

ERRATA

KLAMATH RIVER BASELINE WATER QUALITY SAMPLING – 2009 ANNUAL REPORT –

Prepared for the KHSA Water Quality Monitoring Group

Prepared by
Watercourse Engineering, Inc.
January 4, 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 2009 dataset which required the following changes be made to the Klamath River Baseline Water Quality Sampling 2009 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 figures are given a new figure number that would place them in the correct location within the original report. 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 2009 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 2009 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)
KR2334	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)
KR0935	Klamath River at Clear Creek	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)

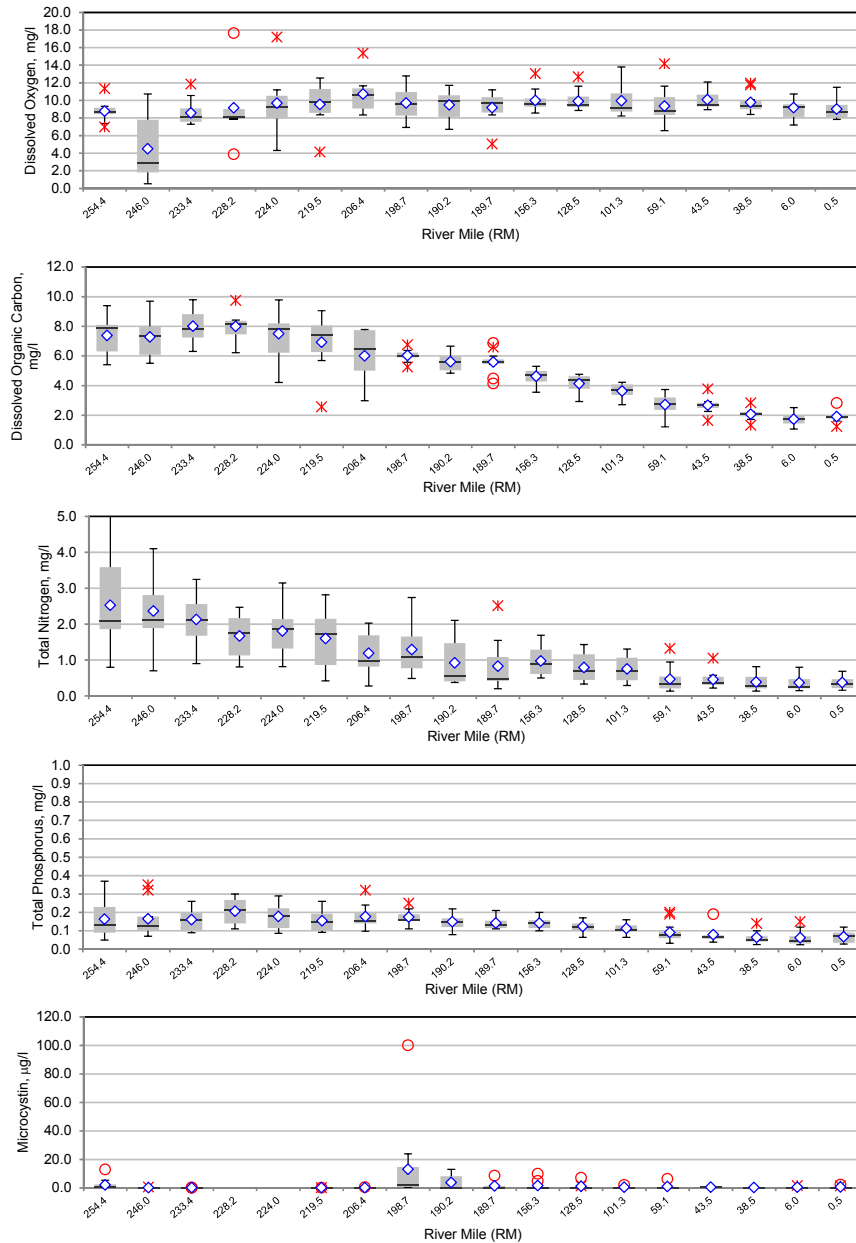
3. The original methods, MDLs and RLs listed in Table 2 did not present information for all constituents of interest in 2009, nor was the variability of the MDLs and RLs presented. The methods as well as the MDL and RL variation in 2009 are presented in Errata Table 2.

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

Constituent Name	Constituent ID	Basic			CH2MHill			Aquatic Research			CBL			EPA			Aquatic Analysts		
		Method	MDL	RL	Method	MDL	RL	Method	MDL	RL	Method	MDL	RL	Method	MDL	RL	Method	MDL	RL
Alkalinity	Alk	SM 2320B	1	5	EPA 310.1	0.55 0.9 2.38 2.4 1.54	5	SM 2320B	1	na	-	-	-	-	-	-	-	-	-
Carbonaceous Biological Oxygen Demand	CBOD	SM 5210	3	3	SM 5210B	2 N/A	2	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Organic Carbon	DOC	SM 5310C	0.3	0.5	EPA 415.1	0.052	0.5	SM 5310B	0.25	na	-	-	-	-	-	-	-	-	-
Ammonia	NH3	EPA 350.1	0.020 0.03	0.05	EPA 350.1	0.0087 0.0081 0.01	0.1 0.05 0.05	SM 4500NH3H	0.01	na	-	-	-	-	-	-	-	-	-
Nitrate + Nitrite	NO3+ NO2	EPA353.2	0.01	0.05	EPA353.2	0.0017	0.01	SM 4500NO3F	0.01	na	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	TKN	EPA 351.2	0.1	0.2	EPA 351.2	0.038 0.087	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Total Nitrogen	TN	EPA 351.2	na	0.2	SM 4500 NC	0.02	0.02	SM 4500 NC	0.05	na	-	-	-	-	-	-	-	-	-
Ortho-phosphate	OPO4	SM 4500PE	0.01	0.05	EPA 365.1	0.0018 0.0013	0.01	SM 4500PF	0.001	na	-	-	-	-	-	-	-	-	-
Total Phosphorus	TP	SM 4500PBE	0.02	0.05	EPA 365.4	0.0078 0.011	0.05	SM 4500PF	0.002	na	-	-	-	-	-	-	-	-	-
Total Suspended Solids	TSS	SM 2540D	1	5	EPA 160.2	0.87 0.9	2	SM 2540D	0.5	na	-	-	-	-	-	-	-	-	-
Volatile Suspended Solids	VSS	SM 2540D	1	5	EPA 160.4	0.87 0.9	2	SM 2540E	0.5	na	-	-	-	-	-	-	-	-	-
Turbidity ^a	Turb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Particulate Carbon	PC	-	-	-	-	-	-	-	-	-	EPA 440.0	0.0021	na	-	-	-	-	-	-
Particulate Nitrogen	PN	-	-	-	-	-	-	-	-	-	EPA 440.0	0.0021	na	-	-	-	-	-	-
Chlorophyll-a	CHLA	-	-	-	-	-	-	SM 10200H	0.1	na	EPA 445.0	0.68	na	-	-	-	SM 10200H	0.1	na
Pheophytin	PHEO	-	-	-	-	-	-	SM 10200H	0.1	na	EPA 445.0	0.68	na	-	-	-	-	-	-
Microcystin	MYCN	-	-	-	-	-	-	-	-	-	-	-	-	EUSA	0.09	0.18	-	-	-

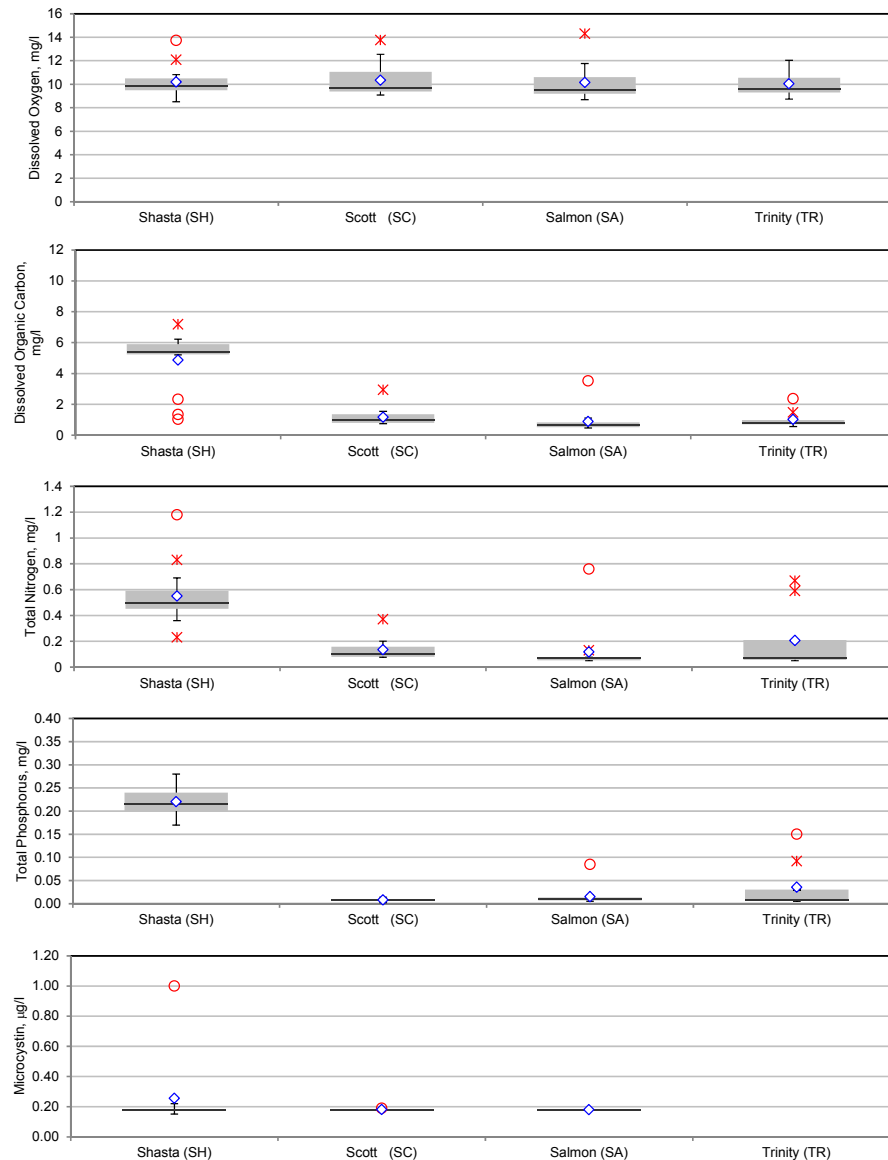
^a In 2009, turbidity was measured in the field by the USBR field crew, and not collected by the PacificCorp, Karuk or Yurok field crews.

4. Because of the small sample size at each site during 2009, the boxplots presented in the annual report and this errata sheet may not be statistically robust and are included for illustration purposes only. For errata boxplot figures, sites with less than six points of data are no longer presented and the errata figure captions indicate those locations.
5. Erroneous dissolved oxygen data was corrected in the dataset. To reflect these changes to the dataset, the mainstem dissolved oxygen boxplot in the top panel of Figure 2 was revised and is presented below in Errata Figure 2.



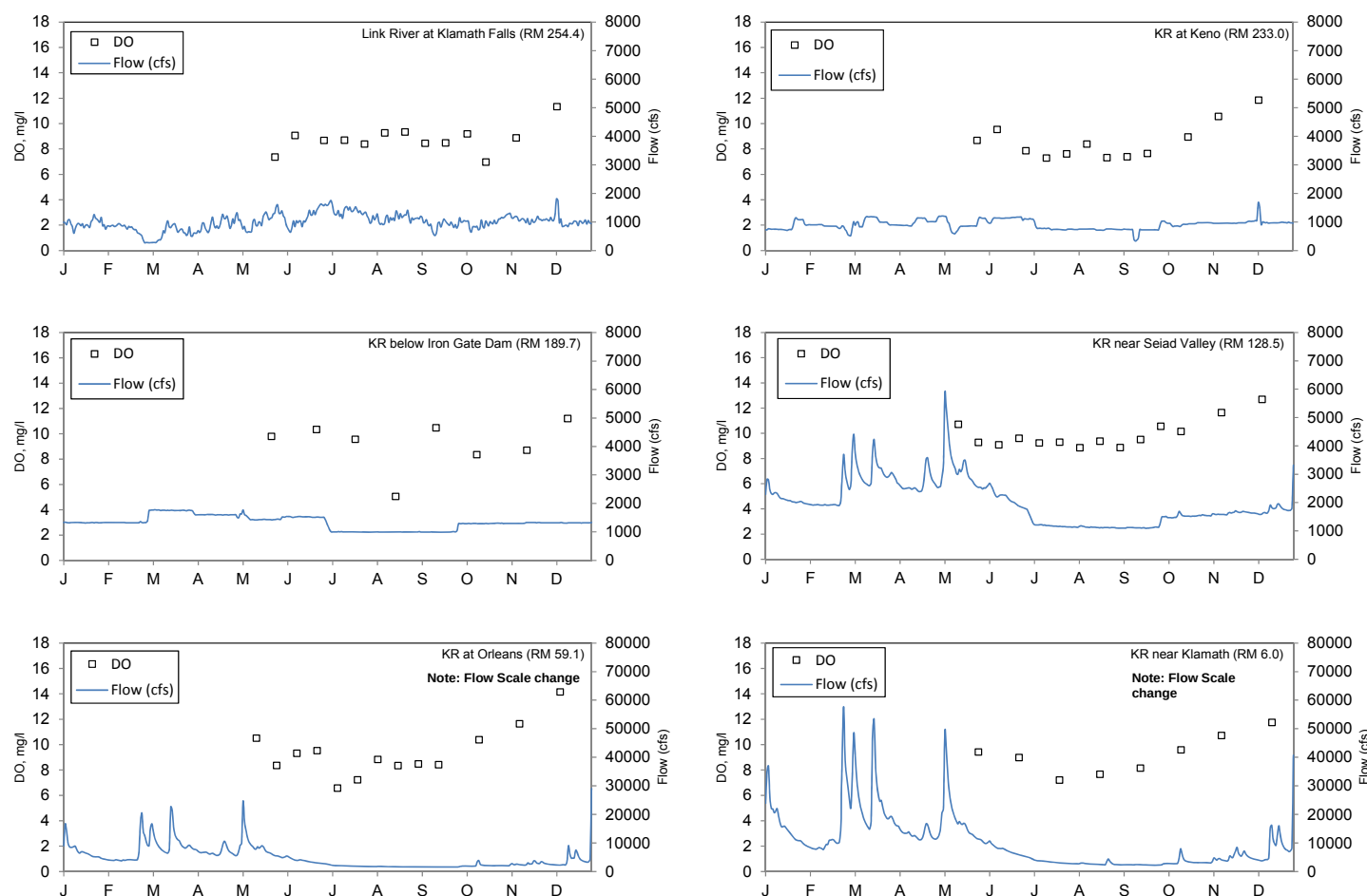
Errata Figure 2. Revised baseline water quality program data for dissolved oxygen, dissolved organic carbon, total nitrogen, total phosphorus, and microcystin concentration (top to bottom) in the Klamath River from Link River to Klamath. May 2009 – December 2009). Note: No microcystin boxplots are included for River Mile 228.2 and 224.0 because there were fewer than six data points at each of these sites.

6. Microcystin data was missing from the original dataset and has now been included. Erroneous microcystin data was also corrected in the dataset. To reflect these changes to the dataset, the mainstem microcystin boxplot in the bottom panel of Figure 2 was revised and is presented above in Errata Figure 2.
7. Erroneous dissolved oxygen data was corrected in the dataset. To reflect these changes to the dataset, the tributary dissolved oxygen boxplot in the top panel of Figure 3 was revised and is presented below in Errata Figure 3.



