

ERRATA

KLAMATH RIVER BASELINE WATER QUALITY SAMPLING – 2010 ANNUAL REPORT –

Prepared for the KHSA Water Quality Monitoring Group

Prepared by
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January 24, 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 2010 dataset which required the following changes be made to the Klamath River Baseline Water Quality Sampling 2010 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 2010 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 2010 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 Reservoir	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	KR22000	Klamath River at Spring Island (RM 220.0; 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	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)

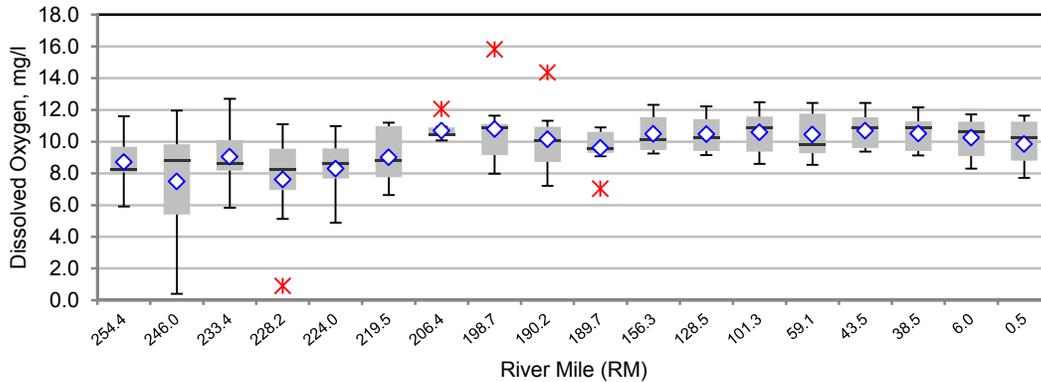
3. The original methods, MDLs and RLs listed in Table 2 did not present information for all constituents of interest in 2010, nor was the variability of the MDLs and RLs presented. The methods as well as the MDL and RL variation in 2010 are presented in Errata Table 2.

Errata Table 2. 2009 Laboratory methods, method detection limits (MDLs) and reporting limits (RLs). “na” indicates no limit available for a method.

Constituent Name	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	1.5	5.0	SM 2320B	1.0	-	-	-	-	-	-	-
						1.54	5.0									
						0.9	5.0									
						1.7	5.0									
						0.6	5.0									
Dissolved Organic Carbon	DOC	SM 5310C	0.3	0.5	EPA 415.1	0.052	0.5	SM 5310B	0.25	-	-	-	-	-	-	-
						0.081	0.5									
						0.0081	0.5									
						0.1	0.5									
						0.08	0.5									
Carbonaceous Biological Oxygen Demand	CBOD	SM 5210	3.0	3.0	SM 5210B	na	2.0	-	-	-	-	-	-	-	-	-
Ammonia	NH3	EPA 350.1	0.03	0.05	EPA 350.1	0.01 0.014	0.05 0.05	SM 4500NH3H	0.01	-	-	-	-	-	-	-
Nitrate+Nitrite	NO3+NO2	EPA353.2	0.01	0.05	EPA353.2	0.002 0.003	0.01 0.01	SM 4500NO3F	0.01	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	TKN	EPA 351.2	0.1	0.2	EPA 351.2	0.087 0.044	0.2 0.2	-	-	-	-	-	-	-	-	-
Total Nitrogen	TN	EPA 351.2	na	0.2	SM 4500-N C	0.02	0.2	SM 4500 NC	0.05	-	-	-	-	-	-	-
			na	0.25		0.12	0.2									
Ortho Phosphate	OPO4	SM 4500P-E	0.01	0.05	EPA 365.1	0.0013 0.001	0.01 0.01	SM 4500PF	0.001	-	-	-	-	-	-	-
Total Phosphorus	TP	SM 4500P-BE	0.02	0.05	EPA 365.4	0.011 0.024	0.052 0.05	SM 4500PF	0.002	-	-	-	-	-	-	-
Total Suspended Solids	TSS	SM 2540D	1.0	5.0	EPA 160.2	0.95	2.0	SM 2540D	0.5	-	-	-	-	-	-	-
						1.0	2.0									
Volatile Suspended Solids	VSS	SM 2540D	1.0	5.0	EPA 160.4	0.95	2.0	SM 2540E	0.5	-	-	-	-	-	-	-
						1.0	2.0									
Turbidity ^a	TURB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorophyll-a	CHLA	SM 10200H	2.0 4.0	6.0 13.0	-	-	-	SM 10200H	0.1	-	EPA 445.0	0.68	-	-	-	-
Pheophytin	PHEO	SM 10200H	2.0 4.0	6.0 13.0	-	-	-	SM 10200H	0.1	-	EPA 445.0	0.42	-	-	-	-
Particulate Carbon	PC	-	-	-	-	-	-	-	-	-	EPA 440.0	0.0633	-	-	-	-
Particulate Nitrogen	PN	-	-	-	-	-	-	-	-	-	EPA 440.0	0.0105	-	-	-	-
Microcystin	MYCN	-	-	-	-	-	-	-	-	-	-	-	-	EUSA	0.15	0.18

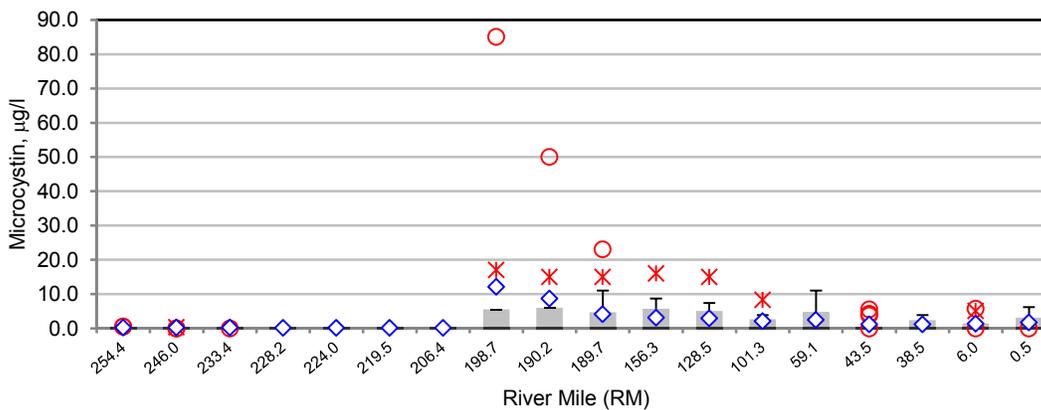
^a In 2010, turbidity was measured in the field by the USBR field crew, and not collected by the PacifiCorp, Karuk or Yurok field crews.

- Because of the small sample size at each site during 2010, 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.
- Erroneous dissolved oxygen data assigned to five samples, was corrected in the dataset. To reflect these changes to the dataset, the mainstem dissolved oxygen boxplot in Figure 2 was revised and is presented below in Errata Figure 2.



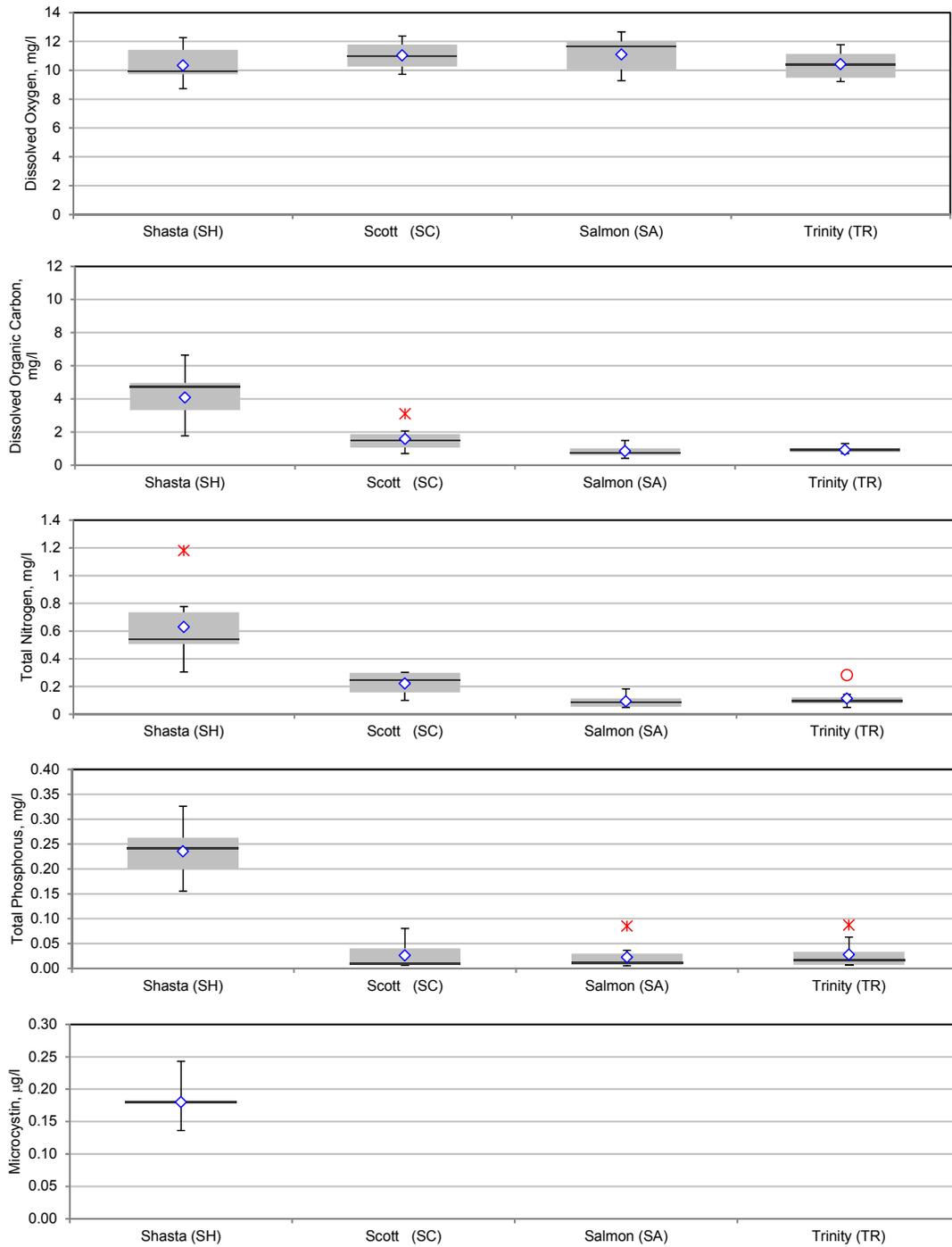
Errata Figure 2. Revised baseline water quality program data for dissolved oxygen in the Klamath River from Link River to the Klamath River estuary with median (—), mean (◊), outliers(*), and extreme outliers (○) identified (February 2010 – December 2010). Keno (246), Copco (198.7), and Iron Gate (190.1) are reservoirs. Only surface samples are taken into account. Note: X-axis is not to scale.

- Erroneous microcystin data assigned to five samples, was corrected in the dataset. Also, missing microcystin data was added to the dataset. To reflect these changes to the dataset, the mainstem microcystin boxplot in Figure 6 was revised and is presented below in Errata Figure 6.



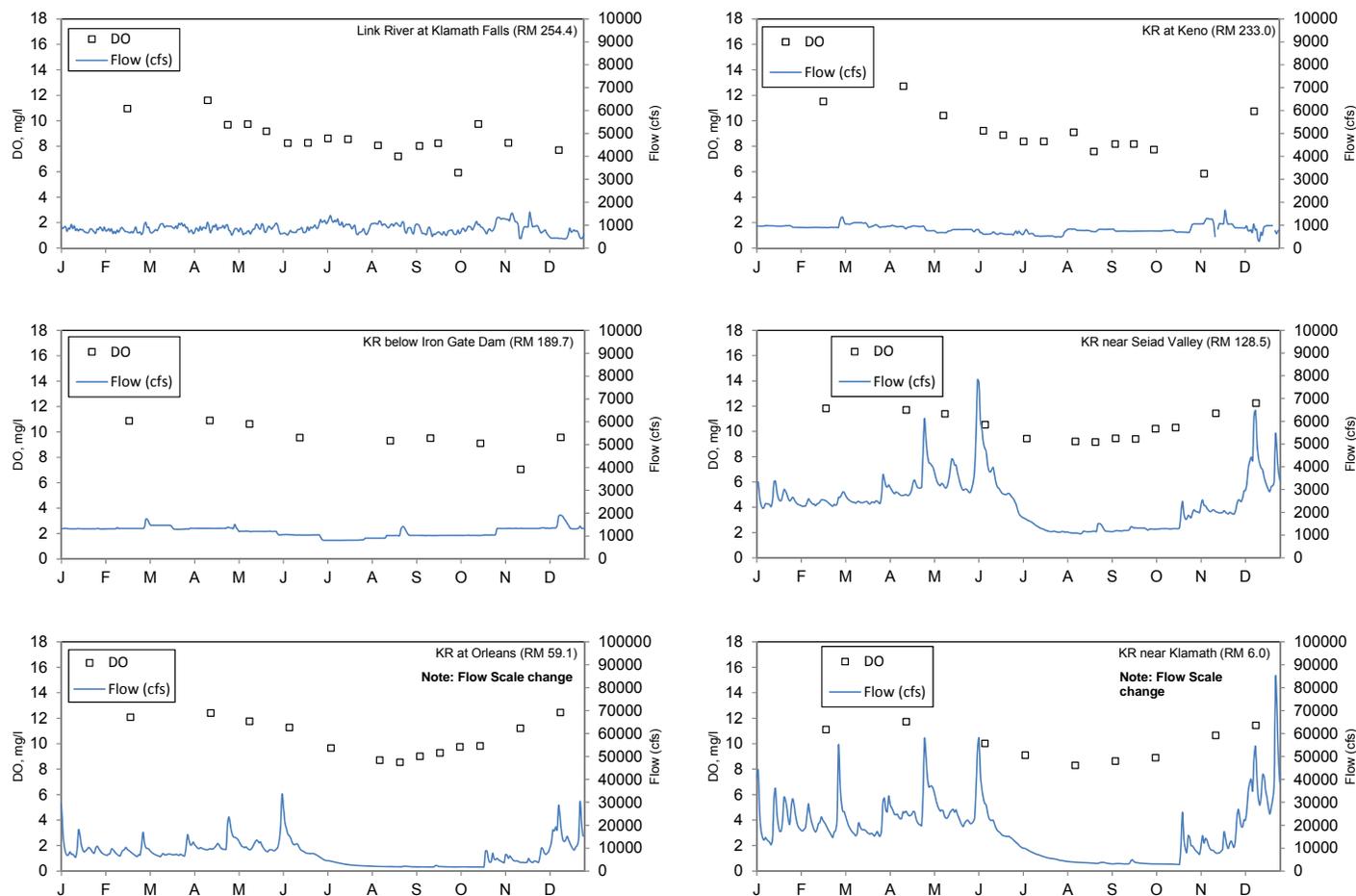
Errata Figure 6. Revised baseline water quality program data for microcystin in the Klamath River from Link River to the Klamath River estuary with median (—), mean (◊), outliers(*), and extreme outliers (○) identified (February 2010 – December 2010). Keno (246), Copco (198.7), and Iron Gate (190.1) are reservoirs. Only surface samples are taken into account. Note: X-axis is not to scale.

7. Missing microcystin data was added to the dataset. To reflect this change to the dataset, a Figure 7 was revised and is presented in Errata Figure 7 below.



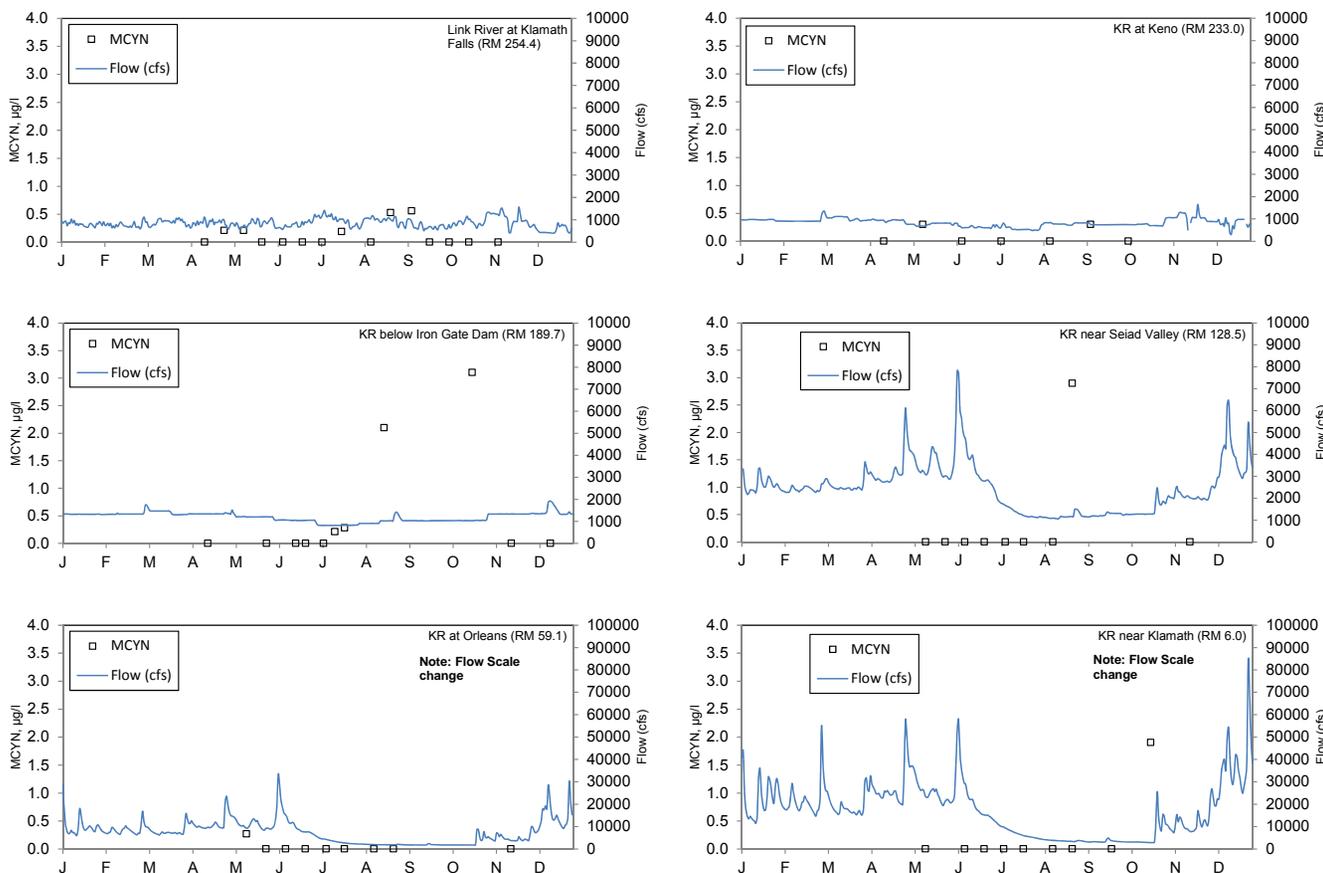
Errata Figure 1. Revised baseline water quality program data for dissolved oxygen, dissolved organic carbon, total nitrogen, total phosphorus, and microcystin for the Shasta, Scott, Salmon, and Trinity rivers with median (—), mean (◊), outliers (*), and extreme outliers (○) identified (February 2010 – December 2010). Note: No microcystin boxplots are included for the Scott River, Salmon River or Trinity River because there were fewer than six data points at each location.

8. Erroneous dissolved oxygen data was corrected in the dataset and to reflect this change the USGS flow and dissolved oxygen graph in Figure 11 was revised and is presented below in Errata Figure 11.



Errata Figure 11. Revised discrete 2010 dissolved oxygen (DO) 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).

9. Missing microcystin data was added to the dataset. To reflect this change to the dataset, the USGS flow and microcystin graph in Figure 15 was revised and is presented below in Errata Figure 15.



Errata Figure 15. Revised discrete 2010 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).

10. The Appendix A 2010 KHSA dataset has been revised since the original 2010 Annual Report was completed. The revised dataset is presented in the table below in Errata Table A-2.

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth	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 NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
2010KDR001	2/16/2010	9:00	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	5.11	7.61	109	10.95	4	50	3.6	1.6	<3	0.38	0.34	1.1	1.4	<0.05	0.07	14.7	17	<6.0					
2010KHA009	4/13/2010	8:00	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	5.87	8.81	110	11.6	14	8	50	6.3	5.4	0.14	<0.05	1.1	1.1	<0.05	0.11	34.9	64	14	<0.18				
2010KHA016	4/27/2010	8:15	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	10.2	8.57	108	9.67	62	49	5.4	6.8	0.1	<0.05	1.3	1.27	<0.05	0.12	36.7	71	13	0.21					
2010KHA019	5/11/2010	6:30	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	9.41	8.42	110	9.72	11	52	5.8	4.4	0.07	<0.05	1.1	1.1	<0.05	0.13	25.4	41	9	0.21					
2010KHA025	5/24/2010	8:30	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	10.61	7.81	112	9.16	8	53	5.2	2.4	0.13	<0.05	0.7	0.77	<0.05	0.07	18.4	20	<6.0	<0.18					
2010KHA031	6/8/2010	6:45	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	16.24	7.81	112	8.24	55	5.8	2.3	3	0.11	<0.05	0.6	0.6	<0.05	<0.05	5.8	<5.0	<6.0	<0.18					
2010KHA037	6/22/2010	7:45	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	16.54	7.94	114	8.26	6	54	5.3		<3	<0.05	<0.05	0.6	0.63	<0.05	0.05	7.6	7	<6.0	<0.18				
2010KHA042	7/6/2010	7:00	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	18.75	8.93	115	8.61	32	55	5.3	3.6	6	0.09	<0.05	1.3	1.35	<0.05	0.07	7.9	11	6	<0.18				
2010KHA048	7/20/2010	8:00	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	22.31	9.77	120	8.55	139	57	7	11.1	13	0.15	<0.05	3	3	<0.05	0.17	94.6	13	8	0.19				
2010KHA055	8/10/2010	6:30	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	20.81	9.21	120	8.06	74	59	8.4	4.6	7	0.18	<0.05	2.1	2.1	<0.05	0.18	8.3	10	<6.0	<0.18				
2010KHA062	8/24/2010	7:45	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	18.72	9.38	118	7.19	168	63	9	8.8	12	0.18	0.05	3.3	3.3	<0.05	0.2	23.4	10	<6.0	0.53				
2010KHA066	9/8/2010	8:15	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	16.22	9.08	118	8.02	170	59	7.8	8.6	12	0.15	<0.05	3.2	3.2	<0.05	0.17	12.2	13	5	0.56				
2010KHA072	9/21/2010	7:45	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	15.17	9.47	113	8.23	139	58	9	7.7	11	0.19	<0.05	2.7	2.7	<0.05	0.21	12.5	8	6	<0.18				
2010KHA079	10/5/2010	6:45	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	14.1	8.23	117	5.92	48	55	5.6	3.2	6	0.43	0.06	2.5	2.59	0.06	0.19	13.4	13	<6.0	<0.18				
2010KHA085	10/19/2010	8:00	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	11.71	8.93	120	9.74	70	58	7.2	3.6		0.16	<0.05	1.9	2	<0.05	0.12	12.4	8	<6.0	<0.18				
2010KHA089	11/9/2010	8:00	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	6.22	7.28	125	8.26	19	7	60	7.1	3.7	3	0.69	0.21	1.9	2.07	<0.05	0.08	11.3	10	<6.0	<0.18			
2010KHA095	12/14/2010	12:00	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	4.48	7.15	128	7.68	61	5.1	0.9	<3	1.14	0.22	2.1	2.32	<0.05	0.07	8.2	<5.0	<6.0						
2010KDR006	2/16/2010	11:30	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	5.33	7.65	148	10.09	66	4.1	1.3			0.41	0.42	1.1	1.5	<0.05	0.09	14.2	13	<6.0					
2010KHA012	4/13/2010	10:00	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	6.61	8.81	133	11.95	19	58	5.8	5.5		0.16	0.06	1.3	1.3	<0.05	0.16	31.3	48	11	<0.18				
2010KHA022	5/11/2010	8:15	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	R	10.67	8.35	131	9.79	11	4	60	5.9	3.6	0.16	<0.05	1.2	1.23	<0.05	0.17	20.6	36	8	0.37				
2010KHA034	6/8/2010	8:30	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	16.59	8.91	164	9.25	3	77	5.9	1.1	<3	0.1	<0.05	0.8	0.9	0.08	0.13	5.4	<5.0	<6.0	<0.18				
2010KHA045	7/6/2010	9:00	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	19.28	8.6	120	8.18	10	2	5.3	1.3	<3	0.15	<0.05	0.7	0.78	<0.05	0.05	4.9	5	<6.0	<0.18				
2010KHA056	8/10/2010	8:00	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	21.98	8.45	130	4.5	62	61	8.1	6.3	9	0.82	<0.05	3.1	3.1	0.06	0.24	50.3	8	<6.0	<0.18				
2010KHA067	9/8/2010	10:00	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	17.25	7.91	131	2.28	42	4	55	7.9	2.2	6	0.86	<0.05	2.4	2.4	<0.05	0.13	6.5	7	<6.0	0.24			

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth	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, Chemicals, 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 NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l	
2010KHSAD080	10/5/2010	8:20	KR24600	Keno Reservoir at Miller Island (RM 246.0, Baseline)	USBR	0.5	P	15.59	7.42	161	0.4	5	5	72	6.4	4.2	6	1.63	<0.05		3.3	3.29	0.16	0.35			7.2	11	<6.0	<0.18	
2010KHSAD092	11/9/2010	11:00	KR24600	Keno Reservoir at Miller Island (RM 246.0, Baseline)	USBR	0.5	P	7.7	7.42	138	9.86	12	3	61	7.3	1.7	<3	0.87	0.23		2.4	2.58	<0.05	0.11			8.4	5	<6.0		
2010KHSAD096	12/14/2010	8:45	KR24600	Keno Reservoir at Miller Island (RM 246.0, Baseline)	USBR	0.5	P	4.23	7.15	215	8.43	5	2	92	6.6	0.9	<3	0.86	0.41		1.8	2.23	0.11	0.16			13.8	7	<6.0		
2010KDR007	2/16/2010	13:15	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4, Baseline)	USBR	0.5	P	5.23	7.81	224	11.5	13		88	5.7	2.6	<3	0.31	0.47		1.2	1.7	<0.05	0.13			20.5	23	5		
2010KHSAD013	4/13/2010	11:00	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4, Baseline)	USBR	0.5	P	7.09	9.01	177	12.7	16		74	6.7	5.2		0.12	<0.05		1.3	1.3	<0.05	0.18			25.7	41	12	<0.18	
2010KHSAD023	5/11/2010	9:30	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4, Baseline)	USBR	0.5	P	10.3	8.77	186	10.4	26	5	73	6.2	4.4		0.16	<0.05		1.4	1.39	0.05	0.18			21.2	33	9	0.3	
2010KHSAD035	6/8/2010	10:00	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4, Baseline)	USBR	0.5	P	16.16	8.18	169	9.21	6	3	74	7	1.7	3	0.11	<0.05		1	1	0.08	0.15			6.2	5	<6.0	<0.18	
2010KHSAD040	6/22/2010	6:15	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4, Baseline)	USBR	0.5	P	16.77	8.63	166	8.86								<3							4.5					
2010KHSAD046	7/6/2010	10:30	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4, Baseline)	USBR	0.5	P	20.08	8.93	133	8.36	18	11	61	6.1	2.2	4	0.23	<0.05		1.1	1.13	<0.05	0.09			4.8	5	<6.0	<0.18	
2010KHSAD051	7/20/2010	13:30	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4, Baseline)	USBR	0.5	P	20.08	8.93	133	8.36															3.7					
2010KHSAD059	8/10/2010	9:15	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4, Baseline)	USBR	0.5	P	21.42	7.94	148	9.09	27		66	8.8	2.5	5	0.83	<0.05		2.2	2.2	0.09	0.25			5.0	<5.0	<6.0	<0.18	
2010KHSAD064	8/24/2010	11:15	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4, Baseline)	USBR	0.5	P	20.61	8.31	146	7.58															6.6					
2010KHSAD070	9/8/2010	11:20	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4, Baseline)	USBR	0.5	P	17.6	8.09	145	8.16	44	5	58	8.7	2.5	5	0.48	<0.05		2	2.1	<0.05	0.14			6.2	7	<6.0	0.3	
2010KHSAD077	9/21/2010	12:00	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4, Baseline)	USBR	0.5	P	16.32	7.88	171	8.17															4.3					
2010KHSAD082	10/5/2010	9:40	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4, Baseline)	USBR	0.5	P	15.58	7.68	180	7.72	22	14	78	7	2.5	5	0.7	<0.05		2.4	2.39	0.08	0.21			5.5	8	<6.0	<0.18	
2010KHSAD093	11/9/2010	10:00	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4, Baseline)	USBR	0.5	P	7.94	7.32	136	5.84	2		62	7.3	0.5	<3	1.01	0.23		2	2.27	<0.05	0.11			6.4	<5.0	<6.0		
2010KHSAD099	12/14/2010	10:30	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4, Baseline)	USBR	0.5	P	3.76	7.37	193	10.73	2	5	83	6.3	1.1	<3	1.02	0.43		1.9	2.37	0.07	0.11			8.5	<5.0	<6.0		
KR10002	2/16/2010	9:10	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	5.18	7.81	235	5.13			82	5.7						1.18	1.81	0.084	0.14			15.2	1.2			
KR10025	4/13/2010	13:00	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	7.91	8.37	198	0.9	139.48	15.75	70	6.1	5.11			<0.05	0.049	0.88	1.73	1.48	0.036	0.16			37.6	10	<0.18	
KR10048	5/11/2010	12:00	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	11.71	8.08	192	9.26	50.59	30.83	65.1	6.23	2.77			<0.05	0.014	0.44		1.21	0.075	0.21			33.6	10.8	<0.18	
KR10127	7/13/2010	13:00	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P							57.7	6.77	0.92			<0.05	0.29	0.15	1.33	1.15	0.074	0.14			4	2	<0.18	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth	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, Chemicals, 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 NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l	
KR10178	8/17/2010	11:30	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	23.07	7.73	148	7.55	21.17	10.51		7.3	2.75	<0.05	0.5	0.49	1.51	2.05		0.28								<0.18
KR10223	9/14/2010	11:15	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	17.04	7.52	166	8.09	7.09	6.52	61.8	9.42	0.94	0.15	0.92	0.16	1.72	2.18		0.04	0.16				4.4	1.2	<0.18	
KR10274	10/19/2010	15:15	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	14.4	7.64		8.41	3.57	4.79	64.1	8.06	0.68	<2	0.27	1.14	0.11	1.78	2.78	0.14	0.24			4.4	1.2	<0.18		
KR10301	11/16/2010	9:15	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	6.35	7.22	155	11.09	1.25	2.13	55.1	6.8	0.61	0.56	0.8	0.08	1.83	2.37		0.061	0.1			1	2	<0.18		
KR10328	12/14/2010	11:30	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	4.05	7.64	202	10.41			73.4	5.95		0.53	0.83		1.99	2.32		0.076	0.13			7.2	3.2	<0.18		
KR10003	2/16/2010	11:40	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	6.21	7.78	281	8.98			86	6.57		0.17	0.59		1.15	2.1		0.085	0.18			12	1.6			
KR10004	2/16/2010	11:50	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0-8	I		7.71					88	6.68		0.19	0.59		1.2	1.78		0.082	0.16			12	1.6			
KR10026	4/13/2010	9:00	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	7.92	8.08	198	9.39	134.36	13.38	70	5.9	4.37	<0.05	0.032	0.75	1.56	1.23		0.037	0.16			33.6	9.2	<0.18		
KR10027	4/13/2010	9:30	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0-8	I		8.02			130.7	15.6	76	5.64	4.00	<0.05	0.052	0.71	1.7	1.35		0.046	0.16			34	9.6	<0.18		
KR10049	5/11/2010	11:30	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	11.49	7.85	189	8.7			67.5	5.75		<0.05	<0.01			1.08		0.095	0.22			24.4	7.6			
KR10050	5/11/2010	11:35	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8.0	P		7.72					63.6	5.99	2.22	<0.05	<0.01	0.36		1.01		0.1	0.2			24.4	7.2	<0.18		
KR10084	6/15/2010	12:05	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	20.13	8.75	178	10.15	18.55	4.29	72.4	6.41	1.16	<0.05	0.046	0.21	0.9	0.84		0.1	0.18			8.4	2.4	<0.18		
KR10085	6/15/2010	12:10	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8.0	P	16.61	7.67	180	5.57	7.71	4.55	73.3	6.79	0.81	0.1	0.08	0.14	0.97	0.85		0.12	0.18			6.8	2	<0.18		
KR10128	7/13/2010	9:30	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P							62.9	6.03	0.92	<0.05	0.21	0.18	1.41	1.06		0.067	0.15			4	2.8	<0.18		
KR10129	7/13/2010	9:40	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8.0	P							64.2	6.39	0.71	0.15	0.26	0.13	1.88	1.26		0.083	0.16			3.6	<2.0	<0.18		
KR10179	8/17/2010	10:30	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	23.43	8.31	151	9.55	49.11	12.12		7.6	2.74	<0.05	0.53	0.56	1.59	2.03			0.23					<0.18		
KR10180	8/17/2010	10:40	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8.0	P					10.07	6.45		7.7	0.87	0.32	0.56	0.16	1.43	1.97			0.21					<0.18		
KR10224	9/14/2010	10:20	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	17.45	7.33	158	7.05	3.87	2.73	60.1	8.85	0.59	0.19	0.76	0.11	1.62	1.94		0.036	0.14			2	<2.0	<0.18		
KR10225	9/14/2010	10:25	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8.0	P							60.5	8.93	0.94	0.21	0.72	0.19	1.56	2.01		0.041	0.15			2.8	<2.0	<0.18		
KR10275	10/19/2010	14:20	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	13.28	7.43		7.55	4.65	5.14	63.5	7.97	0.90	0.44	1.18	0.13	2.34	3.07		0.17	0.24			3.6	<2.0	<0.18		
KR10276	10/19/2010	14:30	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8.0	P					4.45	4.92	63.6	8.14	0.82	0.42	1.16	0.12	2.68	3.04		0.18	0.25			2.8	2	<0.18		
KR10302	11/16/2010	11:38	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	7.31	7.43	155	2.2	1.25	2.18	56	6.7	0.77	0.59	0.77	0.09	1.73	2.39		0.069	0.09			<2.0	<2.0	<0.18		
KR10303	11/16/2010	11:40	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8.0	P	7.09	7.39	155	1.95	1.33	2.38	56	6.4	0.79	0.58	0.76	0.12	1.82	2.34		0.069	0.098			6	<2.0	<0.18		
KR10329	12/14/2010	11:10	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	3.84	7.52	188	10.98			68	5.75		0.45	0.82		1.68	2.01		0.061	0.11			3.6	4.4	<0.18		
KR10330	12/14/2010	11:15	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8.0	P	3.74	7.52	187	9.89	0.88	1.38	70.4	6.2		0.47	0.82		1.66	2.16		0.06	0.11			4	<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, Chlorophylla ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Chemicals, 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 NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l			
KR10001	2/16/2010	11:05	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	5.41	7.8	269	9.93																						
KR10024	4/13/2010	12:20	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	7.64	8.18	206	5.06	121.45	14.14	76	6.1	4.62																	
KR10047	5/11/2010	10:40	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	11.21	7.78	185	9.57																						
KR10082	6/15/2010	10:15	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	19.1	8.3	176	8.64	16.75	4.43	71.7	6.51	1.02																	
KR10126	7/13/2010	11:00	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	25.65				3.27	1.75	62.6	6.58	0.57																	
KR10177	8/17/2010	10:00	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	22.2	7.56	154	7.67	25.63	11.91	7	1.03																		
KR10222	9/14/2010	9:50	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	16.55	7.36	157	8.5	3.46	4.25	59.5	7.08	0.93																	
KR10273	10/19/2010	13:00	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	12.89	7.44		9.31	5.4	6.72	63.1	7.76	0.87																	
KR10300	11/16/2010	10:20	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	7.21	7.54	156	4.9	1.07	1.75	54.9	6.8	0.66																	
KR10327	12/14/2010	10:10	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	3.84	7.52	188	10.98																						
KR10007	2/16/2010	10:20	KR22000	Klamath River at Spring Island (RM 220.0; Baseline)	PacifiCorp	0.5	P	5.35	7.76	258	11.12			88	5.74																		
KR10032	4/13/2010	10:00	KR22000	Klamath River at Spring Island (RM 220.0; Baseline)	PacifiCorp	0.5	P	7.49	7.81		11.19	126.95	12.79	73	6.1	4.42																	
KR10055	5/11/2010	9:45	KR22000	Klamath River at Spring Island (RM 220.0; Baseline)	PacifiCorp	0.5	P	11.19	7.63	187	9.23	27.67	8.46	5.39	3.04																		
KR10090	6/15/2010	10:00	KR22000	Klamath River at Spring Island (RM 220.0; Baseline)	PacifiCorp	0.5	P	18.44	7.94	176	8.59	12.42	5.15	71.5	6.28	1.18																	
KR10130	7/13/2010	12:00	KR22000	Klamath River at Spring Island (RM 220.0; Baseline)	PacifiCorp	0.5	P	23.86				4.2	2.42	63.8	6.84	0.75																	
KR10181	8/17/2010	8:40	KR22000	Klamath River at Spring Island (RM 220.0; Baseline)	PacifiCorp	0.5	P	20.86	7.15	154	6.67	19.11	8.06	5.9	1.18																		
KR10226	9/14/2010	9:00	KR22000	Klamath River at Spring Island (RM 220.0; Baseline)	PacifiCorp	0.5	P	16.21	7.17	157	7.75	0.94	1.52	59.5	7.08	0.57																	
KR10277	10/19/2010	12:10	KR22000	Klamath River at Spring Island (RM 220.0; Baseline)	PacifiCorp	0.5	P	13.03	7.21		8.81	5.82	6.48	61.3	8.31	0.86																	
KR10304	11/16/2010	10:00	KR22000	Klamath River at Spring Island (RM 220.0; Baseline)	PacifiCorp	0.5	P	7.25	7.46	156	6.64			55.1	6.7																		
KR10331	12/14/2010	9:15	KR22000	Klamath River at Spring Island (RM 220.0; Baseline)	PacifiCorp	0.5	P	3.9	7.17	192	10.98			69.3	5.69																		
KR10010	2/17/2010	9:25	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	5.8	7.97	232	10.76			81	4.35																		
KR10033	4/14/2010	12:00	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	9.02	8.06	174	10.94	70.63	9.66	72	2.85	2.17	2.65																
KR10056	5/12/2010	10:15	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	10.51	8.27	170	10.46	29.56	9.52	66.8	3.59	1.49																	
KR10071	5/27/2010	not sampled	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp		R																										
KR10091	6/16/2010	10:30	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	14.58	8.27	174	10.38	8.13	4.75	73	4.58	0.65																	
KR10111	6/21/2010	12:15	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	R																										

