lower left corner of each plot depicts concentrations below the reporting limits for respective laboratories in 2012 (data below RLs are not shown).

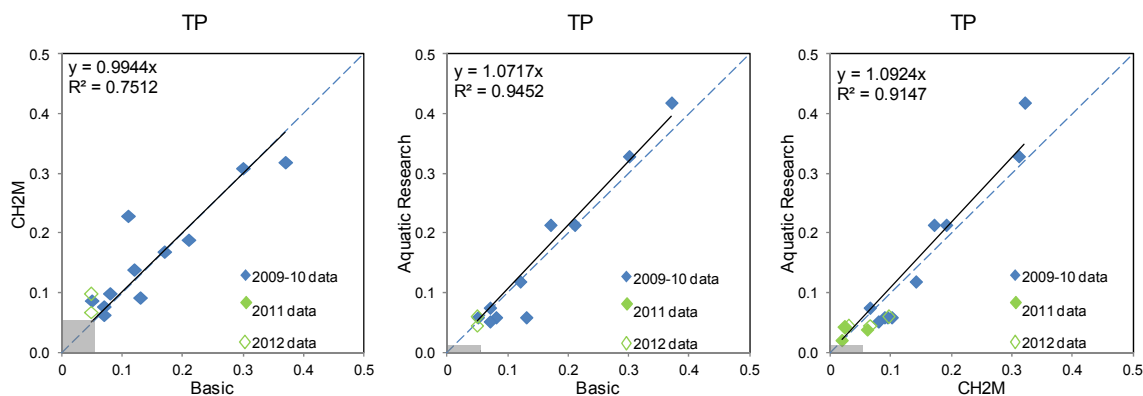


Figure E-6. KHSa inter-laboratory plots from 2009-2012 for Total Phosphorus. Units in milligrams per liter (mg/l). Grey region in lower left corner of each plot depicts concentrations below the reporting limits for respective laboratories in 2012.

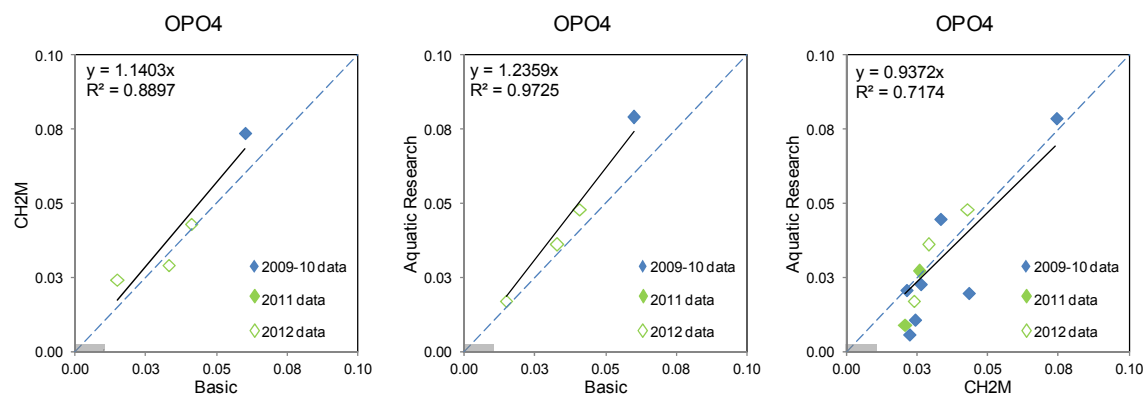


Figure E-7. KHSa inter-laboratory plots from 2009-2012 for Orthophosphate. Units in milligrams per liter (mg/l). Grey region in lower left corner of each plot depicts concentrations below the reporting limits for respective laboratories in 2012 (data below RLs are not shown).