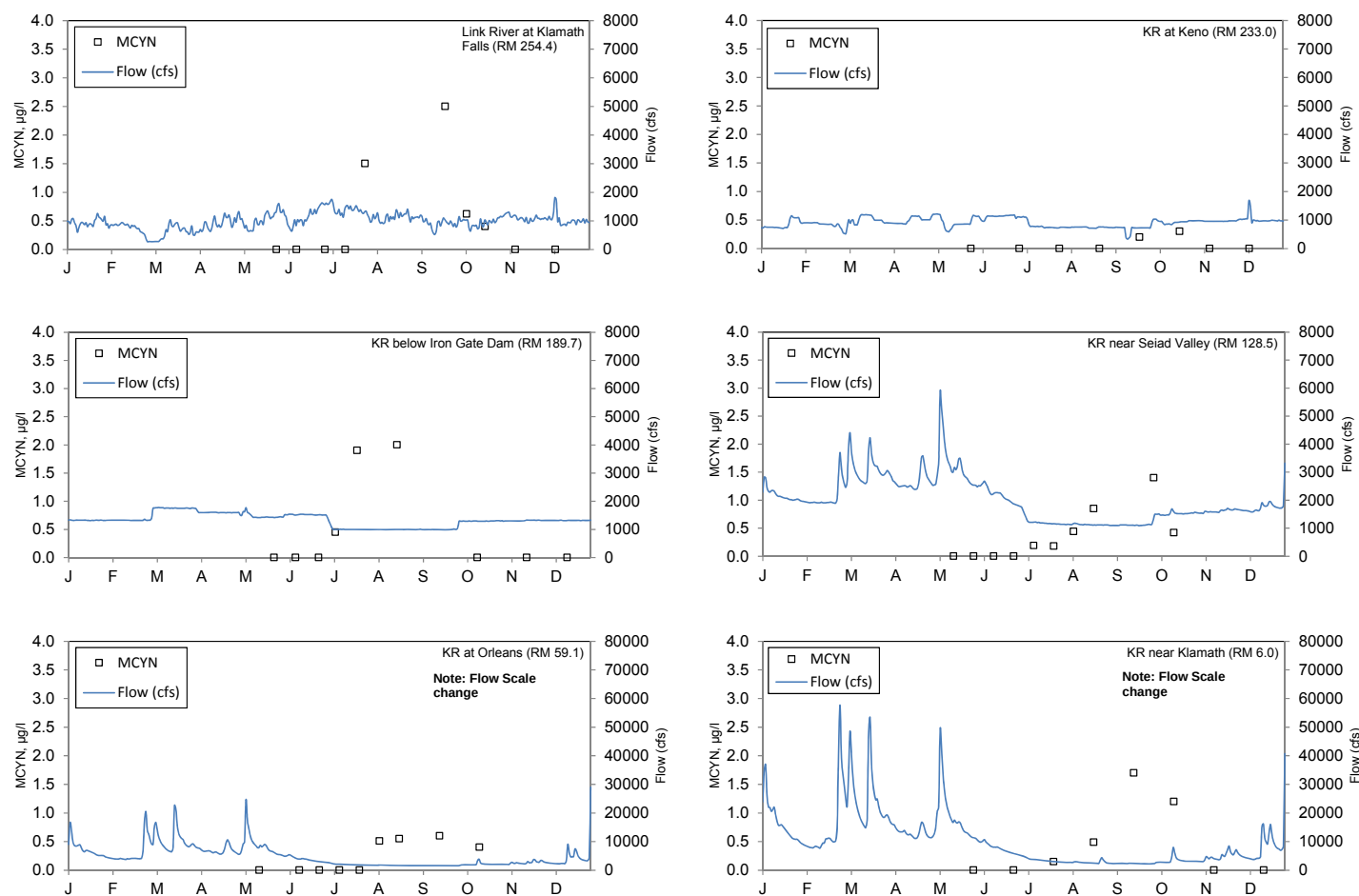
Errata Figure 3. Baseline water quality program data for dissolved oxygen, dissolved organic carbon, total nitrogen, total phosphorus, and microcystin concentration (top to bottom) in the Shasta, Scott, Salmon, and Trinity rivers. May 2009 – December 2009). Note: A microcystin boxplot is not included for the Trinity River because there were fewer than six data points at this location.

8. Erroneous dissolved oxygen data was corrected in dataset. To reflect these changes to the dataset, the dissolved oxygen and USGS gage flow graph in Figure 5 was revised and is presented below in Errata Figure 5.



Errata Figure 5. Revised discrete 2009 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. Microcystin data was missing from the original dataset and has now been included. To reflect these changes to the dataset, the microcystin and USGS gage flow graph in Figure 9 was revised and is presented below in Errata Figure 9.



Errata Figure 9. Revised discrete 2009 microcystin (MCYN) 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). Only surface samples are taken in consideration. Non-detect values are presented as zeros.

10. The Appendix A 2009 KHSA dataset has been revised since the original 2009 Annual Report was completed. The revised dataset is presented in the table below in Errata Table 3.

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophylla ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
2009AI P-001	5/27/2009	6:50	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	P	17.28	7.8	111	7.35	19		53	5.4	4.53		0.07	<0.05		0.8	0.8	<0.05	0.09			15.97	40	8	<0.18
2009AI P-004	6/10/2009	7:30	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	17.4	9.29	111	9.06	10.2		54	5.7	6.13	7	0.08	<0.05		1.3	1.36	<0.05	0.05			7.18	6	<6.0	<0.18
2009AI P-011	6/30/2009	7:05	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	20.55	9.66	112	8.67	163		50	7.6	9.5	13	0.12	<0.05		1.8	1.8	<0.05	0.14			22.94	7	6	<0.18
2009AI P-018	7/14/2009	8:30	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	19.67	9.61	111	8.68	14.6		53	7.9	6.53	10	0.11	<0.05		1.8	1.86	<0.05	0.12			18.27	10	7	<0.18
2009AI P-024	7/28/2009	7:40	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	23.88	8.78	119	8.37	22.1		57	8.1	5.58	7	0.13	0.06		1.9	1.94	<0.05	0.15			5.78	7	<6.0	1.5
2009AI P-030	8/11/2009	8:00	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	20.33	9.81	118	9.26	631		58	7.9	23.2	23	0.16	<0.05		5.1	5.08	<0.05	0.37			66.70	24	18	13
2009AI P-038	8/25/2009	7:05	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	19.88	9.99	118	9.33	158		58	8.2	11.6	18	0.14	<0.05		3.6	3.59	0.05	0.23			37.93	19	14	4.1
2009AI P-043	9/8/2009	8:00	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	16.18	9.89	113	8.43	4.4		54	9.4	12.1	17	0.22	<0.05		4	3.98	0.06	0.3			10.99	21	13	5.5
2009AI P-050	9/22/2009	7:40	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	16.03	9.58	112	8.47			59	8.5		10	0.18	<0.05		3.9	3.95	0.05	0.26			22.63	15	8	2.5
2009AI P-056	10/7/2009	8:45	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	8.11	8.04	119	9.17	3.9		55	7.1	1.8		0.2	0.3		1.8	2.09	<0.05	0.09			29.37	7	<6.0	0.62
2009AI P-060	10/20/2009	7:30	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	10.93	7.7	124	6.96	2		61	7.9		3	0.4	0.33		1.7	2.02	<0.05	0.11			8.47	<6.0	<6.0	0.4
2009AI P-068	11/10/2009	8:30	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	5.17	7.6	128	8.86	8.8		58	6.3		<3	0.71	0.36		1.7	2.11	<0.05	0.08			14.20	11	<6.0	<0.18
2009AI P-076	12/8/2009	10:45	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	1.87	7.77	133	11.33	2		59	6	2.18	<3	0.84	0.4		1.8	2.25	<0.05	0.13			24.47	27	<6.0	<0.18
2009AI P-002	5/27/2009	9:10	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	18.31	8.04	120	8.25	26.3		55	5.5	1.94		0.07	<0.05		0.7	0.7	<0.05	0.07			5.39	11	<6.0	<0.18
2009AI P-014	6/30/2009	8:40	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	21.66	8.76	117	2.14	26.3		52	7.2	4.49		0.44	0.09		1.9	2	<0.05	0.13			6.57	8	6	<0.18
2009AI P-027	7/28/2009	9:20	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	23.75	7.39	129	2.56	8.8		58	7.9	2		0.53	0.05		1.5	1.57	0.06	0.12			4.55	<6.0	<6.0	0.66
2009AI P-040	8/25/2009	9:00	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	21.71	9.29	127	0.8	35		63	8.3	7.7		0.91	<0.05		4.1	4.1	0.09	0.32			18.88	17	14	<0.18
2009AI P-053	9/22/2009	9:20	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	17.34	8.52	146	0.51			70	9.7			1.59	<0.05		3.8	3.78	0.11	0.35			9.38	9	<6.0	0.25
2009AI P-065	10/20/2009	9:30	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	11.56	7.25	145	3.23	8.8		64	7.5			0.77	0.33		1.8	2.1	<0.05	0.1			6.82	<6.0	<6.0	0.45
2009AI P-073	11/10/2009	11:10	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	6.56	7.46	129	7.65	4.8		58	6.1			0.92	0.45		1.7	2.16	<0.05	0.1			12.03	6	<6.0	0.18
2009AI P-081	12/8/2009	10:00	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	0.32	7.7	159	10.73	5.1		65	6	1.8		0.93	0.47		2	2.48	<0.05	0.13			24.67	35	<6.0	<0.18
2009AI P-003	5/27/2009	11:50	KR23340	Klamath River below Keno Dam near a USGS	USBR	0.5	P	18.7	8.5	182	8.67	35		74	7.5	2.6		0.11	<0.05		0.9	0.9	0.14	0.19			6.93	13	<2.0	<0.18

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae,Chlorophyll/a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
2009AI P-009	6/10/2009	10:40	KR23340	gage (RM 233.4; Baseline) Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	18.08	9.24	190	9.52						7										14.63			
2009AI P-015	6/30/2009	7:50	KR23340	gage (RM 233.4; Baseline) Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	20.9	8.91	128	7.84	23.8		55	8.1	3.93	6	0.15	<0.05		1.5	1.5	0.05	0.15			7.86	7	<6.0	<0.18
2009AI P-023	7/14/2009	11:00	KR23340	gage (RM 233.4; Baseline) Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	20.68	7.9	181	7.28						4										4.60			
2009AI P-028	7/28/2009	10:50	KR23340	gage (RM 233.4; Baseline) Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	26.61	8.25	148	7.6	26.3		66	9.2	2.94	3	0.66	<0.05		2.1	2.11	0.07	0.17			4.02	<6.0	<6.0	<0.18
2009AI P-036	8/11/2009	10:00	KR23340	gage (RM 233.4; Baseline) Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	19.69	8.51	152	8.37						5										8.60			
2009AI P-041	8/25/2009	10:30	KR23340	gage (RM 233.4; Baseline) Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	20.48	8.75	151	7.3	18		57	8.7	2.33	5	0.95	<0.05		2.9	2.95	0.12	0.23			5.13	6	<6.0	<0.18
2009AI P-049	9/8/2009	11:00	KR23340	gage (RM 233.4; Baseline) Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	18.12	8.16	139	7.38						3										3.67			
2009AI P-054	9/22/2009	10:45	KR23340	gage (RM 233.4; Baseline) Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	18.2	8.2	170	7.64			74	9.8		3	1.19	<0.05		3.2	3.25	0.11	0.26			4.59	<6.0	<6.0	0.2
2009AI P-066	10/20/2009	11:00	KR23340	gage (RM 233.4; Baseline) Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	10.77	7.47	161	8.94	7.3		70	7.3		<3	0.59	0.36		1.4	1.74	<0.05	0.09			4.70	<6.0	<6.0	0.3
2009AI P-074	11/10/2009	12:45	KR23340	gage (RM 233.4; Baseline) Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	7.1	7.66	141	10.55	5.8		60	6.3		<3	0.71	0.52		1.6	2.15	<0.05	0.09			10.57	6	<6.0	<0.18
2009AI P-082	12/8/2009	8:30	KR23340	gage (RM 233.4; Baseline) Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	0.84	7.6	195	11.84	16		68	7.1	1.64	<3	0.84	0.54		1.9	2.43	<0.05	0.1			18.63	20	<6.0	<0.18
KR9055	5/25/2009	13:00	KR22822	above J.C. Boyle Reservoir (RM 228.22; Baseline) Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	20.42	8.5	192.9	8.33	32.32	9.52		7.22	2.27		<0.05	0.049	0.372			0.81	0.19	0.28			13.2	3.2	<0.18
KR9070	6/23/2009	21:20	KR22822	above J.C. Boyle Reservoir (RM 228.22; Baseline) Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	19.03	7.76	205	7.89			78.3	8.15			0.12	0.4				1.04	0.095	0.12			6	<2.0	
KR9130	7/21/2009	13:50	KR22822	above J.C. Boyle Reservoir (RM 228.22; Baseline) Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	25.16	7.71	144	7.93	2.35	2.42	57.6	8.42	0.876		0.086	0.76	0.156			1.4	0.19	0.2			3.6	2.4	
KR9163	8/19/2009	11:20	KR22822	above J.C. Boyle Reservoir (RM 228.22; Baseline) Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	21.3	7.61	143.4	3.86	10.82	9.7	57.9	8.22	1.46		0.13	0.99	0.242			2.47	0.22	0.23			5.2	<2.0	
KR9202	9/16/2009	12:45	KR22822	above J.C. Boyle Reservoir (RM 228.22; Baseline) Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	19.53	7.99	140	9.23	9.37	10.56	54	9.75	0.525		<0.05	1.55	0.0634			2.18	0.24	0.3			4.8	<2.0	
KR9271	11/18/2009	11:35	KR22822	above J.C. Boyle Reservoir (RM 228.22; Baseline) Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	4.52	7.67	160.1	17.64	5.13	2.9	59	6.22	0.536		0.36	0.95	0.0937			2.12	0.12	0.11			4.4	<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, Phosphytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l	
KR9053	5/25/2009	11:30	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P					22.17	4.49		7.92	1.83		<0.05	<0.01	0.31		0.69	0.18	0.29				6	2.4	<0.18	
KR9054	5/25/2009	11:35	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8	P	18.19	7.67	201.9	7.35				8.08	1.88		<0.05	0.05	0.31		0.79	0.2	0.27				6.8	2	<0.18	
KR9071	6/23/2009	20:30	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	20.59	8.16	200.8	8.93			77.1	8.52			0.12	0.26			0.85	0.095	0.13				4	<2.0	<0.18	
KR9072	6/23/2009	20:15	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8	P	17.87	7.53	202.3	6.94			80.7	<0.20		8.56	0.22	0.91			<0.20	0.1	4.8				2.4		<0.18	
KR9128	7/21/2009	10:40	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	24.23	7.51	153.3	6.85	2.15	2.79	60	8.96	1.1		0.35	0.63	0.214		1.52	0.22	0.24				<2.0	<2.0	<0.18	
KR9129	7/21/2009	11:00	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8	P	21.55	7.1	152.7	3.67	2.12	2.33	61.3	8.78	0.579		0.18	0.66	0.117		1.41	0.18	0.23				3.2	2	<0.18	
KR9161	8/19/2009	12:30	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	22.18	7.65	146.9	4.02	6.14	4.29	59.7	7.97	0.946		0.13	0.89	0.216		2	0.19	0.18				2	<2.0	0.37	
KR9162	8/19/2009	12:40	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8	P	19.51	7.12	152.8	2.4	7.53	6.59	61.1	8.48	1		0.21	0.87	0.184		2.01	0.21	0.21				4.8	<2.0	0.24	
KR9200	9/16/2009	9:30	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	18.67	7.23	151.5	5.79	1.60	1.97	58	8.35	0.943		0.16	1.12	0.127		1.52	0.22	0.31				2	<2.0	<0.18	
KR9201	9/16/2009	9:40	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8	P	18.03	7.12	153.4	4.65	4.84	5.97	58	9.67	1.15		0.3	1.16	0.17		1.71	0.25	0.35				2.8	<2.0	<0.18	
KR9238	10/14/2009	10:35	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	10.47	7.47	167.5	9.29	4.45	4.06	67	8.04	0.483		0.15	0.85	0.0928	1.32	2.9	0.095	0.14				2	<2.0	0.19	
KR9239	10/14/2009	10:40	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8	P	10.42	7.72	168.8	9.5	4.10	3.99	67	7.86	0.648		0.17	0.84	0.113	1.22	2.62	0.1	0.21				3.2	<2.0	0.2	
KR9269	11/18/2009	12:35	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	4.19	7.58	149.1	10.78	3.30	2.41	59	5.87	0.474		0.36	0.92	0.087		2.03	0.08	0.1				4	<2.0	<0.18	
KR9270	11/18/2009	12:45	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	8	P	4.15	7.52	151.1	10.82	4.09	2.27	57	6.17	0.547		0.34	0.93	0.0893		2.1	0.11	0.094				2.8	<2.0	<0.18	
KR9046	5/25/2009	10:45	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	19.7	8.19	203.2	7.9	28.02	5.69		7.83	2.01		<0.05	0.027	0.343		0.82	0.19	0.26				8.8	2.4		
KR9069	6/23/2009	17:40	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	19.38	7.8	189.2	8.92			75.6	9.78			0.18	0.28			0.91	0.14	0.15				4.8	<2.0		
KR9125	7/21/2009	11:40	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	23.33	7.46	151.3	7.95	1.99	2.05	60.6	9.74	0.785		0.22	0.69	0.141		1.46	0.19	0.21				2.8	<2.0		
KR9157	8/19/2009	14:25	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	21.42	7.55	147.8	4.32	7.19	6.37	59.7	7.73	1.24		0.14	0.92	0.212		2.09	0.19	0.21				3.2	<2.0		
KR9160 MS	8/19/2009	14:40	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P								4.21																
KR9196	9/16/2009	11:40	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	18.52	7.7	145	9.6	4.00	4.54	58	8.2	0.697		0.19	1.21	0.102		1.75	0.25	0.29				<2.0	<2.0		
KR9234	10/14/2009	11:45	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	10.53	7.61	168	10.32	4.48	4.87	69	7.92	0.673		0.13	0.87	0.11	1.25	3.15	0.13	0.12				3.2	<2.0		
KR9265	11/18/2009	10:30	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	4.1	7.65	148.5	11.19	3.47	2.16	58	5.81	0.421		0.3	0.95	0.067		2	0.09	0.099				2	<2.0		
KR9292	12/16/2009	10:45	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	R	0.84	7.79	169.7	17.18	7.38	3.83	65.2	6.22	1	3.36	0.58	0.77	0.167		2.3	0.05	0.086				12.4	2.4	<0.18	
KR9052	5/25/2009	10:00	KR22000	Klamath River at Spring Island (RM 220.0;	PacifiCorp	0.5	P	19.37	8.06	206.2	8.38	27.97	5.43		8.06	1.77		<0.05	0.041	0.312		0.72	0.21	0.26				7.2	<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, Phycophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l	
Baseline)																															
KR9075	6/23/2009	15:52	KR22000	Klamath River at Spring Island (RM 220.0; Baseline)	PacifiCorp	0.5	P	19.5	7.29	188.8	8.66			73.8	7.97			0.1	0.29				0.91	0.095	0.12				3.6	<2.0	<0.18
KR9124	7/21/2009	12:50	KR22000	Klamath River at Spring Island (RM 220.0; Baseline)	PacifiCorp	0.5	P	23.32	7.4	150	8.97	4.56	2.7	60	9.05	0.678		0.17	0.71	0.13			1.51	0.19	0.2				3.2	2	<0.18
KR9158	8/19/2009	13:15	KR22000	Klamath River at Spring Island (RM 220.0; Baseline)	PacifiCorp	0.5	P	21.24	7.47	147.9	4.13	7.93	6.07	60.6	8.57	1.01		0.12	0.92	0.191			2.08	0.19	0.19				2.8	<2.0	0.26
KR9197	9/16/2009	10:10	KR22000	Klamath River at Spring Island (RM 220.0; Baseline)	PacifiCorp	0.5	P	13.17	8.09	148.5	11.22	1.24	1.33	66	2.56	0.346		<0.05	0.55	0.0407			0.42	0.14	0.18				<2.0	<2.0	<0.18
KR9197 MS	9/16/2009	10:10	KR22000	Klamath River at Spring Island (RM 220.0; Baseline)	PacifiCorp	0.5	P								6.69																
KR9235	10/14/2009	14:00	KR22000	Klamath River at Spring Island (RM 220.0; Baseline)	PacifiCorp	0.5	P	10.55	7.57	167.9	11.52	4.00	4.11	67	7.43	0.273		0.1	0.88	0.053	1.28		2.82	0.11	0.098				4.4	<2.0	0.24
KR9266	11/18/2009	9:45	KR22000	Klamath River at Spring Island (RM 220.0; Baseline)	PacifiCorp	0.5	P	4.24	7.68	147.8	10.76	3.72	2.26	57	5.69	0.514		0.28	0.97	0.0848			1.95	0.07	0.091				2.8	<2.0	0.18
KR9293	12/16/2009	12:00	KR22000	Klamath River at Spring Island (RM 220.0; Baseline)	PacifiCorp	0.5	P	1.02	7.7	168.8	12.55	7.66	3.78	64.2	6.26	1.04		0.58	0.78	0.185			2.36	0.06	0.1				12.4	2	<0.18
KR9050	5/23/2009	8:00	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	20.26	8.66	210.3	9.28	13.99	4.83		7.78	2.75	4.7	<0.05	0.054	0.436			0.82	0.17	0.24				10	3.2	
KR9076	6/24/2009	15:05	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	20.02	8.42	190.2	10.27			77.2	7.33		<2	<0.05	0.34			0.82	0.095	0.11				5.2	<2.0	<0.18	
KR9105	7/20/2009	20:25	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	23.32	7.89	152.3	8.41	2.75	2.76	61.4	7.75	0.669	5.1	<0.05	0.84	0.141			1.1	0.21	0.18				2.8	<2.0	
KR9138	8/17/2009	19:00	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	20.84	8.05	144.3	11	7.23	4.71	59.4	7.75	0.983	<2	<0.05	0.78	0.159			1.58	0.18	0.16				4.4	<2.0	<0.18
KR9177	9/15/2009	16:30	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	16.6	8.63	153.1	11.28	1.13	1.18	65	3.26	0.449	7.62	<0.05	0.49	0.0589			0.28	0.12	0.15				<2.0	<2.0	<0.18
KR9215	10/13/2009	16:50	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	13.8	7.35	171.5	8.34	2.54	1.56	72	5.6	0.636	<2	0.21	0.66	0.115	1.02	2.03	0.21	0.32				<2.0	<2.0	0.52	
KR9246	11/16/2009	16:20	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	7.49	7.87	146.1	11.66	2.67	2.19	62	2.98	0.439	6.3	<0.05	0.63	0.067			0.85	0.11	0.098				3.6	<2.0	<0.18
KR9273	12/14/2009	16:35	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	2.81	7.79	177	15.34	5.79	3.48	67.1	5.59	0.63	3.53	0.39	0.89	0.118			2.03	0.1	0.15				11.2	<2.0	<0.18
KR9033	5/24/2009	11:25	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P																								<0.18
KR9034	5/24/2009	11:50	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.8	I	19.05	8.61	198.7	10.09	25.17	2.4																		<0.18
KR9035	5/24/2009	11:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	22.41	8.6	206.9	8.96	23.72	2.56		6.05	1.88		<0.05	<0.01	0.253			0.59	0.13	0.18				8.4	3.6	<0.18
KR9036	5/24/2009	11:05	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	9	P	17.07	7.86	202.1	8.61	16.78	2.75		6.28	1.16		<0.05	<0.01	0.182			0.51	0.15	0.2				3.6	<2.0	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophylla ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
KR9038	5/24/2009	11:10	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	18	P	11.01	7.2	225.8	3.61				5.6	0.7		0.36	0.036	0.104		0.92	0.27	0.29				2.4	<2.0	
KR9039	5/24/2009	11:15	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	27	P								5.83	1.72		<0.05	<0.01	0.224		0.52	0.14	0.24				4.4	2.4	
KR9079	6/24/2009	14:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I																							<0.18
KR9080	6/24/2009	12:25	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	22.2	8.76	205.1	11.95			79.4	6.75			<0.05	0.083			0.49	0.095	0.16				2.4	<2.0	0.19
KR9081	6/24/2009	12:55	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	9	P	18.08	7.58	206.4	7.24			78.4	6.26			0.13	0.17			0.62	0.12	0.15				<2.0	<2.0	
KR9082	6/24/2009	13:35	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	18	P	11.88	7.11	215.9	2.34			79.7	5.66			0.28	0.042			0.65	0.25	0.27				2.8	2	
KR9083	6/24/2009	13:55	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	27	P	10.6	7.1	238.1	1.86			91.3	6.26			1	<0.01			0.84	0.62	0.73				3.2	2	
KR9116	7/21/2009	14:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					6.75	2.2			0.689				0.13										3.5
KR9117	7/21/2009	14:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P																							24
KR9118	7/22/2009	14:10	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	24.73	8.71	163.7	10.94	22.52	1	67.5	6.37	3.25		<0.05	0.48	0.585		0.92	0.12	0.16				5.6	5.6	16
KR9119	7/22/2009	14:30	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	9	P	20.69	7.43	168.7	5.49	2.21	3.14	68.4	5.47	0.608		0.091	0.52	0.108		0.69	0.22	0.15				<2.0	<2.0	
KR9120	7/22/2009	14:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	18	P					0.91	1.19	81.8	5.29	0.421		0.37	0.15	0.0749		0.45	0.31	0.33				<2.0	<2.0	
KR9121	7/22/2009	14:50	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	27	P	10.95	7.2	235.8	2.03	0.91	0.83	93.8	5.99	0.579		1.21	<0.01	0.117		0.82	0.76	0.7				<2.0	<2.0	
KR9149	8/18/2009	15:35	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I																							4.7
KR9150	8/18/2009	14:39	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	22.28	9.09	155.5	6.93																			100
KR9151	8/18/2009	14:40	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	22.28	9.09	155.5	6.93	63.35	2.54	67.3	6.03	4.03		<0.05	0.28	0.781		1.27	0.14	0.16				9.6	3.6	8.9
KR9152	8/18/2009	15:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	9	P	20.15	8.13	161.2	4.48	8.47	1.32	67.2	5.81	0.58		<0.05	0.34	0.123		1	0.14	0.11				4	2	
KR9153	8/18/2009	15:15	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	18	P	15.2	7.21	213.5	1.44	1.21	0.9	76.3	5.44	0.427		0.41	0.21	0.0786		0.99	0.29	0.28				3.2	<2.0	
KR9154	8/18/2009	15:25	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	27	P	11.23	7.09	237.4	1.4	0.90	0.78	96	5.69	0.689		1.5	0.015	0.128		1.45	1.4	0.85				3.6	<2.0	
KR9188	9/15/2009	11:30	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					26.80	1.19			1.64				0.285										6.2
KR9189	9/15/2009	10:05	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P																							15
KR9190	9/15/2009	10:10	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	19.2	8.69	158	10.88	31.17	0.29	75	6.01	3		<0.05	0.59	0.582		0.83	0.15	0.25				4.8	3.6	14
KR9191	9/15/2009	10:20	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	9	P	18.73	8.59	156.2	10.58	13.68	1.35	74	5.79	1.19		<0.05	0.6	0.22		0.72	0.14	0.18				3.2	2	
KR9192	9/15/2009	11:15	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	18	P	16.99	7.14	169.5	3.39	2.83	1.92	64	5.62	0.775		0.22	0.8	0.124		0.93	0.2	0.28				2.4	<2.0	
KR9193	9/15/2009	11:20	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	27	P					0.68	0.29	102	5.92	0.189		1.94	0.016	0.0136		0.89	0.8	1.11				2	<2.0	
KR9226	10/13/2009	11:15	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					7.05	2.62			1.25				0.188										0.69