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth	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, Chemicals, 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 NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l		
KR10135	7/14/2010	10:45	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P							67.8	3.64	0.69	<2	<0.05	0.27	0.11	0.79	0.76	0.078	0.14			2.4	1.2	<0.18			
KR10186	8/18/2010	13:20	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	18.48	8.43	149	10.07	7.18	3.92	64.6	3.1	0.90		<0.05	0.44	0.16	0.53	0.93	0.11	0.16			4.8	2	<0.18			
KR10231	9/15/2010	15:00	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	9.56	8.39		10.9	3.76	3.68	63.4	5.59	0.83	<2	<0.05	0.7	0.14	0.99	1.34	0.088	0.12			4.8	2	<0.18			
KR10258	10/6/2010	not sampled	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp		P																									
KR10282	10/20/2010	10:15	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	11.12	7.96		10.22	2.99	3.77	61.5	6.92	0.79	<2	<0.05	1.33	0.09	1.34	2.45	0.15	0.21			1.2	<2.0	<0.18			
KR10309	11/17/2010	13:00	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	7.49	8.05	152	10.44	1.54	1.69	55.5	5.4	0.50	<2	0.14	1.05	0.07	1	2.05	0.061	0.078			<2.0	1	<0.18			
KR10336	12/15/2010	12:00	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	6.33	7.91	163	12.05	<0.68	0.98	66.3	2.68		<2	<0.05	0.68		0.4	0.9	0.075	0.12			1.2	1.2	<0.18			
KR10011	2/17/2010	not sampled	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp		I																									
KR10012	2/17/2010	12:30	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	6.92	8.01	207	10.93			70	4.62			<0.05	0.66		0.68	1.26	0.047	0.1			6	1.6				
KR10013	2/17/2010	12:40	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	13.0	P	5.85	7.75	204	10.59			68	4.06			<0.05	0.71		0.69	1.55	0.051	0.096			5.2	<2.0				
KR10014	2/17/2010	12:50	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	27.0	P	5.29	7.54	197	9.89			68	4.48			0.12	0.8		0.76	1.31	0.062	0.097			4	<2.0				
KR10034	4/14/2010	13:15	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I	9.24	8.24	195	12.06	65.2	5.96			3.24															<0.18	
KR10035	4/14/2010	13:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	9.18	8.27	195	11.64	62.25	9.09	70	4.5	1.95		<0.05	0.21	0.34	1	0.99	0.045	0.11			12.4	3.6	<0.18			
KR10036	4/14/2010	13:30	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	13.0	P	8.58	7.9	195	10.3	60.78	6.26	70	4.43	1.70		<0.05	0.23	0.31	1.1	0.91	0.049	0.17			12	3.2				
KR10037	4/14/2010	13:35	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	27.0	P	7.85	7.45	213	7.1	60.76	9.52	72	4.48	1.63		<0.05	0.21	0.29	1.07	1	0.046	0.095			10.8	3.2				
KR10057	5/12/2010	11:15	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I	13.26	8.06	172	9.23	16.39	4.66			1.39															<0.18	
KR10058	5/12/2010	11:10	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	13.32	8.02	172	9.21	13.88	3.64	63.9	4.25	0.96		<0.05	<0.01	0.15			0.5	0.071	0.12			4.8	2.8	<0.18		
KR10059	5/12/2010	11:20	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	13.0	P	11.36	7.66	175	7.37	15.27	4.07	64.2	4.23	1.05		<0.05	0.012	0.17			0.58	0.079	0.12			8.8	<2.0			
KR10060	5/12/2010	11:30	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	27.0	P	8.93	7.41	200	4.45												1.14	0.18	0.21			4	1.6			
KR10092	6/16/2010	11:45	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I	17.77	8.17	163	8.88	2.44	1.48			0.72															<0.18	
KR10093	6/16/2010	11:40	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	17.73	8.1	162	8.97	2.92	1.49	66.7	4.38	0.77		<0.05	0.048	0.15	0.63	0.44	0.095	0.15			1.6	1.6	<0.18			
KR10094	6/16/2010	11:50	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	13.0	P	12.79	7.5	171	4.42	0.79	1.08	68.3	4.08	0.37		0.26	0.039	0.06	0.8	0.67	0.18	0.18			1.2	<2.0				
KR10095	6/16/2010	12:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	27.0	P	9.54	7.24	205	0.56	<0.68	0.52	80.2	5.56	0.80		1.02	<0.01	0.16	1.8	1.52	0.48	0.47			2	<2.0				
KR10136	7/14/2010	12:10	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					6.76	1.80			1.28															0.24	
KR10137	7/14/2010	12:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	22.58				5.12	2.22	68	4.55	0.45		<0.05	0.081	0.09	0.69	0.57	0.067	0.13			<2.0	<2.0		0.4		
KR10138	7/14/2010	12:20	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	9.0	P	19.2				<0.68	0.52	67.4	4.29	0.47		<0.05	0.069	0.09	1.05	0.57	0.072	0.13			<2.0	1.2				

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, Chemicals, 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 NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
KR10139	7/14/2010	12:30	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	18.0	P	11.22				<0.68	<0.42	74.6	4.02	0.46		0.59	<0.01	0.08	1.47	1.1	0.31	0.33			<2.0	<2.0		
KR10140	7/14/2010	12:40	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	27.0	P	10.53				5.22	2.34	79.4	4.45	0.61		1.02	<0.01	0.12	2.67	1.68	0.51	0.54			<2.0	1.2		
KR10187	8/18/2010	11:55	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					18.26	2.47			1.49				0.27										3.9
KR10188	8/18/2010	11:50	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	22.92	8.9	162	10.84	35.27	<0.42	68.5	6	1.86		<0.05	0.091	0.44	0.95	1.07	0.084	0.15			2	3.2	5.6	
KR10189	8/18/2010	12:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	9.0	P	20.61	7.66	162	6.09	2.72	1.77	67.1	5.4	0.42		0.093	0.21	0.11	0.73	0.9	0.1	0.15			<2.0	<2.0		
KR10190	8/18/2010	12:15	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	18.0	P	11.49	7.09	191	1.18	<0.68	0.6	74.7	4.8	0.45		0.78	0.014	0.11	1.26	1.24	0.4	0.38			2	<2.0		
KR10191	8/18/2010	12:25	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	27.0	P	10.78	7.01	199	1.07	0.93	0.69	81	4.5	0.76		1.38	<0.01	0.20	1.82	1.93	0.62	0.58			2	1.6		
KR10232	9/15/2010	13:10	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					57.07	<0.42			3.63				0.78										45
KR10233	9/15/2010	13:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	18.77	9.11	155	15.81	6.22	7.79	64.5	5.75	1.28		<0.05	0.084	0.22	2.38	2.07	0.051	0.21			17.6	15.6	85	
KR10234	9/15/2010	13:15	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	9.0	P	16.72	7.51	156	5.9	1.05	1.72	63.9	5.74	0.49		<0.05	0.21	0.07	1.15	1.44	0.073	0.12			4.4	2.8		
KR10235	9/15/2010	13:20	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	18.0	P	11.55	7.11	196	1.09	1.23	0.75	78	4.76	0.93		0.97	0.027	0.18	1.96	1.57	0.39	0.43			4.8	1.6		
KR10236	9/15/2010	13:30	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	27.0	P	10.94	7	204	0.94	<0.68	0.79	84.2	4.67	1.06		1.82	<0.01	0.15	3.04	2.36	0.76	0.77			3.6	1.6		
KR10283	10/20/2010	11:40	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					3.22	1.36			1.38				0.23										6.7
KR10284	10/20/2010	11:30	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P					8.03	3.75	67.8	6.24	1.34		0.11	0.62	0.22	1.1	1.82	0.13	0.17			1.6	2.8	17	
KR10285	10/20/2010	11:50	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	9.0	P					1.29	0.98	66.4	5.72	0.44		0.13	0.6	0.07	0.56	1.64	0.13	0.14			2.4	<2.0		
KR10286	10/20/2010	12:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	18.0	P							70.9	5.63	0.55		0.51	0.62	0.07	1.8	2.05	0.29	0.3			2.4	1.2		
KR10287	10/20/2010	12:10	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	27.0	P							85.9	4.53	1.31		1.84	0.028	0.21	2.84	2.84	0.93	0.9			2	2.8		
KR10310	11/17/2010	11:05	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					0.94	0.99			0.98				0.14										<0.18
KR10311	11/17/2010	11:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	9.23	7.58	169	7.97	0.94	0.99	61.3	5.4	0.56		0.17	0.81	0.09	0.89	1.72	0.084	0.089			<2.0	<2.0	<0.18	
KR10312	11/17/2010	11:10	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	9.0	P	9.13	7.5	164	7.67	0.94		60.4	5.7	0.43		0.16	0.81	0.06	0.92	1.74	0.084	0.093			<2.0	1.5		
KR10313	11/17/2010	11:15	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	18.0	P	8.05	7.48	157	8.23	1.03	0.87	59.5	5.5	0.42		0.2	0.84	0.06	1.08	1.85	0.074	0.085			2	<2.0		
KR10314	11/17/2010	11:20	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	27.0	P	7.96	7.5	156	8.15	<0.68	1.08	58.8	5.5	0.56		0.24	0.85	0.08	1.09	1.89	0.07	0.084			1.5	<2.0		
KR10337	12/15/2010	10:45	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					<0.68	1.11			0.75														<0.18
KR10338	12/15/2010	10:30	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	4.79	7.6	164	10.92	<0.68	0.9	62.6	5.2			0.27	0.78		1.26	1.9	0.064	0.1			1.2	1.2	<0.18	
KR10339	12/15/2010	10:35	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	9.0	P	4.66	7.56	161	10.75	<0.68	0.97	61.8	4.8			0.28	0.77		1.13	1.78	0.063	0.091			1.6	1.2		
KR10340	12/15/2010	10:40	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	18.0	P	4.61	7.53	162	10.49	<0.68	0.86	63.9	5.41			0.31	0.77		1.17	1.87	0.064	0.091			2	<2.0		

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth	Type	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophylla	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Chemicals, Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate-Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
KR10341	12/15/2010	10:50	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	27.0	P	4.61	7.54	162	10.42	<0.68	0.97	60.9	4.77			0.28	0.77		1.11	1.87	0.064	0.087			1.2	<2.0		
KR10015	2/17/2010	11:40	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	6.01	7.78	203	10.65				70	4.42		<0.05	0.72		0.66	1.38	0.052	0.097			4.8	1.2		
KR10038	4/14/2010	10:20	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	8.8	7.89	197	10.53	62.26	8.34	72	4.72	1.91		<0.05	0.24	0.35	0.93	1.06	0.049	0.15			12	2.8	<0.18	
KR10061	5/12/2010	14:40	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	12.63	7.94	174	8.56	15.64	4.96	64.5	4.22	1.09		<0.05	0.016	0.18		0.57	0.077	0.14			8	2.4		
KR10096	6/16/2010	15:20	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	16.94	7.98	162	8.37	2.11	1.58	66.5	4.55	0.43		0.062	0.061	0.05	0.45	0.46	0.11	0.12			<2.0	1.6	<0.18	
KR10141	7/14/2010	17:00	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P											0.054	0.083	0.08	0.97	0.61	0.099	0.14			<2.0	<2.0		
KR10192	8/18/2010	11:15	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	21.45	8.52	165	7.72	19.56	1.78	66.6	5.4	1.33		0.073	0.2	0.31	1.01	1.1	0.12	0.16			1.6	2.4	3.9	
KR10237	9/15/2010	12:20	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	17.76	8.75	153	10.72	47.49	<0.42	63.2	5.66	2.09		<0.05	0.23	0.46	1.3	1.46	0.086	0.14			8.4	5.2	37	
KR10288	10/20/2010	13:00	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	14.17	7.64	170	7.33	2.07	1.16	68.3	6	0.84		0.19	0.63	0.14	1.03	1.7	0.16	0.18			1.6	1.2	4	
KR10315	11/17/2010	10:00	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	8.97	7.32	169	8.11	<0.68	0.92	60.5	5.3	0.69		0.15	0.84	0.07	0.9	1.76	0.082	0.087			3	2	<0.18	
KR10342	12/15/2010	9:30	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	4.64	7.53	162	10.98							0.3	0.79		1.35	1.94	0.064	0.11			<2.0	1.6	<0.18	
KR10016	2/17/2010	not sampled	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp		I																							
KR10017	2/17/2010	14:20	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	6.85	7.76	193	10.94				67	3.94		0.1	0.81		0.66	1.77	0.051	0.097			1.2	<2.0		
KR10018	2/17/2010	14:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	13.0	P	5.51	7.59	188	10.23				68	4.15		0.12	0.83		0.65	1.62	0.058	0.072			2.8	<2.0		
KR10019	2/17/2010	14:50	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	26.0	P	5.17	7.53	188	9.8				67	3.85		0.15	0.83		0.54	1.62	0.059	0.086			2	<2.0		
KR10020	2/17/2010	15:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	40.0	P	4.95	7.46	186	9.38				67	3.68		0.18	0.83		0.84	1.67	0.066	0.11			<2.0	<2.0		
KR10039	4/14/2010	15:25	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.8	I					41.2	2.7			1.54				0.27										<0.18
KR10040	4/14/2010	15:20	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	9.38	8.04	203	11.31	40.69	2.89	74	4.36	1.38		<0.05	0.42	0.25	0.68	0.99	0.049	0.09			5.2	<2.0	<0.18	
KR10041	4/14/2010	15:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	13.0	P	8.3	7.58	212	9.08	27.12	2.97	73	4.12	0.93		<0.05	0.56	0.17	0.72	1.05	0.064	0.079			4.4	2		
KR10042	4/14/2010	15:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	26.0	P	7.33	7.38	217	7.33	7.38	1.62	76	4.19	0.65		<0.05	0.75	0.11	0.46	1.28	0.083	0.19			2.4	<2.0		
KR10043	4/14/2010	15:50	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	40.0	P	6.79	7.33	216	6.83	6.21	1.48	74	4.43	0.65		<0.05	0.79	0.12	0.98	1.22	0.088	0.15			2.4	2		
KR10062	5/12/2010	13:10	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.8	I					13.1	3.4			1.08				0.18										0.21
KR10063	5/12/2010	13:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	13.47	8.5	177	10.72	14.62	2.99	66.1	4.25	1.28		<0.05	<0.01	0.18		0.44	0.032	0.095			8.8	4.4		
KR10064	5/12/2010	13:15	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	13.0	P	9.73	7.71	189	7.67	3.46	1.33	70.1	4.22	0.78		<0.05	0.14	0.16		0.56	0.032	0.064			2	<2.0		
KR10065	5/12/2010	13:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	26.0	P	8.17	7.48	203	6.11	2.94	1.4	69.7	4.5	0.40		<0.05	0.6	0.06		0.96	0.058	0.085			2	1.6		
KR10066	5/12/2010	13:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	40.0	P	7.18	7.35	213	4.61	1.81	1.21	71.4	4.4	0.44		<0.05	0.85	0.07		1.22	0.089	0.15			<2.0	<2.0		

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, Chlorophylla ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Chemicals, 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 NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l	
KR10097	6/16/2010	13:45	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	0.8	I					4.7	2.6		1.04					0.18											<0.18
KR10098	6/16/2010	13:20	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	0.5	P	19.08	8.48	166	10.08	4.34	1.5	67.4	4.24	0.75	<0.05	<0.01	0.14	0.51	0.33	0.067	0.1					2.8	<2.0	0.18	
KR10099	6/16/2010	13:40	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	13.0	P	12.64	7.45	172	4.89	4.33	1.62	67.9	3.86	0.42	<0.05	0.21	0.08	0.47	0.52	0.12	0.14					1.6	<2.0		
KR10100	6/16/2010	13:50	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	27.0	P	7.62	7.33	210	2.5	1.49	0.79	74.1	4.47	0.30	<0.05	0.73	0.05	0.91	1.02	0.11	0.12					1.2	<2.0		
KR10101	6/16/2010	14:00	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	40.0	P	7.44	7.26	212	0.72	0.78	0.7	76	4.75	0.33	<0.05	0.87	0.05	0.66	1.21	0.16	0.16					2	1.2		
KR10142	7/14/2010	15:10	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	0.8	I					1.4	0.6		0.83					0.14											<0.18
KR10143	7/14/2010	15:00	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	0.5	P					2.37	0.79	72.4	4.23	0.32	<0.05	<0.01	0.06	0.93	0.44	0.065	0.11					<2.0	<2.0	0.27	
KR10144	7/14/2010	15:15	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	10.0	P					0.8	0.43	71.5	3.89	0.27	<0.05	0.047	0.05	1.23	0.45	0.095	0.13					<2.0	<2.0		
KR10145	7/14/2010	15:30	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	20.0	P					<0.68	<0.42	70.9	3.8	0.29	<0.05	0.37	0.05	1.15	0.73	0.094	0.13					<2.0	<2.0		
KR10146	7/14/2010	15:40	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	30.0	P							74.8	4.38	0.34	<0.05	0.69	0.07	1.19	1.21	0.14	0.18					<2.0	<2.0		
KR10147	7/14/2010	16:00	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	40.0	P	10.56			9.63	<0.68	<0.42	75.3	4.36	0.44	0.12	0.59	0.08	0.95	1.26	0.19	0.22					1.6	<2.0		
KR10193	8/18/2010	9:15	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	0.8	I	22.92	8.79	167	8.98	19.2	<0.42		2.97					0.53											4.900
KR10194	8/18/2010	9:00	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	0.5	P	22.83	8.85	169	9.6	41.8	<0.42	71.7	4.8	2.72	<0.05	0.026	0.64	0.95	0.9	<0.01	0.13					3.6	5.2	3.1	
KR10195	8/18/2010	9:30	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	10.0	P	20.75	7.42	170	3.86	3.62	1.15	69.2	4.4	0.35	0.11	0.16	0.08	0.84	0.77	0.12	0.15					<2.0	<2.0		
KR10196	8/18/2010	9:40	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	20.0	P	10.2	7.1	188	1.87	1.2	0.8	70.2	3.9	0.36	<0.05	0.35	0.10	0.3	0.64	0.15	0.16					<2.0	<2.0		
KR10197	8/18/2010	10:00	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	30.0	P	7.92	7.06	208	1.17	<0.68	0.54	75.7	4.4	0.28	0.11	0.5	0.05	0.59	1.07	0.2	0.21					<2.0	<2.0		
KR10198	8/18/2010	10:10	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	40.0	P	7.77	7.04	210	1.13	<0.68	<0.42	77.7	4.5	0.36	0.3	0.36	0.09	0.7	1.11	0.26	0.33					1.2	<2.0		
KR10238	9/15/2010	10:05	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	0.8	I					36.9	<0.42		3.74					0.71											46
KR10239	9/15/2010	10:00	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	0.5	P	19.65	9.22	164	14.34	3.62	6.01	68.1	5.73	0.89	<0.05	<0.01	0.15	1.3	1.16	0.064	0.15					9.2	8	50	
KR10240	9/15/2010	10:10	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	10.0	P	17.82	7.94	157	6.55	5.15	1.21	66.6	5.26	0.56	0.24	0.25	0.10	1.07	0.99	0.12	0.15					3.6	1.6		
KR10241	9/15/2010	10:20	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	20.0	P	11.53	7.04	180	1.07	<0.68	<0.42	68.9	3.81	0.28	<0.05	0.37	0.05	0.5	0.76	0.17	0.18					<2.0	<2.0		
KR10242	9/15/2010	10:30	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	30.0	P	8.11	7.04	207	0.98	0.79	0.57	74.8	4.37	0.39	0.19	0.44	0.06	0.75	1.01	0.21	0.21					1.6	<2.0		
KR10243	9/15/2010	10:40	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	40.0	P	7.84	6.99	212	0.95	<0.68	<0.42	91.2	4.4	0.44	0.46	0.22	0.06	1.05	1.2	0.28	0.24					2.4	<2.0		
KR10289	10/20/2010	14:10	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	0.8	I					4.81	2.2		1.87					0.28											15
KR10290	10/20/2010	14:00	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	0.5	P	15.71	8.08	162	7.21	5.67	2.04	65.5	5.5	1.02	<0.05	0.36	0.17	0.91	1.11	0.098	0.16					3.6	2	15	
KR10291	10/20/2010	14:20	KR19019	Iron Gate Reservoir (RM 19019; Baseline)	PacifiCorp	10.0	P	15.35	7.63	165	5.5	3.27	1.9	66.5	4.92	0.84	<0.05	0.34	0.13	0.8	1.07	0.096	0.15					2.8	2.8		

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, Chemicals, 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 NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
KR10292	10/20/2010	14:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	20.0	P	14.57	7.29	172	4.04	1.01	1.47	68.6	5	0.92		0.22	0.38	0.12	1.08	1.25	0.16	0.19			2.4	2.8		
KR10293	10/20/2010	14:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	30.0	P	8.11	7	211	0.97	<0.68	0.57	74.1	4.45	0.75	0.26	0.24	0.09	1	1.04	0.24	0.25			2.4	2.4			
KR10294	10/20/2010	14:45	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	40.0	P	7.89	6.95	215	0.96	<0.68	<0.42	77.7	4.89	0.67	0.56	0.085	0.11	1.2	1.18	0.32	0.32			<2.0	<2.0			
KR10316	11/17/2010	14:15	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					<0.68	<0.42			0.67				0.12										<0.18
KR10317	11/17/2010	14:20	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	11.13	7.39	181	8.44	<0.68	1.17	66.1	5.2	0.29	0.16	0.67	0.06	1.15	1.53	0.12	0.16			<2.0	<2.0	<0.18		
KR10318	11/17/2010	14:25	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	10.0	P	10.74	7.31	171	5.9	<0.68	0.51	65.4	5.1	0.35	0.15	0.67	0.05	0.81	1.46	0.12	0.12			<2.0	<2.0			
KR10319	11/17/2010	14:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	20.0	P	9.88	7.17	173	4.74	<0.68	0.75	65.5	5.1	0.32	0.25	0.6	0.05	0.92	1.49	0.14	0.15			1	1			
KR10320	11/17/2010	14:35	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	30.0	P	8.5	6.99	215	1.89	<0.68	0.76	67.5	5.3	0.50	0.26	0.49	0.06	0.97	1.43	0.17	0.19			<2.0	<2.0			
KR10321	11/17/2010	14:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	40.0	P	7.95	6.93	227	1.13	<0.68	<0.42	79.2	4.6	0.50	0.68	0.011	0.06	1.2	1.22	0.31	0.31			<2.0	<2.0			
KR10343	12/15/2010	14:35	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					<0.68	0.44		0.46														<0.18	
KR10344	12/15/2010	13:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	7.03	7.4	162	8.72			61.1	4.7		0.18	0.72		1.07	1.71	0.097	0.12			<2.0	<2.0	<0.18		
KR10345	12/15/2010	14:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	10.0	P	6.07	7.39	160	8.31			62.6	4.61		0.23	0.74		1.12	1.71	0.088	0.11			<2.0	<2.0			
KR10346	12/15/2010	14:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	20.0	P	5.45	7.42	160	9.33	<0.68	0.82	62.6	4.64		0.25	0.73		1.06	1.7	0.079	0.095			1.2	1.2			
KR10347	12/15/2010	14:10	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	30.0	P	5.38	7.41	160	9.35	<0.68	0.99	64.2	4.58		0.28	0.74		1.03	1.77	0.08	0.1			<2.0	<2.0			
KR10348	12/15/2010	14:20	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	40.0	P	5.34	7.43	160	9.17	<0.68	1.04	63.5	4.55		0.27	0.73		1.06	1.69	0.08	0.1			1.2	<2.0			
KR10009	2/17/2010	10:35	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	5.96	7.62	195	10.86			80	4.03		2.74	0.097	0.83		0.67	1.81	0.056	0.092			1.6	1.6		
KR10031	4/14/2010	16:40	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	8.82	7.72	207	10.89	31.61	2.58	74	4.35	0.48	<2	<0.05	0.5	0.09	0.79	0.99	0.06	0.12			5.2	1.6	<0.18	
KR10054	5/12/2010	9:45	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	12.33	8.18	180	10.61	11.78	3.47	66.1	4.22	1.01	<2	<0.05	0.046	0.17		0.51	0.034	0.093			6.8	2		
KR10089	6/16/2010	15:00	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	17.82	8.2	168	9.54	4.84	1.27	68	4.16	0.37	<2	<0.05	0.061	0.07	0.47	0.43	0.085	0.1			2.4	1.6	<0.18	
KR10117	7/6/2010	11:15	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.1	R										<2												<0.18	
KR10134	7/14/2010	11:30	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R							71.4	3.58	0.29	<2	<0.05	0.052	0.06	0.78	0.49	0.084	0.13			<2.0	<2.0	0.21	
KR10158	7/19/2010	14:35	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P							71.2	4.05		<2	<0.05	0.077		0.76	0.57	0.092	0.11			<2.0	<2.0		
KR10185	8/18/2010	14:30	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	22.18	8.72	167	9.3	7.39	0.9	71.4	4.7	0.62	<2	<0.05	0.1	0.15	0.61	0.61	0.091	0.12			<2.0	1.6	2.1	
KR10212	8/30/2010	11:40	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P							69.4	4.75		<2	0.051	0.18		0.78	0.89	0.11	0.12			3.6	<2.0		
KR10230	9/15/2010	15:50	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	18.33	8.67	160	9.5	28.7	<0.42	68.3	4.68	3.79	<2	0.093	0.17	0.78	1.04	1.35	0.11	0.17			3.6	2.4	15	
KR10257	10/6/2010	12:30	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.1	R							37.46	<0.42	65.6	5.17	<2	<0.05	0.11		1.31	1.14	0.15	0.076			6.4	3.2	23

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth	Type	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophylla	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Chemicals, Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate-Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Towens, Microcystin
KR10281	10/20/2010	16:10	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	15.52	7.93	164	9.08	4.33	2.53	66.5	5.38	1.08	<2	<0.05	0.36	0.17	1.07	1.37	0.11	0.14			3.6	1.2	3.1	
KR10308	11/17/2010	16:10	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	10.75	7.31	177	7.03	<0.68	<0.42	67	4.9	0.42	<2	0.15	0.68	0.05	0.85	1.46	0.13	0.12			<2.0	<2.0	<0.18	
KR10335	12/15/2010	15:30	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	6.14	7.4	163	9.56	<0.68	0.7	63	5.03		<2	0.19	0.74		1.11	1.58	0.089	0.11			<2.0	<2.0	<0.18	
IG052610-OC	5/26/10	13:21	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	Karuk	0.5	P																							<0.18
IG062310-OC	6/23/10	14:00	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	Karuk	0.5	P																							<0.18
IG072110-OC	7/21/10	13:00	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	Karuk	0.5	P																							0.28
IG082510-OC	8/25/10	13:25	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	Karuk	0.5	P																							4.2
IG092210-OC	9/22/10	12:47	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	Karuk	0.5	P																							6.2
IG102010-OC	10/20/10	12:45	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	Karuk	0.5	P																							11
WA021810-OC	2/18/2010	12:08	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	6.09	8.25	216	11.84	3.2	6.5	98.4	3.1			0.018	0.871			1.42	0.055	0.089			5.5	1		
WA041510-OC	4/15/2010	11:50	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	9.36	8.32	237	11.75	25	4.3	108	3.46			0.038	0.423			0.88	0.046	0.091			8.8	2.8		
WA051210-OC	5/12/2010	12:00	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	13.1	8.01	97	10.25	13	4.2	110	3.83			<0.010	0.012			0.577	0.035	0.085			10	3.5	0.28	
WA052610-OC	5/26/2010	12:00	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P																							<0.18
WA060910-OC	6/9/2010	12:15	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	14.74	8.54	181	10.78	3.2	4.3	82.1	2.71			<0.010	0.059			0.461	0.071	0.108			6.8	2	<0.18	
WA062310-OC	6/23/2010	12:40	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P																							<0.18
WA070810-OC	7/8/2010	12:15	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	21.81	8.7	183	9.26	1.1	3	85.2	3.2			<0.010	<0.010			0.453	0.078	0.127			2.6	1.6	<0.18	
WA072110-OC	7/21/2010	11:26	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P																							<0.18
WA081110-OC	8/11/2010	12:17	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	21.69	8.48	183	9.32	3.2	5	85.7	3.53			0.016	0.12			0.595	0.106	0.139			3.3	1.5	<0.18	
WA082510-OC	8/25/2010	11:53	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	22.12	8.53	187																				2.4
WA090810-OC	9/8/2010	11:49	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	18.74	8.61	186	9.51	12	6	93.3	3.82			<0.010	0.142			0.89	0.105	0.157			6	4	6.6	
WA092210-OC	9/22/2010	11:22	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	16.73	8.52	198	9.36																			5.8
WA100610-OC	10/6/2010	11:29	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	16.03	8.62	196	9.9	14	7.4	96.3	3.25			0.1	0.059			1.1	0.084	0.154			7.3	4.5	16	
WA102010-OC	10/20/2010	11:20	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	13.77	8.39	201	10																			8.7
WA111710-OC	11/17/2010	13:04	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	9.44	8.16	203	11.46	1.3	3.9	96.1	3.57			0.036	0.674			1.35	0.133	0.149			3.9	1.3	<0.18	
WA121510-OC	12/15/2010	11:50	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	5.87	8.06	224	12.31	3.2	11	110	4.27			0.105	0.66			1.8	0.098	0.155			27	7		
SV021810-OC	2/18/2010	10:50	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	6.87	8.31	206	11.81	2.9	3.2	96.8	2.18			<0.010	0.574			0.823	0.035	0.068			7	1.5		