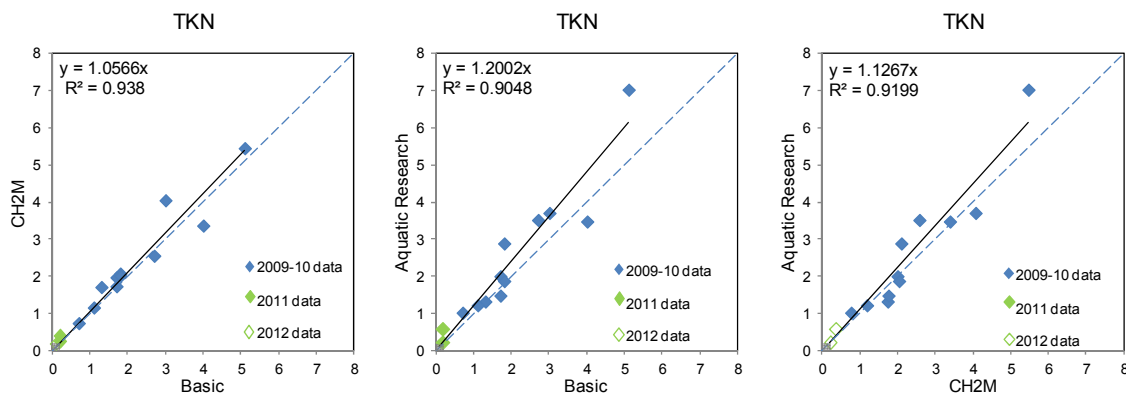


Figure E-8. KHSa inter-laboratory plots from 2009-2012 for Total Kjeldahl Nitrogen. Units in milligrams per liter (mg/l). Grey region in lower left corner of each plot depicts concentrations below the reporting limits for respective laboratories in 2012 (data below RLs are not shown).

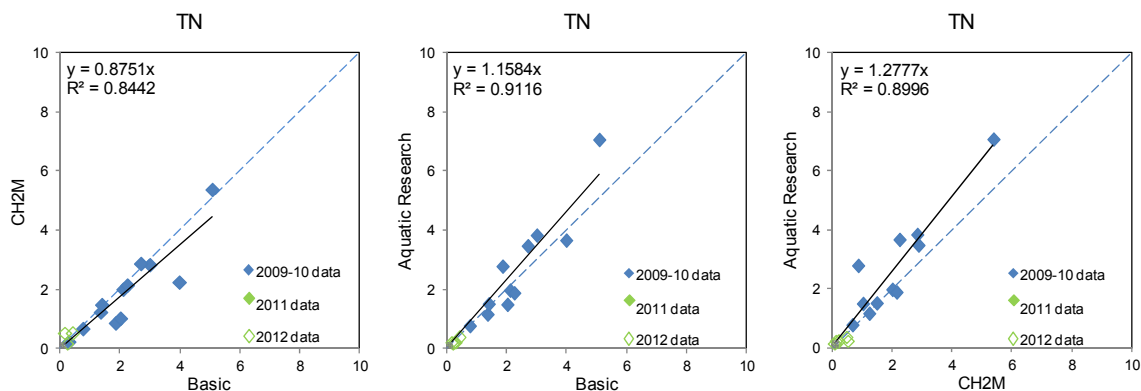


Figure E-9. KHSa inter-laboratory plots from 2009-2012 for Total Nitrogen. Units in milligrams per liter (mg/l). Grey region in lower left corner of each plot depicts concentrations below the reporting limits for respective laboratories in 2012 (data below RLs are not shown).

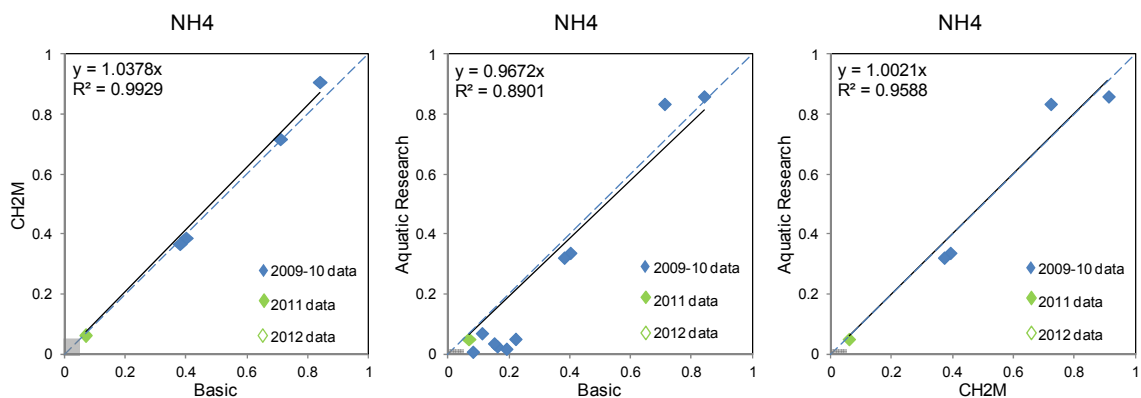


Figure E-10. KHSa inter-laboratory plots from 2009-2012 for Ammonia. Units in milligrams per liter (mg/l). Grey region in lower left corner of each plot depicts concentrations below the reporting limits for respective laboratories in 2012.