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, Phaeophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l	
KR9227	10/13/2009	11:10	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P																							1.2	
KR9228	10/13/2009	10:50	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	13.1	7.56	166	8.28	5.25	1.77	67	6.18	0.633		0.075	0.88	0.133	1.12	2.74	0.2	0.22				2.4	<2.0	2.3	
KR9229	10/13/2009	10:55	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	9	P	12.81	7.72	166.8	6.78	3.39	2.36	68	6.45	0.548		0.12	0.89	0.0906	1.12	2.52	0.18	0.17				2.8	<2.0		
KR9230	10/13/2009	11:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	18	P	12.21	7.64	169.8	5.83	2.51	3.15	71	6.87	0.657		0.23	0.85	0.095	1.38	2.73	0.21	0.25				3.2	<2.0		
KR9231	10/13/2009	11:05	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	27	P					1.41	1.95	82	6.16	1.86		1.04	0.4	0.351	2.08	2.68	0.5	0.55				8.8	3.6		
KR9257	11/17/2009	11:25	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					1.71	1.72		0.835					0.0937										<0.18	
KR9258	11/17/2009	11:20	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P																								<0.18
KR9259	11/17/2009	11:30	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	8.14	7.57	158.2	9.56	1.07	1.05	63	5.58	0.201		0.1	0.88	0.0357		1.55	0.12	0.15				2.4	<2.0	<0.18	
KR9260	11/17/2009	11:35	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	9	P	7.58	7.52	155.5	10.18	1.02	1.33	63	5.14	0.236		0.11	0.89	0.0335		1.51	0.12	0.11				2	<2.0		
KR9261	11/17/2009	11:40	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	18	P	7.26	7.55	154.5	10.39	1.21	1.23	63	5.24	0.201		0.084	0.88	0.0312		1.49	0.1	0.12				<2.0	<2.0		
KR9262	11/17/2009	11:45	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	27	P	7.16	7.55	154.2	10.44	1.27	1.44	62	5.15	0.305		0.11	0.9	0.0536		1.49	0.1	0.13				<2.0	<2.0		
KR9284	12/15/2009	11:05	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					3.62	2.33		1.08					0.151										<0.18	
KR9286	12/15/2009	10:45	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	1.95	7.82	173.8	12.78	2.97	2.8	67.9	5.26	0.547		0.28	0.88	0.08		1.96	0.08	0.11				7.2	2.4	<0.18	
KR9287	12/15/2009	10:50	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	9	P	2.93	7.67	165.3	11.98	2.11	1.9	67.2	4.9	0.361		0.26	0.89	0.064		1.71	0.09	0.095				4.4	<2.0		
KR9288	12/15/2009	10:55	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	18	P	3.35	7.65	163.7	11.57	0.68	0.86	65	4.8	0.275		0.2	0.92	0.0457		1.75	0.12	0.092				3.2	<2.0		
KR9289	12/15/2009	11:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	27	P	3.62	7.58	165.4	11.13	1.10	1.07	65.9	4.72	0.32		0.21	0.9	0.0423		1.55	0.11	0.13				2	<2.0		
KR9084	6/24/2009	16:40	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	19.36	8.01	202.4	8.84			79.7	6.53			0.085	0.16			0.61	0.11	0.15				<2.0	<0.87	<0.18	
KR9122	7/22/2009	16:00	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	22.04	8.17	168.2	8.43	9.94	3.07	70.5	5.67	1.25		0.05	0.48	0.227		0.78	0.17	0.36				3.6	3.6	6	
KR9122 MS	7/22/2009	16:05	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P								11.9																
KR9194	9/15/2009	9:00	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	18.49	8.3	162	9.17	9.97	1.28	65	5.53	1.01		0.058	0.68	0.177		0.84	0.17	0.34				2.8	2.4	2	
KR9232	10/13/2009	12:55	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	12.94	7.69	165.1	10.37	6.06	2.89	67	6.73	0.932		0.11	0.9	0.177	1.28	2.84	0.19	0.21				3.6	<2.0	1.8	
KR9263	11/17/2009	9:30	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	7.73	7.62	156.3	9.81	2.67	1.77	63	5.15	0.314		0.078	0.9	0.0536		1.52	0.11	0.08				2.4	<2.0	<0.18	
KR9290	12/15/2009	9:40	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	2.93	7.74	167.7		1.51	1.26	64.6	4.92	0.384		0.22	0.91	0.0503		1.81	0.09	0.071				4	2	<0.18	
KR9040	5/24/2009	14:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P					11.22	1.34																		<0.18

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll a ug/l	Algae, Phaeophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l	
KR9041	5/24/2009	14:35	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.8	I					17.94	2.97																		<0.18
KR9042	5/24/2009	14:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	22.47	8.87	176.9	9.78				4.9	1.4		<0.05	<0.01	0.179		0.43	0.082	0.12					7.2	<2.0	<0.18
KR9043	5/24/2009	14:05	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	10	P	13.13	7.53	182.7	8.01				5.3	1.06		<0.05	<0.01	0.171		0.37	0.072	0.13					4	<2.0	
KR9047	5/24/2009	14:10	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	20	P	7.75	7.38	215.3	6.81				4.82	0.558		<0.05	0.52	0.0875		0.84	0.049	0.13					<2.0	<2.0	
KR9048	5/24/2009	14:15	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	30	P								5.14	0.743		<0.05	0.72	0.124		1.05	0.12	0.16					<2.0	<2.0	
KR9049	5/24/2009	14:20	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	40	P								4.62	0.751		<0.05	0.79	0.115		1.15	0.11	0.14					<2.0	<2.0	
KR9085	6/24/2009	14:05	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.8	I																								<0.18
KR9086	6/24/2009	19:15	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	21.78	8.63	182.3	10.17			73.6	5.83			<0.05	0.039			0.38	0.1	0.14					<2.0	<2.0	<0.18
KR9089	6/24/2009	18:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	10	P	6.75	7.15	207.5	3.9			79.8	4.31			<0.05	0.42			0.63	0.11	0.14					<2.0	<2.0	
KR9090	6/24/2009	18:45	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	20	P	8.88	7.23	215.3	6.11			79.8	4.69			<0.05	0.48			0.64	0.098	0.11					<2.0	<2.0	
KR9091	6/24/2009	19:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	30	P	18.19	7.55	181.5	7.6			74.4	5.51			0.081	0.1			0.4	0.16	0.16					<2.0	<2.0	
KR9092	6/24/2009	18:20	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	40	P	6.63	7.1	208.2	2.18			77	4.68			<0.05	0.78			0.95	0.13	0.13				2	<2.0		
KR9107	7/21/2009	10:10	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.8	I					14.69	2.04			1.35					0.227										10
KR9109	7/22/2009	10:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	25.43	9.21	178.2	11.71	17.27	0.42	74.6	6.66	1.84		<0.05	<0.01	0.319		0.41	0.075	0.16					6.4	6.4	
KR9110	7/22/2009	10:20	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	10	P	20.05	7.28	181.8	3.95	6.50	1.96	71.6	5.65	0.555		<0.05	0.39	0.106		0.49	0.14	0.15					<2.0	<2.0	
KR9111	7/22/2009	10:50	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	20	P	9.54	7.21	210.6	4.39	0.71	0.51	80.9	5.01	0.299		<0.05	0.42	0.0573		0.44	0.17	0.1					<2.0	<2.0	
KR9112	7/22/2009	11:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	30	P	6.95	7.16	206.2	2.77	0.68	0.37	78.6	4.69	0.56		<0.05	0.68	0.165		0.67	0.15	0.13					<2.0	<2.0	
KR9113	7/22/2009	12:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	40	P	6.75	7.16	208.9	2.54	0.68	0.39	79.6	4.5	0.279		0.067	0.66	0.0529		0.7	0.15	0.12					<2.0	<2.0	
KR9140	8/18/2009	13:10	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.8	I																								5.6
KR9141	8/18/2009	11:20	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P																								7.4
KR9142	8/18/2009	11:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	23.36	9.29	165.3	6.72	30.09	1.72	72.1	6.48	2.1		<0.05	<0.01	0.357		0.67	0.12	0.12					4.8	2.8	12
KR9143	8/18/2009	11:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	10	P	20.6	7.33	169.7	6.83	5.43	1.34	70	5.37	0.161		<0.05	0.5	0.0359			0.18	0.16					2.4	<2.0	
KR9144	8/18/2009	12:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	20	P	11.24	7.15	205.4	3.57	1.58	0.79	78.2	4.26	0.214		<0.05	0.39	0.0427		0.74	0.16	0.16					<2.0	<2.0	
KR9145	8/18/2009	12:20	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	30	P	7.11	7.16	209.3	1.99	1.65	0.53	79.8	4.72	0.289		<0.05	0.6	0.0629		1.07	0.16	0.17					<2.0	<2.0	
KR9146	8/18/2009	12:35	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	40	P	6.85	7.15	211.7	1.73	2.16	0.54	79.8	4.75	0.357		0.17	0.58	0.0674		1.09	0.2	0.16				2	<2.0		
KR9179	9/15/2009	13:50	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.8	I					41.99	0.29			2.4					0.464										7.6