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth	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, Chemicals, 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 NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
SV041510-OC	4/15/2010	10:32	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	9.56	8.29	212	11.68	17	5.3	103	2.74		<0.010	0.208			0.561	0.022	0.056			9.2	3.6			
SV051210-OC	5/12/2010	10:39	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	10.95	8.27	194	11.38	5.9	3.3	96.1	2.9		<0.010	0.041			0.362	0.017	0.039			6	1	<0.18		
SV052610-OC	5/26/2010	10:57	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P																						<0.18	
SV060910-OC	6/9/2010	10:49	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	12.5	8.14	131	10.51	2.7	3.7	64.7	2.09		<0.010	0.058			0.362	0.026	0.099			76	5.2	<0.18		
SV062310-OC	6/23/2010	11:30	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P																						<0.18	
SV070810-OC	7/8/2010	10:47	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	20.86	8.27	173	9.42	1.3	2.8	85.7	2.31		<0.010	<0.010			0.257	0.044	0.062			2.8	0.87	<0.18		
SV072110-OC	7/21/2010	10:11	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P																						<0.18	
SV081110-OC	8/11/2010	10:42	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	21.37	8.36	190	9.19	2.7	4.8	91.5	3.12		0.013	0.035			0.4	0.089	0.113			3	1.3	<0.18		
SV082510-OC	8/25/2010	10:21	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	21.32	8.43	196	9.15																		2.9	
SV090810-OC	9/8/2010	10:29	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	18.02	8.35	195	9.43	12	10	96.8	3.69		<0.010	0.082			0.835	0.093	0.137			6.5	3.3	7.4		
SV092210-OC	9/22/2010	9:56	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	16	8.19	207	9.38																		5.1	
SV100610-OC	10/6/2010	9:57	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	14.84	8.36	205	10.2	1	8.5	97.6	3.54		<0.010	0.014			0.867	0.073	0.142			6.7	2.5	15		
SV102010-OC	10/20/2010	10:01	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	12.73	8.37	209	10.28																		5.9	
SV111710-OC	11/17/2010	10:50	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	9.34	8.19	196	11.41	3.7	4.5	95.8	3.04		0.018	0.504			0.944	0.09	0.127			6.9	2	<0.18		
SV121510-OC	12/15/2010	10:41	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	6.45	7.95	151	12.22	4.8	14	74.5	3.4		0.045	0.295			0.928	0.041	0.174			59	12			
HC021810-OC	2/18/2010	10:00	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	7.25	8.17	173	11.66	3.7	3.4	85.2	1.59		<0.010	0.366			0.589	0.023	0.045			11	1.8			
HC041510-OC	4/15/2010	9:45	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	8.67	8.02	176	11.59	9.9	2.8	89.4	2.25		<0.010	0.133			0.317	0.013	0.037			6.5	2.5			
HC051210-OC	5/12/2010	9:54	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	10	8	165	11.18	4.5	2.6	84.5	2.16		<0.010	0.013			0.252	0.01	0.028			6	1.3	<0.18		
HC060910-OC	6/9/2010	9:55	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	12.08	7.99	120	10.58	2.1	3.5	59.3	2.02		<0.010	0.044			0.237	0.02	0.061			21	2.5	<0.18		
HC070810-OC	7/8/2010	9:54	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	20	8.13	165	9.19	1.3	1.7	82	1.82		<0.010	<0.010			0.19	0.034	0.48			3	1	<0.18		
HC081110-OC	8/11/2010	9:46	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	20.91	8.17	186	8.59	3.2	4.6	88.9	2.46		<0.010	<0.010			0.275	0.068	0.091			3.2	1.7	1.6		
HC090810-OC	9/8/2010	9:24	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	18.04	8.26	185	9.12	15	7.8	91.1	3.14		<0.010	0.012			0.67	0.072	0.119			5.8	3.5	8.3		
HC100610-OC	10/6/2010	9:00	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	14.9	8.22	204	9.9	8.5	9.4	101	3		<0.010	0.138			0.738	0.075	0.126			7.3	2	3.9		
HC111710-OC	11/17/2010	9:52	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	9.66	8.03	187	11.49	3.2	4.6	92.8	2.55		<0.010	0.409			0.766	0.075	0.098			4.8	1.6	<0.18		
HC121510-OC	12/15/2010	9:57	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	6.82	7.98	127	12.48	9.1	15	64.2	2.63		0.029	0.229			0.936	0.025	0.141			62	14			
OR021810-OC	2/18/2010	8:30	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	8.03	7.89	135	12.07	2.1	2.2	65.9	0.955		<0.010	0.168			0.248	0.013	0.024			3.8	1			

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth	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, Chemicals, 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 NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Towens, Microcystin ug/l	
OR041510-OC	4/15/2010	8:10	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	8.82	7.9	142	12.4	8	2.1	73.2	1.4		<0.010	0.014				0.21	0.003	0.021			5	1.5			
OR051210-OC	5/12/2010	8:33	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	10.61	7.9	133	11.75	7.5	3.4	67.9	1.33		<0.010	<0.010				0.257	0.004	0.045			30	7	0.27		
OR052610-OC	5/26/2010	8:50	Or	Klamath River near Orleans	Karuk	0.5	P																							<0.18	
OR060910-OC	6/9/2010	8:40	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	12.39	7.99	95	11.27	12	14	48	1.58		<0.010	0.032				1.09	0.009	0.567			437	60	<0.18		
OR062310-OC	6/23/2010	9:00	Or	Klamath River near Orleans	Karuk	0.5	P																							<0.18	
OR070810-OC	7/8/2010	8:30	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	19.55	8.05	129	9.65	1.3	1.1	63.8	1.17		<0.010	<0.010				0.125	0.014	0.028			5	1.5	<0.18		
OR072110-OC	7/21/2010	8:00	Or	Klamath River near Orleans	Karuk	0.5	P																							<0.18	
OR081110-OC	8/11/2010	7:56	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	21.12	8.22	171	8.7	2.1	2.3	82	1.63		<0.010	<0.010				0.187	0.037	0.051			2.1	0.8	<0.18		
OR082510-OC	8/25/2010	7:40	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	21.01	8.15	178	8.53																			<0.18	
OR090810-OC	9/8/2010	7:34	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	18.04	8.31	176	9	18	8.4	87.6	2.19		<0.010	<0.010				0.519	0.044	0.091			12	5.5	9.6		
OR092210-OC	9/22/2010	7:42	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	16.92	8.16	176	9.27																			4.8	
OR100610-OC	10/6/2010	7:29	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	15.96	8.34	193	9.73	5.9	4	92.3	2.51		<0.010	<0.010				0.434	0.045	0.08			3.3	2	5.4		
OR102010-OC	10/20/2010	7:35	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	13.52	8.37	191	9.81																			11	
OR111710-OC	11/17/2010	8:34	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	9.67	7.92	155	11.21	2.4	2.5	73.6	1.88		0.1	0.232				0.392	0.043	0.054			2.1	0.9	<0.18		
OR121510-OC	12/15/2010	8:34	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	7.56	7.85	97	12.44	6.4	8.2	50	1.69		0.037	0.097				0.578	0.012	0.224			120	17			
WE021810-OC	2/18/2010	11:51	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P	8.21	7.88	128	11.44	2.14	1.79	63.2	1.118		<0.010	0.156				0.23	0.014	0.021			4	<0.50			
WE041510-OC	4/15/2010	11:48	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P	8.89	8.13	131	11.54	1.6	1.76	66.2	1.18		<0.010	0.048				0.122	0.007	0.019			2.2	4	1.5		
WE051210-OC	5/12/2010	11:59	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P	10.45	7.83	125		3.2	2.03	64.9	1.26		<0.010	0.011				0.128	0.006	0.019			0.66	3.7	1.2	<0.18	
WE052610-OC	5/26/2010	11:27	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P																							1.7	<0.18
WE060910-OC	6/9/2010	11:35	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P	12.27	7.97	91	10.88	1.6	2.14	44.2	1.43		<0.010	0.043				0.147	0.01	0.045			5.5	16	2	<0.18	
WE062310-OC	6/23/2010	12:01	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P																							0.72	<0.18
WE070710-OC	7/7/2010	11:16	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P	19.01	8	127	9.45	1.07	0.8	65.5	1.23		<0.010	<0.010				0.142	0.014	0.025			0.51	2	0.87	<0.18	
WE072110-OC	7/21/2010	11:11	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P																							0.34	<0.18
WE081110-OC	8/11/2010	11:57	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P	20.93	8.28	166	9.38	1.87	1.87	78.6	1.63		<0.010	<0.010				0.213	0.03	0.048			0.38	2	0.9	<0.18	
WE082510-OC	8/25/2010	11:50	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P																							0.42	0.19
WE090810-OC	9/8/2010	11:35	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P	18.52	8.38	174	9.6	10.95	3.26	91.4	2.14		<0.010	<0.010				0.592	0.042	0.075			2.5	3.5	1.5	5.5	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth	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, Chemicals, 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 NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l		
WE092210-OC	9/22/2010	11:15	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P																								1.7	<0.18
WE100610-OC	9/22/2010	10:57	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P	15.99	8.43	190	9.87	7.21	3.07	95.2	2.32		<0.010	<0.010				0.42	0.041	0.07				2.3	1.2	4.2		
WE102010-OC	10/20/2010	11:30	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P																							2.7	3.8	
WE111710-OC	11/17/2010	11:03	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P	9.77	8.55	151	11.55	2.4	2.27	75.1	2.03		<0.010	0.188				0.386	0.042	0.051			0.42	2	1	<0.18		
WE121510-OC	12/18/2010	11:04	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P	7.62	8.42	94	12.44	5.874	2.3	48	1.7		0.015	0.093				0.444	0.012	0.066			38	5				
TC021810-OC	2/18/2010	11:13	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	P	8.44	8.06	137	11.23	2.67	1.25	68.6	1.035		<0.010	0.112				0.169	0.01	0.023			8	0.67				
TC041510-OC	4/15/2010	11:10	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	P	8.88	8.08	138	11.28	4.81	1.74	71.2	1.26		<0.010	0.047				0.117	0.007	0.034			6.9	20	2.7			
TC051210-OC	5/12/2010	11:11	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	P	10.36	7.56	126		1.6	2.88	66.2	1.31		<0.010	0.018				0.106	0.006	0.027			3.4	16	3.5	<0.18		
TC060910-OC	6/9/2010	10:50	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	P	12.72	8.04	98	10.66	1.6	2.14	48.3	1.24		<0.010	0.037				0.129	0.008	0.058			5.8	17	1.5	<0.18		
TC070710-OC	7/7/2010	10:32	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	P	18.56	7.97	127	9.32	1.42	0.57	65.5	1.01		<0.010	<0.010				0.128	0.009	0.02			0.51	2.4	0.63	<0.18		
TC072110-OC	7/21/2010	10:18	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	P																				0.29			<0.18		
TC081110-OC	8/11/2010	11:02	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	P	20.64	8.31	165	9.13	2.14	1.42	80.3	1.38		<0.010	<0.010				0.121	0.02	0.031			0.37	1.6	0.9	<0.18		
TC082510-OC	8/25/2010	11:16	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	P																				0.47			<0.18		
TC090810-OC	9/8/2010	10:59	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	P	18.52	8.3	172	9.23	6.68	2.48	91.3	1.64		<0.010	<0.010				0.316	0.028	0.053			1.8	3.3	1.7	3.8		
TC092210-OC	9/22/2010	10:34	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	P																				1.4			<0.18		
TC100610-OC	10/6/2010	10:14	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	P	15.9	8.36	182	9.69	5.87	2.54	92.6	1.95		<0.010	0.01				0.309	0.026	0.05			0.92	1.8	1.7	3.9		
TC102010-OC	10/20/2010	10:55	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	P																				0.78			3.2		
TC111710-OC	11/17/2010	10:28	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	P	10.08	8.44	152	11.29	2.4	1.9	75.9	1.58		<0.010	0.125				0.265	0.029	0.038			0.50	2.1	1			
TC121510-OC	12/17/2010	10:19	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	P	8.04	8.56	100	12.15	4.27	1.9	52	1.57		0.03	0.075				0.403	0.01	0.071			58	6.5				
TG021810-OC	2/18/2010	9:18	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P	9.11	7.66	136	11.09	2.67	1.63	68.6	0.806		<0.010	0.13				0.232	0.01	0.032			18	1.5				
TG041510-OC	4/15/2010	9:10	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P	9.4	8	134	11.72	4.01	1.98	69.4	1.05		<0.010	0.064				0.124	0.007	0.027			6.3	16	1.5			
TG051210-OC	5/12/2010	8:56	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P	10.94	7.88	127		2.14	2.35	67.2	1		<0.010	0.05				0.131	0.006	0.037			4.4	18	2	<0.18		
TG060910-OC	6/9/2010	7:40	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P	13.2	7.83	101	10.01	1.6	2.51	51.5	1.19		<0.010	0.063				0.174	0.009	0.056			12	23	1.8	<0.18		
TG062310-OC	6/23/2010	9:24	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P																				1.6			<0.18		
TG070710-OC	7/7/2010	8:28	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P	17.99	8.01	129	9.09	1.6	0.89	64.9	0.869		<0.010	<0.010				0.088	0.007	0.016			0.66	2	0.63	<0.18		
TG072110-OC	7/21/2010	8:12	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P																				0.42			<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, Chlorophylla ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Chemicals, 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 NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
TG081110-OC	8/11/2010	8:10	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P	20.37	8.15	164	8.29	2.4	2.08	80	1.16		<0.010	0.013				0.136	0.016	0.027			0.43	2	0.8	<0.18
TG082510-OC	8/25/2010	8:40	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P																			0.52			<0.18	
TG090810-OC	9/8/2010	8:48	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P	18.85	8.25	170	8.62	9.35	2.8	90	1.33		<0.010	0.012				0.339	0.026	0.051			2.0	4.5	2.7	5.7
TG092210-OC	9/22/2010	8:33	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P																			1.7			<0.18	
TG100610-OC	10/6/2010	8:11	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P	16.71	8.38	177	8.89	5.61	2.62	90.2	2.34		0.013	<0.010				0.307	0.02	0.043			1.6	1.7	1	5.1
TG102010-OC	10/20/2010	8:48	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P																			0.67			1.9	
TG111710-OC	11/17/2010	8:23	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P	10.11	8.39	151	10.65	1.6	1.39	74.9	1.17		<0.010	0.135				0.223	0.023	0.031			0.45	1.4	0.6	
TG121510-OC	12/15/2010	8:11	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P	8.62	8.39	94	11.43	5.34	1.39	44.5	1.43		0.011	0.08				0.358	0.011	0.063			20	39.5	3.5	
LES021810-OC	2/18/2010	8:13	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P	9.01	7.68	142	11.25	2.67	1.63	63.9	0.894		<0.010	0.148				0.231	0.01	0.028			12	<0.50		
LES041510-OC	4/15/2010	8:01	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P	9.21	7.86	137	11.63	4.01	2.16	66.1	0.844		0.01	0.078				0.175	0.007	0.041			7.9	19	2	
LES051210-OC	5/12/2010	7:55	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P	10.62	7.8	126		3.2	1.66	64	1.19		<0.010	0.045				0.141	0.006	0.034			4.1	19	2.3	<0.18
LES060910-OC	6/9/2010	8:48	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P	13.1	8.01	97	10.25	1.6	2.51	46.5	1.43		<0.010	0.058				0.249	0.013	0.052			14	21	1.8	<0.18
LES062310-OC	6/23/2010	8:39	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P																			2.1			<0.18	
LES070710-OC	7/7/2010	7:51	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P	18	7.95	136	8.91	1.25	1.12	65	0.838		<0.010	<0.010				0.099	0.008	0.019			0.53	2.8	0.63	<0.18
LES072110-OC	7/21/2010	7:05	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P																			0.38			<0.18	
LES081110-OC	8/11/2010	7:31	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P	20.44	8.04		7.77	1.07	2.48	83.3	1		0.012	0.016				0.136	0.017	0.028			0.53	2.6	0.9	<0.18
LES082510-OC	8/25/2010	7:36	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P																			0.61			<0.18	
LES090810-OC	9/8/2010	8:02	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P	17.96	7.98		7.72	7.21	3.44	93.9	1.56		0.012	0.027				0.4	0.026	0.052			1.4	5.8	3.3	5.8
LES091410-OC	9/14/2010	14:20	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P																						6.2	
LES092210-OC	9/22/2010	7:39	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P																			1.8			<0.18	
LES100610-OC	10/6/2010	7:30	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P	15.58	8.18		8.79	4.54	3.12	94.2	1.82		0.019	0.04				0.358	0.024	0.043			0.92	4.2	1.5	4.2
LES102010-OC	10/20/2010	7:48	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P																			0.72			2.1	
LES111710-OC	11/17/2010	7:40	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P	10.13	8.25	180	10.69	1.25	1	72.7	1.21		0.015	0.127				0.243	0.024	0.032			0.61	1.6	0.6	
LES121510-OC	12/15/2010	7:22	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P	8.69	8.34	91	11.64	3.2	1	45	1.51		0.015	0.102				0.433	0.01	0.097			27	67.5	5	
SA021810-OC	2/18/2010	9:00	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	6.35	8.02	105	12.1	1.6	1.4	53	0.569		<0.010	0.018				0.13	0.004	0.008			1.3	0.63		
SA041510-OC	4/15/2010	8:50	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	7.53	7.9	106	12.05	1.6	0.3	56	0.81		<0.010	0.017				0.068	0.003	0.007			1.6	1.1		

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth	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, Chemicals, 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 NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
SA051210-OC	5/12/2010	9:33	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	8.64	7.92	92	11.87	1.1	<0.1	48.1	0.85		<0.010	0.029				0.116	0.002	0.007			4	1.8	0.22	
SA052610-OC	5/26/2010	9:25	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P																							<0.18
SA060910-OC	6/9/2010	10:09	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	10.1	7.81	60	11.48	1.1	1.5	28.3	1.32		<0.010	0.043				0.102	0.004	0.026			12	1.6	<0.18	
SA070810-OC	7/8/2010	9:04	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	16.87	7.93	77	9.97	1.3	0.5	40.1	0.67		<0.010	<0.010				<0.050	0.002	0.005			2	0.8	<0.18	
SA081110-OC	8/11/2010	8:35	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	18.11	8.16	122	9.28	4.8	1.2	62	0.65		<0.010	<0.010				0.113	0.005	0.036			26	4.5		
SA090810-OC	9/8/2010	8:05	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	16.62	8.11	136	9.36	2.7	2.2	73.1	0.59		<0.010	<0.010				0.067	0.004	0.013			5.9	1.4		
SA100610-OC	10/6/2010	7:58	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	13.65	8.18	142	10.34	0.4	0.2	71.8	0.41		<0.010	<0.010				<0.050	0.002	0.085			55	11		
SA111710-OC	11/17/2010	9:03	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	7.78	7.93	93	11.8	2.1	<0.1	43.9	1.09		0.011	<0.010				<0.050	0.002	0.005			0.6	0.5		
SA121510-OC	12/15/2010	9:00	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	6.86	8.04	74	12.66	1.1	3	37.6	1.49		<0.010	0.039				0.183	0.003	0.031			24	3		
SC021810-OC	2/18/2010	11:32	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	6.53	8.34	179	11.9	2.4	1.7	95	1.94		<0.010	0.161				0.303	0.003	0.009			2.6	0.63		
SC041510-OC	4/15/2010	11:15	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	8.61	8.22	174	11.49	0.8	1.8	96.9	1.54		<0.010	0.14				0.267	0.003	0.009			2.8	0.8		
SC051210-OC	5/12/2010	11:27	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	10.02	8.35	159	11.08	1.3	1.8	87.3	1.67		<0.010	0.152				0.303	0.003	0.011			5	0.6	0.24	
SC052610-OC	5/26/2010	11:30	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P																							<0.18
SC060910-OC	6/9/2010	11:35	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	11.35	8.12	93	10.62	2.1	2.7	49.1	2.06		<0.010	0.066				0.224	0.007	0.08			50	4	<0.18	
SC070810-OC	7/8/2010	11:35	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	18.74	8.5	140	9.98	1.9	2.4	74.5	1.19		<0.010	0.057				0.152	0.002	0.009			3.6	1.3	<0.18	
SC081110-OC	8/11/2010	11:29	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	19.99	8.54	235	9.72	1.1	1.2	124	1.03		<0.010	0.072				0.173	0.058	0.068			1	0.6		
SC090810-OC	9/8/2010	11:08	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	16.88	8.62	245	10.14	0.9	1	133	1		<0.010	0.012				0.1	<0.001	0.006			0.6	<0.50		
SC100610-OC	10/6/2010	10:42	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	12.83	8.56	272	10.93	2.1	2.7	144	0.7		<0.010	0.169				0.3	<0.001	0.006			1.4	1		
SC111710-OC	11/17/2010	11:27	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	7.65	8.41	159	12.16	2.9	1	83.1	1.5		<0.010	0.081				0.1	0.002	0.01			1.5	<0.50		
SC121510-OC	12/15/2010	11:20	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	5.66	8.09	95	12.37	2.1	4.6	53.7	3.1		0.015	0.052				0.3	0.011	0.05			22	2.5		
SH021810-OC	2/18/2010	13:02	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	9.16	8.87	458	11.46	8	9.2	246	1.8		<0.010	0.194				0.698	0.166	0.255			55	12		
SH041510-OC	4/15/2010	12:35	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	11.89	8.75	539	11.5	1.9	2.8	310	3.45		<0.010	0.012				0.305	0.121	0.155			3	1.5		
SH051210-OC	5/12/2010	12:33	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	13.2	7.83	101	10.01	4.3	6.6	295	5.3		<0.010	<0.010				0.776	0.145	0.201			14	5	<0.18	
SH052610-OC	5/26/2010	12:45	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P																							<0.18
SH060910-OC	6/9/2010	12:58	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	18.9	9.9	560	9.9	1.6	3.3	290	4.97		<0.010	<0.010				0.506	0.148	0.199			21	2.5	<0.18	
SH070810-OC	7/8/2010	13:00	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	22.63	8.51	578	8.73	1.6	2.5	297	4.71		<0.010	<0.010				0.512	0.217	0.321			2.8	0.87	<0.18	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophylla ug/l	Algae, Phycophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Chemicals, 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 NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l	
SH072110-OC	7/21/2010	12:12	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P																								<0.18
SH081110-OC	8/11/2010	14:51	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	23.6	8.76	581	8.99	5.3	7.4	289	4.76		0.032	<0.010				0.735	0.184	0.241			23	6.5		<0.18	
SH082510-OC	8/25/2010	12:47	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	20.81	8.74	525	9.64																			<0.18	
SH090810-OC	9/8/2010	12:34	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	16.99	8.73	532	9.88	3.2	5.4	288	3.33		<0.010	<0.010				0.403	0.132	0.157			3.7	1.8		<0.18	
SH092210-OC	9/22/2010	12:05	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	14.44	8.55	540	9.76																			<0.18	
SH102010-OC	10/20/2010	12:04	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	10.49	8.62	428	10.39																			<0.18	
SH111710-OC	11/17/2010	14:02	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	8.27	8.52	459	11.41	9.1	7.9	226	1.77		<0.010	0.136				0.545	0.171	0.263			28	7		<0.18	
SH121510-OC	12/15/2010	12:36	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	6.43	8.31	474	12.27	5.9	11	239	6.65		0.015	0.045				1.18	0.232	0.326			40	8		<0.18	
TR021810-OC	2/18/2010	12:04	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	8.73	8.02	151	11.13	1.87	1.5	79	0.907		<0.010	0.059				0.102	0.006	0.024			12	<0.50		<0.18	
TR041510-OC	4/15/2010	12:01	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	9.02	8.03	148	10.98	4.81	1.17	77	1.05		0.022	0.047				0.093	0.006	0.063			17	33	1.6	<0.18	
TR051210-OC	5/12/2010	12:17	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	10.67	7.89	128		1.6	2.14	71.2	1.1		<0.010	0.038				0.128	0.004	0.034			5.5	22	1.8	<0.18	
TR060910-OC	6/9/2010	12:22	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	13.71	8.34	111	10.39	2.14	0.85	55.5	1.02		<0.010	0.032				0.144	0.003	0.031			4.4	21	1.5	<0.18	
TR070710-OC	7/7/2010	11:36	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	18.24	7.89	127	9.48	1.42	0.2	66.2	0.711		<0.010	<0.010				0.109	0.002	0.01			0.60	2.5	0.75	<0.18	
TR072110-OC	7/21/2010	11:36	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P																				0.27			<0.18	
TR081110-OC	8/11/2010	12:17	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	21.02	8.17	164	9.22	1.5	<0.1	79.2	0.71		<0.010	<0.010				0.056	0.002	0.007			0.24	<0.50	<0.50	<0.18	
TR090810-OC	9/8/2010	11:54	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	18.63	8.33	165	9.46	0.93	0.37	89	0.82		<0.010	<0.010				0.093	<0.001	0.007			0.17	<0.50	<0.50	<0.18	
TR092210-OC	9/22/2010	11:35	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P																				0.18			<0.18	
TR100610-OC	10/6/2010	11:18	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	15.31	8.2	164	10.03	0.67	0.64	84.8	0.77		<0.010	0.01				0.074	<0.001	0.007			0.23	<0.50	<0.50	<0.18	
TR102010-OC	10/20/2010	11:56	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P																				0.17			<0.18	
TR111710-OC	11/17/2010	11:21	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	10.25	8.65	159	11.29	2.94	0.24	78.7	0.9		<0.010	<0.010				<0.050	0.002	0.007			0.33	0.9	0.5	<0.18	
TR121510-OC	12/19/2010	11:18	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	8.57	8.62	115	11.78	5.34	0.24	59.4	1.3		0.017	0.06				0.283	0.007	0.087			69.5	5		<0.18	

End of Errata

KLAMATH RIVER BASELINE WATER QUALITY SAMPLING – 2010 ANNUAL REPORT –



Grant Johnson

Prepared for the
KHSa Water Quality Monitoring Group

Prepared by
Watercourse Engineering, Inc.
November 23, 2011



1. 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. Water quality monitoring in 2009 was conducted under the plan: AIP Interim Measure 12: Water Quality Monitoring Activities, Monitoring Year 2009.

The Klamath Hydroelectric Settlement Agreement (KHSA), signed on February 18, 2010, supersedes the AIP. Interim Measure 15 of KHSA states that PacifiCorp shall fund long-term baseline water quality monitoring to support dam removal, nutrient removal, and permitting studies, and also will fund 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 2010 water quality monitoring was conducted under the KHSA and represents the second year of water quality monitoring.

The monitoring program is a cooperative effort of the KHSA Monitoring Group¹. 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. The program continues to collect data from 254 miles of river and reservoirs from Link Dam near Klamath Falls, Oregon to the Klamath River Estuary near Klamath, California. Annual planning and coordination meetings, as well as interim reporting meetings during the sampling season, include the KHSA Monitoring Group and stakeholders. The KHSA Monitoring Group ensures that the intent of the Interim Measure is met, that appropriate quality assurance protocols and standard operating procedures are in place, water quality conditions and sampling matters are tracked in a timely fashion, and ensures process transparency.

This summary report focuses on the grab sampling data collection and the available water quality probe data. Two appendices accompany this report. Field data from the 2010 water quality sampling program is presented in Appendix A. Appendix B is a Technical Memorandum in which results of a laboratory comparison are given.

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. Program Elements

The 2010 KHSA monitoring program was carried out from February through December of 2010 and included several monitoring elements. The primary elements of the program include baseline monitoring 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 and concentration 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 (identified in Table 1). The grab samples are collected for analytical determination for a suite of water quality constituents (see Section 3.2.1). 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.

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 2010 season. 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 KHSA program, including the baseline monitoring and the public health monitoring elements. These data are accessible via the KBMP website (<http://kbmp.net/>). In addition, the KBMP website includes links to quality assurance plans, associated program documents, and other materials and features that provide transparency to the KBMP process that are directly transferable to the KHSA monitoring program.

There are other Klamath River monitoring efforts outside of the KHSA program that are sponsored by individual entities. Some of these programs may provide additional data related to Klamath River water quality as well as other aquatic system information.

3. Baseline Program Water Quality Sampling

3.1. Site Locations and Frequency

In 2010, 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 crews. 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, the Shasta, Scott, Salmon and Trinity Rivers. Physical parameters (water temperature, dissolved oxygen, specific conductivity, pH) were collected at all sites during the sampling event. Grab samples for analysis of all other baseline water quality constituents were collected monthly, except at Link Dam and below Iron Gate Dam, where samples were collected bi-monthly from May through October and monthly for the remainder of the sampling season. Site locations, sampling frequency and sampling crew are presented in Table 1.

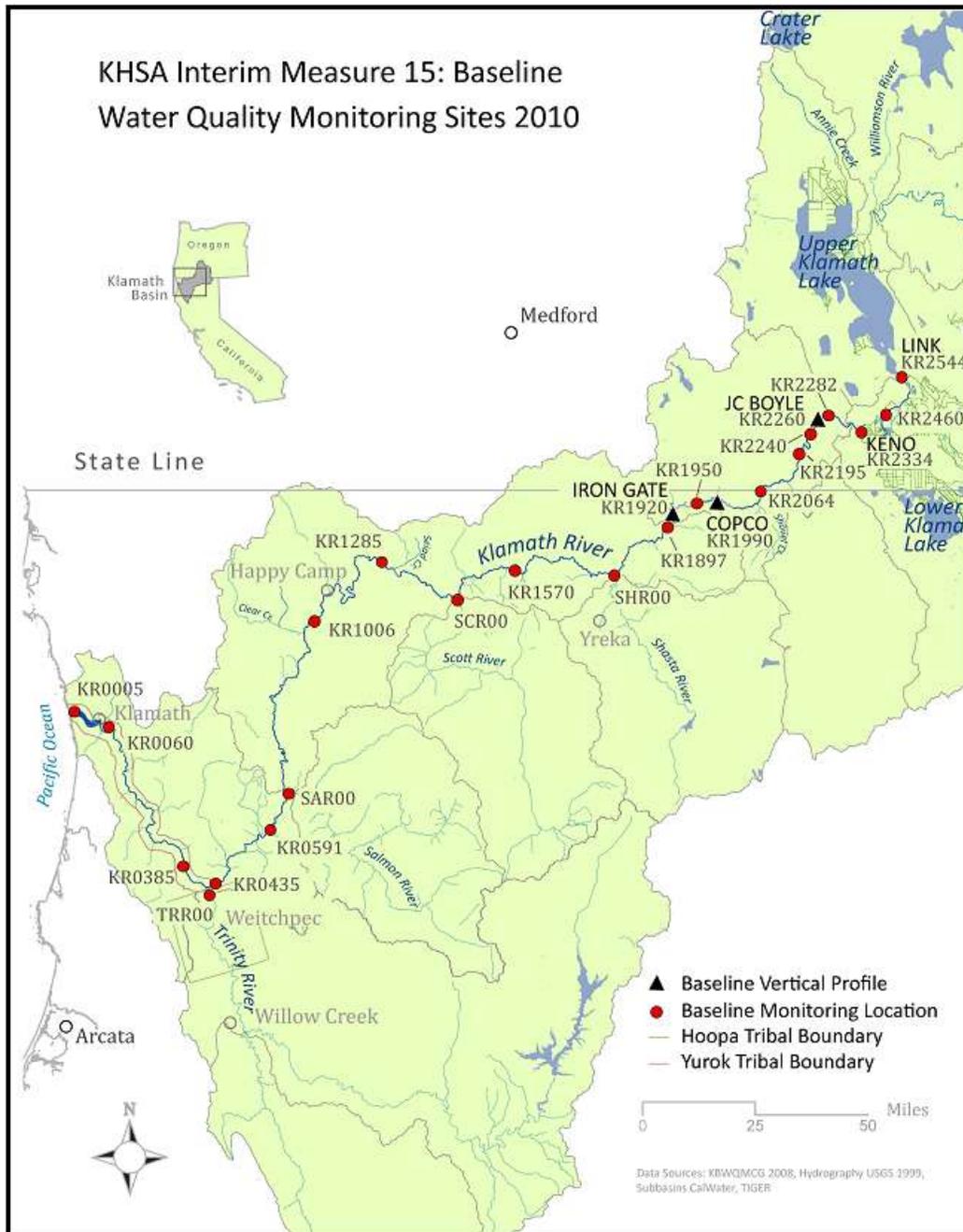


Figure 1. 2010 KHSA Klamath River baseline monitoring sampling sites.