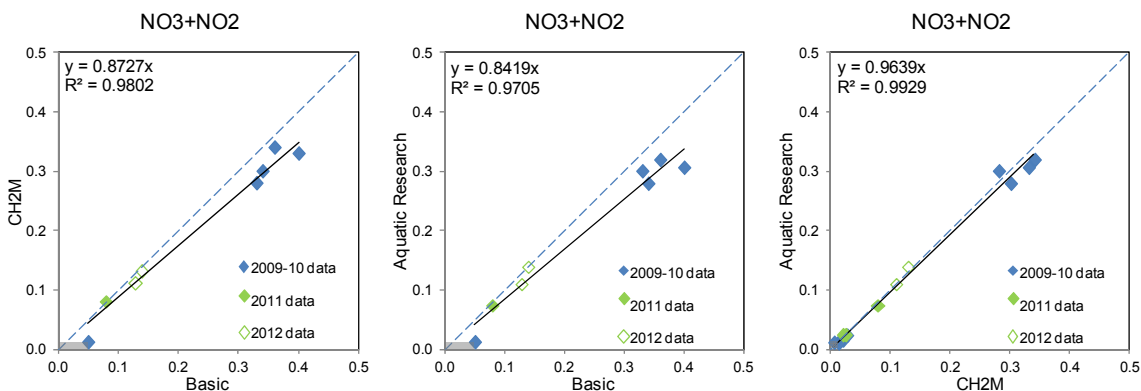


Figure E-11. KHSa inter-laboratory plots from 2009-2012 for Nitrate+Nitrite. Units in milligrams per liter (mg/l). Grey region in lower left corner of each plot depicts concentrations below the reporting limits for respective laboratories in 2012 (data below RLs are not shown).

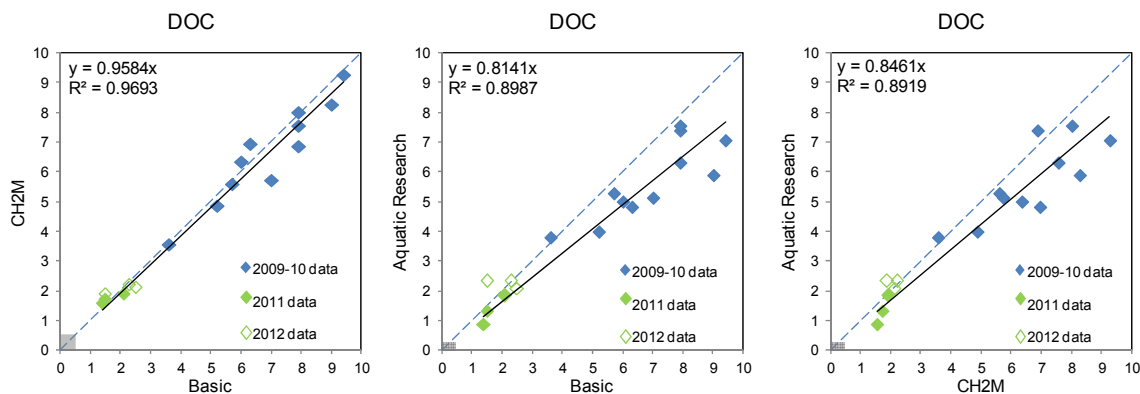


Figure E-12. KHSa inter-laboratory plots from 2009-2012 for Dissolved Organic Carbon. Units in milligrams per liter (mg/l). Grey region in lower left corner of each plot depicts concentrations below the reporting limits for respective laboratories in 2012 (data below RLs are not shown).