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, Phosphytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l	
KR9180	9/15/2009	13:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P																								13
KR9181	9/15/2009	12:55	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	19.62	8.88	160.2	11.1	45.70	0.29	68	5.08	3.54		<0.05	0.12	0.742		0.4	0.15	0.19					5.6	4.4	11
KR9182	9/15/2009	13:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	10	P	19.18	8.11	162	7.05	6.04	0.94	68	5.46	0.65		<0.05	0.39	0.111		0.39	0.16	0.15					<2.0	<2.0	
KR9183	9/15/2009	13:20	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	20	P	11.47	7.02	205	1.46	1.10	0.64	76	4.38	0.514		<0.05	0.15	0.0724		<0.20	0.21	0.22					<2.0	<2.0	
KR9184	9/15/2009	13:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	30	P					0.77	0.51	81	4.76	0.647		0.13	0.46	0.0928		0.42	0.16	0.16					<2.0	<2.0	
KR9185	9/15/2009	13:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	40	P					0.68	0.43	81	4.44	0.441		0.24	0.5	0.0611		0.47	0.18	0.22					<2.0	<2.0	
KR9217	10/13/2009	15:10	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					2.93	1.41			0.86					0.13										2.6
KR9218	10/13/2009	15:05	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P																								0.39
KR9219	10/13/2009	14:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	13.98	7.39	169.1	7.61	2.09	1.33	70	5.8	0.432		0.18	0.68	0.0707	1.07	2.11	0.2	0.22					2.4	<2.0	0.93
KR9220	10/13/2009	14:45	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	10	P	13.97	7.62	169.6	7.93	2.19	1.62	69	5.95	0.697		0.19	0.69	0.119	1.14	2.1	0.23	0.24					2	<2.0	
KR9221	10/13/2009	14:50	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	20	P	12.54	7.36	188.3	4.55	1.52	1.52	73	5.77	0.677		0.2	0.59	0.117	0.95	1.95	0.23	0.24					2	<2.0	
KR9222	10/13/2009	14:55	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	30	P	7.34	7.18	211.9	1.94	0.72	0.47	82	4.72	0.447		0.2	0.16	0.0685	1.03	0.9	0.23	0.22					<2.0	<2.0	
KR9223	10/13/2009	15:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	40	P	7.04	7.13	215.3	1.77	0.68	0.48	82	4.83	0.436		0.39	0.38	0.0751	1.05	1.26	0.23	0.25					<2.0	<2.0	
KR9248	11/17/2009	14:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					0.68	0.67			0.706					0.112										0.21
KR9249	11/17/2009	14:35	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P																								<0.18
KR9250	11/17/2009	14:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	9.67	7.32	168.2	8.31	0.68	0.62	68	5.32	0.277		0.15	0.75	0.0424		1.45	0.13	0.16					<2.0	<2.0	<0.18
KR9251	11/17/2009	14:10	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	10	P	9.66	7.26	167.7	7.56	0.77	0.71	69	5.63	0.243		0.17	0.76	0.0402		1.38	0.13	0.64					<2.0	<2.0	
KR9252	11/17/2009	14:15	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	20	P	9.16	7.12	173.3	5.83	0.81	0.87	69	5.43	0.44		0.18	0.73	0.0826		1.39	0.14	0.16					2	<2.0	
KR9253	11/17/2009	14:20	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	30	P	8.17	6.95	214.4	2.39	0.68	0.83	70	5.52	0.438		0.24	0.65	0.0826		1.35	0.16	0.15					2	<2.0	
KR9254	11/17/2009	13:50	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	40	P	7.12	6.91	222.4	1.18	0.68	0.36	82	4.74	0.566		0.51	0.33	0.121		1.18	0.23	0.23					2.8	<2.0	
KR9275	12/15/2009	13:35	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					1.26	0.75			0.519					0.0732										<0.18
KR9277	12/15/2009	12:45	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	5.36	7.47	160.3	10.4	1.45	0.75	65.6	4.83	0.308		0.16	0.83	0.0366		1.55	0.11	0.079					<2.0	<2.0	<0.18
KR9278	12/15/2009	12:55	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	10	P	4.64	7.49	160.9	10.04	0.68	0.73	65.4	4.84	0.304		0.16	0.85	0.0549		1.51	0.11	0.094					<2.0	<2.0	
KR9279	12/15/2009	13:05	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	20	P	4.39	7.51	161.6	10.12	0.78	0.86	65.4	4.76	0.353		0.16	0.84	0.0526		1.47	0.1	0.14					<2.0	<2.0	
KR9280	12/15/2009	13:15	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	30	P	4.27	7.51	161.8	10.15	0.76	0.73	65.6	4.75	0.578		0.17	0.85	0.08		1.64	0.11	0.098					<2.0	<2.0	
KR9281	12/15/2009	13:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	40	P	4.19	7.53	162.3	10.13	0.71	0.68	64.6	4.81	0.49		0.17	0.85	0.0709		1.63	0.11	0.11					<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, Chlorophyll-a ug/l	Algae, Phosphyrin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
KR9030	5/14/2009	10:15	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P							71	5.71		<2	<0.05	0.084				<0.20	0.092	0.11			2.4	<2.0	
KR9031	5/24/2009	17:00	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	18.05	8.42	179.5	9.78	20.21	2.65		5.63	1.54	2.6	<0.05	0.02	0.215			0.46	0.1	0.19			4.4	<2.0	<0.18
KR9058	6/8/2009	15:40	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P							76.5	5.62		<0.05	0.032					0.4	0.14	0.16			<2.0	<2.0	<0.18
KR9078	6/24/2009	20:30	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	20.5	8.25	183.1	10.33			69.8	5.76		<2	<0.05	0.075				0.41	0.12	0.12			<2.0	<2.0	<0.18
KR9094	7/6/2009	14:30	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P							76.5	6.6		<0.05	0.17							0.12			<2.0	<2.0	0.45
KR9106	7/21/2009	17:00	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	22.34	8.27	178.4	9.55	11.48	2.99	73.2	5.49	0.848	4.98	<0.05	0.22	0.149			0.43	0.12	0.13			3.6	3.2	1.9
KR9139	8/18/2009	16:50	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	21.93	8.82	166.8	5.04	14.32	1.94	70.1	5.99	1.02	<2	<0.05	0.19	0.186			0.73	0.13	0.11			3.2	<2.0	2
KR9178	9/15/2009	14:50	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	19.71	8.78	162.9	10.46	16.97	0.47	68	5.48	1.68	7.02	<0.05	0.22	0.327			0.47	0.15	0.21			3.6	2.4	8.7
KR9187 MS	9/15/2009	15:30	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P								4.14															
KR9216	10/13/2009	18:25	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	13.8	7.35	171.5	8.34	4.00	4.14	67	6.86	0.813	<2	<0.05	0.88	0.137	1.11	2.51	0.11	0.15			4	2.4	<0.18	
KR9247	11/17/2009	8:30	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	9.47	7.3	168.8	8.69	0.80	0.9	69	5.46	0.454	6.15	0.15	0.77	0.0804			1.44	0.14	0.15			2	<2.0	<0.18
KR9256 MS	11/17/2009	8:35	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P								4.47															
KR9274	12/15/2009	14:25	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	4.73	7.55	161.2	11.19	1.09	0.93	65.9	5.47	0.413	2.91	0.16	0.86	0.0549			1.55	0.1	0.11			<2.0	<2.0	<0.18
WA051 409-OC	5/14/2009	11:15	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	13.17	8.15	203	10.52	9.07	4.37	89.7	4.15			<0.010	0.095				0.56	0.078	0.1			5.5	2.5	<0.18
WA052 809-OC	5/28/2009	11:13	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	17.97	8.24	79	9.47	10.68	4.45	85.4	4.57			<0.010	0.012				0.5	0.073	0.11			5.37	2.12	<0.18
WA061 109-OC	6/11/2009	11:27	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	18.7	8.25	150	9.09	6.76	3.57	95	4.91			<0.010	0.02				0.52	0.1	0.15			5	1.75	
WA062 509-OC	6/25/2009	12:35	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	20.12	8.42	202	9.64	2.93	3.04	91.7	4.84			<0.010	0.07				0.61	0.082	0.13			3.75	2	<0.18
WA070 909-OC	7/9/2009	11:50	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	20.84	7.51	207		2.93	3.04	96.5	5.3			<0.010	0.14				0.63	0.086	0.11			2.25	1.62	0.39
WA072 309-OC	7/23/2009	12:05	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	23.75	8.52	192	9.55	5.6	4.48	86.1	5.07			<0.010	0.2				0.81	0.098	0.13			3.12	1.62	<0.18
WA080 609-OC	8/6/2009	12:00	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	21.28	8.45	184	8.55	13.88	4.05	85.6	5.03			<0.010	0.21				0.98	0.11	0.16			5.33	3.33	0.48

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophylla ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
WA082 009-OC	8/20/2009	12:13	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	22.86	8.64	181	9.29	8.54	4.53	83.3	4.69			<0.010	0.18			0.82	0.12	0.15				3.5	2.12	0.18
WA090 309-OC	9/3/2009	11:40	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	20.67	8.66	174	9.29	16.02	4.72	83.1	5.19			<0.010	0.14			0.96	0.11	0.15				5.16	3.16	0.21
WA091 709-OC	9/17/2009		KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P					10.14	4.8	84.8	4.64			0.017	0.27			1	0.12	0.16				5	3.16	4.9
WA100 109-OC	10/1/2009	11:22	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	15.37	8.4	184	10.01	18.69	10.09	84.3	4.76			<0.010	0.33			1.6	0.12	0.2				12.75	6	10
WA101 509-OC	10/15/2009	11:47	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	14.17	8.2	199	10.13	5.34	5.12	93.6	4.18			0.038	0.72			1.69	0.15	0.19				6.16	2.66	0.96
WA111 209-OC	11/12/2009	12:00	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	9.64	8.22	182	11.3	2.67	3.31	95.4	4.01			0.038	0.76			1.39	0.11	0.13				3.12	0.87	
WA121 009-OC	12/10/2009	12:40	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	P	2.98	8.18	110	13.04	2.93	3.79	87.5	3.56			0.044	0.82			1.62	0.077	0.1				2.75	0.87	
SV0514 09-OC	5/14/2009	10:10	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	12.55	8.09	168	10.7	6.94	3.33	82	2.93			0.011	0.03			0.33	0.039	0.065				6	2.16	<0.18
SV0528 09-OC	5/28/2009	10:12	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	17.71	8.1	42	9.27	6.14	3.76	81.1	3.28			<0.010	<0.010			0.35	0.043	0.079				11.5	2.62	<0.18
SV0611 09-OC	6/11/2009	10:05	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	18.13	8.24	200	9.06	4.8	3.29	97.3	3.86			0.01	0.013			0.44	0.075	0.12				7.5	2.33	<0.18
SV0625 09-OC	6/25/2009	11:20	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	20.19	8.4	202	9.59	2.13	3.65	96.6	4.28			<0.010	0.034			0.47	0.081	0.12				5.12	1.37	<0.18
SV0709 09-OC	7/9/2009	10:36	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	20.38	8.48	212	9.22	3.47	4.75	101.3	4.69			<0.010	<0.010			0.43	0.061	0.1				4.87	1.75	0.19
SV0723 09-OC	7/23/2009	10:45	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	23.65	8.43	199	9.28	5.07	4.45	89.7	4.72			0.013	0.075			0.62	0.082	0.11				2.87	1.62	0.18
SV0806 09-OC	8/6/2009	10:20	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	20.89	8.2	192	8.84	9.87	3.76	88.6	4.54			0.01	0.19			0.76	0.1	0.14				2.62	2	0.44
SV0820 09-OC	8/20/2009	10:21	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	22.46	8.49	185	9.36	8.54	5.84	90	4.66			<0.010	0.05			0.65	0.1	0.13				2.5	1.75	0.85
SV0903 09-OC	9/3/2009	10:05	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	20.32	8.24	185	8.85	6.94	5.2	87.9	4.76			0.014	0.18			0.81	0.11	0.14				5.62	3.37	
SV0917 09-OC	9/17/2009	10:45	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	19.89	8.49	184	9.49	14.95	5.6	88	4.41			<0.010	0.21			0.93	0.11	0.16				9.16	4.16	7.2
SV1001 09-OC	10/1/2009	9:50	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	14.24	8.48	186	10.54	16.55	4.37	88.6	4.48			<0.010	0.13			1.27	0.1	0.17				8.25	6.5	1.4
SV1015 09-OC	10/15/2009	10:25	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	13.92	8.17	204	10.13	5.34	6.99	93	4.05			0.025	0.66			1.43	0.15	0.17				6.5	2.5	0.42
SV1112 09-OC	11/12/2009	10:45	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	9.38	8.3	188	11.62	3.2	4.64	97.5	3.78			0.014	0.66			1.24	0.1	0.12				2.87	1.37	
SV1210 09-OC	12/10/2009	11:10	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	P	1.68	8.21	109	12.68	3.73	4.11	91.7	3.34			0.025	0.77			1.41	0.073	0.099				3.37	1.37	
HC052 809-OC	5/28/2009	9:32	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	17.62	7.99	159	9.13	5.87	2.72	78	2.71			<0.010	<0.010			0.29	0.037	0.064				4.5	1.5	<0.18
HC062 509-OC	6/25/2009	10:00	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	20.1	8.25	199	9.05	2.4	2.64	94.1	3.75			<0.010	0.01			0.34	0.073	0.1				3.37	1.37	<0.18
HC072 309-OC	7/23/2009	9:45	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	23.13	8.21	198	8.6	6.14	4.69	91	4.12			0.01	<0.010			0.47	0.065	0.1				4.87	2.12	<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, Phaeophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l	
Baseline)																															
HC082 009-OC	8/20/2009	9:30	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	22.17	8.26	187	8.23	6.4	4.43	90.4	4.23			<0.010	<0.010				0.57	0.088	0.12				3.87	1.87	0.24
HC091 709-OC	9/17/2009	10:05	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	19.42	8.16	185	8.76	15.48	11.42	89.1	4.06			0.028	0.22				0.85	0.1	0.16				11.83	5.16	2.1
HC101 509-OC	10/15/2009	9:27	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	13.5	8.08	192	10.6	7.47	10.46	91.3	3.61			0.02	0.55				1.31	0.11	0.16				10.4	3.19	0.51
HC111 209-OC	11/12/2009	10:00	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	9.44	8.13	184	11.35	4.45	4.27	93.4	3.48			0.01	0.57				1.05	0.089	0.11				3.62	1.12	
HC121 009-OC	12/10/2009	10:07	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	P	0.85	8.02	106	13.8	3.47	4	90.4	3.05			<0.010	0.69				1.12	0.061	0.087				2.62	1.12	
OR051 409-OC	5/14/2009	8:00	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	11.71	7.82	126	10.49	2.93	0.98	64.5	1.22			<0.010	0.011				0.14	0.017	0.032				8	2	<0.18
OR052 809-OC	5/28/2009	8:12	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	17.25	7.77	85	8.34	5.34	1.38	62.9	1.6			0.01	0.018				0.19	0.017	0.053				13.33	3.33	
OR061 109-OC	6/11/2009	7:50	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	17.36	8.14	121	9.3	2.93	1.92	77.7	2.31			<0.010	<0.010				0.2	0.035	0.061				3.37	1.12	<0.18
OR062 509-OC	6/25/2009	8:15	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	19.8	8.34	174	9.51	1.33	2.21	83.8	2.47			<0.010	<0.010				0.23	0.039	0.096				5.37	1.25	<0.18
OR070 909-OC	7/9/2009	8:00	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	20.59	8.07	184	6.56	1.24	1.24	89.6	2.69			0.011	<0.010				0.21	0.032	0.045				1.12	0.99	<0.18
OR072 309-OC	7/23/2009	8:08	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	23.44	8.09	173	7.21	3.47	2.13	85.9	3.24			<0.010	<0.010				0.32	0.042	0.06				2.5	1.37	<0.18
OR080 609-OC	8/6/2009	7:55	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	22.26	8.26		8.82	5.34	2.32	86.3	2.87			<0.010	<0.010				0.3	0.053	0.083				3.5	2.12	0.51
OR082 009-OC	8/20/2009	7:45	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	22.67	8.34	181	8.33	5.87	1.97	86	3.08			<0.010	<0.010				0.42	0.057	0.083				2.75	1.5	0.55
OR090 309-OC	9/3/2009	7:45	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	20.63	8.27	181	8.47	4.53	3.12	87.1	3.34			<0.010	<0.010				0.38	0.055	0.074				3	1.75	
OR091 709-OC	9/17/2009	8:36	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	19.68	8.29	171	8.4	6.14	0.96	88.8	3.01			0.017	0.064				0.43	0.082	0.096				3.62	1.62	0.6
OR100 109-OC	10/1/2009		KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P					34.17	11.8	89.7	3.51			<0.010	<0.010				0.95	0.049	0.19				17	7.75	6.4
OR101 509-OC	10/15/2009	8:00	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	13.26	8.14	154	10.37	22.42	22.8	70.5	3.74			0.015	0.31				1.32	0.052	0.2				56	13	0.4
OR111 209-OC	11/12/2009	8:30	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	9.42	8.14	126	11.62	2.53	4	84.4	2.63			<0.010	0.35				0.58	0.056	0.072				1.75	0.87	
OR121 009-OC	12/10/2009	8:43	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	P	1.01	8.07	97	14.14	20.02	4.83	85.6	2.33			<0.010	0.44				0.91	0.038	0.12				6.83	2.5	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophylla ug/l	Algae, Phaeophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
WE052 809	5/28/2009	11:06	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P	17.38	8.11	123	9.57	6.68	1.17	62.2	1.64			<0.010	<0.010			0.22	0.019	0.038				4	1.38	
WE061 109-OC	6/11/2009	11:24	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P																							<0.18
WE062 509	6/25/2009	11:24	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P	20.15	8.4	169	9.39	1.87	1.5	82.5	2.26			<0.010	<0.010			0.22	0.036	0.057				1.88	0.87	
WE071 009-OC	7/10/2009	12:42	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P																							<0.18
WE072 309-OC	7/23/2009	11:19	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P	22.66	8.32	181	8.94	4.01	2.72	86.9	2.58			<0.010	<0.010			0.34	0.037	0.054				2.75	1.75	
WE082 009-OC	8/20/2009	11:35	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P	22.09	8.24	179	9.02	5.87	1.6	85.8	2.82			<0.010	0.011			0.35	0.054	0.072				3.25	2.13	0.89
WE091 709-OC	9/17/2009	11:37	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P	19.78	8.2	180	9.48	5.61	4.3	86.9	2.92			<0.010	0.049			0.39	0.063	0.086				2.75	1.5	1.1
WE101 509-OC	10/15/2009	11:36	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P	13.29	7.92	152	10.18	25.63	20.35	71	3.77			<0.010	0.26			1.05	0.048	0.19				33.75	9.75	0.92
WE111 209-OC	11/12/2009	12:02	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P	9.75	8.21	171	12.03	3.74	4.3	83.7	2.66			0.013	0.33			0.58	0.056	0.067				1.88	0.63	
WE121 709-OC	12/17/2009	11:32	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	P	6.67	7.63	117	12.1	9.61	7.21	57.5	2.77			<0.010	0.21			0.52	0.017	0.063				11	3.75	<0.18
TC0528 09	5/28/2009	10:22	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	P	16.91	8.07	122	9.68	4.27	0.96	62.5	1.33			<0.010	<0.010			0.14	0.012	0.026				4	1	<0.18
TC0625 09-OC	6/25/2009	10:38	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	P	19.88	8.27	164	9	1.87	1.12	81.8	1.71			<0.010	<0.010			0.19	0.022	0.041				1.5	0.62	0.1
TC0723 09-OC	7/23/2009	10:24	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	P	22.52	8.32	181	8.4	2.67	3.31	83.5	2.04			<0.010	<0.010			0.22	0.024	0.042				2.5	1.5	0.16
TC0820 09-OC	8/20/2009	10:52	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	P	22.38	8.26	174	8.58	4.54	1.63	87.6	2.23			<0.010	<0.010			0.26	0.033	0.05				2.5	1.75	0.43
TC0917 09-OC	9/17/2009	10:58	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	P	19.99	8.2	173	9.08	4.54	3.5	83.6	2.01			<0.010	0.025			0.27	0.043	0.06				1.88	1.13	0.64
TC1015 09-OC	10/15/2009	10:59	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	P	13.44	7.85	158	10.03	27.23	18	73.8	2.83			<0.010	0.16			0.82	0.031	0.14				34	10	0.67
TC1112 09-OC	11/12/2009	11:14	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	P	9.73	8.14	172	11.73	2.94	3.23	85.7	2.09			0.011	0.24			0.45	0.041	0.05				1.88	0.63	<0.18
TC1217 09-OC	12/17/2009	10:59	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	P	6.75	7.68	131	11.95	14.42	10.25	64.3	2.24			0.011	0.16			0.77	0.011	0.1				38	6.5	
TG0528 09	5/28/2009	8:20	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P	16.59	8.07	123	9.4	4.54	1.07	63.2	1.08			<0.010	0.011			0.15	0.009	0.024				4.88	1.25	<0.18
TG0625 09-OC	6/25/2009	8:53	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P	18.96	8.09	163	8.96	2.67	1.82	80.4	1.42			<0.010	0.018			0.19	0.014	0.032				5	1.25	<0.18
TG0723 09-OC	7/23/2009	8:10	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P	20.72	7.68	178	7.2	5.07	2.59	86.5	1.46			<0.010	0.022			0.22	0.012	0.027				2	1.25	0.15
TG0820 09-OC	8/20/2009	8:28	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P	21.47	8.26	175	7.65	6.14	2.27	85.9	1.87			<0.010	0.013			0.25	0.02	0.042				2.75	1.75	0.49
TG0917 09-OC	9/17/2009	9:03	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P	20.01	8.19	174	8.13	7.74	4.97	84.7	1.96			<0.010	<0.010			0.27	0.031	0.054				3.75	1.5	1.7