Table 1. 2010 Baseline monitoring locations, constituents, sampling frequency, and sampling entity

Monitoring Location	Temperature (°C)	Dissolved Oxygen (mg/l)	pH (log[H ⁺])	Specific Conductivity (uS/cm)	Inorganic/Organic N (mg/l)	Inorganic/Organic P (mg/l)	Particulate and Dissolved C (mg/l)	TSS/VSS (mg/l)	Alkalinity (mg/l)	Water Column chl_a/Pheo (ug/l)	Phytoplankton species	Microcystin (ug/l)	LCMS confirmation of Microcystin	CBOD, mg/l	Sampling Entity	
Site ID	Sampling Method:	T,P	P	P	P	G	G	G	G	G	G	G	G	G	G	
KR2544	Link Dam	H/VP	H/VP	H/VP	H/VP	M/BM	M/BM	M/BM	M/BM	M/BM	M/BM	M/BM	BM/S	BM	M2/BM2	USBR
KR2460	Keno Reservoir at Miller Island	H/VP	H/VP	H/VP	H/VP	M	M	M	M	M	M	M	M/S	-	-	USBR
KR2330	Klamath River below Keno Dam	H/VP	H/VP	H/V	H/V	M	M	M	M	M	M	M	M/S	-	M2/BM2	USBR
KR2282	Klamath River above J.C. Boyle Reservoir	H	-	-	-	M	M	M	M	M	M	M	-	-	-	PacifiCorp
KR2260	J.C. Boyle Reservoir ^a	VP	VP	VP	VP	M	M	M	M	M	M	M	M/S	-	-	PacifiCorp
KR2240	Klamath River below J.C. Boyle Dam	H	-	-	-	M	M	M	M	M	M	M	-	-	-	PacifiCorp
KR2195	Klamath River below USGS Gage	H	H	H	H	M	M	M	M	M	M	M	M/S	-	-	PacifiCorp
KR2064	KR above Shovel Creek (Stateline)	H	-	-	-	M	M	M	M	M	M	M	M/S	-	M2/BM2	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	-	-	-	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				M/BM	M/BM	M/BM	M/BM	M/BM	M/BM	M/BM	BM/S	M	M2/BM2	PacifiCorp
KR1560	Klamath River at Walker Bridge Road	H	-	-	-	M	M	M	M	M	M	M	M/S	-	-	Karuk
KR1285	Klamath River below Seiad	H	H	H	H	M	M	M	M	M	M	M	M/S	-	M	Karuk
KR1006	Klamath River near Happy Camp	H	-	-	-	M	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	-	-	Karuk
KR0435	Klamath River At Weitchpec	H	H	H	H	M	M	-	M	M	M	M	M/S	M/S	-	Yurok
KR0385	Klamath River below Trinity River	H	H	H	H	M	M	-	M	M	M	M	M	-	-	Yurok
KR0060	Klamath River near Klamath	H	H	H	H	M	M	-	M	M	M	M	M	-	-	Yurok
KR0005	Klamath River Estuary	-	-	-	-	M	M	-	M	M	M	M	M	-	-	Yurok

SHR00	Shasta River near mouth	H	H	H	H	M	M	M	M	M	M	M	-	-	-	Karuk
SCR00	Scott River near mouth	H	H	H	H	M	M	M	M	M	M	M	-	-	-	Karuk
SAR00	Salmon River near mouth	H	H	H	H	M	M	M	M	M	M	M	-	-	-	Karuk
TRR00	Trinity River near mouth	H	H	H	H	M	M	M	M	M	M	M	-	-	-	Yurok
<u>Notes:</u>																
^a Sampling at two depths in J.C. Boyle reservoir (0.5 m and 8 m below surface)																
^b Sampling at three depths in Copco reservoir (0.5 m below surface, one intermediate depth, and 1 m above bottom)																
^c Sampling at four depths in Iron Gate reservoir (0.5 m below surface, two intermediate depths, and 1 m above bottom)																
<u>Key:</u>																
<u>Sampling Method</u>																
T – Thermistor																
P – Probe or data sonde (minimum seasonal deployment – April to November)																
G – Grab sample																
<u>Sampling Frequency Codes</u>																
H – Hourly measurements (in some instances, sub-hourly)																
VP – Vertical profile at stated sampling frequency																
M – Monthly sampling																
M/S – Monthly sampling (May – October)																
BM/S – Bi-monthly sampling (May – October)																
M/BM – Bi-monthly sampling May - October and monthly sampling the remainder of the year																
M2/BM2 - Bi-monthly sampling June -September and monthly sampling the remainder of the year																

3.2. Water Quality Sample Collection

Water samples were collected by the KHSA baseline water quality monitoring program participants as was the water quality probe data (temperature, dissolved oxygen, specific conductivity, and pH). Analytical samples (i.e., other physical constituents and chemical constituents listed in Table 1) were sent to laboratories for analysis.

3.2.1. Analytical Samples

Grab water samples were collected for analytical determination of:

- Nitrogen (ammonia, nitrate+nitrite, total Kjeldahl nitrogen (TKN), and total nitrogen),
- Phosphorus (orthophosphate and total phosphorus),
- Carbon (dissolved organic carbon (DOC) and particulate organic carbon (POC)),
- Solids (total suspended solids (TSS) and volatile suspended solids (VSS)),
- Alkalinity,
- Algae (chlorophyll-a and pheophytin),
- Microcystin,
- Carbonaceous biological oxygen demand (CBOD).

Additional microcystin grab samples were collected for the analysis using liquid chromatography tandem mass spectrometry (LCMS). Not all constituents were sampled at all locations. All data are included in Appendix A.

A total of seven laboratories completed the analytical work for the participating program agencies:

- Basic Laboratories (Basic) in Redding, California,
- CH2MHill Applied Sciences Laboratory (CH2MHill) in Corvallis, Oregon,
- Aquatic Research in Seattle, Washington,
- Chesapeake Biological Laboratories (CBL) in Solomons, Maryland,
- EPA Region 9 (EPA) laboratory in Richmond, California,
- California Department of Fish and Game Water Pollution Control (DFG) Laboratory in Rancho Cordova, California ,
- Aquatic Analysts in Friday Harbor, Washington.

3.2.2. 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 (see Table 1), physical parameters were also measured when grab samples were collected. Physical measurements that were collected during grab sampling are included in the field data

(see Appendix A), while time series monitoring data are maintained by (and available from) each sampling entity.

3.2.3. 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).

3.2.4. Laboratory Comparison

Because several laboratories are used by the various sampling parties, samples were collected in triplicate and submitted for analysis to Aquatic Research, Basic, and CH2MHill laboratories. There was variability in the laboratory results for all constituents but ammonium, total nitrogen, total suspended solids, and dissolved organic carbon showed the most variability. In addition, results varied among the three laboratories. In general, the laboratory comparison, coupled with quality assurance samples (e.g., duplicates), illustrates the range of potential results from individual and multiple laboratories that can be incorporated into data interpretation. More details on the 2010 laboratory comparison are presented in Appendix B.

3.3. Water Quality Analytical Methods

Basic, CH2MHill, Aquatic Research, and Chesapeake Biological Laboratories (CBL) 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 or, in certain cases, were not presented.

3.3.1. 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. All microcystin analysis was performed using the enzyme-linked immunosorbent assay (ELISA) method at the EPA laboratory and additional microcystin analysis was done by the DFG laboratory using LCMS for selected locations.

Table 2. Analyzing laboratories, method references, method detection limits and method reporting limits for water quality constituents (2010)

Constituent Name	Constituent ID	Basic			CH2MHill			Aquatic Research			CBL		
		Method	MDL	RL	Method	MDL	RL	Method	MDL	RL	Method	MDL	RL
Alkalinity	ALKT	SM 2320B	1.5	5.00	EPA 310.1	1.5	5.00	SM182320B	0.2	1	-	-	-
Ammonia	NH3	EPA 350.1	0.03	0.05	EPA 350.1	0.01	0.050	SM184500N H3H	.006	.01	-	-	-
Carbonaceous Biological Oxygen Demand – 5 day	CBOD5	SM 5210	3.00	3.00	SM5210B	2.00	2.00	SM205210B	2.0	2.0	-	-	-
Dissolved Organic Carbon	DOC	SM5310C	0.3	0.50	EPA 415.1	0.052	0.50	SM205310B	0.095	0.25	-	-	-
Nitrate + Nitrite	NO3+NO2	EPA 353.2	0.01	0.05	EPA 353.2	0.002	0.010	SM184500N0 3F	0.005	0.01	-	-	-
Total Nitrogen	TN	EPA 351.2	(calc)	0.20	SM4500-N C	0.020	0.020	SM204500NC	-	0.05	-	-	-
Ortho-phosphate	OPO4	SM 4500P- E	0.01	0.05	EPA 365.1	0.002	0.010	SM18 4500PF	0.001	0.001	-	-	-
Total Phosphorus	TP	SM 4500P- BE	0.02	0.05	EPA 365.4	0.011	0.050	SM18 4500PF	0.002	0.002	-	-	-
Total Kjeldahl Nitrogen	TKN	EPA 351.2	0.1	0.20	EPA 351.2	0.087	0.20	EPA 351.1	-	0.2	-	-	-
Total Suspended Solids	TSS	SM 2540D	1.0	5.0	EPA 160.2	0.95	2.00	SM20 2540D	0.1	0.5	-	-	-
Volatile Suspended Solids	VSS	SM 2540D	1.0	5.0	EPA 160.4	0.95	2.00	SM20 2540E	0.1	0.5	-	-	-
Filtered Ammonia	NH43 filtered or NH4 filtered	EPA 350.1	0.03	0.05	EPA 350.1	0.0087	0.050	SM184500N H3H	0.01	-	-	-	-
Filtered Nitrate + Nitrite	NO3+NO2 filtered	EPA 353.2	0.01	0.05	EPA 353.2	0.0017	0.010	SM184500N0 3F	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	-	0.0633
MDL – method detection limit RL – method reporting limit													

4. Baseline Program Water Quality Data

Water quality samples for the 2010 KHSA baseline water quality monitoring program were from February through December in 2010 (no sampling was done in March). Sampling crews from the various entities collected samples within a few days of each other, but 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 periods when one or more sites were omitted or one or more constituents were not sampled. All data are included in Appendix A.

4.1. 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 (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, and total 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 2010 sampling period. Data are presented in three formats: longitudinal patterns based on seasonal data collection, time series at specific locations, and charts representing the types of algae. Longitudinal patterns are presented as box and whisker plots² and encompass all data at each mainstem Klamath River site. The major tributaries (Shasta, Scott, Salmon, and Trinity Rivers) are graphed separately. Constituents presented include dissolved oxygen, total dissolved 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/>). The locations of USGS flow gages for which time series constituent data is presented in this report are presented in Table 3. Algae data are presented for four locations: Klamath River above JC Boyle Reservoir, Klamath River below JC Boyle powerhouse, Copco Reservoir near Copco Dam, and Irongate Reservoir at the log boom. Plots representing the percentages of the types of algae present are in Appendix A.

² 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.

Table 3. USGS flow gage locations for time series constituent data within this report.

Location	USGS Gage Number
Link River at Klamath Falls, OR	11507500
Klamath River at Keno, OR	11509500
Klamath River below Iron Gate Dam, CA	11516530
Klamath River near Seiad Valley, CA	11520500
Klamath River at Orleans, CA	11523000
Klamath River near Klamath, CA	11530500

Grab sample data and/or the associated physical measurements taken at the time of the grab sample (e.g., temperature and dissolved oxygen) are shown in Figure 2 through Figure 15 (see Table 4 for list of presented information/data). 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 system during the 2010 field season. The complete data set (Appendix A) is available at the KBMP website (<http://www.kbmp.net/>). The inter-lab comparison report is presented in Appendix C.

Table 4. List of figures and data presented.

Figure #	Information/Data presented
Figure 2	Box plot of baseline water quality program data for dissolved oxygen in the Klamath River from Link River to the Klamath River estuary
Figure 3	Box plot of baseline water quality program data for dissolved organic carbon in the Klamath River from Link River to the Klamath River estuary
Figure 4	Box plot of baseline water quality program data for total nitrogen in the Klamath River from Link River to the Klamath River estuary
Figure 5	Box plot of baseline water quality program data for total phosphorus in the Klamath River from Link River to the Klamath River estuary
Figure 6	Box plot of baseline water quality program data for microcystin in the Klamath River from Link River to the Klamath River estuary
Figure 7	Box plot of baseline water quality program data for dissolved oxygen, dissolved organic carbon, total nitrogen, total phosphorus for the Shasta, Scott, Salmon, and Trinity Rivers
Figure 8	Continuous (e.g., hourly) water temperature, dissolved oxygen, and pH data at Link Dam, Klamath River above Keno Dam, Klamath River below Iron Gate Dam, Klamath River near Seiad Valley, and Klamath River below the Trinity River.
Figure 9	Continuous water (e.g., hourly) temperature, dissolved oxygen, and pH for the Shasta River, Scott River, Salmon River, and Trinity River. Data was collected using water quality data sonde.
Figure 10	Water temperature readings and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers.
Figure 11	Dissolved oxygen readings and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers.
Figure 12	Grab sample dissolved organic carbon and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers.
Figure 13	Grab sample nitrogen and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers.
Figure 14	Grab sample phosphorus and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers.
Figure 15	Grab sample microcystin and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers.

4.1.1. Mainstem locations

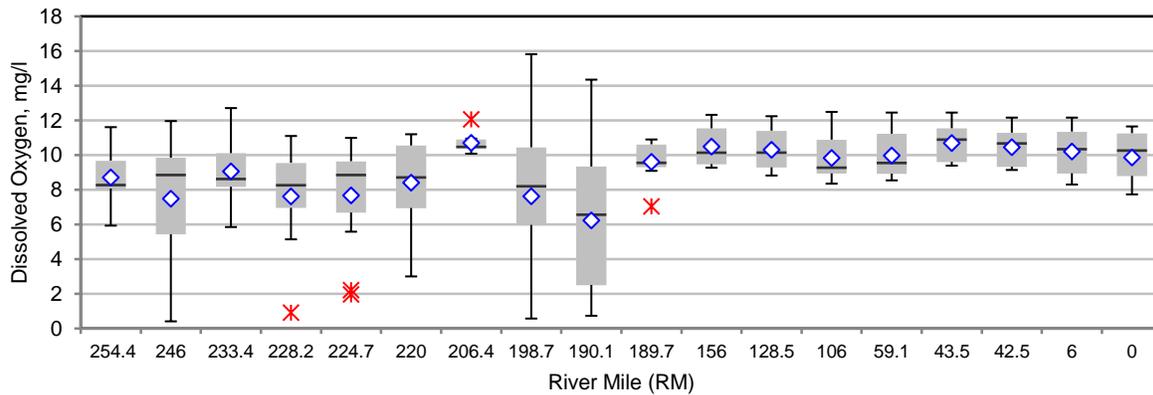


Figure 2. Baseline water quality program data for dissolved oxygen in the Klamath River from Link River to the Klamath River estuary with median (—), mean (◊), outliers(*), and extreme outliers (○) identified (February 2010 – December 2010). Keno (246), Copco (198.7), and Iron Gate (190.1) are reservoirs. Only surface samples are taken into account. Note: X-axis is not to scale.

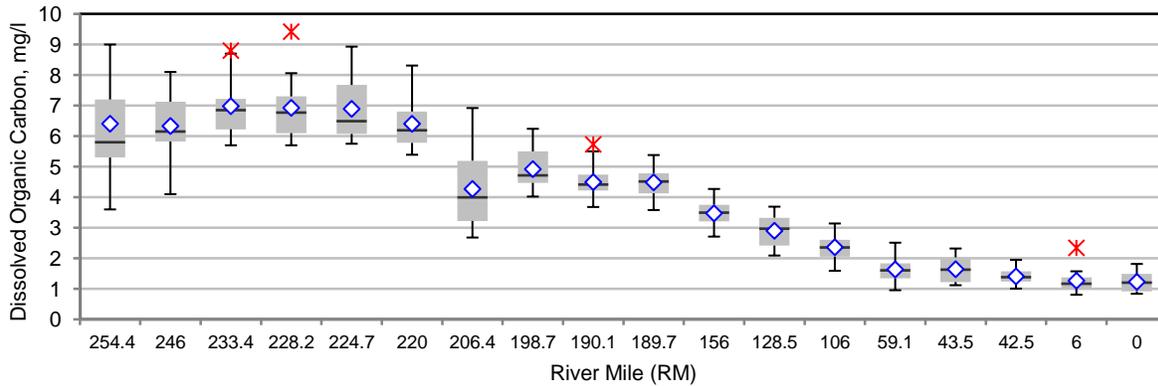


Figure 3. Baseline water quality program data for dissolved organic carbon in the Klamath River from Link River to the Klamath River estuary with median (—), mean (◊), outliers(*), and extreme outliers (○) identified (February 2010 – December 2010). Keno (246), Copco (198.7), and Iron Gate (190.1) are reservoirs. Only surface samples are taken into account. Note: X-axis is not to scale.

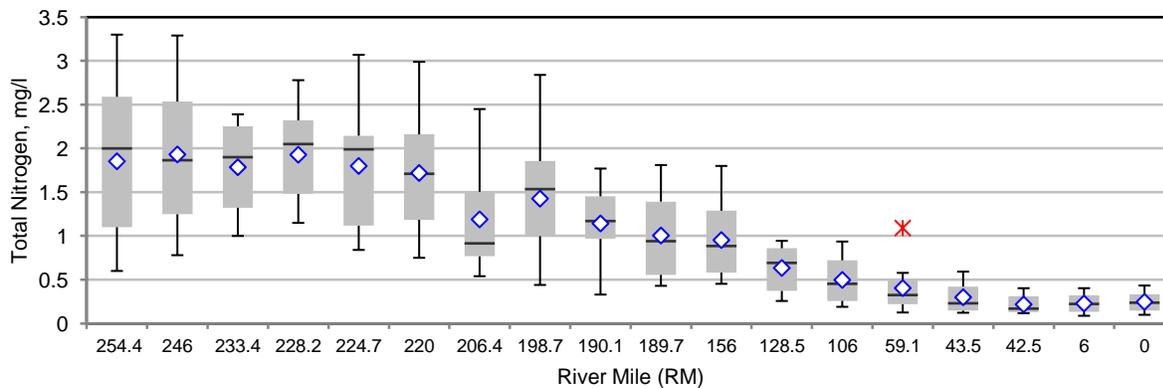


Figure 4. Baseline water quality program data for total nitrogen in the Klamath River from Link River to the Klamath River estuary with median (–), mean (◊), outliers(*), and extreme outliers (◊) identified (February 2010 – December 2010). Keno (246), Copco (198.7), and Iron Gate (190.1) are reservoirs. Only surface samples are taken into account. Note: X-axis is not to scale.

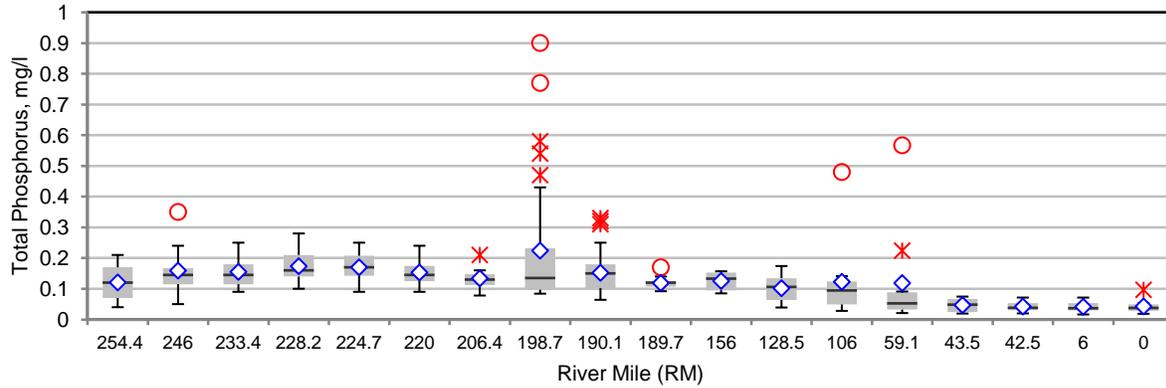


Figure 5. Baseline water quality program data for total phosphorus in the Klamath River from Link River to the Klamath River estuary with median (–), mean (◊), outliers(*), and extreme outliers (◊) identified (February 2010 – December 2010). Keno (246), Copco (198.7), and Iron Gate (190.1) are reservoirs. Only surface samples are taken into account. Note: X-axis is not to scale.

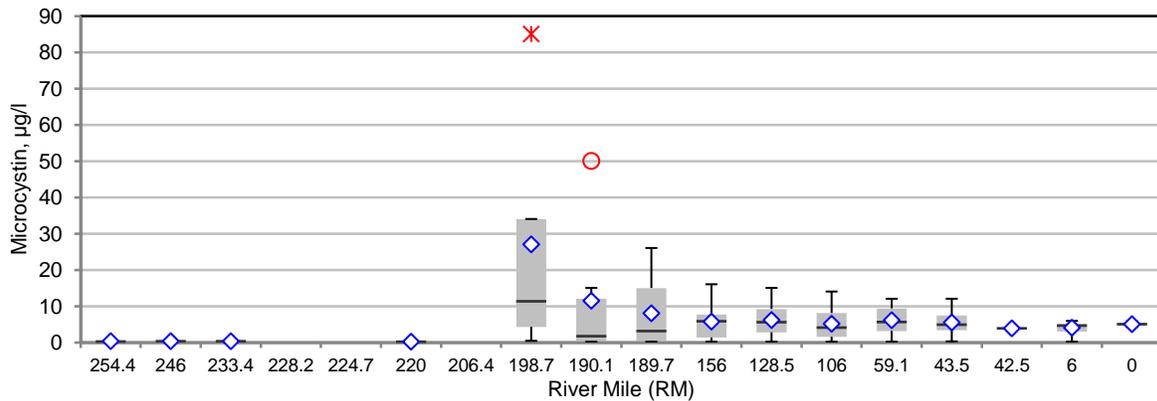


Figure 6. Baseline water quality program data for microcystin in the Klamath River from Link River to the Klamath River estuary with median (–), mean (◊), outliers(*), and extreme outliers (◊) identified (February 2010 – December 2010). Keno (246), Copco (198.7), and Iron Gate (190.1) are reservoirs. Only surface samples are taken into account. Note: X-axis is not to scale.

4.1.2. Mainstem locations

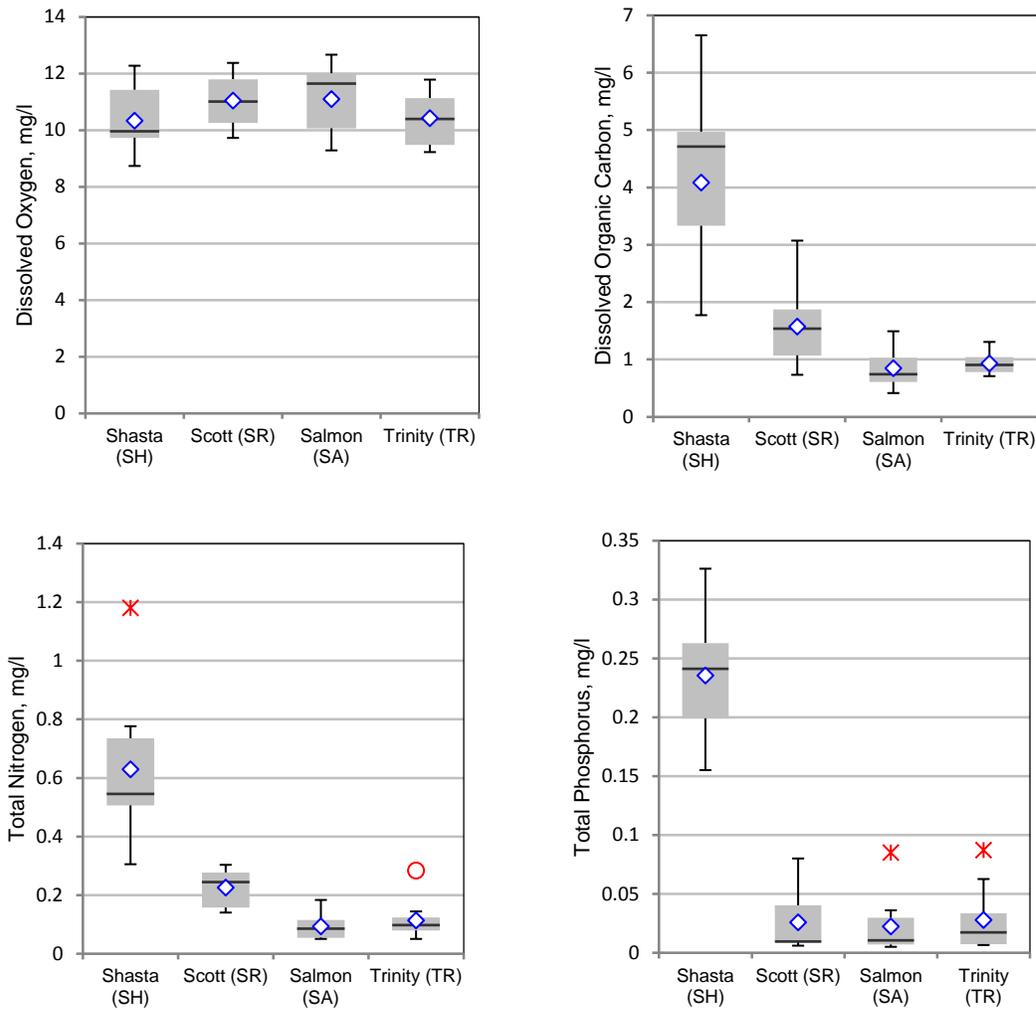


Figure 7. Baseline water quality program data for dissolved oxygen, dissolved organic carbon, total nitrogen, and total phosphorus for the Shasta, Scott, Salmon, and Trinity Rivers with median (—), mean (◊), outliers(*), and extreme outliers (o) identified (February 2010 – December 2010).

4.1.3. Mainstem locations

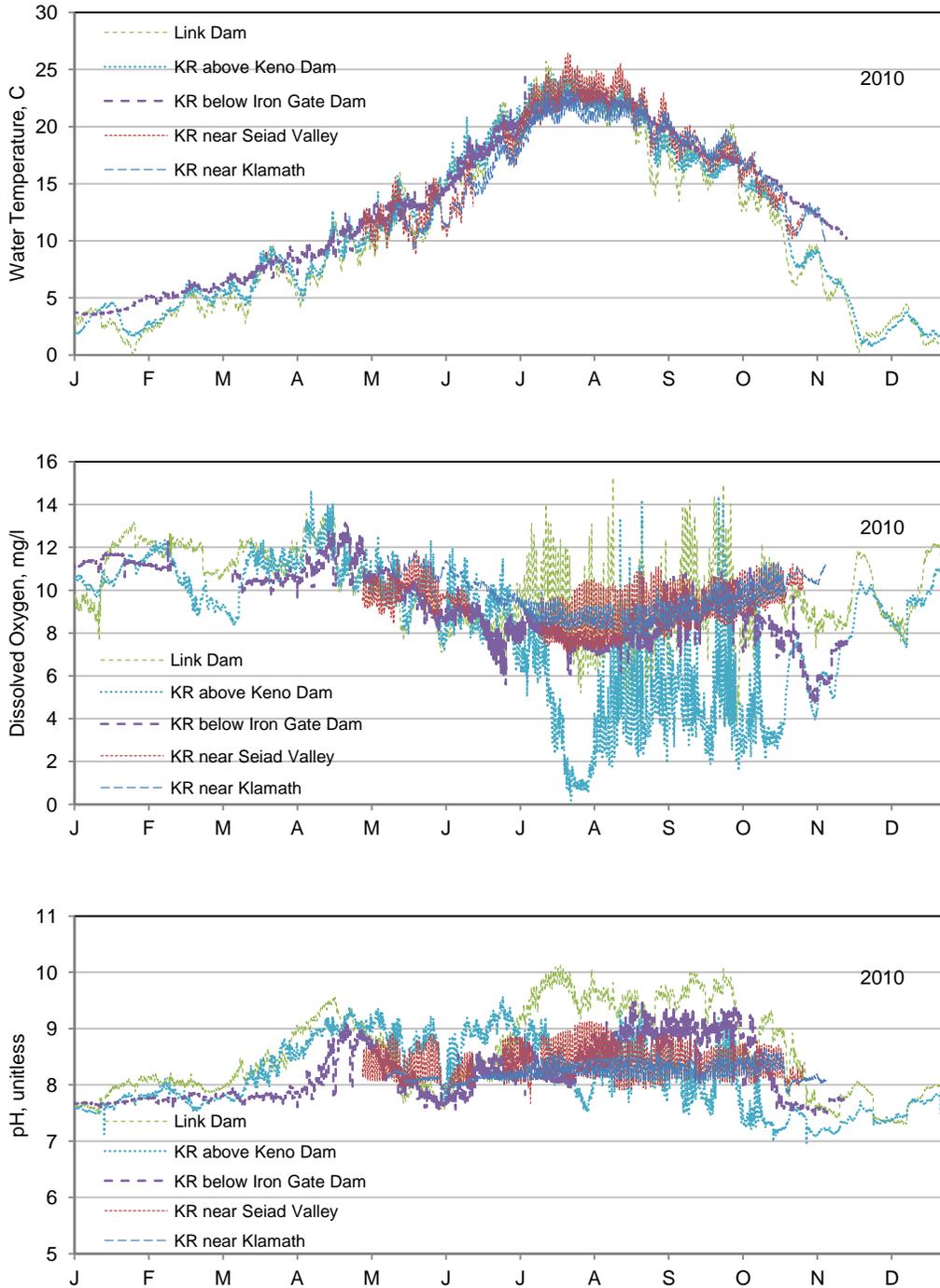


Figure 8. 2010 continuous water temperature, dissolved oxygen, and pH data at Link Dam, Klamath River above Keno Dam, Klamath River below Iron Gate Dam, Klamath River near Seiad Valley, and Klamath River below the Trinity River.

4.1.4. Major tributaries

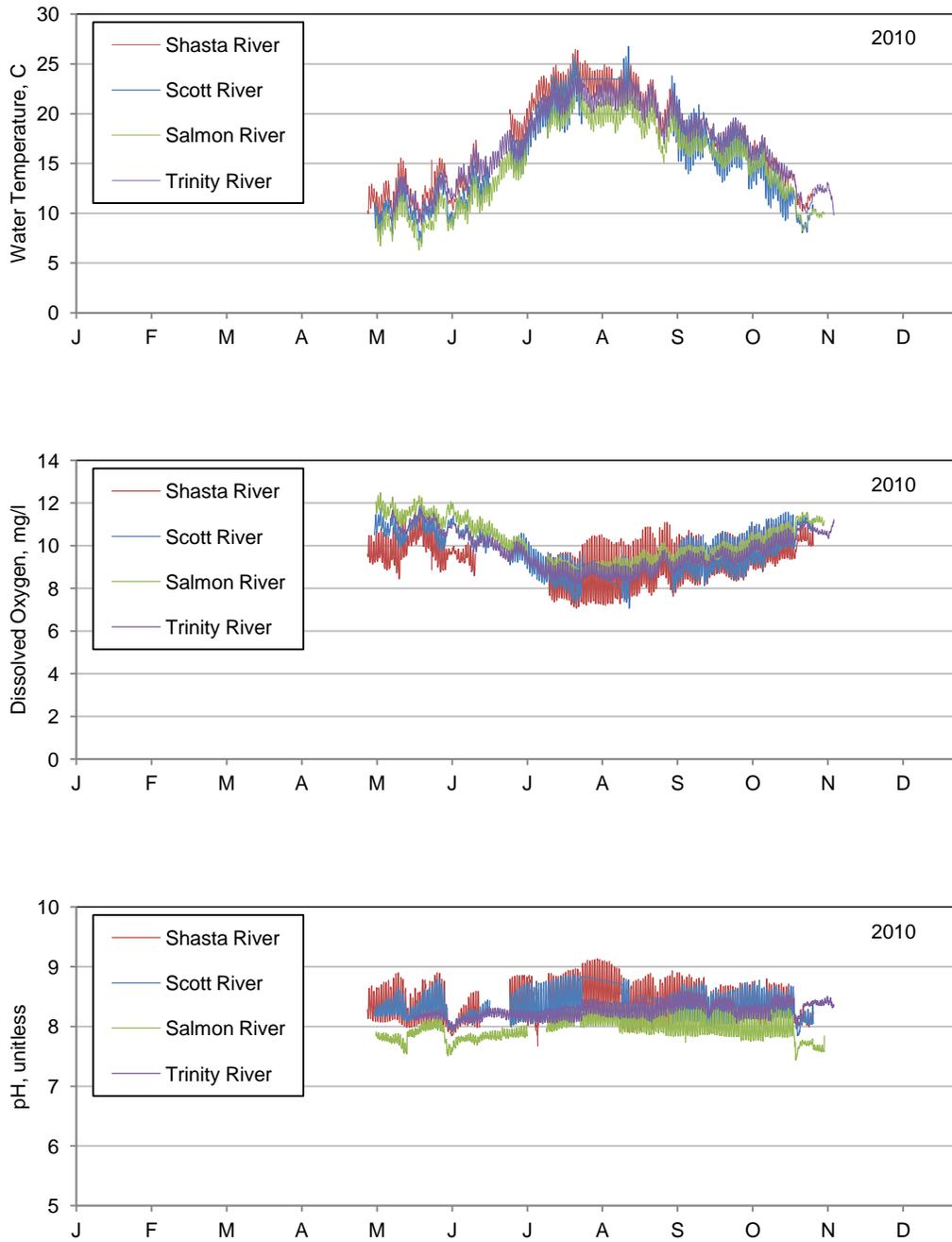


Figure 9. 2010 continuous water temperature, dissolved oxygen, and pH for the Shasta River, Scott River, Salmon River, and Trinity River. Data was collected using water quality data sonde.