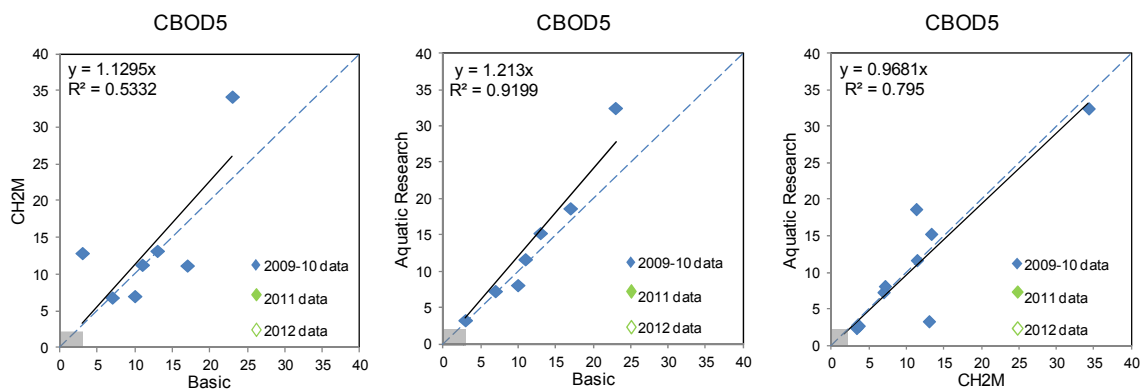


Figure E-13. KHSa inter-laboratory plots from 2009-2012 for Carbonaceous Biological Oxygen Demand. Units in milligrams per liter (mg/l). Grey region in lower left corner of each plot depicts concentrations below the reporting limits for respective laboratories in 2012 (data below RLs are not shown).

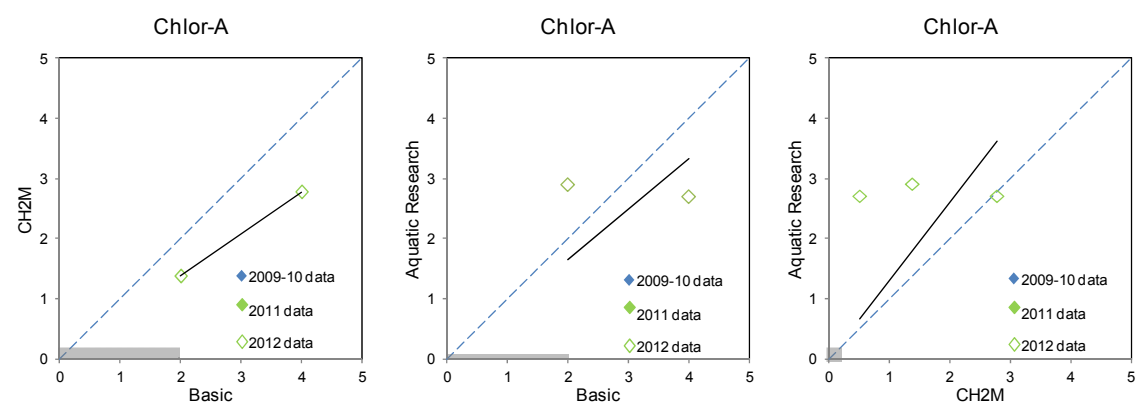


Figure E-14. KHSa inter-laboratory plots from 2009-2012 for Chlorophyll-a. Units in micrograms per liter ($\mu\text{g/l}$). Grey region in lower left corner of each plot depicts concentrations below the reporting limits for respective laboratories in 2012 (data below RLs are not shown). Chlorophyll-a was not collected from 2009-2011 for the three laboratories.

Table E-11. CH2M Hill method detection limits (MDL) and method reporting limits (RL). Total Kjeldahl Nitrogen (TKN) and Alkalinity (ALK) were not collected during the 8/8/12 and 11/14/12 sampling event. Changes from the 11/14/12 MDL/RL are bolded.

	04/18/12			08/08/12			11/14/12		
	MDL	RL	METHOD	MDL	RL	METHOD	MDL	RL	METHOD
NH4	0.014	0.05	E350.1	0.014	0.05	E350.1	0.014	0.05	E350.1
NO3+NO2	0.0028	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						
ALK	N/A	5	E310.1						
CBOD5	N/A	2	SM5210B	N/A	2	SM5210B	N/A	2	SM5210B
DOC	0.065	0.5	SM5310B	0.065	0.5	SM5310B	0.047	0.5	SM5310B
TSS	N/A	2	SM2540D	N/A	2	SM2540D	1.2	10	SM2540D
VSS	N/A	2	E160.4	N/A	2	E160.4	N/A	10	E160.4
Chlor-a ^a	0.21	0.21	EPA 445.0	0.21	0.21	EPA 445.0	0.21	0.21	EPA 445.0

^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.