Sample ID	Date	Time	Site ID	Site Name (Baseline)	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophylla ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
TG1015 09-OC	10/15/2009	8:43	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P	13.78	7.87	167	9.57	26.7	23.02	78.4	2.51			<0.010	0.22			0.8	0.046	0.15				30.25	7.25	1.2
TG1112 09-OC	11/12/2009	9:16	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P	10.2	7.84	171	10.71	2.31	4.54	84.6	1.65			0.012	0.23			0.4	0.033	0.044				2.13	1	<0.18
TG1217 09-OC	12/17/2009	9:00	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	P	7.01	7.61	128	11.73	19.22	13.67	62.8	1.97			0.019	0.16			0.7	0.011	0.12				51	7.5	<0.18
LES052 809	5/28/2009	7:33	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P	16.5	8.05	127	9.28	4.27	1.71	61.2	1.24			<0.010	<0.010			0.16	0.01	0.073				17.88	2.25	<0.18
LES062 509	6/25/2009	7:41	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P	19.14	8.01	2512	8.21	1.87	1.68	81.8	1.82			<0.010	0.012			0.2	0.017	0.034				3.5	1.38	<0.18
LES072 309-OC	7/23/2009	7:10	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P	19.5	8.17	14,100 - 14,200	8.12	3.2	2.03	94.8	1.61			0.022	0.015			0.29	0.014	0.028				2.38	0.75	0.19
LES082 009-OC	8/20/2009	7:33	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P	20.7	8.18	5,000 - 5,300	7.87	3.47	1.95	90	1.97			0.011	0.018			0.23	0.019	0.035				2.13	<0.50	0.34
LES091 709-OC	9/17/2009	8:09	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P	18.96	8.01	5,800 - 5,900	7.84	5.34	3.82	88.6	2.06			0.041	0.019			0.41	0.033	0.065				3.83	2.67	1.4
LES101 509-OC	10/15/2009	7:55	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P	14.01	7.83	22340	9.12	8.01	9.93	82.1	2.82			0.025	0.19			0.58	0.047	0.089				12.75	2.75	2.3
LES111 209-OC	11/12/2009	7:52	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P	9.93	7.89	7140	10.13	1.6	4.75	89	1.88			0.033	0.2			0.44	0.038	0.091				17	1.5	<0.18
LES121 709-OC	12/17/2009	7:56	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	P	7.1	7.44	162	11.5	17.09	16.18	59.9	1.9			0.026	0.2			0.69	0.012	0.12				42	8	0.23
SA0514 09-OC	5/14/2009	8:35	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	9.85	7.78	73	11.76	1.33	0.16	38.2	1.11			<0.010	<0.010			0.06	0.003	0.012				3.62	0.75	<0.18
SA0528 09-OC	5/28/2009	8:33	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	14.78	7.76	69	9.92	1.6	0.26	36.2	0.87			<0.010	<0.010			0.064	0.002	0.014				5.75	1.5	<0.18
SA0611 09-OC	6/11/2009	8:21	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	14.95	7.98	88	9.7	0.66	0.64	45.2	0.66			<0.010	<0.010			<0.050	0.002	0.006				0.75	0.5	<0.18
SA0625 09-OC	6/25/2009	8:52	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	17.75	8.08	105	9.55	1.33	0.16	54	0.66			<0.010	<0.010			<0.050	0.005	0.011				<0.50	<0.50	<0.18
SA0709 09-OC	7/9/2009	8:45	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	17.64	8.16	119	9.39	0.89	0.48	61	0.64			<0.010	<0.010			<0.050	0.003	0.006				<0.50	<0.50	<0.18
SA0723 09-OC	7/23/2009	8:45	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	20.35	8.09	130	9.2	9.87	5.25	65.3	0.52			<0.010	<0.010			0.13	<0.001	0.019				10	3.62	<0.18
SA0806 09-OC	8/6/2009	8:32	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	19.92	8.01	128	8.96	1.46	0.86	70.5	0.68			<0.010	<0.010			0.075	0.005	0.01				1.5	1.12	<0.18
SA0820 09-OC	8/20/2009	8:26	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	19.7	8.12	144	8.68	0.8	1.06	72.1	0.48			<0.010	<0.010			0.059	0.001	0.007				<0.50	<0.50	<0.18
SA0903 09-OC	9/3/2009	8:15	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	18.04	8.05	146	9.01	1.06	1.73	74.9	0.62			<0.010	<0.010			0.073	0.002	0.007				5.12	0.99	<0.18
SA0917 09-OC	9/17/2009	9:15	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	17.74	8.13	148	9.24	1.24	1.37	74.8	0.47			<0.010	0.014			<0.050	0.002	0.005				1.25	<0.50	<0.18
SA1001 09-OC	10/1/2009		SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P					1.6	1.13	73.5	0.53			<0.010	<0.010			0.069	0.001	0.007				1.87	1	<0.18
SA1015 09-OC	10/15/2009	8:38	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	12.18	7.92	95	10.6	12.81	9.23	43.6	3.52			<0.010	0.22			0.76	0.003	0.085				34.66	10.66	<0.18
SA1112 09-OC	11/12/2009	8:30	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	8.71	8.02	115	11.65	1.33	1.09	62.3	1.05			<0.010	0.016			0.076	0.004	0.008				2	0.75	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth,m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophylla ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
SA1210 09-OC	12/10/2009	9:15	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	0.05	8.03	65	14.31	4.53	0.5	61.9	0.51			<0.010	0.015			0.075	0.002	0.014				6.62	2.75	
SC0514 09-OC	5/14/2009	10:45	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	10.96	8.2	115	11.18	2.13	0.66	67.1	1.54			<0.010	0.058			0.15	0.004	0.014				5	0.87	<0.18
SC0528 09-OC	5/28/2009	10:42	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	15.64	8.33	116	9.77	2.13	1.41	67.4	1.43			<0.010	<0.010			0.1	0.001	0.009				3.5	1.37	0.19
SC0611 09-OC	6/11/2009	0:00	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	16.12	8.41	172	9.5	1.86	2.61	94.4	1.41			<0.010	0.064			0.16	<0.001	0.009				2.66	1.16	<0.18
SC0625 09-OC	6/25/2009	12:05	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	19.45	8.49	215	9.37	0.8	2.75	115.8	0.99			<0.010	0.11			0.2	<0.001	0.012				1.37	0.87	<0.18
SC0709 09-OC	7/9/2009	11:08	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	19.16	8.51	228	9.41	1.06	0.92	122.7	1.18			<0.010	0.011			0.1	<0.001	0.007				1.12	0.62	<0.18
SC0723 09-OC	7/23/2009	11:25	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	23.68	8.51	223	9.27	1.42	1.44	115.7	0.86			<0.010	<0.010			0.1	<0.001	0.006				0.5	<0.50	<0.18
SC0806 09-OC	8/6/2009	11:10	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	19.57	8.37	237	9.08	0.93	1.21	120.8	0.83			0.011	0.011			0.084	0.002	0.008				0.87	0.75	<0.18
SC0820 09-OC	8/20/2009	11:19	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	22.31	8.58	250	9.31	1.06	<0.1	120.4	0.95			<0.010	<0.010			0.14	0.001	0.007				0.99	0.99	<0.18
SC0903 09-OC	9/3/2009	10:50	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	19.81	8.55	256	9.6	0.71	1.15	123.9	0.99			<0.010	<0.010			0.077	<0.001	0.01				1.5	0.62	<0.18
SC0917 09-OC	9/17/2009	11:25	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	20.32	8.71	259	9.91	1.6	1.01	128.9	0.79			0.02	<0.010			0.076	<0.001	0.009				0.87	0.87	<0.18
SC1001 09-OC	10/1/2009	10:30	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	12.29	8.49	177	11.18	1.6	0.51	126.2	0.78			<0.010	<0.010			0.079	<0.001	0.006				0.75	<0.50	<0.18
SC1015 09-OC	10/15/2009	11:12	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	12.89	8.35	208	10.74	2.93	1.54	104.1	2.93			<0.010	<0.010			0.17	0.001	0.012				2.62	1.25	<0.18
SC1112 09-OC	11/12/2009	11:30	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	7.75	8.59	234	12.55	1.73	1.06	133.4	0.75			<0.010	0.024			0.078	0.001	0.003				<0.50	<0.50	
SC1210 09-OC	12/10/2009	11:45	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	0.01	8.34	152	13.77	4.09	0.26	148	0.78			<0.010	0.34			0.37	<0.001	0.002				0.99	0.5	
SH0514 09-OC	5/14/2009	12:06	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	15.79	8.62	556	10.81	4.27	3.57	307	5.52			<0.010	<0.010			0.52	0.15	0.18				9.16	3.5	<0.18
SH0528 09-OC	5/28/2009	12:11	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	21.41	8.57	607	9.83	1.33	1.46	318.2	5.49			<0.010	<0.010			0.45	0.2	0.24				0.75	<0.50	<0.18
SH0611 09-OC	6/11/2009	13:30	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	20.62	8.57	600	8.51	5.87	7.95	314.8	6.16			<0.010	<0.010			0.83	0.15	0.25				25.25	6.75	
SH0625 09-OC	6/25/2009	14:15	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	23.87	8.69	577	8.83	1.6	4.75	304	5.94			<0.010	<0.010			0.54	0.17	0.22				7.12	1.87	<0.18
SH0709 09-OC	7/9/2009	14:00	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P					1.33	3.15	328.2	6.22			<0.010	<0.010			0.54	0.17	0.21				4.75	1.87	<0.18
SH0723 09-OC	7/23/2009	12:50	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	25.26	8.71	627	9.49	1.33	3.33	322.4	7.19			<0.010	<0.010			0.69	0.22	0.28				3.5	1.12	1
SH0806 09-OC	8/6/2009	13:00	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	19.17	8.65	598	9.08	1.6	2.69	313.6	5.32			<0.010	<0.010			0.47	0.21	0.22				1.87	0.5	<0.18
SH0820 09-OC	8/20/2009	13:00	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	23.35	8.77	593	9.51	1.86	2.42	286.4	5.21			<0.010	<0.010			0.46	0.17	0.21				3	2.37	<0.18
SH0903 09-OC	9/3/2009	12:23	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	19.82	8.69	612	10.09	1.86	1.86	304.8	5.75			<0.010	<0.010			0.46	0.17	0.2				1.37	0.75	<0.18
SH0917 09-OC	9/17/2009	13:00	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	20.16	8.77	626	9.72	4.27	6.19	323.4	5.36			<0.010	<0.010			0.61	0.2	0.24				17.66	4.16	<0.18
SH1001 09-OC	10/1/2009	12:04	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	11.48	8.59	617	10.36	14.95	21.68	298.4	5.36			0.007	0.076			1.18	0.16	0.28				55	15	<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, Phosphyrin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity mg/l	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
SH1015 09-OC	10/15/2009	12:50	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	12.72	8.58	466	10.5	3.73	5.6	236.6	2.32		<0.010	0.09				0.36	0.16	0.18				8.66	1.83	<0.18
SH1112 09-OC	11/12/2009	12:45	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	8.07	8.74	397	12.08	3.02	4.45	224.8	1.33		<0.010	0.084				0.23	0.15	0.17				4.37	1.12	
SH1210 09-OC	12/10/2009	13:15	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	0.01	8.49	223	13.73	7.2	3.63	215.4	1.03		<0.010	0.21				0.37	0.17	0.2				7.62	2	
TR0528 09	5/28/2009	11:24	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	16.38	8.03	122	9.62	1.34	0.16	64.8	0.73		<0.010	<0.010				0.084	0.002	0.01				2.38	1	
TR0611 09-OC	6/11/2009	11:40	TR00000	Trinity River near mouth (Baseline)	Yurok	0.1	P																							<0.18
TR0625 09	6/25/2009	11:46	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	19.82	8.33	154	9.4	1.07	0.99	77.1	0.61		<0.010	<0.010				0.072	0.002	0.008				1.63	0.75	
TR0709 09	7/9/2009	11:45	TR00000	Trinity River near mouth (Baseline)	Yurok	0.1	P																							<0.18
TR0723 09-OC	7/23/2009	11:35	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	22.47	8.24	167	8.73	1.34	1.09	83	0.56		<0.010	<0.010				0.072	0.003	0.006				0.87	0.87	
TR0806 09-OC	8/6/2009	11:52	TR00000	Trinity River near mouth (Baseline)	Yurok	0.1	P																							<0.18
TR0820 09-OC	8/20/2009	11:55	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	22.32	8.28	163	8.98	0.8	0.51	80	0.82		<0.010	<0.010				0.057	<0.001	0.006				1	0.88	
TR0903 09-OC	9/3/2009	11:39	TR00000	Trinity River near mouth (Baseline)	Yurok	0.1	P																							<0.18
TR0917 09-OC	9/17/2009	11:58	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	19.84	8.27	157	9.56	1.6	0.64	76.1	0.78		<0.010	<0.010				0.053	<0.001	0.006				0.75	0.63	
TR1001 09-OC	10/1/2009	11:19	TR00000	Trinity River near mouth (Baseline)	Yurok	0.1	P																							<0.18
TR1015 09-OC	10/15/2009	12:00	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	13.51	7.95	167	10.11	24.03	11.11	81.7	1.47		<0.010	<0.010				0.59	<0.001	0.092				35.25	11	
TR1112 09-OC	11/12/2009	12:30	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	9.92	8.3	178	12.04	1.47	0.12	85.4	0.76		<0.010	<0.010				<0.050	0.003	0.005				<0.50	<0.50	
TR1217 09-OC	12/17/2009	11:48	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	6.83	7.9	158	11.88	18.69	12.34	75.7	2.36		0.013	0.11				0.67	0.005	0.15				48	7.5	

End of Errata

KLAMATH RIVER BASELINE WATER QUALITY SAMPLING – 2009 ANNUAL REPORT –



Grant Johnson

**Prepared for the
KHSa Water Quality Monitoring Group**

**Prepared by
Watercourse Engineering, Inc.
February 10, 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 several 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 conducted 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, and 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 monitoring program is a cooperative effort termed the KHSA Monitoring group¹. Actual monitoring is completed by a sub-set of the group, and includes the Yurok Tribe, Karuk Tribe, PacifiCorp, and the U.S. Bureau of Reclamation. The program collects data from approximately 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 monitoring entities as well as stakeholders, the North Coast Regional Water Quality Control Board and the Oregon Department of Environmental Quality, and the U.S. Environmental Protection Agency. This group, termed the KHSA monitoring group for purposes of this report, 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 process transparency.