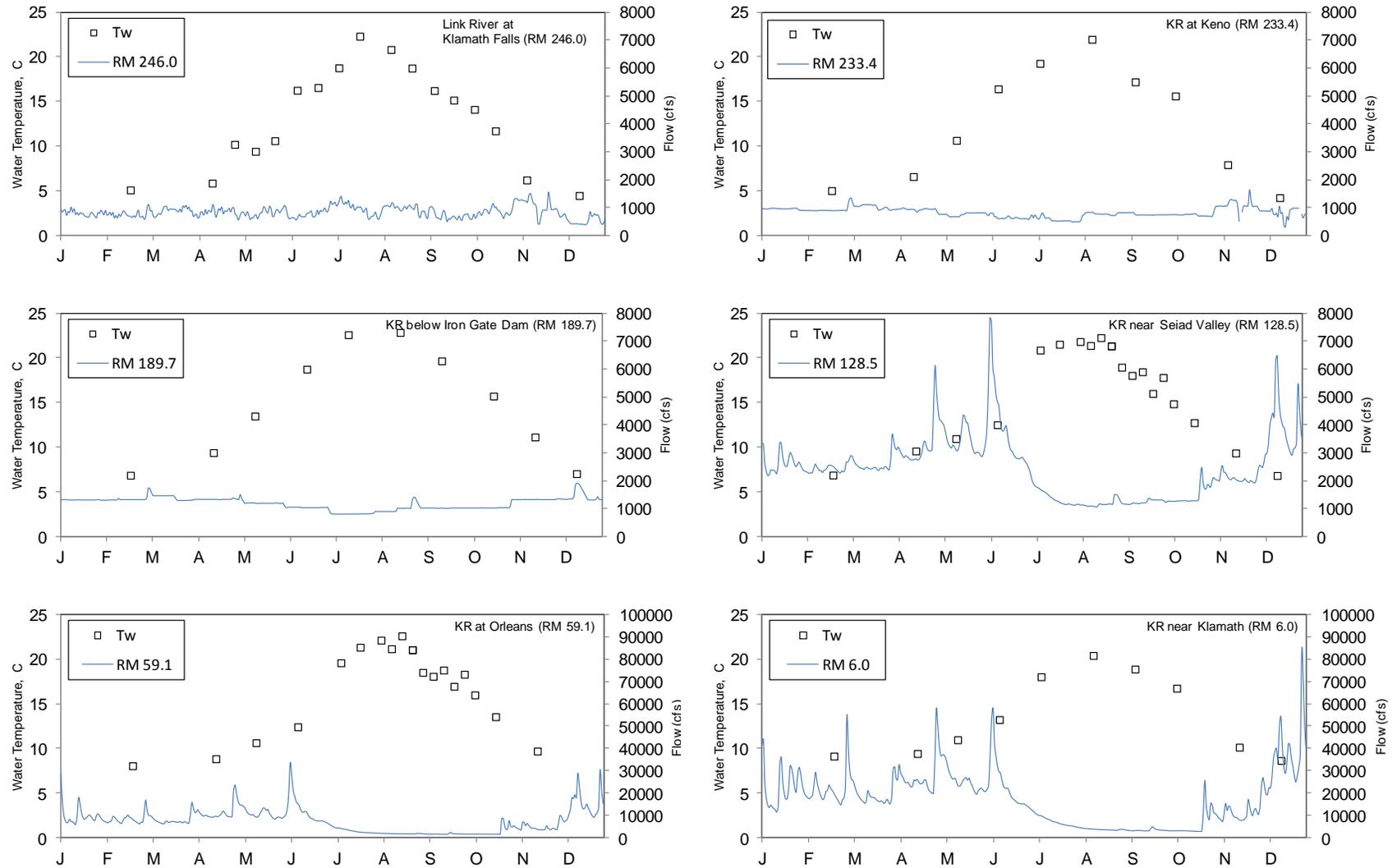


Figure 10. 2010 KHSA sampling program water temperature (Tw) and daily flow at USGS flow gage locations (station number provided in legend) for the mainstem Klamath and Link Rivers. Note that the y-axis on the right hand side is not the same for each graph.

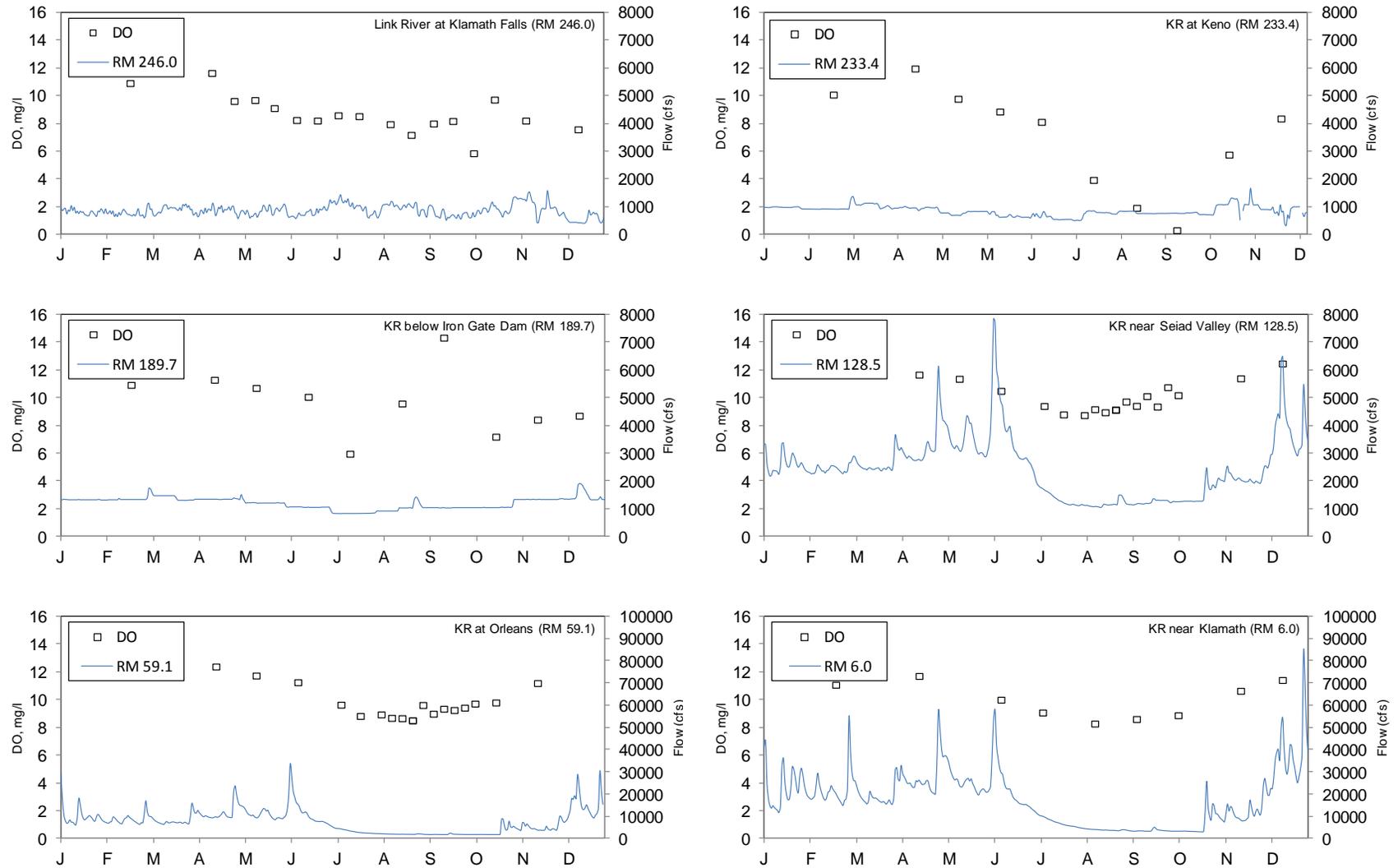


Figure 11. 2010 KHSA sampling program dissolved oxygen (DO) and daily flow at USGS flow gage locations (station number provided in legend) for the mainstem Klamath and Link Rivers. Note that the y-axis on the right hand side is not the same for each graph.

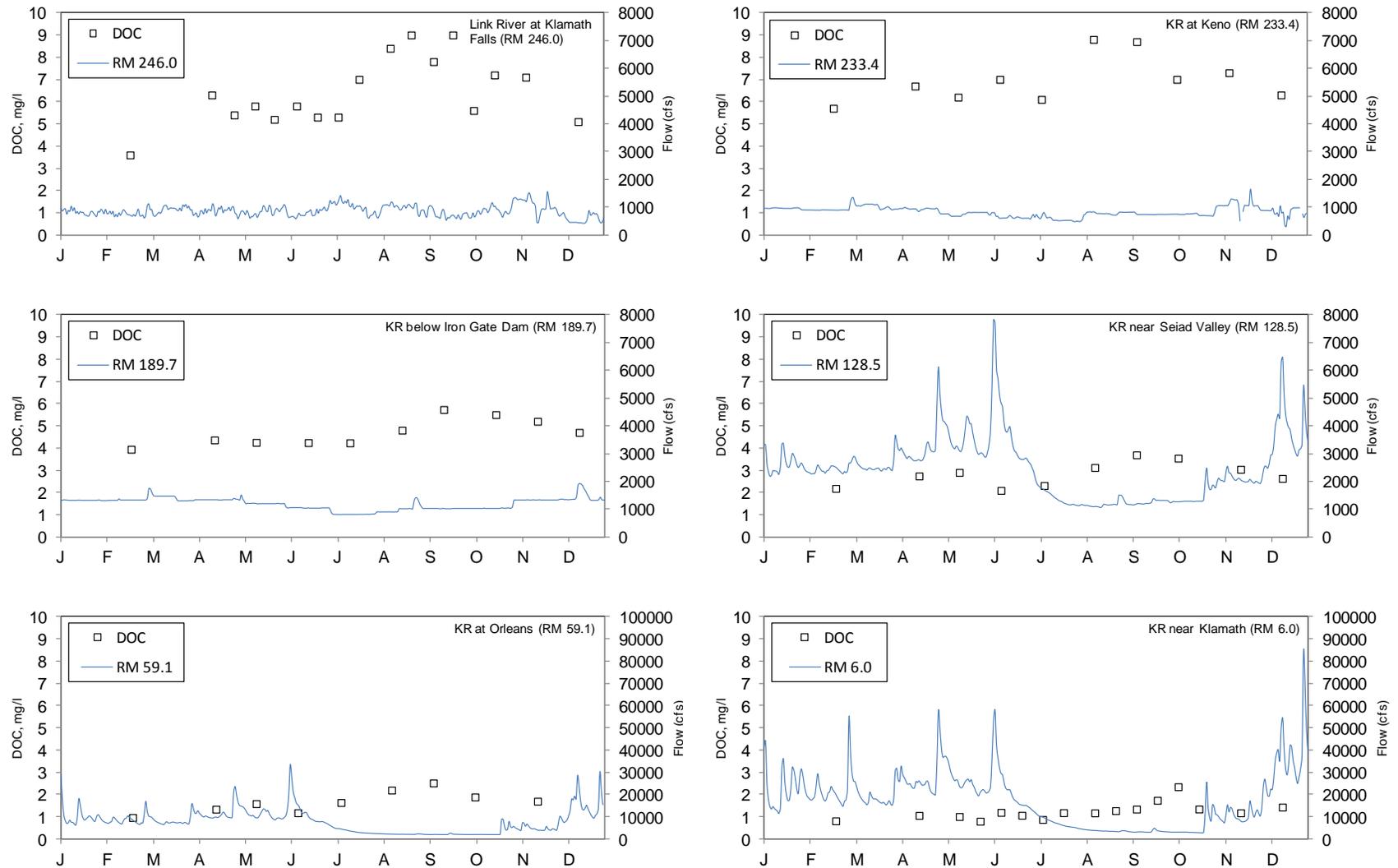


Figure 12. 2010 KHSA sampling program dissolved organic carbon (DOC) and daily flow at USGS flow gage locations (station number provided in legend) for the mainstem Klamath and Link Rivers. Note that the y-axis on the right hand side is not the same for each graph.

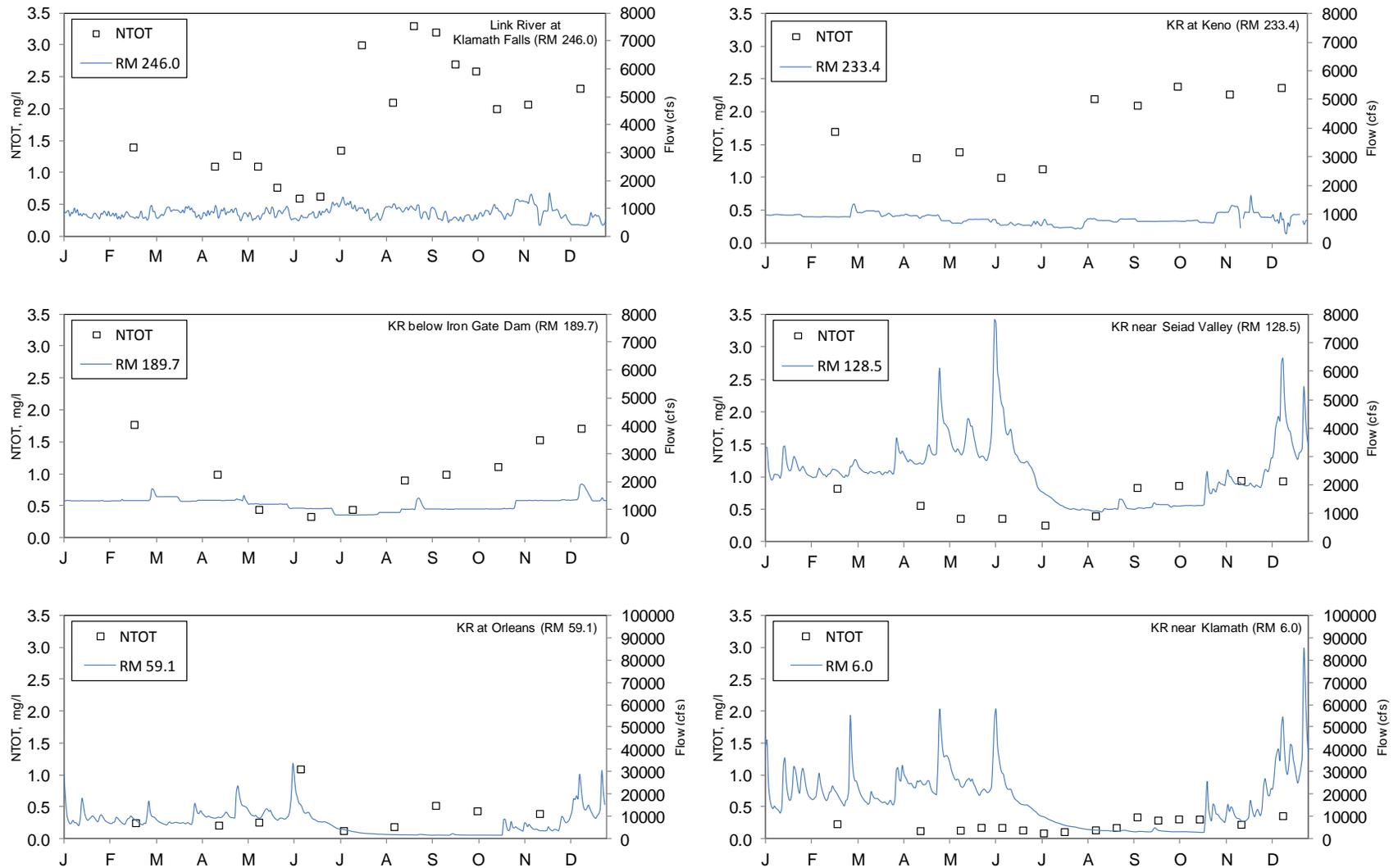


Figure 13. 2010 KHSA sampling program total nitrogen (NTOT) and daily flow at USGS flow gage locations (station number provided in legend) for the mainstem Klamath and Link Rivers. Note that the y-axis on the right hand side is not the same for each graph.

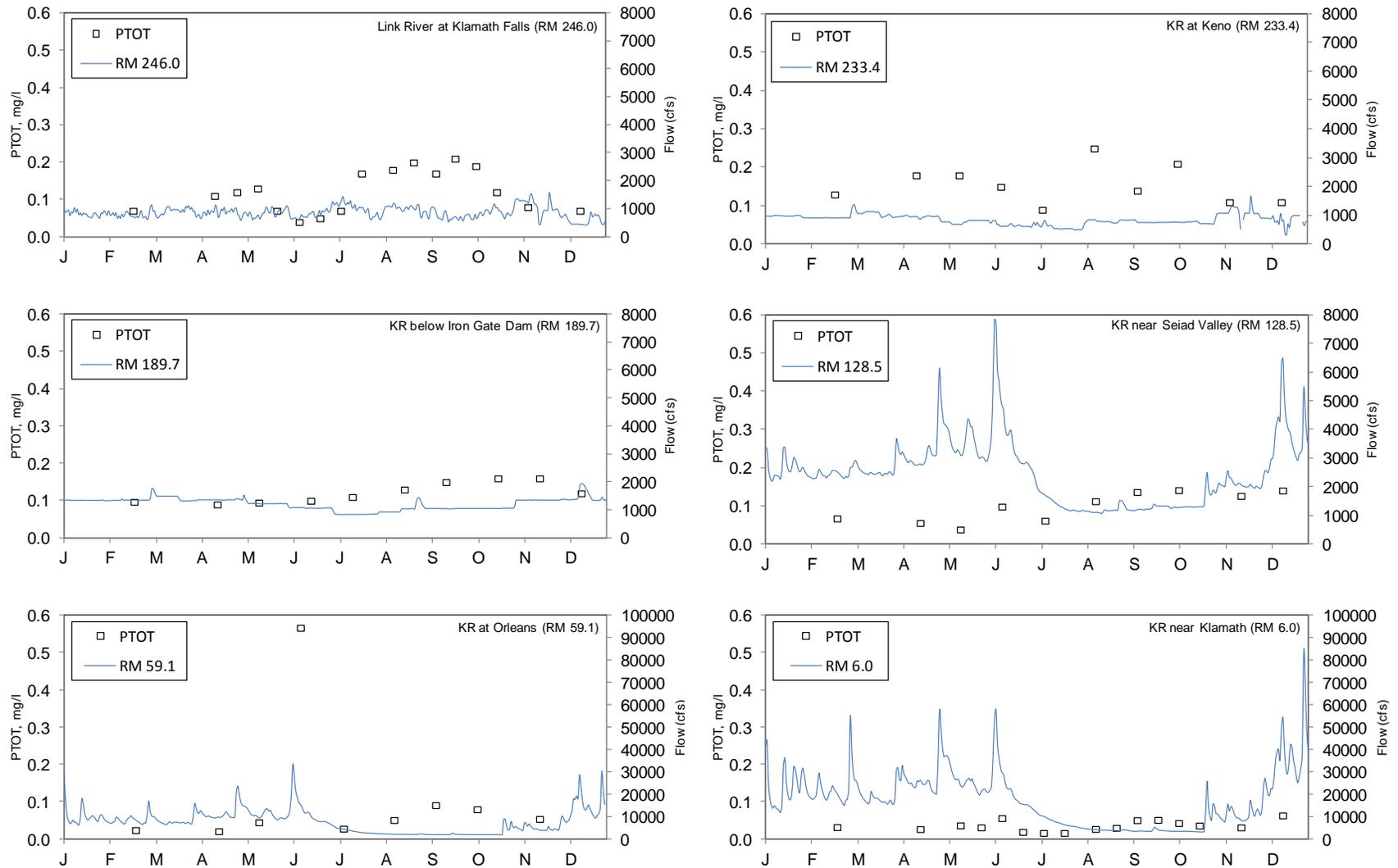


Figure 14. 2010 KHSA sampling program total phosphorus (PTOT) and daily flow at USGS flow gage locations (station number provided in legend) for the mainstem Klamath and Link Rivers. Note that the y-axis on the right hand side is not the same for each graph.

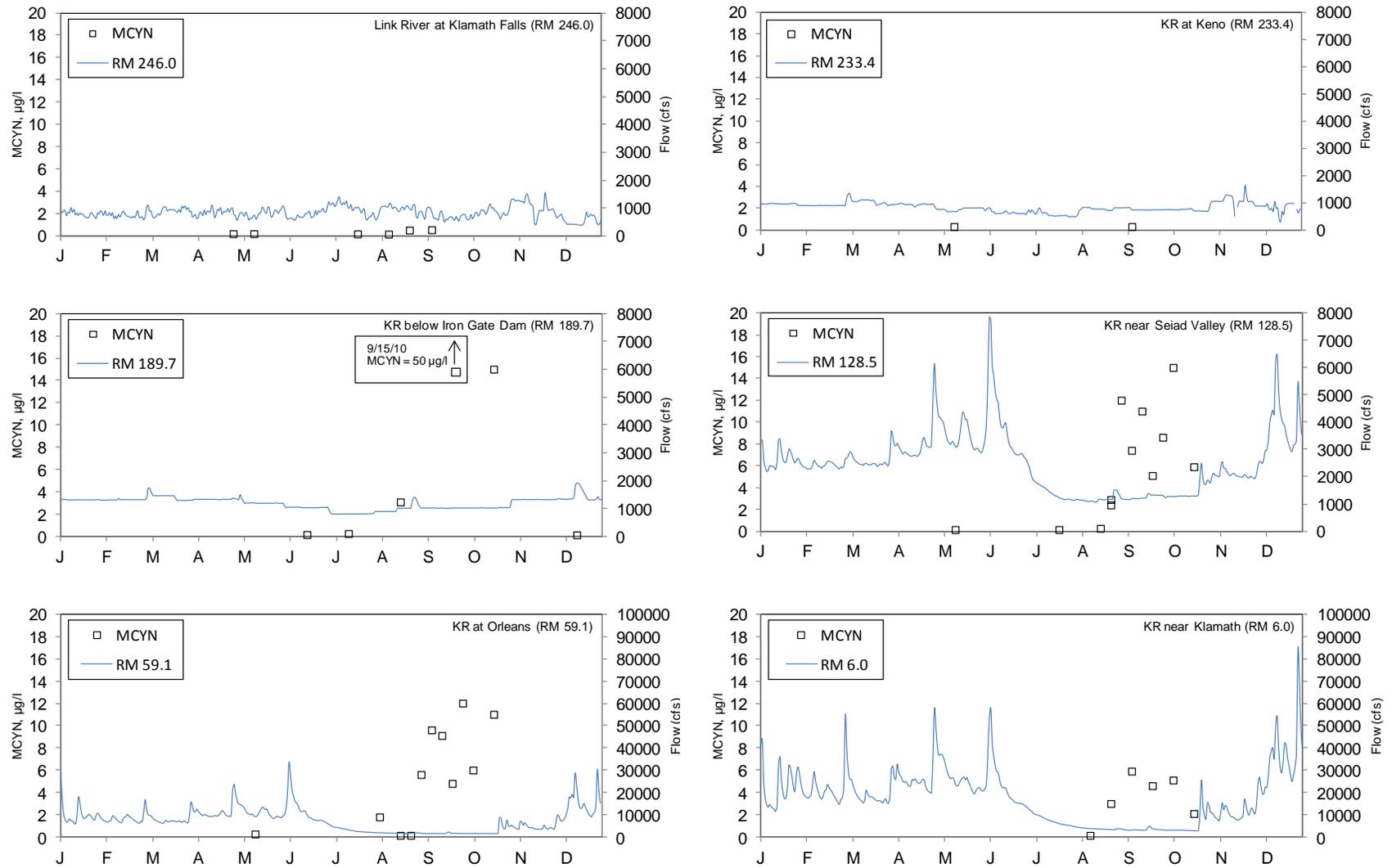


Figure 15. 2010 KHSA baseline sampling program microcystin (MCYN) and daily flow at USGS flow gage locations (station number provided in legend) for the mainstem Klamath and Link Rivers. Note that the y-axis on the right hand side is not the same for each graph. The microcystin data presented herein do not include public health monitoring data.

5. Summary

The KHSA 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 2009 and second year monitoring was completed during 2010. Quality assurance measures have been incorporated into the process and final data sets are available to all interested parties (<http://kbmp.net/>). The 2010 planning and monitoring effort has laid the groundwork for continued cooperation and quality data collection in the Klamath River basin.

6. References

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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

Sampling Locations and Data Summary

Table A-1. 2010 Klamath River mainstem and major tributary 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	Reservoir	224.8	PacifiCorp
KR2240	Klamath River below J.C. Boyle Dam	Mainstem	224.0	PacifiCorp
KR2195	Klamath River below USGS Gage	Mainstem	219.5	PacifiCorp
KR2064	KR above Shovel Creek (Stateline)	Mainstem	206.4	PacifiCorp
KR1990	Copco Reservoir	Reservoir	198.7	PacifiCorp
KR1950	Klamath River below Copco Dam	Mainstem	195.0	PacifiCorp
KR1920	Iron Gate Reservoir	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	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

Table A-2. 2010 Klamath River Data Summary

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, Total Kjeldahl Nitrogen, mg/l	Nitrogen, Total Nitrogen, mg/l	Phosphorus, Phosphate, mg/l	Phosphorus, Total Phosphorus, mg/l	Solids, Total Suspended Solids, mg/l	Solids, Volatile Suspended Solids, mg/l	Toxins, Microcystin, ug/l	
2010KDR001	2/16/2010	9:00	KR2544	Link Dam	USBR	0.5	R	5.11	7.61	109	10.95		0.004	50	3.6		<3	0.38	0.34	1.1	1.4	<0.01	0.07	17	3j		
2010KHS A009	4/13/2010	8:00	KR2544	Link Dam	USBR	0.5	R	5.87	8.81	110	11.60	14	0.008	50	6.3		0.14	<0.01	1.1	1.1	<0.01	0.11	64	14			
2010KHS A015	4/27/2010	8:15	KR2544	Link Dam	USBR	0.5	R	10.20	8.57	108	9.67	62		49	5.4	6.78		0.1	<0.01	1.3	1.27	<0.01	0.12	71	13	0.21	
2010KHS A019	5/11/2010	6:30	KR2544	Link Dam	USBR	0.5	R	9.41	8.42	110	9.72	11		52	5.8	4.35		0.07	0.01j	1.1	1.1	<0.01	0.13	41	9	0.21	
2010KHS A025	5/24/10	8:30	KR2544	Link Dam	USBR	0.5	R	10.61	7.81	112	9.16	8		53	5.2			0.13	0.02j	0.7	0.77	<0.01	0.07	20	3j		
2010KHS A031	6/8/10	6:45	KR2544	Link Dam	USBR	0.5	R	16.24	7.81	112	8.24			55	5.8			0.11	<0.01	0.6	0.6	<0.01	0.04j	4j	3j		
2010KHS A037	6/22/10	7:45	KR2544	Link Dam	USBR	0.5	R	16.54	7.94	114	8.26	6		54	5.3			0.04j	<0.01	0.6	0.63	<0.01	0.05	7	3j		
2010KHS A042	7/8/10	7:00	KR2544	Link Dam	USBR	0.5	R	18.75	8.93	115	8.61	32		55	5.3			0.09	0.02j	1.3	1.35	<0.01	0.07	11	6		
2010KHS A048	7/20/10	8:00	KR2544	Link Dam	USBR	0.5	R	22.31	9.77	120	8.55	139		57	7			0.15	0.01j	3	3	0.02j	0.17	13	8	0.19	
2010KHS A055	8/10/10	6:30	KR2544	Link Dam	USBR	0.5	R	20.81	9.21	120	8.06	74		59	8.4			0.18	0.03j	2.1	2.1	0.04j	0.18	10	4j	0.17	
2010KHS A062	8/24/10	7:45	KR2544	Link Dam	USBR	0.5	R	18.72	9.38	118	7.19	168		63	9	8.78		0.18	0.05	3.3	3.3	0.02j	0.2	10	4j	0.53	
2010KHS A066	9/8/10	8:15	KR2544	Link Dam	USBR	0.5	R	16.22	9.08	118	8.02	170		59	7.8	8.58		0.15	<0.01	3.2	3.2	0.01j	0.17	13	5	0.56	
2010KHS A070	9/21/2010	7:45	KR2544	Link Dam	USBR	0.5	R	15.17	9.47	113	8.23	139		58	9			0.19	0.02j	2.7	2.7	0.03j	0.21	8	6		
2010KHS A079	10/5/2010	6:45	KR2544	Link Dam	USBR	0.5	R	14.10	8.23	117	5.92	48		55	5.6			0.43	0.06	2.5	2.59	0.06	0.19	13	4j		
2010KHS A085	10/19/2010	8:00	KR2544	Link Dam	USBR	0.5	R	11.71	8.93	120	9.74	70		58	7.2			0.16	0.04j	1.9	2	<0.01	0.12	8	3j		
2010KHS A089	11/9/2010	8:00	KR2544	Link Dam	USBR	0.5	R	6.22	7.28	125	8.26	19	0.007	60	7.1			0.69	0.21	1.9	2.07	<0.01	0.08	10	2j		
2010KHS A095	12/14/2010	12:00	KR2544	Link Dam	USBR	0.5	R	4.48	7.15	128	7.68			61	5.1			1.14	0.22	2.1	2.32	0.03j	0.07	3j	2j		
2010KDR006	2/16/2010	11:30	KR2460	Miller Island	USBR	0.5	P	5.33	7.65	148	10.09			66	4.1			0.41	0.42	1.1	1.5	0.01j	0.09	13	3j		
2010KHS A012	4/13/2010	10:00	KR2460	Miller Island	USBR	0.5	P	6.61	8.81	133	11.95	19		58	5.8			0.16	0.06	1.3	1.3	<0.01	0.16	48	11		
2010KHS A022	5/11/2010	8:15	KR2460	Miller Island	USBR	0.5	R	10.67	8.35	131	9.79	11	0.004	60	5.9	3.6		0.16	<0.01	1.2	1.23	0.03j	0.17	36	8	0.37	
2010KHS A034	6/8/10	8:30	KR2460	Miller Island	USBR	0.5	P	16.59	8.91	164	9.25	3		77	5.9			0.1	0.03j	0.8	0.9	0.08	0.13	3j	2j		
2010KHS A045	7/8/10	9:00	KR2460	Miller Island	USBR	0.5	R	19.28	8.60	120	8.18	10	0.002		5.3			0.15	0.04j	0.7	0.78	<0.01	0.05	5	2j		
2010KHS A056	8/10/10	8:00	KR2460	Miller Island	USBR	0.5	R	21.98	8.45	130	4.50	62		61	8.1			0.82	0.02j	3.1	3.1	0.06	0.24	8	4j		
2010KHS A067	9/8/10	10:00	KR2460	Miller Island	USBR	0.5	R	17.25	7.91	131	12.25	42	0.004	55	7.9	2.16		0.86	0.02j	2.4	2.4	0.04j	0.13	7	2j	0.24	
2010KHS A080	10/5/2010	8:20	KR2460	Miller Island	USBR	0.5	R	15.59	7.42	161	0.40	5	0.005	72	6.4			1.63	<0.01	3.3	3.29	0.16	0.35	11	4j		
2010KHS A092	11/9/2010	11:00	KR2460	Miller Island	USBR	0.5	R	7.70	7.42	138	9.86	12	0.003	61	7.3			0.87	0.23	2.4	2.58	0.03j	0.11	5	<1		
2010KHS A096	12/14/2010	8:45	KR2460	Miller Island	USBR	0.5	R	4.23	7.15	215	8.43	5	0.002	92	6.6			<3	0.86	0.41	1.8	2.23	0.11	0.16	7	2j	
2010KDR007	2/16/2010	13:15	KR2334	Below Keno Dam	USBR	0.5	P	5.23	7.81	224	11.50	13		88	5.7			<3	0.31	0.47	1.2	1.7	0.02j	0.13	23	5	
2010KHS A013	4/13/2010	11:00	KR2334	Below Keno Dam	USBR	0.5	P	7.09	9.01	177	12.70	16		74	6.7			0.12	<0.01	1.3	1.3	<0.01	0.18	41	12		
2010KHS A023	5/11/2010	9:30	KR2334	Below Keno Dam	USBR	0.5	R	10.30	8.77	186	10.40	26	0.005	73	6.2	4.4		0.16	<0.01	1.4	1.39	0.05	0.18	33	9	0.3	
2010KHS A035	6/8/10	10:00	KR2334	Below Keno Dam	USBR	0.5	P	16.16	8.18	169	9.21	6	0.003	74	7			0.11	<0.01	1	1	0.08	0.15	5	2j		
2010KHS A040	6/22/10	8:15	KR2334	Below Keno Dam	USBR	0.5	P	16.77	8.63	166	8.86								<3								
2010KHS A046	7/8/10	10:30	KR2334	Below Keno Dam	USBR	0.5	R	20.08	8.93	133	8.36	18	0.011	61	6.1			0.23	0.02j	1.1	1.13	0.03j	0.09	5	3j		
2010KHS A051	7/20/10	13:30	KR2334	Below Keno Dam	USBR	0.5	R	20.08	8.93	133	8.36								5								
2010KHS A059	8/10/10	9:15	KR2334	Below Keno Dam	USBR	0.5	R	21.42	7.94	148	5.99	27		66	8.8			0.83	0.03j	2.2	2.2	0.09	0.25	3j	2j		
2010KHS A064	8/24/10	11:15	KR2334	Below Keno Dam	USBR	0.5	R	20.61	8.31	146	7.58								7								
2010KHS A070	9/8/2010	11:20	KR2334	Below Keno Dam	USBR	0.5	R	17.60	8.09	145	8.16	44	0.005	58	8.7	2.47		0.48	0.03j	2	2.1	0.04j	0.14	7	2j	0.3	
2010KHS A077	9/21/2010	12:00	KR2334	Below Keno Dam	USBR	0.5	R	16.32	7.88	171	8.17								3								
2010KHS A082	10/5/2010	9:40	KR2334	Below Keno Dam	USBR	0.5	R	15.58	7.68	180	7.72	22	0.014	78	7			0.7	0.03j	2.4	2.39	0.08	0.21	8	3j		
2010KHS A093	11/9/2010	10:00	KR2334	Below Keno Dam	USBR	0.5	R	7.94	7.32	136	5.84	2		62	7.3			<3	1.01	0.23	2	2.27	0.04j	0.11	<1	2j	
2010KHS A099	12/14/2010	10:30	KR2334	Below Keno Dam	USBR	0.5	R	3.76	7.37	193	10.73	2	0.005	83	6.3			<3	1.02	0.43	1.9	2.37	0.07	0.11	3j	2j	
KR10079	6/7/2010			Copco res Copco Cove	Pacific Corp		R																				0.47
KR10155	7/19/2010			Copco res Copco Cove	Pacific Corp		R																				1
KR10163	8/2/2010			Copco res Copco Cove	Pacific Corp		R																				0.68
KR10172	8/16/2010			Copco res Copco Cove	Pacific Corp		R																				1500
KR10209	8/30/2010			Copco res Copco Cove	Pacific Corp		R																				2300
KR10219	9/13/2010			Copco res Copco Cove	Pacific Corp		R																				24
KR10259	10/6/2010			Copco res Copco Cove	Pacific Corp		R																				2300

							Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous vs Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate-Nitrite	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin	
KR10269	10/18/2010		CRCC	Copco res Mallard Cove	Pacific orp		R																		5700	
KR10078	6/7/2010		CRMC	Copco res Mallard Cove	Pacific orp		R																			0.25
KR10154	7/19/2010		CRMC	Copco res Mallard Cove	Pacific orp		R																			0.51
KR10162	8/2/2010		CRMC	Copco res Mallard Cove	Pacific orp		R																			200
KR10171	8/16/2010		CRMC	Copco res Mallard Cove	Pacific orp		R																			28
KR10208	8/30/2010		CRMC	Copco res Mallard Cove	Pacific orp		R																			12
KR10218	9/13/2010		CRMC	Copco res Mallard Cove	Pacific orp		R																			120
KR10260	10/6/2010		CRMC	Copco res Mallard Cove	Pacific orp		R																			5400
KR10270	10/18/2010		CRMC	Copco res Mallard Cove	Pacific orp		R																			21
KR10081	6/7/2010		IRCC	Iron Gate Camp Creek	Pacific orp		R																			
KR10152	7/20/2010		IRCC	Iron Gate Camp Creek	Pacific orp		R					51.4		5.72		13.2	<.01	0.012	4.05	2.83	0.021	0.17	11	7	0.5	
KR10160	8/2/2010		IRCC	Iron Gate Camp Creek	Pacific orp		R																			280
KR10169	8/16/2010		IRCC	Iron Gate Camp Creek	Pacific orp		R																			4
KR10206	8/30/2010		IRCC	Iron Gate Camp Creek	Pacific orp		R																			230
KR10216	9/13/2010		IRCC	Iron Gate Camp Creek	Pacific orp		R																			7200
KR10261	10/6/2010		IRCC	Iron Gate Camp Creek	Pacific orp		R																			420
KR10268	10/18/2010		IRCC	Iron Gate Camp Creek	Pacific orp		R																			570
KR10080	6/7/2010		IRJW	Iron Gate Jay Williams	Pacific orp		R																			
KR10153	7/19/2010		IRJW	Iron Gate Jay Williams	Pacific orp		R																			1.7
KR10161	8/2/2010		IRJW	Iron Gate Jay Williams	Pacific orp		R																			4.7
KR10170	8/16/2010		IRJW	Iron Gate Jay Williams	Pacific orp		R																			21
KR10207	8/30/2010		IRJW	Iron Gate Jay Williams	Pacific orp		R																			670
KR10217	9/13/2010		IRJW	Iron Gate Jay Williams	Pacific orp		R																			2100
KR10262	10/6/2010		IRJW	Iron Gate Jay Williams	Pacific orp		R																			11
KR10267	10/18/2010		IRJW	Iron Gate Jay Williams	Pacific orp		R																			55
KR10002	2/16/2010	9:10	KR22822	Above JCB reservoir	Pacific orp		R	5.18	7.81	235	5.13		82	5.7		0.16	0.61	1.18	1.81	0.084	0.14	15.2	1.2			
KR10025	4/13/2010	13:00	KR22822	Above JCB reservoir	Pacific orp		R	7.91	0.90	198	0.9	139.48	15.75	70	6.1		<.01	0.049	1.73	1.48	0.036	0.16	37.6	10	ND	
KR10048	5/11/2010	12:00	KR22822	Above JCB reservoir	Pacific orp		R	11.71	9.26	192	9.26	50.59	30.83	65.1	6.23		<.01	0.014	1.21	1.21	0.075	0.21	33.6	10.8		
KR10127	7/13/2010	13:00	KR22822	Above JCB reservoir	Pacific orp		R							57.7	6.77		<.01	0.29	1.33	1.15	0.074	0.14	4	2	ND	
KR10178	8/17/2010	11:30	KR22822	Above JCB reservoir	Pacific orp		R	23.07	7.55	148	7.55	21.17	10.51		7.3		0.044	0.5	1.51	2.05		0.28			ND	
KR10223	9/14/2010		KR22822	Above JCB reservoir	Pacific orp		R	17.04	8.09	166	8.09	7.09	6.52	61.8	9.42		0.15	0.92	1.72	2.18	0.04	0.16	4.4	1.2	ND	
KR10274	10/19/2010	15:15	KR22822	Above JCB reservoir	Pacific orp		R	14.4	8.41		8.41	3.57	4.79	64.1	8.06		<.2	0.27	1.14	1.78	2.78	0.14	0.24	4.4	1.2	ND
KR10301	11/16/2010	9:15	KR22822	Above JCB reservoir	Pacific orp		R	6.35	11.09	155	11.09	1.25	2.13	55.1	6.8		0.56	0.8	1.83	2.37	0.061	0.1	1	2	ND	
KR10328	12/14/2010	11:30	KR22822	Above JCB reservoir	Pacific orp		R	4.05	10.41	202	10.41			73.4	5.95		0.53	0.83	1.99	2.32	0.076	0.13	7.2	3.2	ND	
KR10003	2/16/2010	11:40	KR22478	JCB reservoir	Pacific orp	0.5	R	6.21	7.78	281	8.98		86	6.57		0.17	0.59	1.15	2.1	0.085	0.18	12	1.6			
KR10026	4/13/2010	9:00	KR22478	JCB reservoir	Pacific orp	0.5	R	7.92	9.39	198	9.39	134.36	13.38	70	5.9		<.01	0.032	1.56	1.23	0.037	0.16	33.6	9.2	ND	
KR10049	5/11/2010	11:30	KR22478	JCB reservoir	Pacific orp	0.5	R	11.49	8.70	189	8.7			67.5	5.75		<.01	0.0038		1.08	0.095	0.22	24.4	7.6		
KR10050	5/11/2010	11:35	KR22478	JCB reservoir	Pacific orp	8	R		8.51		8.51			63.6	5.99		<.01	0.0041		1.01	0.1	0.2	24.4	7.2		
KR10084	6/15/2010	12:05	KR22478	JCB reservoir	Pacific orp	0.5	R	20.13	10.15	178	10.15	18.55	4.29	72.4	6.41		<.01	0.046	0.9	0.84	0.1	0.18	8.4	2.4	ND	
KR10085	6/15/2010	12:10	KR22478	JCB reservoir	Pacific orp	8	R	16.61	5.57	180	5.57	7.71	4.55	73.3	6.79		0.1	0.08	0.97	0.85	0.12	0.18	6.8	2		
KR10128	7/13/2010	9:30	KR22478	JCB reservoir	Pacific orp	0.5	R							62.9	6.03		<.01	0.21	1.41	1.06	0.067	0.15	4	2.8	ND	
KR10129	7/13/2010	9:40	KR22478	JCB reservoir	Pacific orp	8	R							64.2	6.39		0.15	0.26	1.88	1.26	0.083	0.16	3.6	<.85	ND	
KR10179	8/17/2010	10:30	KR22478	JCB reservoir	Pacific orp	0.5	R	23.43	9.55	151	9.55	49.11	12.12		7.6		<.01	0.53	1.59	2.03	0.23				ND	
KR10180	8/17/2010	10:40	KR22478	JCB reservoir	Pacific orp	8	R					10.07	6.45		7.7		0.32	0.56	1.43	1.97		0.21			ND	
KR10224	9/14/2010		KR22478	JCB reservoir	Pacific orp	0.5	R	17.45	7.05	158	7.05	3.87	2.73	60.1	8.85		0.19	0.76	1.62	1.94	0.036	0.14	2	<.95	ND	
KR10225	9/14/2010		KR22478	JCB reservoir	Pacific orp	8	R							60.5	8.93		0.21	0.72	1.56	2.01	0.041	0.15	2.8	<.95	ND	
KR10275	10/19/2010	14:20	KR22478	JCB reservoir	Pacific orp	0.5	R	13.28	7.55		7.55	4.65	5.14	63.5	7.97		0.44	1.18	2.34	3.07	0.17	0.24	3.6	<.95	ND	
KR10276	10/19/2010	14:30	KR22478	JCB reservoir	Pacific orp	8	R					4.45	4.92	63.6	8.14		0.42	1.16	2.68	3.04	0.18	0.25	2.8	2	ND	
KR10302	11/16/2010	11:38	KR22478	JCB reservoir	Pacific orp	0.5	R	7.31	2.20	155	2.2	1.25	2.18	56	6.7		0.59	0.77	1.73	2.39	0.069	0.09	<.95	<.95	ND	
KR10303	11/16/2010	11:40	KR22478	JCB reservoir	Pacific orp	8	R	7.09	1.95	155	1.95	1.33	2.38	56	6.4		0.58	0.76	1.82	2.34	0.069	0.098	6	<.95	ND	
KR10329	12/14/2010	11:10	KR22478	JCB reservoir	Pacific orp	0.5	R	3.84	10.98	188	10.98			68	5.75		0.45	0.82	1.68	2.01	0.061	0.11	3.6	4.4	ND	

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous vs Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
KR10330	12/14/2010	11:15	KR22478	JCB reservoir	Pacificorp	8	R	3.74	9.99	187	9.99	0.88	1.38	70.4	6.2		0.47	0.82	1.66	2.16	0.06	0.11	4	<95	ND	
KR10001	2/16/2010	11:05	KR22460	Below JCB dam	Pacificorp		Q	5.41	7.80	269	9.93			87	6.79		0.18	0.61	1.31	1.78	0.077	0.15	10.4	1.6	ND	
KR10024	4/13/2010	12:20	KR22460	Below JCB dam	Pacificorp		Q	7.64	5.06	206	5.06	121.45	14.14	76	6.1		<.01	0.043	1.79	1.27	0.044	0.16	34.4	8.4		
KR10047	5/11/2010	10:40	KR22460	Below JCB dam	Pacificorp		Q	11.21	9.57	185	9.57			66.6	5.59		<.01	0.0091		1.11	0.11	0.24	25.6	7.6	ND	
KR10082	6/15/2010	10:15	KR22460	Below JCB dam	Pacificorp		Q	19.1	8.64	176	8.64	16.75	4.43	71.7	6.51		<.01	0.058	0.88	0.91	0.11	0.16	7.2	2	ND	
KR10126	7/13/2010	11:00	KR22460	Below JCB dam	Pacificorp		Q	25.65	4.25	8528	4.25	3.27	1.75	62.6	6.58		0.062	0.24	1.15	1.14	0.081	0.16	2.8	<95	ND	
KR10177	8/17/2010	10:00	KR22460	Below JCB dam	Pacificorp		Q	22.2	7.67	154	7.67	25.63	11.91	7			0.15	0.56	1.35	1.88		0.2			ND	
KR10222	9/14/2010		KR22460	Below JCB dam	Pacificorp		Q	16.55	8.50	157	8.5	3.46	4.25	59.5	7.08		0.19	0.75	1.64	1.94	0.044	0.16	3.6	<95	ND	
KR10273	10/19/2010	13:00	KR22460	Below JCB dam	Pacificorp		Q	12.89	9.31		9.31	5.40	6.72	63.1	7.76		0.41	1.23	1.76	3.07	0.18	0.24	6.8	1.2	ND	
KR10300	11/18/2010	10:20	KR22460	Below JCB dam	Pacificorp		Q	7.21	4.90	156	4.9	1.07	1.75	54.9	6.8		0.55	0.82	1.82	2.32	0.07	0.094	1	<95	ND	
KR10327	12/14/2010	10:10	KR22460	Below JCB dam	Pacificorp		Q	3.84	10.98	188	10.98			69.1	5.66		0.45	0.84	1.64	2.21	0.061	0.1	3.6	2.4		
KR10007	2/16/2010	10:20	KR22000	Spring Island	Pacificorp		R	5.35	7.76	258	11.12			88	5.74		0.14	0.62	1.21	1.86	0.078	0.12	10.8	1.6	ND	
KR10032	4/13/2010	10:00	KR22000	Spring Island	Pacificorp		R	7.49	11.19		11.19	126.95	12.79	73	6.1		<.01	0.047	1.66	1.26	0.04	0.14	33.2	8.8		
KR10055	5/11/2010	10:40	KR22000	Spring Island	Pacificorp		R	11.19	9.23	187	9.23	27.67	8.46		5.39		<.01	0.013		1.01		0.21			ND	
KR10090	6/15/2010	10:00	KR22000	Spring Island	Pacificorp		R	18.44	8.59	176	8.59	12.42	5.15	71.5	6.28		0.021	0.079	1	0.75	0.11	0.16	6.8	2.4	ND	
KR10130	7/13/2010	12:00	KR22000	Spring Island	Pacificorp		R	23.66	2.99	7701	2.99	4.20	2.42	63.8	6.64		0.054	0.26	1.31	1.16	0.079	0.15	3.2	2.4	ND	
KR10181	8/17/2010	8:40	KR22000	Spring Island	Pacificorp		R	20.86	6.67	154	6.67	19.11	8.06		5.9		0.076	0.56	1	1.56		0.18			ND	
KR10226	9/14/2010		KR22000	Spring Island	Pacificorp		R	16.21	7.75	157	7.75	0.94	1.52	59.5	7.08		0.13	0.77	1.37	1.98	0.04	0.14	4.8	<95	ND	
KR10277	10/19/2010	12:10	KR22000	Spring Island	Pacificorp		R	13.03	8.81		8.81	5.82	6.48	61.3	8.31		0.4	1.24	1.99	2.99	0.19	0.24	6	<95	ND	
KR10304	11/18/2010	10:00	KR22000	Spring Island	Pacificorp		R	7.25	6.64	156	6.64			55.1	6.7		0.5	0.82	1.75	2.4	0.07	0.09	<95	<95	0.16	
KR10331	12/14/2010	9:15	KR22000	Spring Island	Pacificorp		R	3.9	10.98	192	10.98			69.3	5.69		0.43	0.85	1.61	2.22	0.06	0.1	3.6	<95		
KR10010	2/17/2010	9:25	KR20642	Above Shovel Creek	Pacificorp		R	5.8	7.97	232	10.76			81	4.35		3.93	<.01	0.68	0.67	1.56	0.083	0.11	6.4	2.8	ND
KR10033	4/14/2010	12:00	KR20642	Above Shovel Creek	Pacificorp		R	9.02	10.94	174	10.94	70.63	9.66	72	2.85		2.65	<.01	0.13	0.71	0.79	0.054	0.11	19.2	5.6	
KR10056	5/12/2010	10:15	KR20642	Above Shovel Creek	Pacificorp		R	10.51	10.46	170	10.46	29.56	9.52	66.8	3.59		<.01	0.1		0.57	0.095	0.15	10.8	3.6		
KR10071	5/28/2010		KR20642	Above Shovel Creek	Pacificorp		Q																			ND
KR10091	6/16/2010	10:30	KR20642	Above Shovel Creek	Pacificorp		R	14.58	8.88	174	10.38	8.13	4.75	73	4.58		<2	<.01	0.093	0.62	0.54	0.094	0.14	4.4	1.6	
KR10111	6/21/2010		KR20642	Above Shovel Creek	Pacificorp		Q																			ND
KR10135	7/14/2010	10:45	KR20642	Above Shovel Creek	Pacificorp		R							67.8	3.64		<2	<.01	0.27	0.79	0.76	0.078	0.14	2.4	1.2	ND
KR10186	8/18/2010	13:20	KR20642	Above Shovel Creek	Pacificorp		R	18.48	10.07	149	10.07	7.18	3.92	64.6	3.1		<.01	0.44	0.53	0.93	0.11	0.16	4.8	2	ND	
KR10231	9/15/2010		KR20642	Above Shovel Creek	Pacificorp		R	9.56	10.90		10.9	3.76	3.68	63.4	5.59		<2	<.01	0.7	0.99	1.34	0.088	0.12	4.8	2	ND
KR10282	10/20/2010	10:15	KR20642	Above Shovel Creek	Pacificorp		R	11.12	10.22		10.22	2.99	3.77	61.5	6.92		<2	0.031	1.33	1.34	2.45	0.15	0.21	1.2	<95	ND
KR10309	11/17/2010	13:00	KR20642	Above Shovel Creek	Pacificorp		R	7.49	10.44	152	10.44	1.54	1.69	55.5	5.4		<2	0.14	1.05	1	2.05	0.061	0.078	<95	1	ND
KR10336	12/15/2010	12:00	KR20642	Above Shovel Creek	Pacificorp		R	6.33	12.05	163	12.05	0.64	0.98	66.3	2.68		<2	<.01	0.68	0.4	0.9	0.075	0.12	1.2	1.2	
KR10258			KR20642	Above Shovel Creek	Pacificorp		R																			
KR10012	2/17/2010	12:30	KR19874	Coppo reservoir	Pacificorp	0.5	R	6.92	10.93	207	10.93			70	4.62		<.01	0.66	0.68	1.26	0.047	0.1	6	1.6		
KR10013	2/17/2010	12:40	KR19874	Coppo reservoir	Pacificorp	13	R	5.85	10.59	204	10.59			68	4.06		0.025	0.71	0.69	1.55	0.051	0.096	5.2	<95		
KR10014	2/17/2010	12:50	KR19874	Coppo reservoir	Pacificorp	27	R	5.29	9.89	197	9.89			68	4.48		0.12	0.8	0.76	1.31	0.062	0.097	4	<95		
KR10035	4/14/2010	13:00	KR19874	Coppo reservoir	Pacificorp	0.5	R	9.18	11.64	195	11.64	62.25	9.09	70	4.5		<.01	0.21	1	0.99	0.045	0.11	12.4	3.6	ND	
KR10036	4/14/2010	13:30	KR19874	Coppo reservoir	Pacificorp	13	R	8.58	10.30	195	10.3	60.78	6.26	70	4.43		0.014	0.23	1.1	0.91	0.049	0.17	12	3.2		
KR10037	4/14/2010	13:35	KR19874	Coppo reservoir	Pacificorp	27	R	7.85	7.10	213	7.1	60.76	9.52	72	4.48		<.01	0.21	1.07	1	0.046	0.095	10.8	3.2		
KR10058	5/12/2010	11:10	KR19874	Coppo reservoir	Pacificorp	0.5	R	13.32	9.21	172	9.21	13.88	3.64	63.9	4.25		<.01	0.0076		0.5	0.071	0.12	4.8	2.8		
KR10059	5/12/2010	11:20	KR19874	Coppo reservoir	Pacificorp	13	R	11.36	7.37	175	7.37	15.27	4.07	64.2	4.23		0.019	0.012	0.58	0.079	0.12	8.8	<95			
KR10060	5/12/2010	11:30	KR19874	Coppo reservoir	Pacificorp	27	R	8.93	4.45	200	4.45			74.4	4.66		0.41	0.14	1.14	0.18	0.21	4	1.6			
KR10093	6/16/2010	11:40	KR19874	Coppo reservoir	Pacificorp	0.5	R	17.73	8.97	162	8.97	2.92	1.49	66.7	4.38		0.03	0.048	0.63	0.44	0.095	0.15	1.6	1.6	ND	
KR10094	6/16/2010	11:50	KR19874	Coppo reservoir	Pacificorp	13	R	12.79	4.42	171	4.42	0.79	1.08	68.3	4.08		0.26	0.039	0.8	0.67	0.18	0.18	1.2	<95		

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous vs Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin	
HC121510-OC	12/15/2010	9:57	HC	Klamath River below Happy Camp	Karuk	0.5	P	6.82	7.98	127	12.48	9.10	15.00	64.2	2.63			0.029	0.229		0.936	0.025	0.141	62.0	14.0		
OR02181 0-OC	2/18/2010	8:30	OR	Klamath River near Orleans	Karuk	0.5	P	8.03	7.89	135	12.07	2.10	2.20	65.9	0.955		<0.010	0.168		0.248	0.013	0.024	3.80	1.00			
OR04151 0-OC	4/15/2010	8:10	OR	Klamath River near Orleans	Karuk	0.5	P	8.82	7.90	142	12.40	8.00	2.10	73.2	1.40		<0.010	0.014		0.210	0.003	0.021	5.00	1.50			
OR05121 0-OC	5/12/2010	8:33	OR	Klamath River near Orleans	Karuk	0.5	P	10.61	7.90	133	11.75	7.50	3.40	67.9	1.33		<0.010	<0.010		0.257	0.004	0.045	30	7.0			
OR05121 0-OC	5/12/2010	8:33	OR	Klamath River near Orleans	Karuk	0.5	P																		0.27		
OR06091 0-OC	6/9/2010	8:40	OR	Klamath River near Orleans	Karuk	0.5	P	12.39	7.99	95	11.27	12.00	14.00	48.0	1.58		<0.010	0.032		1.090	0.009	0.567	437	60.0			
OR06091 0-OC	6/9/2010	8:40	OR	Klamath River near Orleans	Karuk	0.5	P																			ND	
OR06091 0-SG	6/9/2010	8:30	OR	Klamath River near Orleans	Karuk	0.5	P																				ND
OR07081 0-OC	7/8/2010	8:30	OR	Klamath River near Orleans	Karuk	0.5	P	19.55	8.05	129	9.65	1.30	1.10	63.8	1.17		<0.010	<0.010		0.125	0.014	0.028	5	1.5			
OR07081 0-OC	7/8/2010	8:30	OR	Klamath River near Orleans	Karuk	0.5	P																				ND
OR07081 0-SG	7/8/2010	8:30	OR	Klamath River near Orleans	Karuk	0.5	P																				ND
OR07211 0-SG	7/21/2010	8:00	OR	Klamath River near Orleans	Karuk	0.5	P	21.29	8.30	152	8.84																ND
OR08041 0-SG	8/4/2010	8:45	OR	Klamath River near Orleans	Karuk	0.5	P	22.08	8.33	168	8.95																1.80
OR08111 0-OC	8/11/2010	7:56	OR	Klamath River near Orleans	Karuk	0.5	P	21.12	8.22	171	8.7	2.10	2.30	82.0	1.63		<0.010	<0.010		0.187	0.037	0.051	2.1	0.8			
OR08111 0-OC	8/11/2010	7:56	OR	Klamath River near Orleans	Karuk	0.5	P																				ND
OR08111 0-SG	8/11/2010	7:56	OR	Klamath River near Orleans	Karuk	0.5	P																				ND
OR08181 0-SG	8/18/2010	8:39	OR	Klamath River near Orleans	Karuk	0.5	P	22.56	8.28	171	8.68																0.15
OR08251 0-OC	8/25/2010	7:40	OR	Klamath River near Orleans	Karuk	0.5	P	21.01	8.15	178	8.53																ND
OR08251 0-SG	8/25/2010	7:40	OR	Klamath River near Orleans	Karuk	0.5	P	21.01	8.15	178	8.53																0.15
OR09011 0-SG	9/1/2010	9:04	OR	Klamath River near Orleans	Karuk	0.5	P	18.48	8.37	169	9.63																5.60
OR09081 0-OC	9/8/2010	7:34	OR	Klamath River near Orleans	Karuk	0.5	P	18.04	8.31	176	9	18.00	8.40	87.6	2.19		<0.010	<0.010		0.519	0.044	0.091	12.0	5.5			
OR09081 0-OC	9/8/2010		OR	Klamath River near Orleans	Karuk	0.5	P																				9.60
OR09081 0-SG	9/8/2010		OR	Klamath River near Orleans	Karuk	0.5	P																				8.80
OR09151 0-SG	9/15/2010	8:59	OR	Klamath River near Orleans	Karuk	0.5	P	18.74	8.29	183	9.36																9.10
OR09221 0-OC	9/22/2010	7:42	OR	Klamath River near Orleans	Karuk	0.5	P	16.92	8.16	176	9.27																4.80
OR09221 0-SG	9/22/2010		OR	Klamath River near Orleans	Karuk	0.5	P																				4.50
OR09291 0-SG	9/29/2010	8:59	OR	Klamath River near Orleans	Karuk	0.5	P	6.28	8.17	189	9.44																12.00
OR10061 0-OC	10/6/2010	7:29	OR	Klamath River near Orleans	Karuk	0.5	P	15.96	8.34	193	9.73	5.90	4.00	92.3	2.51		<0.010	<0.010		0.434	0.045	0.090	3.3	2.0			
OR10061 0-OC	10/6/2010		OR	Klamath River near Orleans	Karuk	0.5	P																				5.40
OR10061 0-SG	10/6/2010		OR	Klamath River near Orleans	Karuk	0.5	P																				6.00
OR10201 0-OC	10/20/2010	7:35	OR	Klamath River near Orleans	Karuk	0.5	P	13.52	8.37	191	9.81																11.00
OR10201 0-SG	10/20/2010	7:35	OR	Klamath River near Orleans	Karuk	0.5	P																				12.00
OR11171 0-OC	11/17/2010	8:34	OR	Klamath River near Orleans	Karuk	0.5	P	9.67	7.92	155	11.21	2.40	2.50	73.6	1.88		0.100	0.232		0.392	0.043	0.054	2.1	0.9			
OR11171 0-OC	11/17/2010		OR	Klamath River near Orleans	Karuk	0.5	P																				ND

							Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate-Nitrite	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
SV021810-OC	2/18/2010	10:50	SV	Klamath River near Seiad Valley	Karuk	0.5	P	6.87	8.31	206	11.81	2.90	3.20	96.8	2.180		<0.010	0.574		0.823	0.035	0.068	7.00	1.50	
SV041510-OC	4/15/2010	10:32	SV	Klamath River near Seiad Valley	Karuk	0.5	P	9.56	8.29	212	11.68	17.00	5.30	103.0	2.74		<0.010	0.208		0.561	0.022	0.056	9.20	3.60	
SV051210-OC	5/12/2010	10:39	SV	Klamath River near Seiad Valley	Karuk	0.5	P	10.95	8.27	194	11.38	5.90	3.30	96.1	2.90		<0.010	0.041		0.362	0.017	0.039	6	1.0	
SV051210-OC	5/12/2010	10:39	SV	Klamath River near Seiad Valley	Karuk	0.5	P																		0.15
SV060910-OC	6/9/2010	10:49	SV	Klamath River near Seiad Valley	Karuk	0.5	P	12.50	8.14	131	10.51	2.70	3.70	64.7	2.090		<0.010	0.058		0.362	0.026	0.099	76.0	5.20	
SV060910-OC	6/9/2010	10:49	SV	Klamath River near Seiad Valley	Karuk	0.5	P																		ND
SV060910-SG	6/9/2010	11:00	SV	Klamath River near Seiad Valley	Karuk	0.5	P																		ND
SV070810-OC	7/8/2010	10:47	SV	Klamath River near Seiad Valley	Karuk	0.5	P	20.86	8.27	173	9.42	1.30	2.80	85.7	2.310		<0.010	<0.010		0.257	0.044	0.062	2.8	0.87	
SV070810-OC	7/8/2010	10:47	SV	Klamath River near Seiad Valley	Karuk	0.5	P																		ND
SV070810-SG	7/8/2010	10:47	SV	Klamath River near Seiad Valley	Karuk	0.5	P																		ND
SV072110-SG	7/21/2010	10:11	SV	Klamath River near Seiad Valley	Karuk	0.5	P	21.51	8.24	192	8.81														0.15
SV080410-SG	8/4/2010	10:52	SV	Klamath River near Seiad Valley	Karuk	0.5	P	23.04	8.86	197	12.23														ND
SV081110-OC	8/11/2010	10:42	SV	Klamath River near Seiad Valley	Karuk	0.5	P	21.37	8.36	190	9.19	2.70	4.80	91.5	3.12		0.013	0.035		0.400	0.089	0.113	3.0	1.3	
SV081110-OC	8/11/2010	10:42	SV	Klamath River near Seiad Valley	Karuk	0.5	P																		ND
SV081110-SG	8/11/2010	10:45	SV	Klamath River near Seiad Valley	Karuk	0.5	P																		ND
SV081810-SG	8/18/2010	10:57	SV	Klamath River near Seiad Valley	Karuk	0.5	P	22.25	8.35	195	8.97														0.26
SV082510-OC	8/25/2010	10:21	SV	Klamath River near Seiad Valley	Karuk	0.5	P	21.32	8.43	196	9.15														2.90
SV082510-SG	8/25/2010	10:21	SV	Klamath River near Seiad Valley	Karuk	0.5	P	21.32	8.43	196	9.15														2.40
SV0901110-SG	9/1/2010		SV	Klamath River near Seiad Valley	Karuk	0.5	P	18.94	8.44	185	9.74														12.00
SV090810-OC	9/8/2010	10:29	SV	Klamath River near Seiad Valley	Karuk	0.5	P	18.02	8.35	195	9.43	12.00	10.00	96.8	3.69		<0.010	0.082		0.835	0.093	0.137	6.5	3.3	
SV090810-OC	9/8/2010		SV	Klamath River near Seiad Valley	Karuk	0.5	P																		7.4
SV090810-SG	9/8/2010		SV	Klamath River near Seiad Valley	Karuk	0.5	P																		5.7
SV091510-SG	9/15/2010	11:12	SV	Klamath River near Seiad Valley	Karuk	0.5	P	18.43	8.52	197	10.13														11.00
SV092210-OC	9/22/2010	9:56	SV	Klamath River near Seiad Valley	Karuk	0.5	P	16	8.19	207	9.38														5.10
SV092210-SG	9/22/2010		SV	Klamath River near Seiad Valley	Karuk	0.5	P																		4.20
SV092910-SG	9/29/2010	10:51	SV	Klamath River near Seiad Valley	Karuk	0.5	P	17.79	8.51	204	10.77														8.60
SV100610-OC	10/6/2010	9:57	SV	Klamath River near Seiad Valley	Karuk	0.5	P	14.84	8.36	205	10.2	1.00	8.50	97.6	3.54		<0.010	0.014		0.867	0.073	0.142	6.7	2.5	
SV100610-OC	10/6/2010		SV	Klamath River near Seiad Valley	Karuk	0.5	P																		15.00
SV100610-SG	10/6/2010		SV	Klamath River near Seiad Valley	Karuk	0.5	P																		12.00
SV102010-OC	10/20/2010	10:01	SV	Klamath River near Seiad Valley	Karuk	0.5	P	12.73	8.37	10.28	209														5.90
SV102010-SG	10/20/2010		SV	Klamath River near Seiad Valley	Karuk	0.5	P																		5.40
SV111710-OC	11/17/2010	10:50	SV	Klamath River near Seiad Valley	Karuk	0.5	P	9.34	8.19	196	11.41	3.70	4.50	95.8	3.04		0.018	0.504		0.944	0.090	0.127	6.9	2.0	
SV111710-OC	11/17/2010		SV	Klamath River near Seiad Valley	Karuk	0.5	P																		ND
SV121510-OC	12/15/2010	10:41	SV	Klamath River near Seiad Valley	Karuk	0.5	P	6.45	7.95	151	12.22	4.80	14.00	74.5	3.40		0.045	0.295		0.928	0.041	0.174	59.0	12.0	