This summary report focuses on the grab sampling data collection. Even though the KHSA was signed after the 2009 sampling year, the monitoring program initiated under the AIP is referred to herein as the 2009 KHSA program for consistency. Two appendices accompany the report, presenting field data from the 2009 program and the Technical Memorandum presenting laboratory comparison findings.

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 2009 KHSA monitoring program occurred from May through December of 2009 and included several monitoring elements. The primary elements included baseline monitoring and public health monitoring. The baseline water quality monitoring element included water quality grab sample data, physical observations associated with these grab samples, water quality probe data and algae data. This report focuses on the grab sample data and associated physical observations in the baseline monitoring element. The data collected using water quality probes recorded observations at hourly or sub-hourly intervals. Parameters sampled by probes included water temperature, dissolved oxygen, conductivity, and pH at specific locations in the Klamath River (identified in Table 1). The algae data in the baseline monitoring element included algae species identification and quantification samples collected at each sampling location. The water quality probe data and algae species and quantification data are not presented herein due to the extensive quantity of information. However, these data are available in electronic form and the KHSA monitoring group is exploring methods of summarizing these data, as well as other data from special studies, for incorporation in future annual reports.

The public health monitoring program data consisted of algae species at specific sites within reservoirs and river reaches and focused 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 2009 season. These frequent reports were used to track phytoplankton and toxin conditions that supported management decisions to post and de-post reservoir and river reaches.

In addition to the baseline and public health monitoring elements, the KHSA monitoring program provided an opportunity to develop additional special studies to support the baseline or public health monitoring elements, or other identified data gaps. In 2009 additional studies implemented under the sampling program included public health related fish and mussel tissue sampling, algae speciation in Keno Reservoir, and the use of temperature loggers in different portions of the river.

A database through the Klamath Basin Monitoring Program (KBMP) is being developed 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/>) that 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.

Finally, there are also other Klamath River monitoring efforts outside of the KHSA program sponsored by individual entities which can provide additional data related to Klamath River water quality and other aquatic system information.

3. Baseline Program Water Quality Sampling

3.1. Site Locations and Frequency

In 2009 sampling was conducted at twenty-four sites along the Klamath River and its tributaries, from Link Dam to the Klamath River Estuary by the four different sampling crews. Sixteen of those sites were located on the mainstem of the Klamath River, four of the sites were located in the reservoirs on the Klamath River, and four of those sites were located on the main tributaries of the Klamath River (Figure 1). Physical parameters (water temperature, dissolved oxygen, 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. 2009 mainstem Klamath River KHSA sampling sites (KR2460 is also a vertical profile site).

Table 1. 2009 Baseline monitoring locations, constituents, frequency, and sampling entity

Monitoring Location		Temperature (°C)	Dissolved Oxygen (mg/l)	pH (log[H+])	Conductance (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	
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	M/ BM	M	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	-	-	USBR
KR2334	Klamath River below Keno Dam	VP	VP	VP	VP	M	M	M	M	M	M	M	M	-	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	-	-	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	-	-	PacifiCorp
KR2064	KR above Shovel Creek (Stateline)	H	-	-	-	M	M	M	M	M	M	M	M	-	M2/BM2	PacifiCorp
KR1990	Copco Reservoir ^b	VP	VP	VP	VP	M	M	M	M	M	M	M	M	-	-	PacifiCorp
KR1950	Klamath River below Copco Dam	H	-	-	-	M	M	M	M	M	M	M	M	-	-	PacifiCorp
KR1920	Iron Gate Reservoir ^c	VP	VP	VP	VP	M	M	M	M	M	M	M	M	-	-	PacifiCorp
KR1897	Klamath River below Iron Gate Dam	H	H	H	H	M/ BM	M/ BM	M/ BM	M/ BM	M/ BM	M/ BM	M/ B M	W/ S	M	M2/ BM2	PacifiCorp
KR1560	Klamath River at Walker Bridge Road	H	-	-	-	M	M	M	M	M	M	M	M	-	-	Karuk
KR1285	Klamath River below Seiad	H	H	H	H	M	M	M	M	M	M	M	M	-	-	Karuk
KR0935	Klamath River at Clear Creek	H	-	-	-	M	M	M	M	M	M	M	M	-	-	Karuk
KR0591	Klamath River at Orleans (USGS)	H	H	H	H	M	M	M	M	M	M	M	M	-	-	Karuk
KR0435	Klamath River At Weitchpec	H	H	H	H	M	M	M	M	M	M	M	-	-	-	Yurok
KR0385	Klamath River below Trinity River	H	-	-	-	M	M	M	M	M	M	M	M	M	-	Yurok
KR0060	Klamath River near Klamath	H	H	H	H	M	M	M	M	M	M	M	M	-	-	Yurok
KR0005	Klamath River Estuary	-	-	-	-	M	M	M	M	M	M	M	M	-	-	Yurok

Monitoring Location		Temperature (°C)	Dissolved Oxygen (mg/l)	pH (log[H+])	Conductance (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	
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	-	-	-	M	M	M	M	M	M	M	-	-	-	Yurok
Notes:																
^a Sampling at two depths in J.C. Boyle reservoir (0.5 m and 1 m off bottom)																
^b Sampling at three depths in Copco reservoir (0.5 m, mid-depth, and 1 m off bottom)																
^c Sampling at four depths in Iron Gate reservoir (0.5 m and two intermediate depths, and 1 m off bottom)																
Key:																
<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 data may be desired)																
VP – vertical profile at stated sampling frequency																
M – monthly sampling																
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 (Table 1). The physical constituents of temperature, dissolved oxygen, conductivity, and pH were collected by participant field crews. 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 for a variety of water quality constituents, including:

- 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 Bay 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

The physical parameters measured in the 2009 program included water temperature, pH, specific conductivity, and dissolved oxygen.

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. Not all parameters were collected by all program participants at all locations or times. Physical measurements that were collected during grab sampling are included in the field data (see Appendix A), while time series monitoring data are maintained (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, Yurok 2008). More recently 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 (KHSa-WG 2009). Overall, differences were distributed among various constituents, although ammonium and total nitrogen (as TN or total Kjeldahl nitrogen) and total suspended solids (TSS) were more prone to vary. Inter-laboratory comparisons were likewise variable 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. Such comparisons were implemented in 2010 as well. More details on the 2009 laboratory comparison are presented in Appendix B.

3.3. *Water Quality Analytical Methods*

Basic, CH2MHill, Aquatic Research, and Chesapeake Bay laboratories used either Standard Methods or EPA analytical methods for analysis of nutrients, dissolved and particulate carbon, alkalinity, carbonaceous biological oxygen demand, total suspended solids and volatile suspended solids (Table 2). Method detection limits (MDL) and reporting limits (RL) varied among the laboratories and in certain cases were not presented.

Analysis of chlorophyll-a and pheophytin was performed by a variety of laboratories. Samples collected by the USBR were analyzed by Aquatic Analysts in Friday Harbor, Washington. Samples collected by the PacifiCorp sampling crew were analyzed by CBL. Samples collected by the Karuk tribe and Yurok tribe were analyzed by Aquatic Research. All microcystin analysis was performed using the enzyme-linked immunosorbent assay (ELISA) method at the EPA laboratory and the additional microcystin analysis was done by the DFG laboratory used LCMS at selected locations.

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

Constituent Name	Constituent ID	Basic			CH2MHill			Aquatic Research			CBL		
		Method	MDL	RL	Method	MDL	RL	Method	MDL	RL	Method	MDL	RL
Alkalinity	Alk	SM 2320B	1.0	5.00	EPA 310.1	0.55	5.00	SM182320 B	1.0	-	-	-	-
Ammonia	NH3 or NH4	EPA 350.1	0.02	0.05	EPA 350.1	0.0087	0.050	SM184500 NH3H	0.01	-	-	-	-
Carbonaceous Biological Oxygen Demand – 5 day	CBOD5	SM 5210	3.00	3.00	SM5210B	2.00	2.00	SM205210 B	2.0	-	-	-	-
Dissolved Organic Carbon	DOC	SM5310C	0.3	0.50	EPA 415.1	0.052	0.50	SM205310 B	0.25	-	-	-	-
Nitrate + Nitrite	NO3+NO2	EPA 353.2	0.01	0.05	EPA 353.2	0.0017	0.010	SM184500 N03F	0.01	-	-	-	-
Total Nitrogen	TN	EPA 351.2	(calc)	0.20	SM4500-N C	0.020	0.020	SM204500 NC	0.05	-	-	-	-
Ortho-phosphate	OPO4	SM 4500P- E	0.01	0.05	EPA 365.1	0.0018	0.010	SM18 4500PF	0.001	-	-	-	-
Total Phosphorus	TP	SM 4500P- BE	0.02	0.05	EPA 365.4	0.0078	0.050	SM18 4500PF	0.002	-	-	-	-
Total Kjeldahl Nitrogen	TKN	EPA 351.2	0.1	0.20	EPA 351.2	0.038	0.20	EPA 351.1	0.2	-	-	-	-
Total Suspended Solids	TSS	SM 2540D	2.0	6.00	EPA 160.2	0.87	2.00	SM20 2540D	0.5	-	-	-	-
Volatile Suspended Solids	VSS	SM 2540D	2.0	6.00	EPA 160.4	0.87	2.00	SM20 2540E	0.5	-	-	-	-
Filtered Ammonia	NH43 filtered or NH4 filtered	EPA 350.1	0.02	0.05	EPA 350.1	0.0087	0.050	SM184500 NH3H	0.01	-	-	-	-
Filtered Nitrate + Nitrite	NO3+NO2 filtered	EPA 353.2	0.01	0.05	EPA 353.2	0.0017	0.010	SM184500 N03F	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 2009 KHSA baseline water quality monitoring program were collected during 8 periods (approximately monthly) from May through December in 2009. Sampling crews among the various entities worked to sample 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 are periods when one or more sites were omitted or one or more constituents were not sampled. Notable exceptions include:

- Sampling did not occur at the Klamath River above J.C. Boyle site (river mile (RM) 228.2) in October or December.
- Sampling did not occur at the Klamath River below Copco (RM 195.0) in May or August.
- For the sites from the Klamath River at Walker Bridge (RM 156.0) to the Estuary (RM 0.5) and in all four tributaries, particulate organic carbon, CBOD, particulate nitrogen, and TKN were not collected.
- For sites from J.C. Boyle Reservoir to Iron Gate Reservoir, chlorophyll-a, pheophytin, particulate organic carbon, CBOD, particulate nitrogen, and TKN were not collected in June.
- Due to laboratory error, no pheophytin analysis was performed from samples collected at Link River, Miller Island, and Keno Dam sites.

All data are included in Appendix A.

Data Summary

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

Selected data are summarized herein to illustrate general spatial and temporal patterns during the 2009 sampling period. Data are presented in two formats: longitudinal patterns based on seasonal data collection and time series at specific locations. Longitudinal patterns are presented as box and whisker plots² and encompass all data at each mainstem Klamath River

² A box-and-whisker plot is a graphical way presenting statistical parameters including median, mean, lower and upper quartiles, and outliers. Herein, the median value is represented by a horizontal black line; the box (gray) is formed by the 25th quartile and 75th quartile and represents the inter-quartile range (IQR); the mean is represented as a blue diamond symbol [◊]; the whiskers extend beyond the 1.5*IQR above and below the quartiles; and, points beyond the whiskers are termed outliers, represented by red circles [○].

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 where USGS flow gages (<http://water.usgs.gov/>) occur on the Klamath River (including Link River near Klamath Falls) (Locations presented in Table 3).

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

Location	USGS Gage Number
LINK RIVER AT KLAMATH FALLS, OR	11507500
KLAMATH RIVER AT KENO, OR	11509500
KLAMATH RIVER BLW JOHN C. BOYLE PWRPLNT, NR KENO, OR	11510700
KLAMATH R BL IRON GATE DAM CA	11516530
KLAMATH R NR SEIAD VALLEY CA	11520500
KLAMATH R A ORLEANS	11523000
KLAMATH R NR KLAMATH CA	11530500

Figure 2 through Figure 9 represent grab sample data and/or the associated physical measurements made at the time of the grab sample (e.g., temperature and dissolved oxygen). Not all measurements for individual constituents occur on the same date or time. These illustrations are not intended to be comprehensive. The complete data set (Appendix A) is available at the KBMP website (<http://www.kbmp.net/>) for agencies, stakeholders, analysts, and interested parties.

5. Summary

The KHSa baseline water quality sampling program is an interagency cooperative effort to characterize water quality conditions in the Klamath Basin to support ongoing and future measures to support restoration, dam removal studies, public health, and other factors. The program has been successfully implemented and first year monitoring completed during 2009, as exhibited by a wide range of constituents sampled over the entire Klamath River reach from near Klamath Falls to the Klamath River estuary, including major tributary contributions. Quality assurance measures have been incorporated into the process and final data sets are available to the agencies, stakeholders, interested parties and the public. The 2009 planning and monitoring effort has laid the groundwork for continued cooperation and high quality data collection in the Klamath River basin.

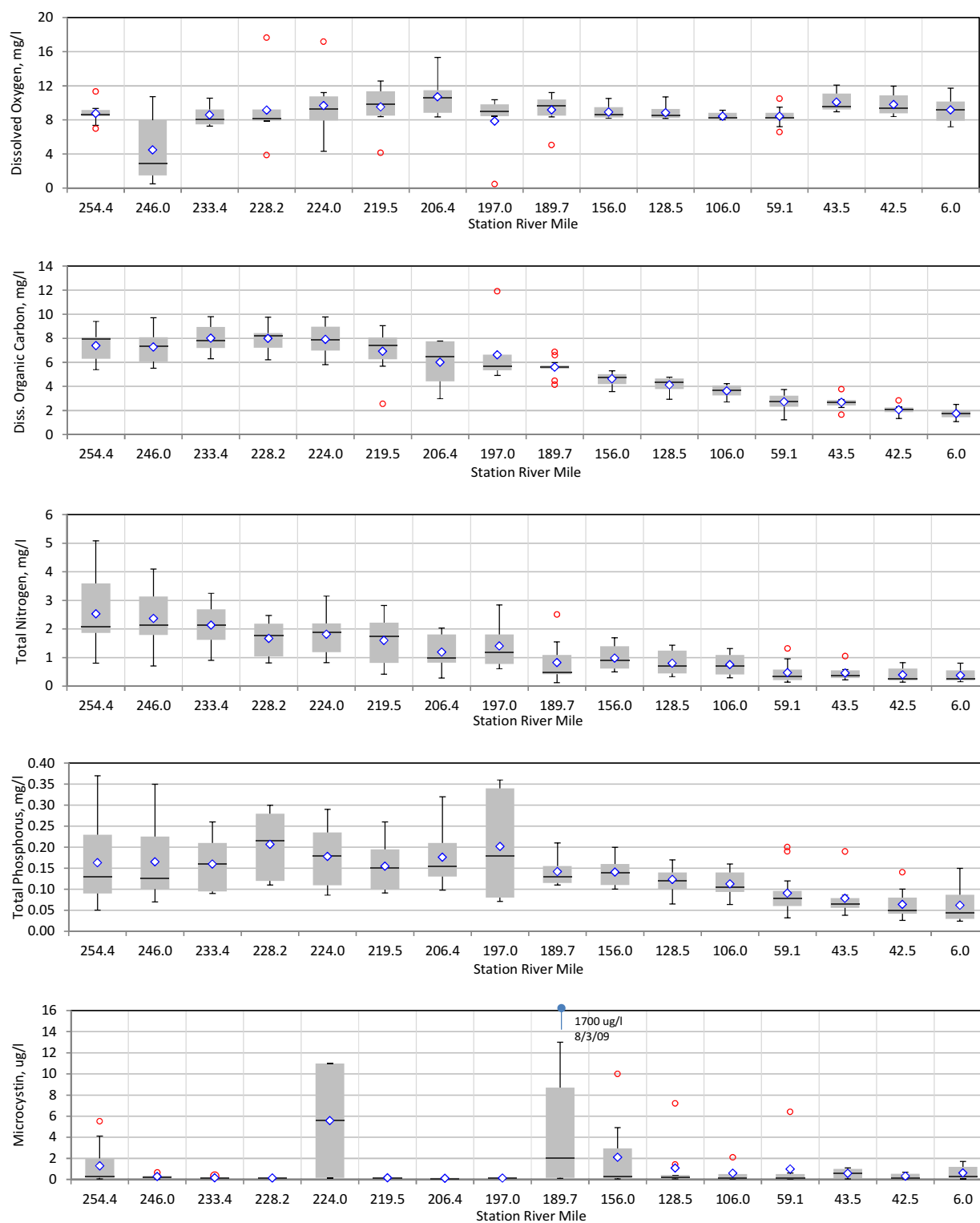


Figure 2. Baseline water quality program data for dissolved oxygen, dissolved organic carbon, total nitrogen, total phosphorus, and microcystin concentration (top to bottom) in the Klamath River from Link River to Klamath. May 2009 – December 2009). Note that the microcystin data do not include public health monitoring data.