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous vs Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate-Nitrite	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
WA02181 0-OC	2/18/2010	12:08	WA	Klamath River at Walker Bridge	Karuk	0.5	P	6.09	8.25	216	11.84	3.20	6.50	98.4	3.100		0.018	0.871		1.420	0.055	0.089	5.50	1.00		
WA04151 0-OC	4/15/2010	11:50	WA	Klamath River at Walker Bridge	Karuk	0.5	P	9.36	8.32	237	11.75	25.00	4.30	108.0	3.46		0.038	0.423		0.880	0.046	0.091	8.80	2.80		
WA05121 0-OC	5/12/2010	12:00	WA	Klamath River at Walker Bridge	Karuk	0.5	P	13.10	8.01	97	10.25	13.00	4.20	110.0	3.83		<0.010	0.012		0.577	0.035	0.085	10	3.5		
WA05121 0-OC	5/12/2010	12:00	WA	Klamath River at Walker Bridge	Karuk	0.5	P																		0.28	
WA06091 0-OC	6/9/2010	12:15	WA	Klamath River at Walker Bridge	Karuk	0.5	P	14.74	8.54	181	10.78	3.20	4.30	82.1	2.710		<0.010	0.059		0.461	0.071	0.108	6.8	2.00		
WA06091 0-OC	6/9/2010	12:15	WA	Klamath River at Walker Bridge	Karuk	0.5	P																			ND
WA07081 0-OC	7/8/2010	12:15	WA	Klamath River at Walker Bridge	Karuk	0.5	P	21.81	8.70	183	9.26	1.10	3.00	85.2	3.200		<0.010	<0.010		0.453	0.078	0.127	2.6	1.60		
WA07081 0-OC	7/8/2010	12:15	WA	Klamath River at Walker Bridge	Karuk	0.5	P																			0.15
WA08111 0-OC	8/11/2010	12:17	WA	Klamath River at Walker Bridge	Karuk	0.5	P	21.69	8.48	183	9.32	3.20	5.00	85.7	3.53		0.016	0.120		0.595	0.106	0.139	3.3	1.5		
WA08111 0-OC	8/11/2010	12:17	WA	Klamath River at Walker Bridge	Karuk	0.5	P																			ND
WA08251 0-OC	8/25/2010	11:53	WA	Klamath River at Walker Bridge	Karuk	0.5	P	22.12	8.53	187																2.40
WA09081 0-OC	9/8/2010	11:49	WA	Klamath River at Walker Bridge	Karuk	0.5	P	18.74	8.61	186	9.51	12.00	6.00	93.3	3.82		<0.010	0.142		0.890	0.105	0.157	6.0	4.0		
WA09081 0-OC	9/8/2010		WA	Klamath River at Walker Bridge	Karuk	0.5	P																			6.60
WA09221 0-OC	9/22/2010	11:22	WA	Klamath River at Walker Bridge	Karuk	0.5	P	16.73	8.52	198	9.36															5.80
WA10060-OC	10/6/2010	11:29	WA	Klamath River at Walker Bridge	Karuk	0.5	P	16.03	8.62	196	9.9	14.00	7.40	96.3	3.25		0.100	0.059		1.100	0.084	0.154	7.3	4.5		
WA10061 0-OC	10/6/2010		WA	Klamath River at Walker Bridge	Karuk	0.5	P																			16.00
WA10201 0-OC	10/20/2010	11:20	WA	Klamath River at Walker Bridge	Karuk	0.5	P	13.77	8.39	201	10															8.70
WA11171 0-OC	11/17/2010	13:04	WA	Klamath River at Walker Bridge	Karuk	0.5	P	9.44	8.16	203	11.46	1.30	3.90	96.1	3.57		0.036	0.674		1.350	0.133	0.149	3.9	1.3		
WA11171 0-OC	11/17/2010		WA	Klamath River at Walker Bridge	Karuk	0.5	P																			ND
WA12151 0-OC	12/15/2010	11:50	WA	Klamath River at Walker Bridge	Karuk	0.5	P	5.87	8.06	224	12.31	3.20	11.00	110.0	4.27		0.105	0.660		1.800	0.098	0.155	27.0	7.0		
LES02181 0-OC	2/18/2010	8:13	LES	Klamath River Estuary	Yurok	0.5	P	9.01	7.68	142	11.25	2.67	1.63	63.9	0.894		<0.010	0.148		0.231	0.010	0.028	12	<0.50		
LES04151 0-OC	4/15/2010	8:01	LES	Klamath River Estuary	Yurok	0.5	P	9.21	7.86	137	11.63	4.01	2.16	66.1	0.844		0.010	0.078		0.175	0.007	0.041	19	2.0		
LES05121 0-OC	5/12/2010	7:55	LES	Klamath River Estuary	Yurok	0.5	P	10.62	7.80	126	N/A	3.20	1.66	64.0	1.19		<0.010	0.045		0.141	0.006	0.034	19	2.3		
LES05121 0-OC	5/12/2010		LES	Klamath River Estuary	Yurok	0.5	P																			ND
LES06091 0-OC	6/9/2010	8:48	LES	Klamath River Estuary	Yurok	0.5	P	13.10	8.01	97	10.25	1.60	2.51	46.5	1.43		<0.010	0.058		0.249	0.013	0.052	21	1.8		
LES06091 0-OC	6/9/2010		LES	Klamath River Estuary	Yurok	0.5	P																			ND
LES07071 0-OC	7/7/2010	7:51	LES	Klamath River Estuary	Yurok	0.5	P	18.00	7.95	136	8.91	1.25	1.12	65.0	0.838		<0.010	<0.010		0.099	0.008	0.019	2.8	0.63		
LES07071 0-OC	7/7/2010		LES	Klamath River Estuary	Yurok	0.5	P																			ND

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous vs Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
LES08111	0-OC	8/11/2010	7:31	LES	Klamath River Estuary	Yurok	0.5	P	20.44	8.04	2367	7.77	1.07	2.48	83.3	1.00		0.012	0.016		0.136	0.017	0.028	2.6	0.9	
LES08111	0-OC	8/11/2010	7:31	LES	Klamath River Estuary	Yurok	0.5	P																		ND
LES09081	0-OC	9/8/2010	8:02	LES	Klamath River Estuary	Yurok	0.5	P	17.96	7.98	4900	7.72	7.21	3.44	93.9	1.56		0.012	0.027		0.400	0.026	0.052	5.8	3.3	
LES09081	0-OC	9/8/2010	8:02	LES	Klamath River Estuary	Yurok	0.5	P																		5.8
LES10061	0-OC	10/6/2010	7:30	LES	Klamath River Estuary	Yurok	0.5	P	15.58	8.18	8025	8.79	4.54	3.12	94.2	1.82		0.019	0.040		0.358	0.024	0.043	4.2	1.5	
LES10061	0-OC	10/6/2010	7:30	LES	Klamath River Estuary	Yurok	0.5	P																		4.2
LES11711	0-OC	11/17/2010	7:40	LES	Klamath River Estuary	Yurok	0.5	P	10.13	8.25	180	10.69	1.25	1.00	72.7	1.21		0.015	0.127		0.243	0.024	0.032	1.6	0.6	
LES12151	0-OC	12/15/2010	7:22	LES	Klamath River Estuary	Yurok	0.5	P	8.69	8.34	91	11.64	3.20	1.00	45	1.51		0.015	0.102		0.433	0.010	0.097	67.5	5.0	
TC021810	-OC	2/18/2010	11:13	TC	Klamath River below Trinity River	Yurok	0.5	P	8.44	8.06	137	11.23	2.67	1.25	68.6	1.035		<0.010	0.112		0.169	0.010	0.023	8	0.67	
TC041510	-OC	4/15/2010	11:10	TC	Klamath River below Trinity River	Yurok	0.5	P	8.88	8.08	138	11.28	4.81	1.74	71.2	1.26		<0.010	0.047		0.117	0.007	0.034	20	2.7	
TC051210	-OC	5/12/2010	11:11	TC	Klamath River below Trinity River	Yurok	0.5	P	10.36	7.56	126	N/A	1.60	2.88	66.2	1.31		<0.010	0.018		0.106	0.006	0.027	16	3.5	
TC051210	-OC	5/12/2010		TC	Klamath River below Trinity River	Yurok	0.5	P																		ND
TC060910	-OC	6/9/2010	10:50	TC	Klamath River below Trinity River	Yurok	0.5	P	12.72	8.04	98	10.66	1.60	2.14	48.3	1.24		<0.010	0.037		0.129	0.008	0.058	17	1.5	
TC060910	-OC	6/9/2010		TC	Klamath River below Trinity River	Yurok	0.5	P																		ND
TC070710	-OC	7/7/2010	10:32	TC	Klamath River below Trinity River	Yurok	0.5	P	18.56	7.97	127	9.32	1.42	0.57	65.5	1.01		<0.010	<0.010		0.128	0.009	0.020	2.4	0.63	
TC070710	-OC	7/7/2010		TC	Klamath River below Trinity River	Yurok	0.5	P																		ND
TC081110	-OC	8/11/2010	11:02	TC	Klamath River below Trinity River	Yurok	0.5	P	20.64	8.31	165	9.13	2.14	1.42	80.3	1.38		<0.010	<0.010		0.121	0.020	0.031	1.6	0.9	
TC081110	-OC	8/11/2010	11:02	TC	Klamath River below Trinity River	Yurok	0.5	P																		ND
TC090810	-OC	9/8/2010	10:59	TC	Klamath River below Trinity River	Yurok	0.5	P	18.52	8.3	172	9.23	6.68	2.48	91.3	1.64		<0.010	<0.010		0.316	0.028	0.053	3.3	1.7	
TC090810	-OC	9/8/2010	10:59	TC	Klamath River below Trinity River	Yurok	0.5	P																		3.8
TC100610	-OC	10/6/2010	10:14	TC	Klamath River below Trinity River	Yurok	0.5	P	15.9	8.36	182	9.69	5.87	2.54	92.6	1.95		<0.010	0.010		0.309	0.026	0.050	1.8	1.7	
TC100610	-OC	10/6/2010	10:14	TC	Klamath River below Trinity River	Yurok	0.5	P																		3.9
TC111710	-OC	11/17/2010	10:28	TC	Klamath River below Trinity River	Yurok	0.5	P	10.08	8.44	152	11.29	2.40	1.90	75.9	1.58		<0.010	0.125		0.265	0.029	0.038	2.1	1.0	
TC121510	-OC	12/17/2010	10:19	TC	Klamath River below Trinity River	Yurok	0.5	P	8.04	8.56	100	12.15	4.27	1.90	52	1.57		0.030	0.075		0.403	0.010	0.071	58.0	6.5	
TG021810	-OC	2/18/2010	9:18	TG	Klamath River near Klamath	Yurok	0.5	P	9.11	7.66	136	11.09	2.67	1.63	68.6	0.806		<0.010	0.130		0.232	0.010	0.032	18	1.5	
TG041510	-OC	4/15/2010	9:10	TG	Klamath River near Klamath	Yurok	0.5	P	9.40	8.00	134	11.72	4.01	1.98	69.4	1.05		<0.010	0.064		0.124	0.007	0.027	16	1.5	
TG051210	-OC	5/12/2010	8:56	TG	Klamath River near Klamath	Yurok	0.5	P	10.94	7.88	127	N/A	2.14	2.35	67.2	1.00		<0.010	0.050		0.131	0.006	0.037	18	2.0	
TG051210	-OC	5/12/2010		TG	Klamath River near Klamath	Yurok	0.5	P																		ND
TG060910	-OC	6/9/2010	7:40	TG	Klamath River near Klamath	Yurok	0.5	P	13.20	7.83	101	10.01	1.60	2.51	51.5	1.19		<0.010	0.063		0.174	0.009	0.056	23	1.8	
TG060910	-OC	6/9/2010		TG	Klamath River near Klamath	Yurok	0.5	P																		ND
TG060910	-SG	6/9/2010		TG	Klamath River near Klamath	Yurok	0.5	P																		ND
TG070710	-OC	7/7/2010	8:28	TG	Klamath River near Klamath	Yurok	0.5	P	17.99	8.01	129	9.09	1.60	0.89	64.9	0.869		<0.010	<0.010		0.088	0.007	0.016	2.0	0.63	
TG070710	-OC	7/7/2010		TG	Klamath River near Klamath	Yurok	0.5	P																		ND
TG070710	-SG	7/7/2010		TG	Klamath River near Klamath	Yurok	0.5	P																		ND

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous vs Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin	
WE07071 0-OC	7/7/2010	11:16	WE	Klamath River At Welchpec	Yurok	0.5	P	19.01	8.00	127	9.45	1.07	0.80	65.5	1.23			<0.010	<0.010		0.142	0.014	0.025	2.0	0.87		
WE07071 0-OC	7/7/2010		WE	Klamath River At Welchpec	Yurok	0.5	P																			ND	
WE07071 0-SG	7/7/2010		WE	Klamath River At Welchpec	Yurok	0.5	P																				ND
WE07211 0-SG	7/21/2010	11:15	WE	Klamath River At Welchpec	Yurok	0.5	P																				ND
WE09041 0-SG	8/4/2010	16:37	WE	Klamath River At Welchpec	Yurok	0.5	P																				ND
WE08111 0-OC	8/11/2010	11:57	WE	Klamath River At Welchpec	Yurok	0.5	P	20.93	8.28	166	9.38	1.87	1.87	78.6	1.63			<0.010	<0.010		0.213	0.030	0.048	2.0	0.9		
WE08111 0-OC	8/11/2010	11:57	WE	Klamath River At Welchpec	Yurok	0.5	P																				ND
WE08111 0-SG	8/11/2010	11:57	WE	Klamath River At Welchpec	Yurok	0.5	P																				ND
WE08181 0-SG	8/18/2010	11:10	WE	Klamath River At Welchpec	Yurok	0.5	P																				ND
WE08251 0-SG	8/25/2010	11:55	WE	Klamath River At Welchpec	Yurok	0.5	P																				ND
WE09011 0-SG	9/1/2010	11:19	WE	Klamath River At Welchpec	Yurok	0.5	P																				0.25
WE09081 0-OC	9/9/2010	11:35	WE	Klamath River At Welchpec	Yurok	0.5	P	18.52	8.38	174	9.6	10.95	3.26	91.4	2.14			<0.010	<0.010		0.592	0.042	0.075	3.5	1.5		
WE09081 0-OC	9/8/2010	11:35	WE	Klamath River At Welchpec	Yurok	0.5	P																				5.5
WE09081 0-SG	9/8/2010	11:45	WE	Klamath River At Welchpec	Yurok	0.5	P																				8.3
WE09151 0-SG	9/15/2010	9:37	WE	Klamath River At Welchpec	Yurok	0.5	P																				12.0
WE09221 0-SG	9/23/2010	11:20	WE	Klamath River At Welchpec	Yurok	0.5	P																				ND
WE09291 0-SG	9/29/2010	9:39	WE	Klamath River At Welchpec	Yurok	0.5	P																				7.1
WE10061 0-OC	10/6/2010	10:57	WE	Klamath River At Welchpec	Yurok	0.5	P	15.99	8.43	190	9.87	7.21	3.07	95.2	2.32			<0.010	<0.010		0.420	0.041	0.070	2.3	1.2		
WE10061 0-OC	10/6/2010	10:57	WE	Klamath River At Welchpec	Yurok	0.5	P																				4.2
WE10061 0-SG	10/6/2010	11:07	WE	Klamath River At Welchpec	Yurok	0.5	P																				3.6
WE10201 0-SG	10/20/2010	11:41	WE	Klamath River At Welchpec	Yurok	0.5	P																				2.8
WE11171 0-OC	11/17/2010	11:03	WE	Klamath River At Welchpec	Yurok	0.5	P	9.77	8.55	151	11.55	2.40	2.27	75.1	2.03			<0.010	0.188		0.386	0.042	0.051	2.0	1.0		
WE11171 0-OC	11/17/2010	11:03	WE	Klamath River At Welchpec	Yurok	0.5	P																				ND
WE12151 0-OC	12/18/2010	11:04	WE	Klamath River At Welchpec	Yurok	0.5	P	7.62	8.42	94	12.44	5.874	2.3	48	1.70			0.015	0.093		0.444	0.012	0.066	38.0	5.0		

Appendix B

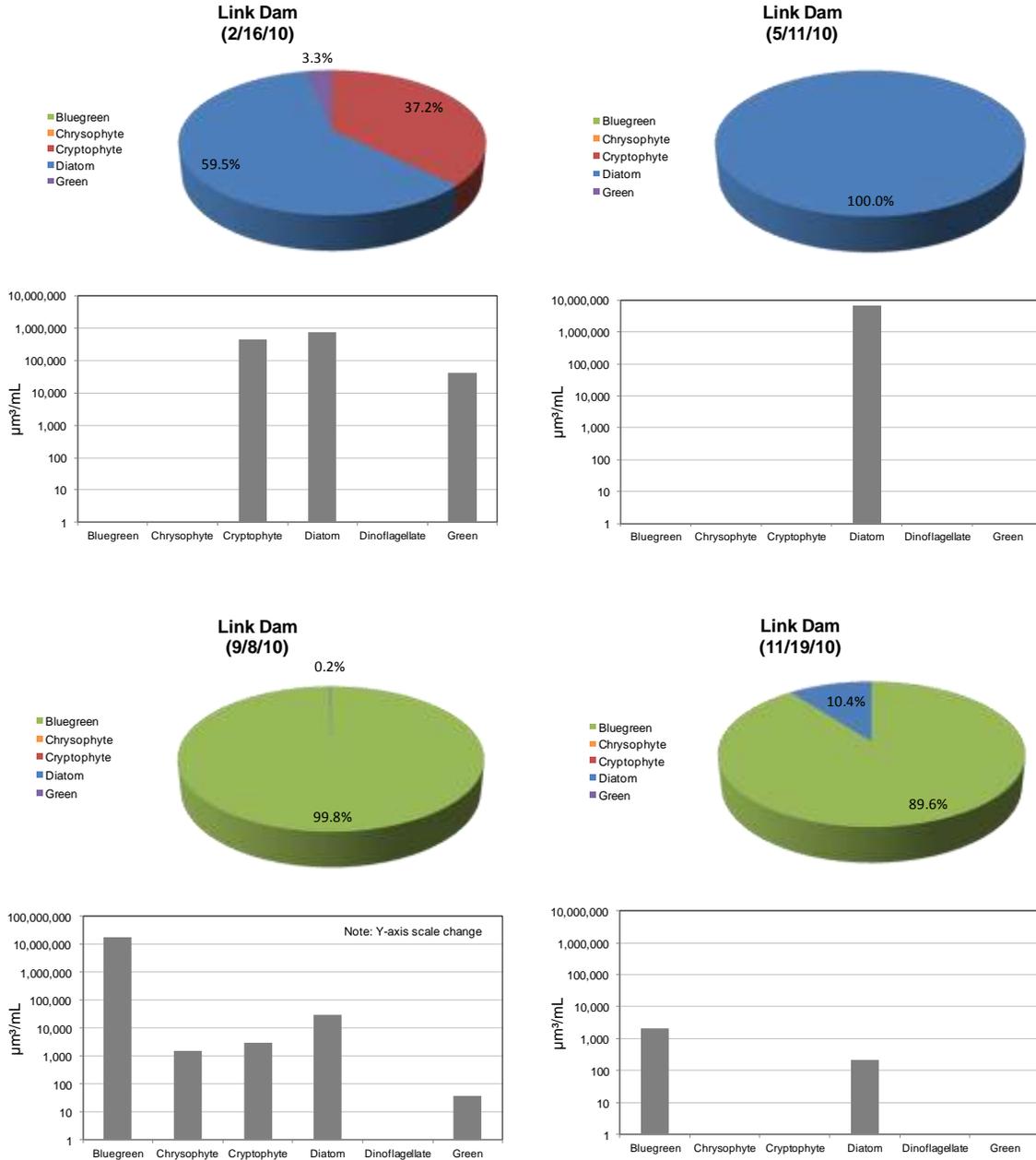


Figure B-1. Pie chart for algal species and bar graph for biovolume at Link River for 2/16/10, 5/11/10, 9/8/10, and 11/19/10. Note: Y-axis in logarithmic scale.

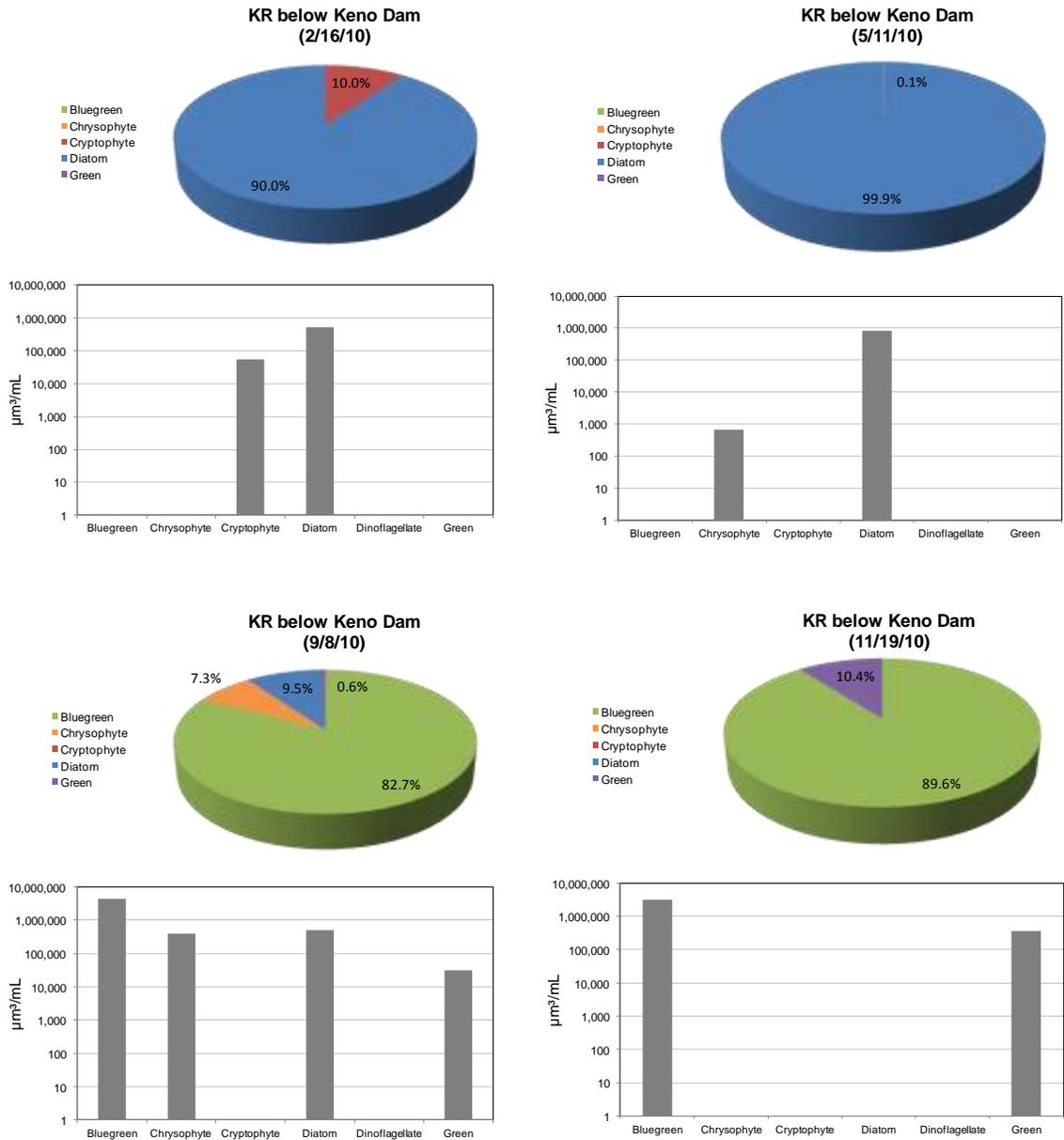


Figure B-2. Pie chart for algal species and bar graph for biovolume at Klamath River below Keno Dam for 2/16/10, 5/11/10, 9/8/10, and 11/19/10. Note: Y-axis in logarithmic scale.

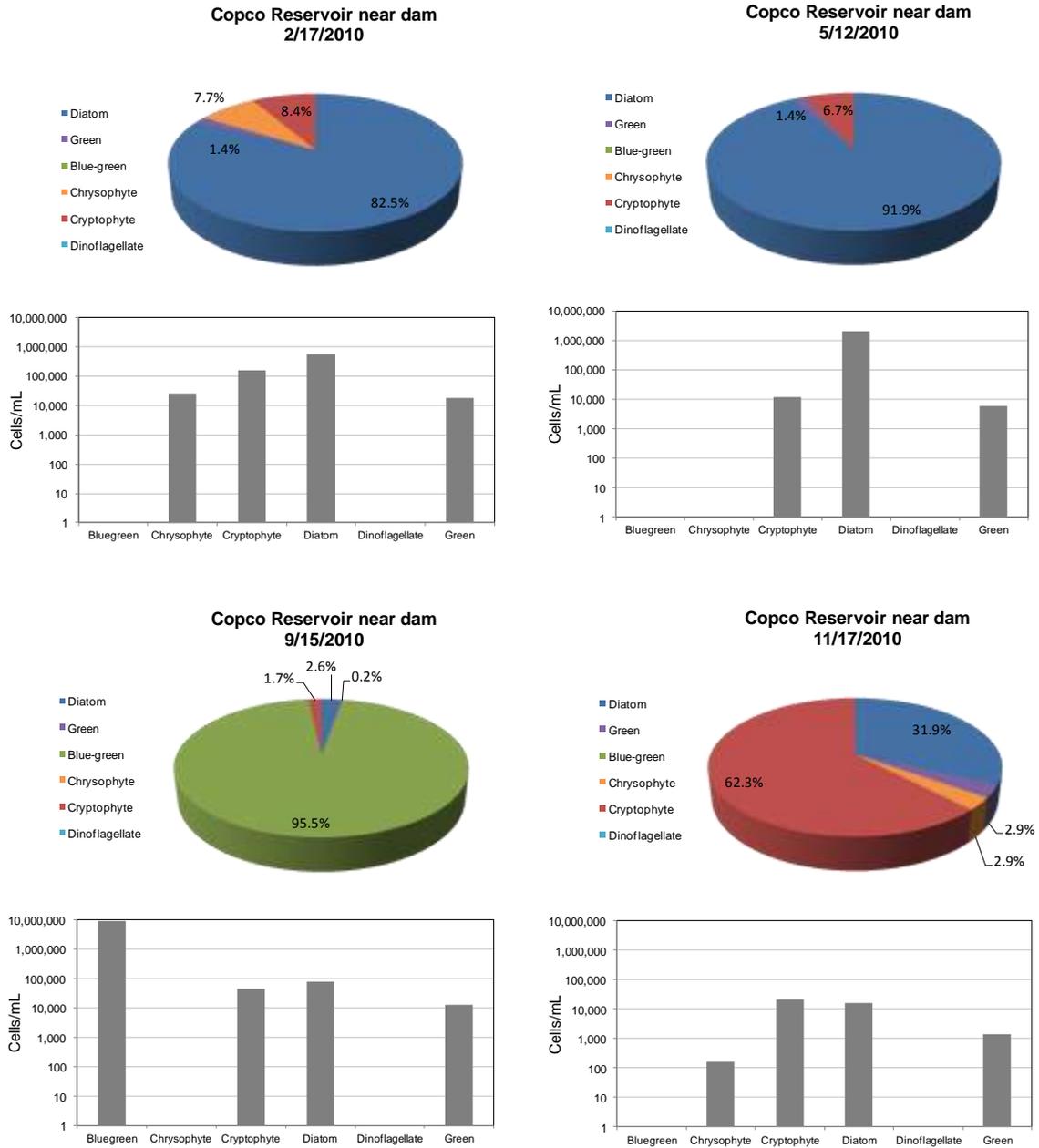


Figure B-3. Pie chart for algal species and bar graph for biovolume at Copco Reservoir near dam for 2/17/10, 5/12/10, 9/15/10, and 11/17/10. Note: Y-axis in logarithmic scale.

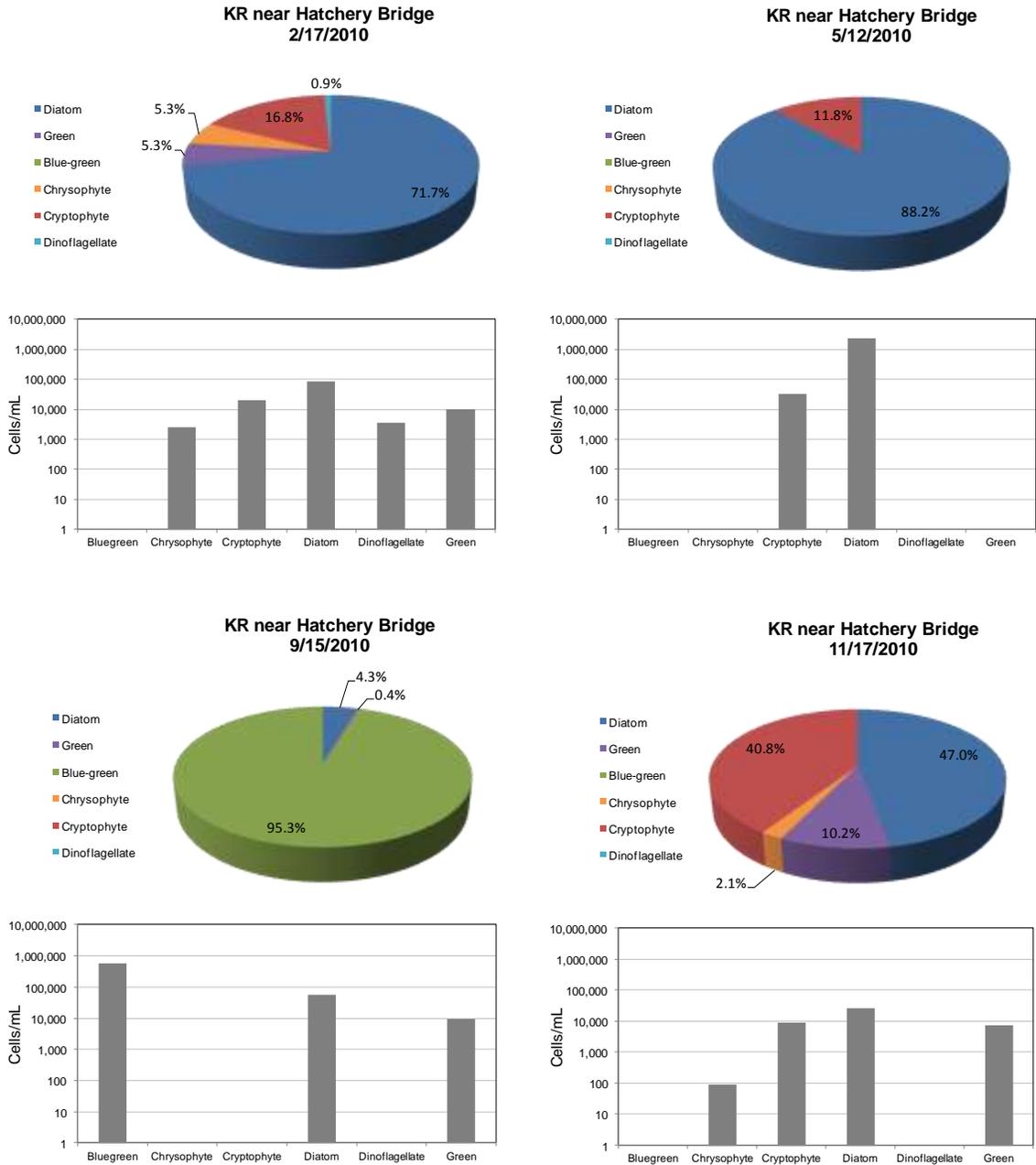


Figure B-4. Pie chart for algal species and bar graph for biovolume at Klamath River near the Hatchery Bridge for 2/17/10, 5/12/10, 9/15/10, and 11/17/10. Note: Y-axis in logarithmic scale.