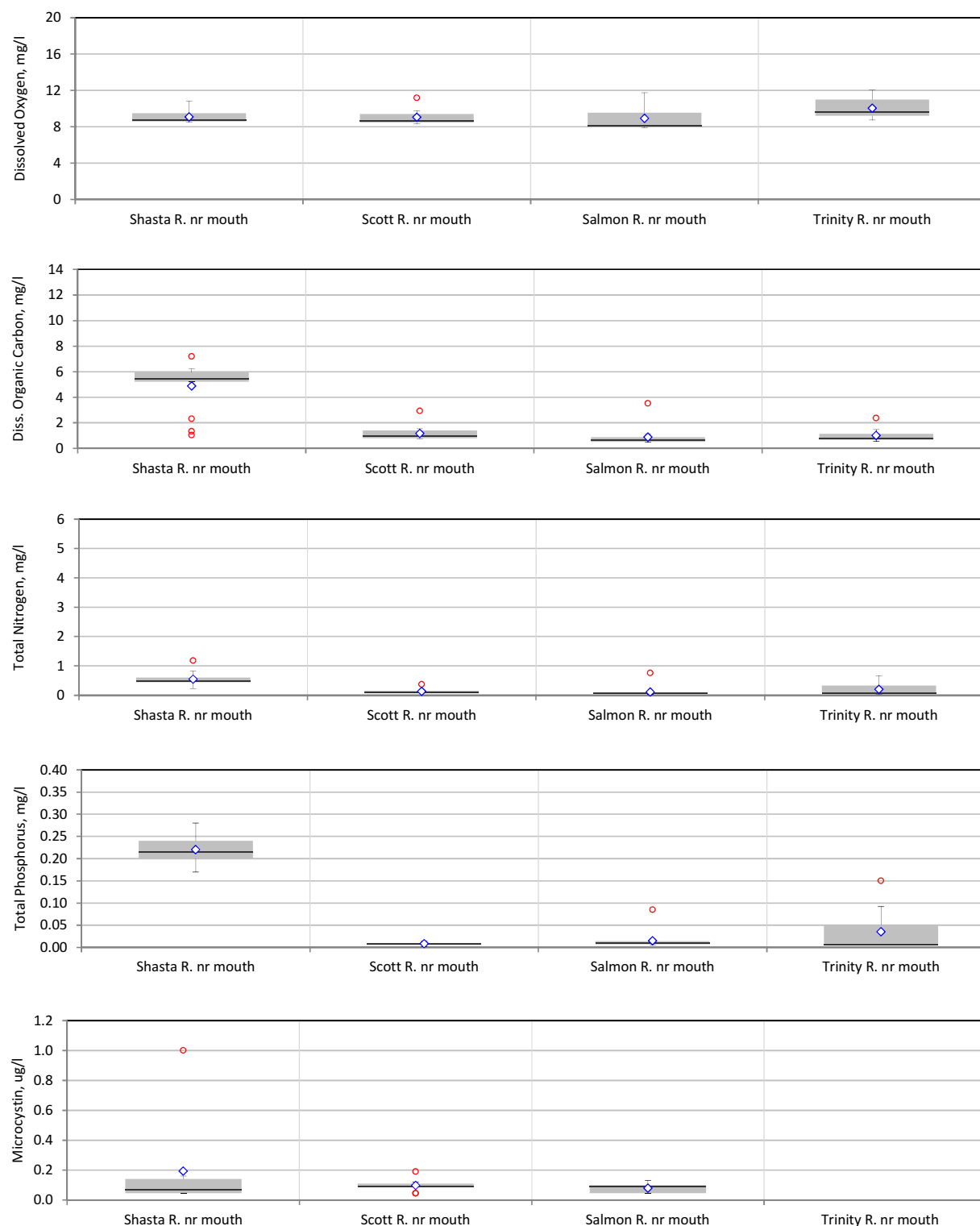


Figure 3. Baseline water quality program data for dissolved oxygen, dissolved organic carbon, total nitrogen, total phosphorus, and microcystin concentration (top to bottom) in the Shasta, Scott, Salmon, and Trinity Rivers. May 2009 – December 2009). Note that the microcystin data do not include public health monitoring data.

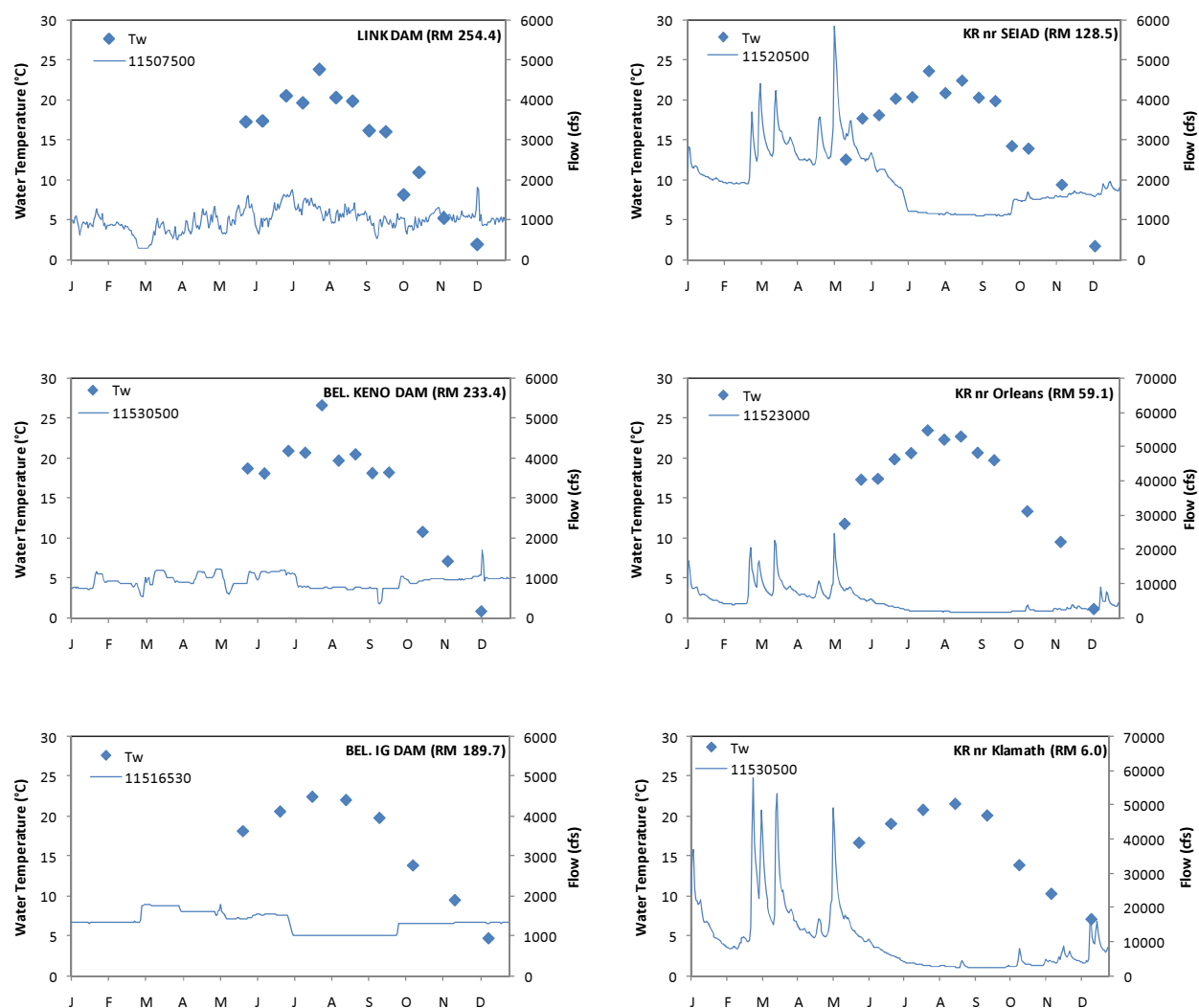


Figure 4. 2009 KHSa sampling program water temperature and flow at USGS flow gage locations (station number provided in legend) for the mainstem Klamath and Link Rivers. Note that the flow scale on the right hand side is not the same for each graph.

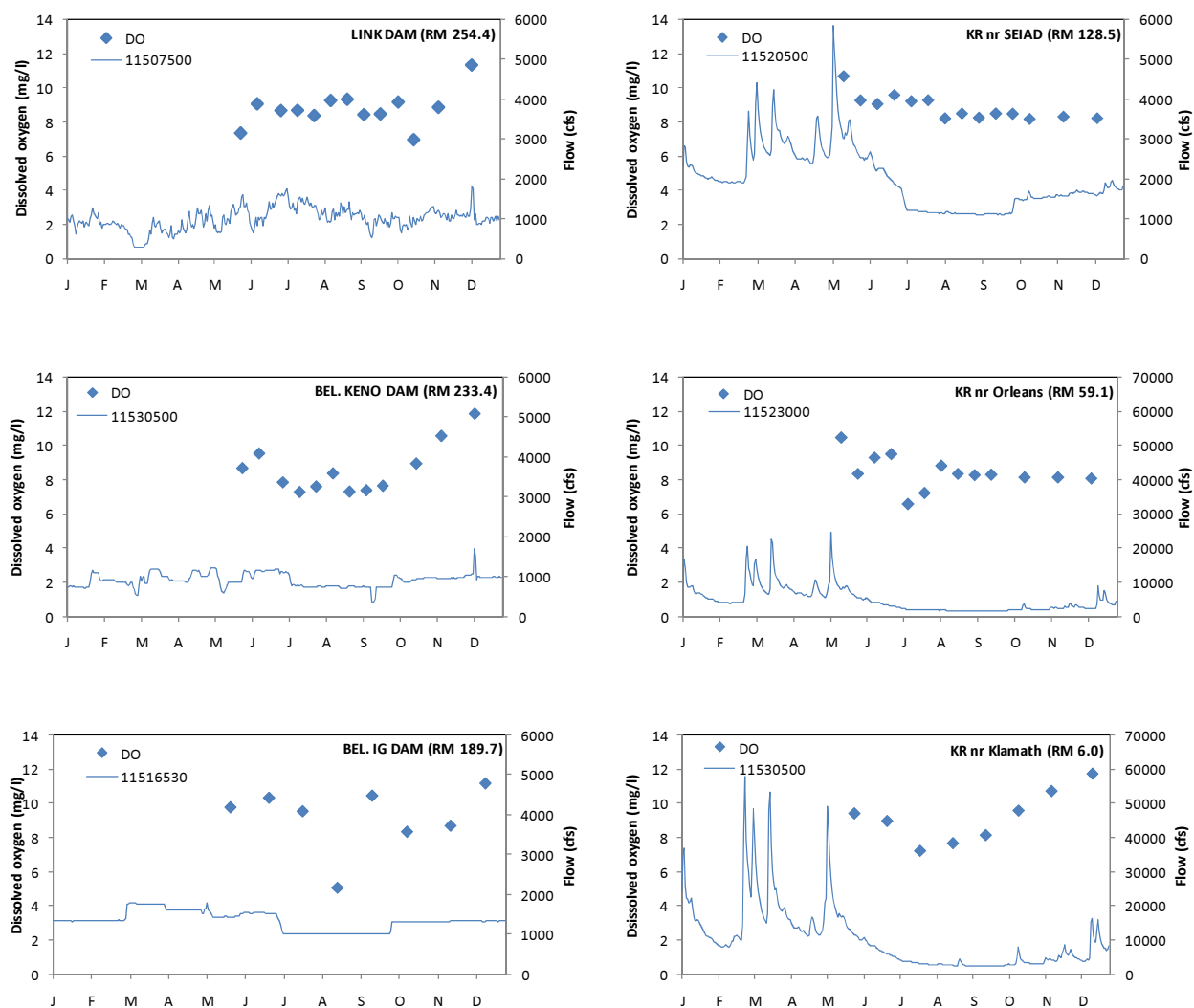


Figure 5. 2009 KHSa sampling program dissolved oxygen and flow at USGS flow gage locations (station number provided in legend) for the mainstem Klamath and Link Rivers. Note that the flow scale on the right hand side is not the same for each graph.

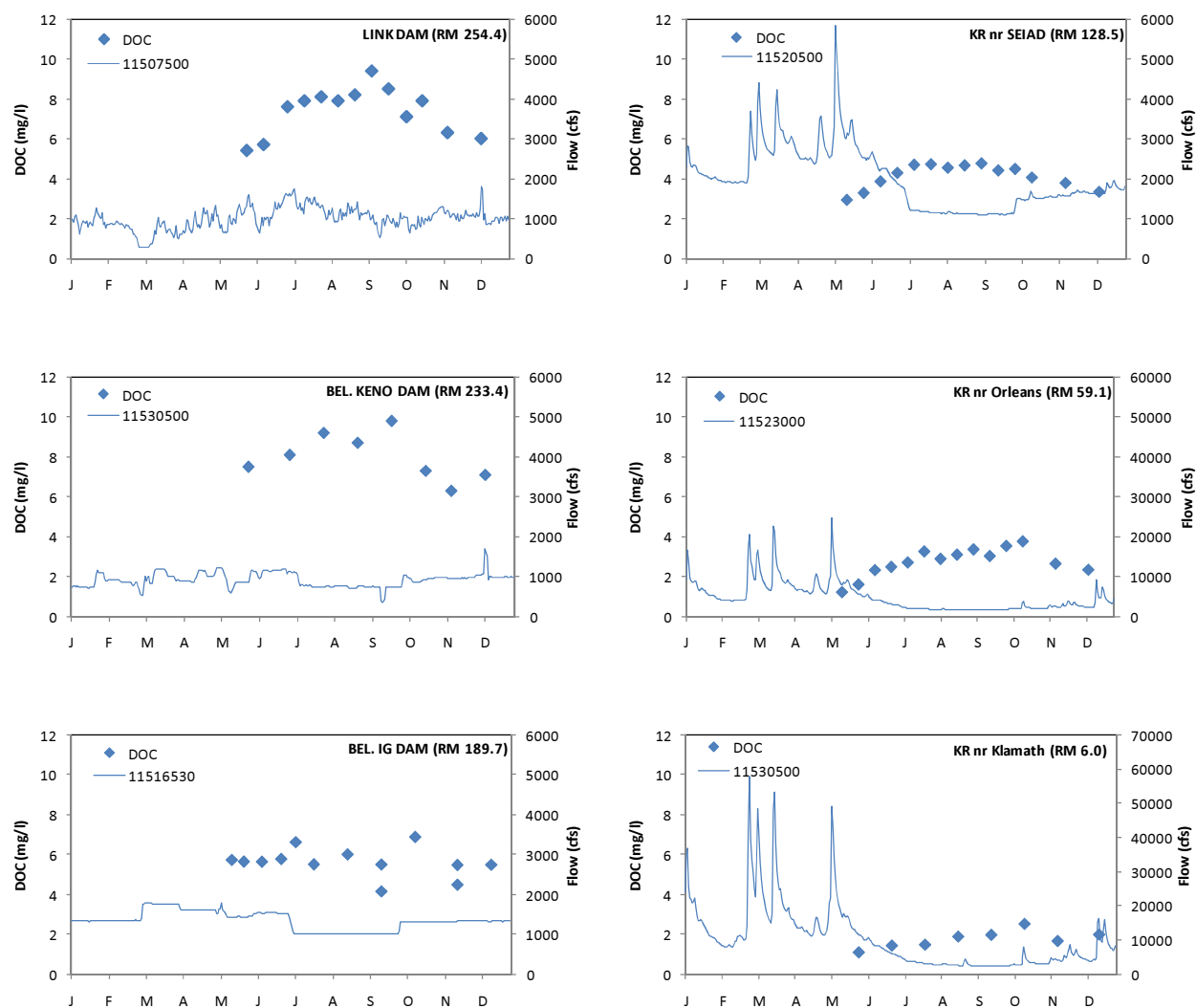


Figure 6. 2009 KHSA sampling program dissolved organic carbon and flow at USGS flow gage locations (station number provided in legend) for the mainstem Klamath and Link Rivers. Note that the flow scale on the right hand side is not the same for each graph.