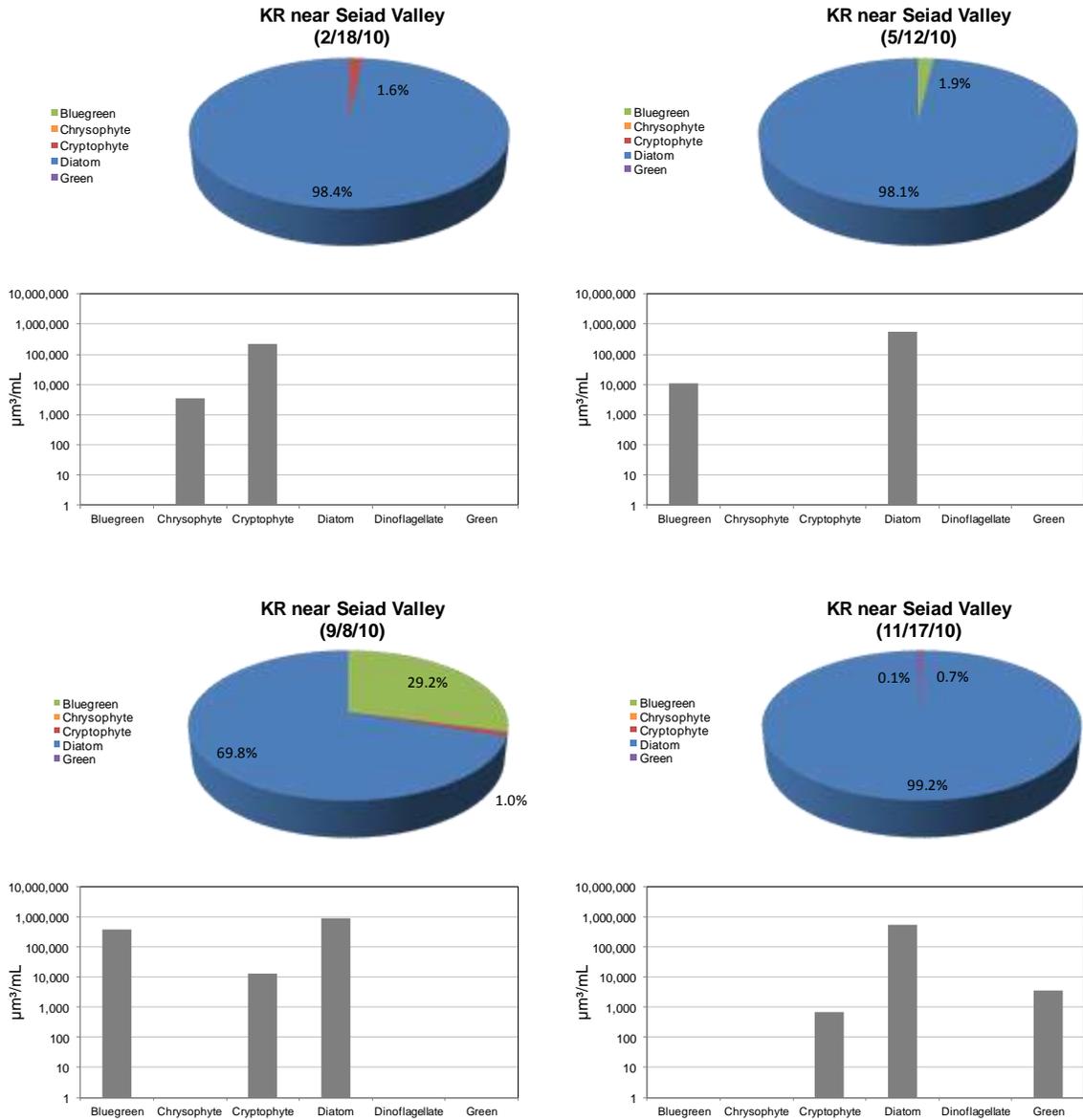


Figure B-5. Pie chart for algal species and bar graph for biovolume at Klamath River near below Seiad Valley for 2/18/10, 5/12/10, 9/8/10, and 11/17/10. Note: Y-axis in logarithmic scale.

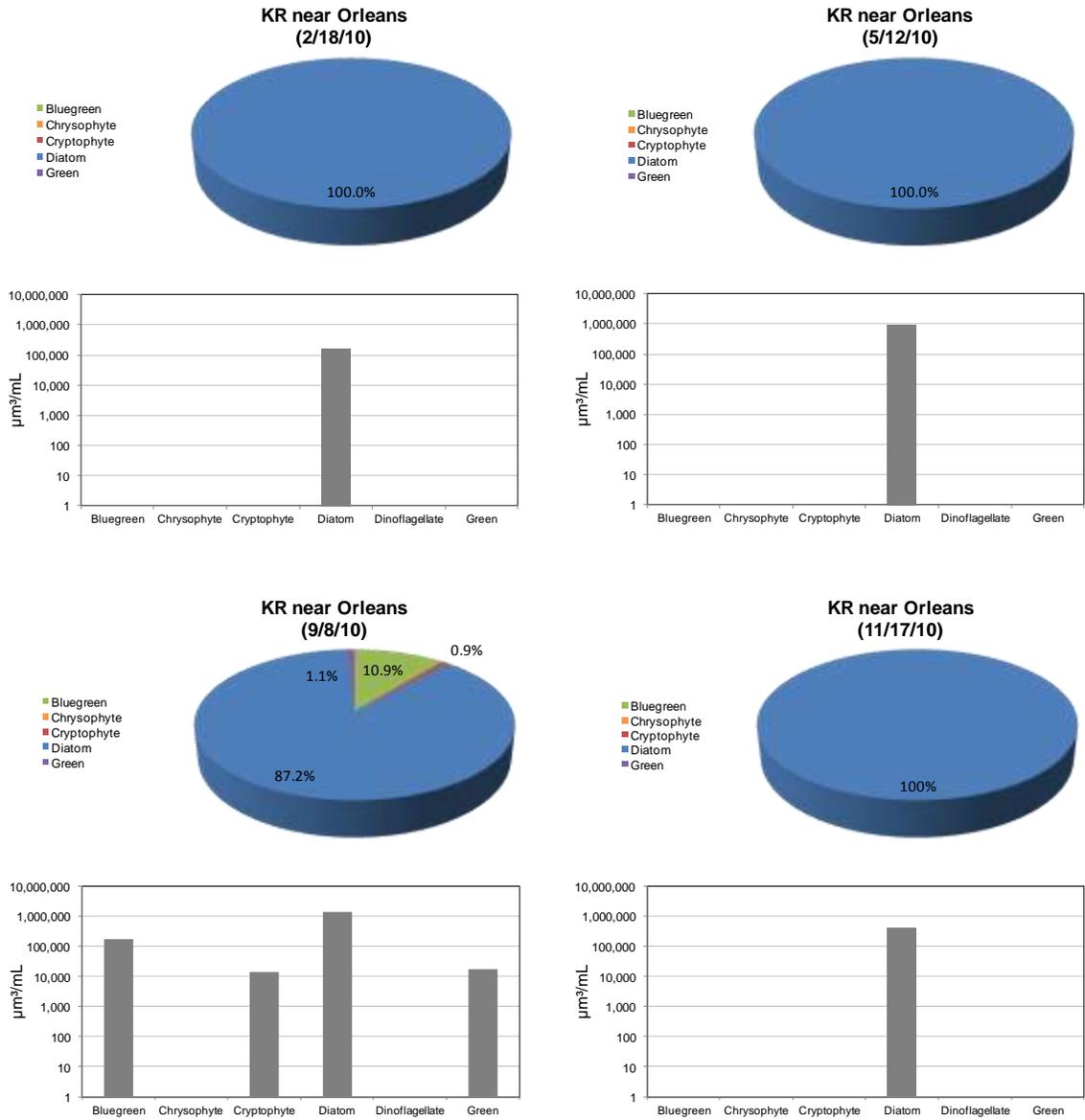


Figure B-6. Pie chart for algal species and bar graph for biovolume at Klamath River near Orleans for 2/18/10, 5/12/10, 9/8/10, and 11/17/10. Note: Y-axis in logarithmic scale.

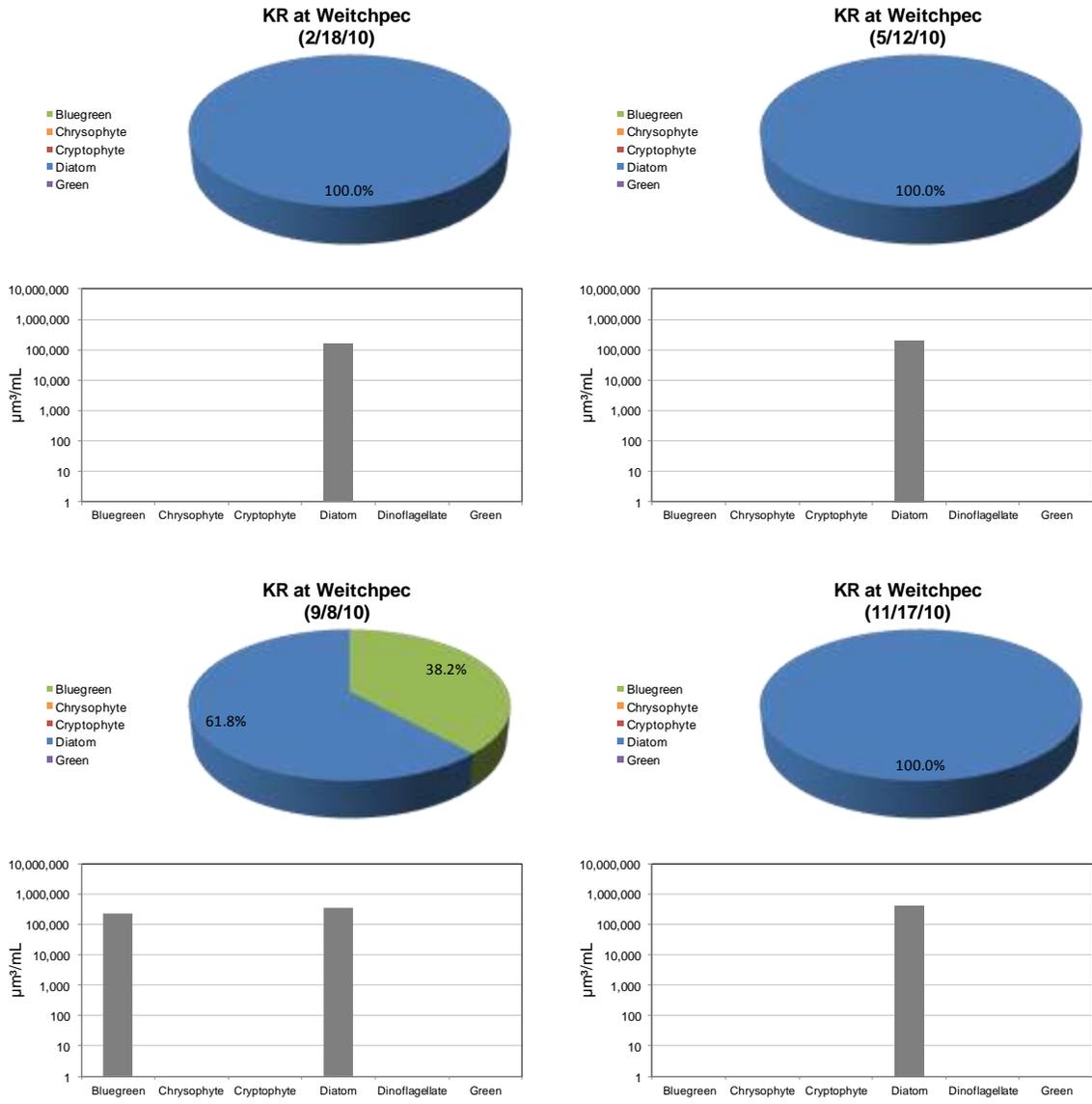


Figure B-7. Pie chart for algal species and bar graph for biovolume at Klamath River at Weitchpec for 2/18/10, 5/12/10, 9/8/10, and 11/17/10. Note: Y-axis in logarithmic scale.

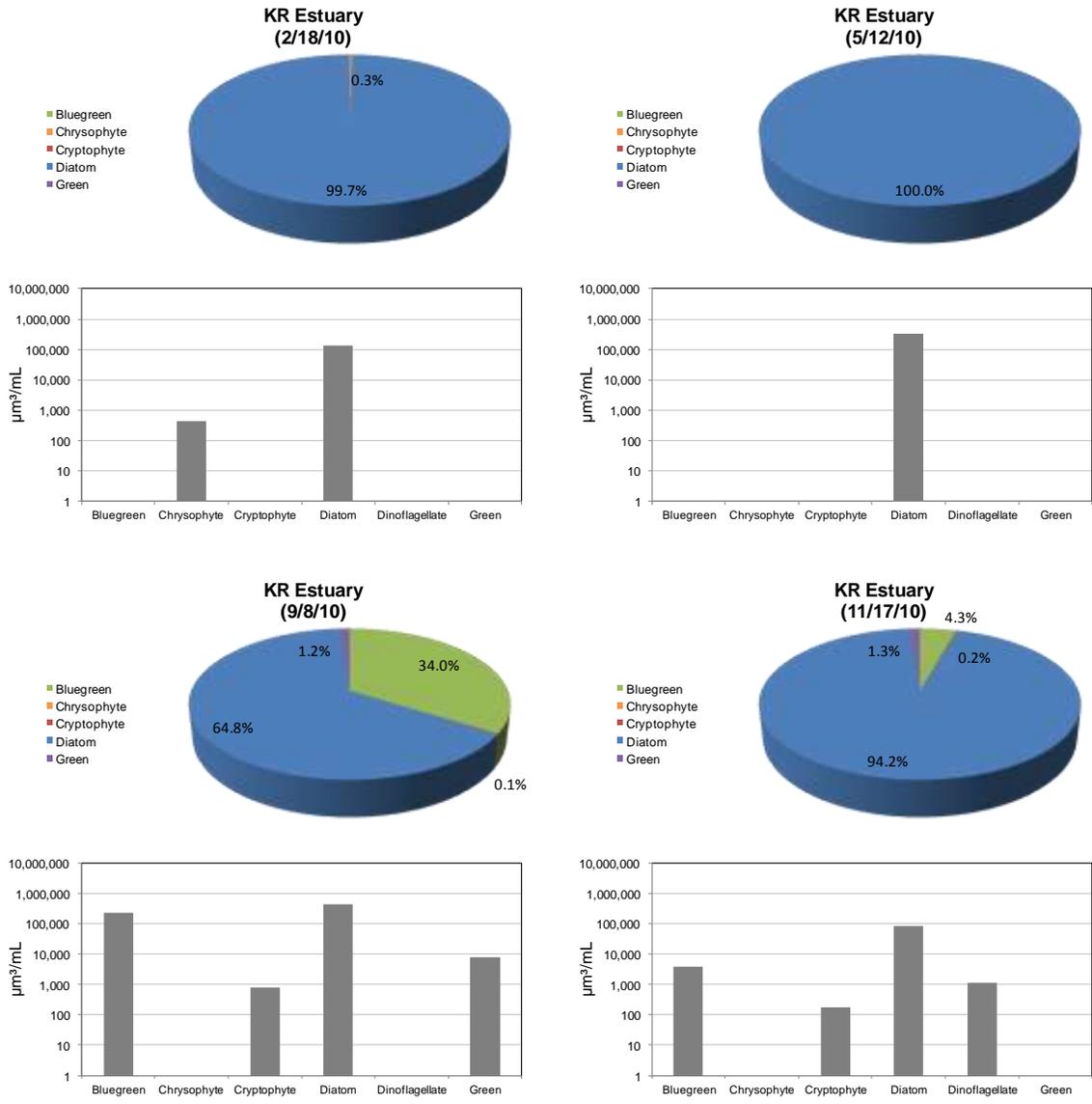


Figure B-8. Pie chart for algal species and bar graph for biovolume at Klamath River Estuary 2/18/10, 5/12/10, 9/8/10, and 11/17/10. Note: Y-axis in logarithmic scale.

Appendix C



Technical Memorandum

Date: March 10, 2011

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
Linda Prendergast, PacifiCorp

From: Eric Miao, Watercourse Engineering, Inc.
Jennifer Vaughn, Watercourse Engineering, Inc.

Re: 2010 Klamath River KHSA Sampling Lab Cross Comparison

Introduction

Laboratory cross comparison was performed during 2010 KHSA Baseline Sampling to provide insight into laboratory performance measures at the three principal laboratories employed in the 2010 sampling season: Basic Laboratory in Redding, California, CH2MHill Applied Sciences Laboratory in Corvallis, Oregon and Aquatic Research, Inc. in Seattle, Washington. Laboratory cross comparisons were performed by collecting a single sample volume at Link Dam on select days, splitting each volume into a triplicate, and sending a sample set to each of the three laboratories. Four cross comparison sampling days (February 16th, May 24th, July 20th, and September 21st) have been evaluated. Water quality analysis included alkalinity, carbonaceous biological oxygen demand – 5 day (CBOD5), dissolved organic carbon (DOC), ammonia, nitrate plus nitrite (NO₃+NO₂), total nitrogen (TN), total Kjeldahl nitrogen (TKN), ortho-phosphate (OPO₄)¹, total phosphorus (TP), total suspended solids (TSS), and volatile suspended solids (VSS).

Comparison

Method Comparison

The methods of analysis for the three laboratories were compared along with the associated method detection limits (MDLs). The reporting limits (RLs) were not fully compared between the three laboratories as Aquatic Research does not present reporting

limits with their analysis. All methods that were used were either EPA methods or Standard Methods. When laboratories used the same methods for a constituent analysis, the MDL and RL (if applicable) were not necessarily the same. The analytical methods and associated limits for each constituent at each laboratory are presented in Table C-1.

Table C-1. Methods and limits for each laboratory

Constituent	units	Basic			CH2MHill			Aquatic Research		
		Method	MDL	RL	Method	MDL	RL	Method	MDL	RL
Alkalinity	mg/l	SM 2320B	1.5	5	E310.1	1.5	5	SM18 2320B	0.2	1
Ammonia	mg/l	EPA 350.1	0.03	0.05	E350.1	0.01	0.05	SM184500NH3H	0.006	0.01
CBOD5 ^a	mg/l	SM 5210	3	3	SM5210B	2	2	SM205210B	2	2
DOC	mg/l	SM5310C	0.3	0.5	E415.1	0.052	0.5	SM205310B	0.095	0.25
NO3+NO2	mg/l	EPA 353.2	0.01	0.05	E353.2	0.002	0.01	SM184500N03F	0.005	0.01
TN	mg/l	EPA 351.2	(n/a) ^b	0.2	SM4500-N C	0.02	0.02	SM204500NC	-	0.05
OPO4	mg/l	SM 4500P-E	0.01	0.05	E365.1	0.002	0.01	SM18 4500PF	0.001	0.001 ^c
TP	mg/l	SM 4500P-BE	0.02	0.05	E365.4	0.011	0.05	SM18 4500PF	0.002	0.002 ^c
TKN	mg/l	EPA 351.2	0.1	0.2	E351.2	0.087	0.2	EPA 351.1	-	0.2
TSS	mg/l	SM 2540D ^b	1	5	E160.2	0.95	2	SM20 2540D	0.1	0.5
VSS	mg/l	SM 2540D	1	5	E160.4	0.95	2	SM20 2540E	0.1	0.5

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

^b There is no MDL for TN at Basic Laboratory, because TN is a calculated value at Basic Laboratory.

^c The MDL and RL values were set at the same concentration for both OPO4 and TP at Aquatic Research.

Results Comparison

Because different laboratories use different equipment, different technicians, and sometimes different methods, it is impractical to expect identical results will be produced for a triplicate sample. A comparison of the results is required to determine if the results are similar or dissimilar.

To compare the results from each laboratory, calculations were made for each pair of results: Basic and CH2MHill, Basic and Aquatic Research, and CH2MHill and Aquatic Research. The sample values used to calculate a relative percent difference (RPD) or absolute difference (AD) for each day are presented in Table to Table. The three laboratories reported different significant figures and the data presented herein are taken directly from the laboratory reports

The RPD and AD were calculated using the following formulae:

$$\text{RPD (percent)} = |(X1 - X2)| / ((X1 + X2) / 2) * 100 \quad (1)$$

$$\text{AD (concentration)} = |X1 - X2| \quad (2)$$

Where: X1 = Value of sample from laboratory 1

X2 = Value of sample from laboratory 2

For each comparison, if the sample value was equal to or greater than five times the 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 value was less than or equal to 20 percent, the two samples were deemed to be similar and the comparison was labeled with an “OK” value in Table through Table. If the RPD value was greater than 20 percent, the RPD value was presented within the table.

If the sample value was less than five times the reporting limit, the AD was calculated (USBR, 2009) and an AD criteria of the reporting limit was used to determine if two samples were similar (AD less than or equal to the reporting limit) or dissimilar (AD greater than the reporting limit). If the two laboratories used different reporting limits the larger of the two was used as the criteria. If the AD was less than the reporting limit for the sample comparison, the comparison was labeled with an “OK” value in Table through Table. If the AD was greater than the reporting limit for the sample comparison, the AD value was presented, along with a footnote of the laboratory reporting limit used. This process is illustrated in Figure C-1.

Some of the reported results from the laboratories were presented as non-detects (ND), censored data (i.e., “less than value”), or were less than the RL (i.e., not censored). All of these reported results were replaced with the RL for calculation of the RPD.

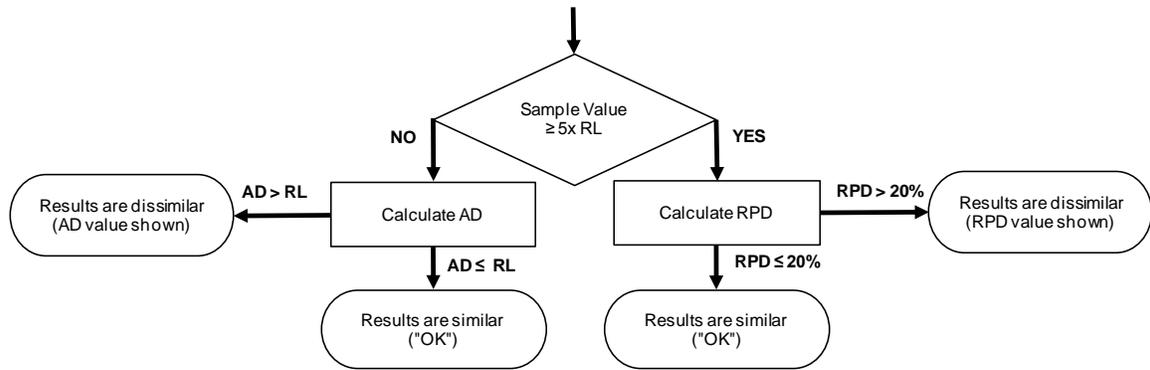


Figure C-1. Flow diagram displaying comparison process. RPD = relative percent difference. RL = reporting limit.

Table C-2. Result values used to determine RPD or AD for February 16, 2010.

	Laboratory Sample ID:	Basic 2010KHSA-001	CH2MHill Applied Sciences 2010KHSA-005	Aquatic Research, Inc. 2010KHSA-004
	Unit			
Alkalinity	mg/l	50	46	49.5
Ammonia	mg/l	0.38	0.37	0.324
CBOD5	mg/l	3 ^a	3.02	2 ^b
DOC	mg/l	3.6	3.56	3.8
NO3+NO2	mg/l	0.34	0.3	0.279
TN	mg/l	1.4	1.48	1.51
OPO4	mg/l	0.01 ^c	0.01 ^d	0.005
TP	mg/l	0.07	0.078	0.053
TKN	mg/l	1.1	1.17	1.23
TSS	mg/l	17	14.4	24
VSS	mg/l	5 ^e	2 ^f	6.5

^a Basic Laboratory reported result for CBOD5 was "ND" and was replaced with the laboratory RL.

^b Aquatic Research reported result for CBOD5 was "ND" and was replaced with the laboratory RL.

^c Basic Laboratory reported result for OPO4 was "ND" and was replaced with the laboratory RL.

^d CH2MHill reported result for OPO4 was 0.0082 mg/l and was replaced with the laboratory RL.

^e Basic Laboratory reported result for VSS was 3 mg/L and was replaced with the laboratory RL.

^f CH2MHill reported result for VSS was 0.8 mg/l and was replaced with the laboratory RL.

Table C-3. Comparison of result pairs for February 16, 2010.

Constituent	Basic versus CH2MHill Applied Sciences	Basic versus Aquatic Research, Inc.	CH2MHill Applied Sciences versus Aquatic Research, Inc.
Alkalinity	OK	OK	OK
Ammonia	OK	OK	OK
CBOD5	OK	OK	OK
DOC	OK	OK	OK
NO3+NO2	OK	OK	OK
TN	OK	OK	OK
OPO4	OK	OK	OK
TP	OK	OK	OK
TKN	OK	OK	OK
TSS	OK	7.0 mg/l ^a	50.0%
VSS	OK	OK	4.5 mg/l ^b

^a Basic Laboratory TSS reporting limit was 5.0 mg/l.

^b CH2MHill VSS reporting limit was 2.0 mg/l.

Table C-4. Result values used to determine RPD or AD for May 24, 2010.

	Laboratory Sample ID	Basic 2010KHSA-025	CH2MHill Applied Sciences 2010KHSA-028	Aquatic Research, Inc. 2010KHSA-029
	Units			
Alkalinity	mg/l	53	50.1	56.1
Ammonia	mg/l	0.13	0.05 ^a	0.01 ^b
CBOD5 ^c	mg/l	-	-	-
DOC	mg/l	5.2	4.86	3.99
NO3+NO2	mg/l	0.05 ^d	0.01 ^e	0.011
TN	mg/l	0.77	0.67	0.771
OPO4	mg/l	0.01 ^f	0.01 ^g	0.011
TP	mg/l	0.07	0.064	0.076
TKN	mg/l	0.7	0.75	1.03
TSS	mg/l	20	20	29
VSS	mg/l	5 ^h	4	8

^a CH2M reported result for ammonia was "ND" and was replaced with the laboratory RL.

^b Aquatic Research reported result for ammonia was "ND" and was replaced with the laboratory RL.

^c No CBOD collected for laboratory cross comparison on May 24, 2010.

^d Basic Laboratory reported result for NO3+NO2 was 0.02 mg/l and was replaced with the laboratory RL.

^e CH2MHill reported result for NO3+NO2 was 0.0078 mg/l and was replaced with the laboratory RL.

^f Basic Laboratory reported result for OPO4 was "ND" mg/l and was replaced with the laboratory RL.

^g CH2MHill reported result for OPO4 was 0.0044 mg/l and was replaced with the laboratory RL.

^h Basic laboratory reported result for VSS was 3 mg/L and was replaced with the laboratory RL.

Table C-5. Comparison of result pairs for May 24, 2010.

Constituent	Basic versus	Basic versus	CH2MHill Applied Sciences versus
	CH2MHill Applied Sciences	Aquatic Research, Inc.	Aquatic Research, Inc.
Alkalinity	OK	OK	OK
Ammonia	0.08 mg/l^a	0.12 mg/l^a	OK
CBOD5	-	-	-
DOC	OK	26.3%	OK
NO3+NO2	OK	OK	OK
TN	OK	OK	OK
OPO4	OK	OK	OK
TP	OK	OK	OK
TKN	OK	0.33 mg/l^b	0.28 mg/l^c
TSS	OK	9.0 mg/l^d	36.7%
VSS	OK	OK	4.0 mg/l^e

^a Basic Laboratory ammonia RL was 0.05 mg/l.

^b Basic Laboratory TKN RL was 0.2 mg/l.

^c CH2MHill TKN RL was 0.2 mg/l.

^d Basic Laboratory TSS RL was 5.0 mg/l.

^e CH2MHill VSS RL was 2.0 mg/l.

Table C-6. Result values used to determine RPD or AD for July 20th, 2010.

	Laboratory Sample ID	Basic 2010KHSA-025	CH2MHill Applied Sciences 2010KHSA-028	Aquatic Research, Inc. 2010KHSA-029
	Units			
Alkalinity	mg/l	57	51.4	63.6
Ammonia	mg/l	0.15	0.05 ^a	0.038
CBOD5	mg/l	13	13.2	15.3
DOC	mg/l	7	5.72	5.13
NO3+NO2	mg/l	0.05 ^b	0.012	0.01
TN	mg/l	3	2.83	3.83
OPO4	mg/l	0.02	0.021	0.021
TP	mg/l	0.17	0.17	0.215
TKN	mg/l	3	4.05	3.71
TSS	mg/l	13	11	15
VSS	mg/l	8	7	13

^a CH2MHill reported result for ammonia was "ND" and was replaced with the laboratory RL.

^b Basic Laboratory reported result for NO3+NO2 was 0.01 mg/L and was replaced with the laboratory RL.

Table C-7. Comparison of result pairs for July 20th, 2010.

Constituent	Basic versus CH2MHill Applied Sciences	Basic versus Aquatic Research, Inc.	CH2MHill Applied Sciences versus Aquatic Research, Inc.
Alkalinity	21.2%	OK	OK
Ammonia	0.10 mg/l ^a	0.11 mg/l ^a	OK
CBOD5	OK	OK	OK
DOC	20.1%	30.8%	OK
NO3+NO2	OK	OK	OK
TN	OK	24.3%	30.0%
OPO4	OK	OK	OK
TP	OK	OK	OK
TKN	29.8%	21.2%	OK
TSS	OK	OK	30.8%
VSS	OK	OK	60.0%

^a Basic Laboratory ammonia reporting limit was 0.05 mg/l.

Table C-8. Result values used to determine RPD or AD for September 21st, 2010.

	Laboratory Sample ID	Basic 2010KHSA-025	CH2MHill Applied Sciences 2010KHSA-028	Aquatic Research, Inc. 2010KHSA-029
	Units			
Alkalinity	mg/l	58	51	65.9
Ammonia	mg/l	0.19	0.05 ^a	0.02
CBOD5	mg/l	11	11.3	11.7
DOC	mg/l	9	8.26	5.89
NO3+NO2	mg/l	0.05 ^b	0.021	0.01 ^c
TN	mg/l	2.7	2.87	3.47
OPO4	mg/l	0.03	0.026	0.023
TP	mg/l	0.21	0.19	0.215
TKN	mg/l	2.7	2.56	3.52
TSS	mg/l	8	18.4	17
VSS	mg/l	6	15.2	12

^a CH2M reported result for ammonia was 0.04 mg/l and was replaced with the laboratory RL.

^b Basic Laboratory reported result for NO3+NO2 was 0.02 mg/L and was replaced with the laboratory RL.

^c Aquatic Research reported result for NO3+NO2 was "ND" and was replaced with the laboratory RL.

Table C-9. Comparison of result pairs for September 21st, 2010.

Constituent	Basic versus CH2MHill Applied Sciences	Basic versus Aquatic Research, Inc.	CH2MHill Applied Sciences versus Aquatic Research, Inc.
Alkalinity	OK	OK	25.5%
Ammonia	0.14 mg/l^a	0.17 mg/l^a	OK
CBOD5	OK	OK	OK
DOC	OK	41.7%	33.5%
NO3+NO2	OK	OK	.011 mg/l^b
TN	OK	25.0%	OK
OPO4	OK	OK	OK
TP	OK	OK	OK
TKN	OK	26.4%	31.6%
TSS	10.4 mg/l^c	9.0 mg/l^c	OK
VSS	9.2 mg/l^d	6.0 mg/l^d	23.5%

^a Basic Laboratory ammonia RL was 0.05 mg/l.

^b CH2MHill NO3+NO2 RL was 0.1 mg/l.

^c Basic Laboratory TSS RL was 5.0 mg/l.

^d Basic Laboratory VSS RL was 5.0 mg/l.

Comparison Summary

In 2010, a total of 129 samples were collected for laboratory cross comparison in 2010. Comparisons were completed for alkalinity, CBOD, DOC, ammonia, NO₃+NO₂, TKN, TN, OPO₄, TP, TSS, and VSS. Total number of comparisons per constituent are shown in Table 10.

There were 93 similar pairs of results and 36 dissimilar pair of results in 2010. Of those 36 dissimilar pairs, 7 dissimilar pairs were from comparing results from Basic and CH2MHill, 15 dissimilar pairs were from comparing results from Basic and Aquatic Research, and 14 dissimilar pairs were from comparing CH2MHill and Aquatic Research. Of the 36 dissimilar pairs, 13 of the pairs were total suspended solids (TSS) and volatile suspended solids (VSS), 16 of the pairs were related to nitrogen (i.e., ammonia, NO₃+NO₂, TN, TKN). Additional details of the laboratory comparison are presented in Table 10 and Figure 3.

Table C-10. Number of total, similar and dissimilar pairs of results per constituent in 2010.

	Alkalinity	CBOD5	DOC	Ammonia	NO3+NO2	TN	TKN	OPO4	TP	TSS	VSS	Totals
Total Number of Comparisons	12	9	12	12	12	12	12	12	12	12	12	129
Total Number of similar pairs of results	10	9	7	6	11	9	6	12	12	5	6	93
Total number of dissimilar pairs of results	2	0	5	6	1	3	6	0	0	7	6	36
<i>Basic and CH2MHill</i>	0	0	1	3	0	0	1	0	0	1	1	7
<i>Basic and Aquatic Research</i>	0	0	3	3	0	2	3	0	0	3	1	15
<i>CH2MHill and Aquatic Research</i>	2	0	1	0	1	1	2	0	0	3	4	14

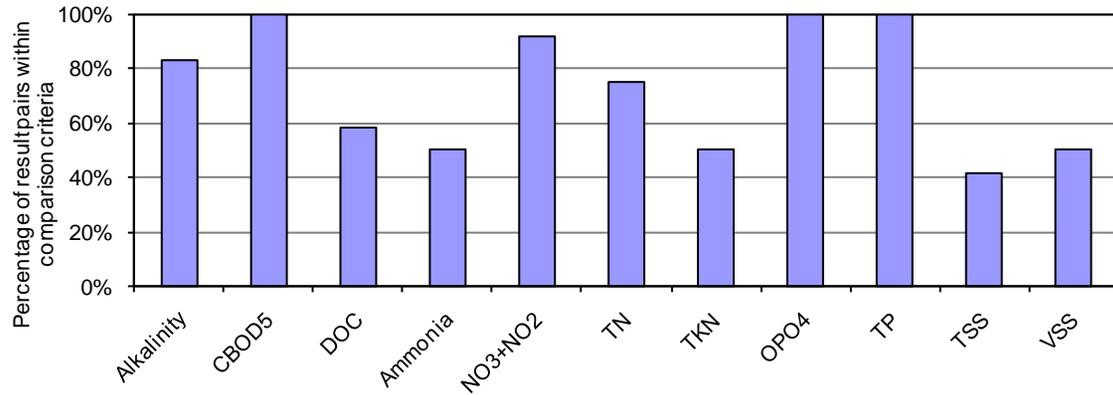


Figure C-2. Percentage of result pairs within comparison criteria from February 16, 2010 through September 21, 2010

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.

Standard Methods, 21st Ed. 2005. Ed. A.D. Eaton, L.S. Clesceri, E.W. Rice, A.E. Greenberg. Published jointly by American Public Health Assc., American Water Work Assc., and Water Environment Federation