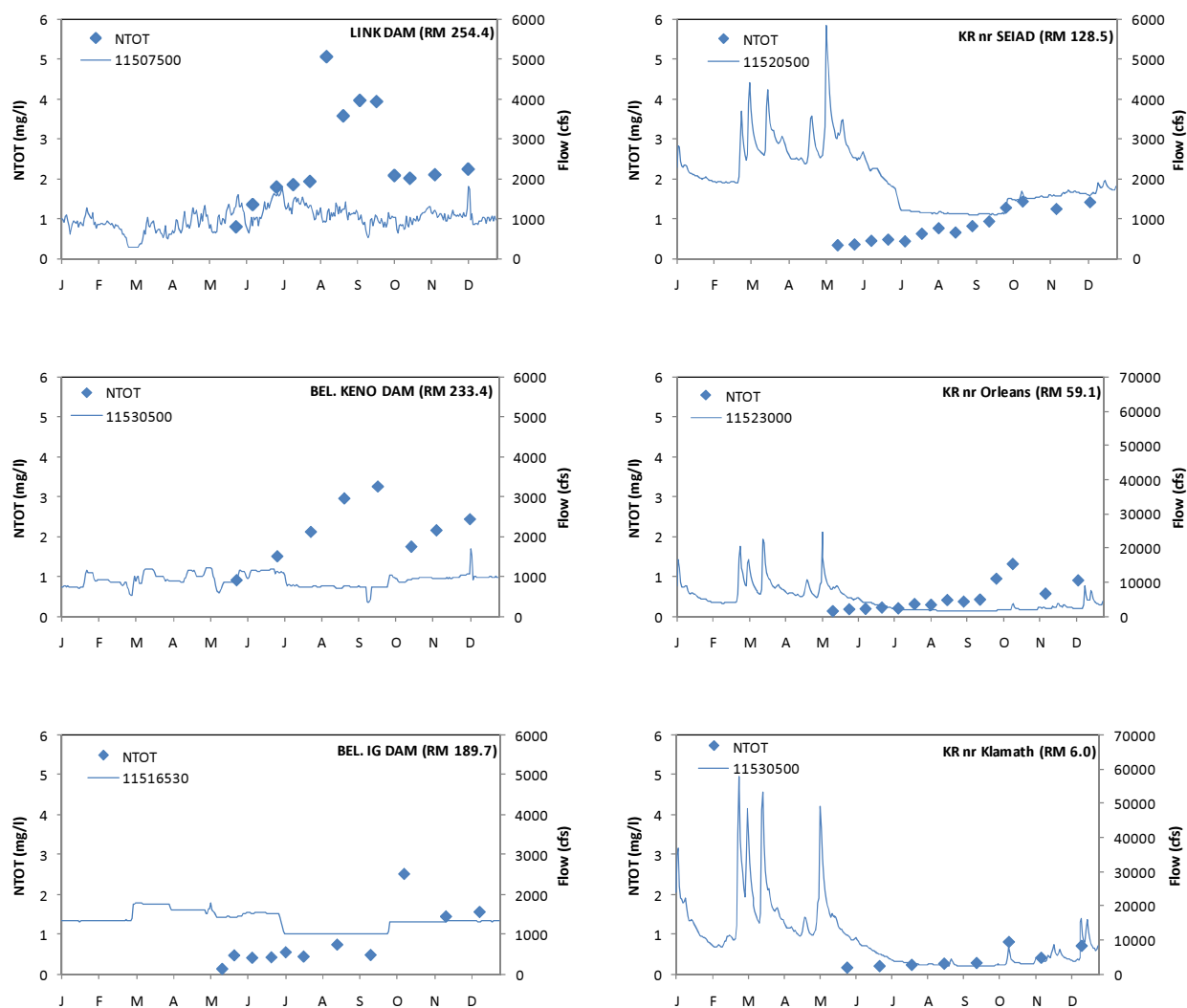


Figure 7. 2009 KHSA sampling program total nitrogen and flow at USGS flow gage locations (station number provided in legend) for the mainstem Klamath and Link Rivers. Note that the flow scale on the right hand side is not the same for each graph.

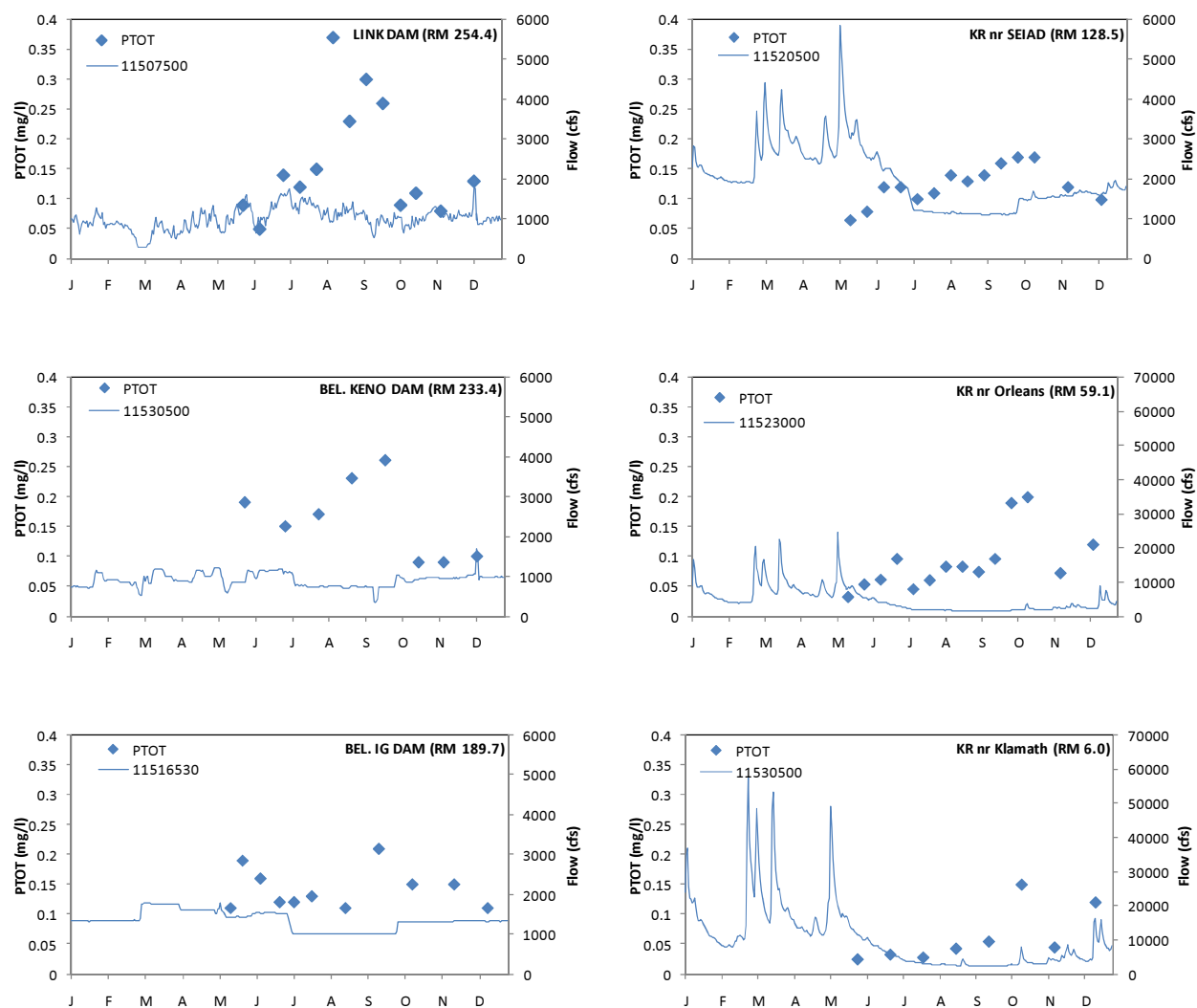


Figure 8. 2009 KHSA sampling program total phosphorus and flow at USGS flow gage locations (station number provided in legend) for the mainstem Klamath and Link Rivers. Note that the flow scale on the right hand side is not the same for each graph.

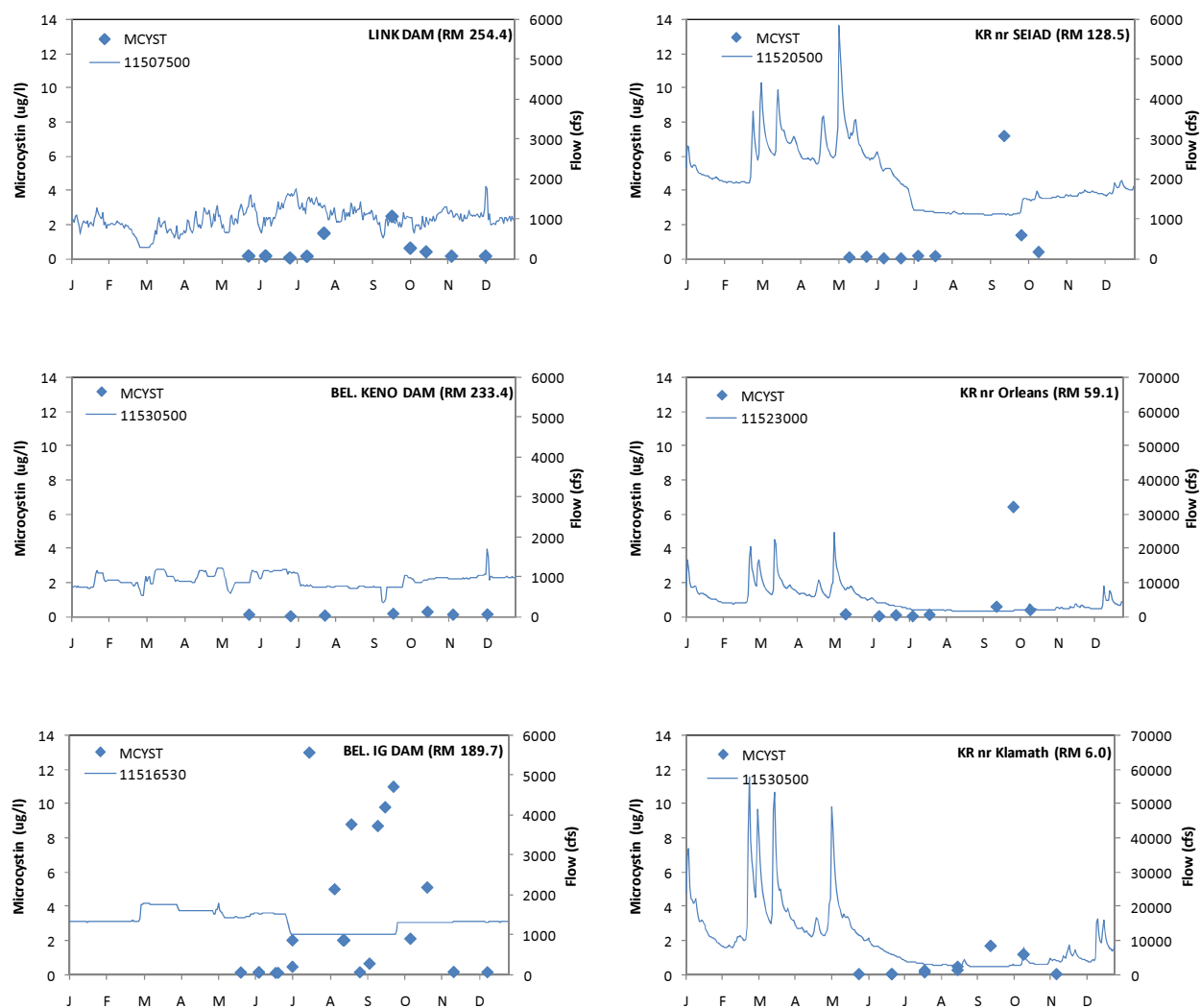


Figure 9. 2009 KHSa baseline sampling program microcystin and flow at USGS flow gage locations (station number provided in legend) for the mainstem Klamath and Link Rivers. Note that the flow scale on the right hand side is not the same for each graph; also, the microcystin data presented herein do not include public health monitoring data.

6. References

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

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

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

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

7. Appendices

Appendix A: Sampling Location and Data Summary

Table 4. Klamath River mainstem and tributary sampling locations

Site ID	Sampling Method:	Site Type	River Mile	Sampling Entity
KR2544	Link Dam	Mainstem	254.4	USBR
KR2460	Keno Reservoir at Miller Island	Mainstem	246.0	USBR
KR2334	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	-	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	-	PacifiCorp
KR1950	Klamath River below Copco Dam	Mainstem	195.0	PacifiCorp
KR1920	Iron Gate Reservoir	Reservoir	-	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
KR1060	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

Sampling Data – KHSA 2009

Date	Time	Sample ID	Site ID	Site Name	Agency	Depth	Water Temp.	pH	Specific Cond.	Diss. Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Diss. Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+ Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Ortho-Phosphate	Phosphorus, Total Phosphorus	Solids, Total Susp. Solids	Solids, Volatile Susp. Solids	Toxins, Microcystin
						m	C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l
5/27/09	6:50	2009AIP-001	KR2544	Link Dam	USBR	0.5	17.28	7.8	111	7.35	19		53	5.4	4.53		0.07	0.01		0.8	0.8	<0.01	0.09	40	8	0.16]
6/10/09	7:30	2009AIP-004	KR2544	Link Dam	USBR	0.5	17.4	9.29	111	9.06	10.2		54	5.7	6.13	7	0.08	0.03		1.3	1.36	<0.01	0.05	6	3]	0.16]
6/30/09	7:05	2009AIP-011	KR2544	Link Dam	USBR	0.5	20.55	9.66	112	8.67	163		50	7.6	9.5	13	0.12	0.02		1.8	1.8	<0.02	0.14	7	6	<0.09
7/14/09	8:30	2009AIP-018	KR2544	Link Dam	USBR	0.5	19.67	9.61	111	8.68	14.6		53	7.9	6.53	10	0.11	0.02		1.8	1.86	<0.01	0.12	10	7	0.14]
7/28/09	7:40	2009AIP-024	KR2544	Link Dam	USBR	0.5	23.88	8.78	119	8.37	22.1		57	8.1	5.58	7	0.13	0.06		1.9	1.94	0.04	0.15	7	5]	1.5
8/11/09	8:00	2009AIP-030	KR2544	Link Dam	USBR	0.5	20.33	9.81	118	9.26	631		58	7.9	23.2	23	0.16	0.03		5.1	5.08	0.02	0.37	24	18	
8/25/09	7:05	2009AIP-038	KR2544	Link Dam	USBR	0.5	19.88	9.99	118	9.33	158		58	8.2	11.6	18	0.14	0.02		3.6	3.59	0.05	0.23	19	14	4.1
9/8/09	8:00	2009AIP-043	KR2544	Link Dam	USBR	0.5	16.18	9.89	113	8.43	4.4		54	9.4	12.1	17	0.22	<0.01		4	3.98	0.06	0.3	21	13	5.5
9/22/09	7:40	2009AIP-050	KR2544	Link Dam	USBR	0.5	16.03	9.58	112	8.47	missing		59	8.5		10	0.18	0.04]		3.9	3.95	0.05	0.26	15	8	2.5
10/7/09	8:45	2009AIP-056	KR2544	Link Dam	USBR	0.5	8.11	8.04	119	9.17	3.9		55	7.1	1.8		0.2	0.3		1.8	2.09	<0.01	0.09	7	2]	0.62
10/20/09	7:30	2009AIP-060	KR2544	Link Dam	USBR	0.5	10.93	7.7	124	6.96	2		61	7.9		3	0.4	0.33		1.7	2.02	0.01]	0.11	5]	2]	0.4
11/10/09	8:30	2009AIP-068	KR2544	Link Dam	USBR	0.5	5.17	7.6	128	8.86	8.8		58	6.3		<3	0.71	0.36		1.7	2.11	<0.01	0.08	11	3]	0.15]
12/8/09	10:45	2009AIP-076	KR2544	Link Dam	USBR	0.5	1.87	7.77	133	11.33	2		59	6	2.18	<3	0.84	0.4		1.8	2.25	<0.01	0.13	27	3]	0.15]
5/27/09	9:10	2009AIP-002	KR2460	Keno Reservoir at Miller Island	USBR	0.5	18.31	8.04	120	8.25	26.3		55	5.5	1.94		0.07	<0.01		0.7	0.7	0.03]	0.07	11	3]	0.16]
6/30/09	8:40	2009AIP-014	KR2460	Keno Reservoir at Miller Island	USBR	0.5	21.66	8.76	117	2.14	26.3		52	7.2	4.49		0.44	0.09		1.9	2	0.03]	0.13	8	6	<0.09
7/28/09	9:20	2009AIP-027	KR2460	Keno Reservoir at Miller Island	USBR	0.5	23.75	7.39	129	2.56	8.8		58	7.9	2		0.53	0.05		1.5	1.57	0.06	0.12	3]	2]	0.66
8/25/09	9:00	2009AIP-040	KR2460	Keno Reservoir at Miller Island	USBR	0.5	21.71	9.29	127	0.8	35		63	8.3	7.7		0.91	0.01]		4.1	4.1	0.09	0.32	17	14	
9/22/09	9:20	2009AIP-053	KR2460	Keno Reservoir at Miller Island	USBR	0.5	17.34	8.52	146	0.51	missing		70	9.7			1.59	0.03		3.8	3.78	0.11	0.35	9	5]	0.25
10/20/09	9:30	2009AIP-065	KR2460	Keno Reservoir at Miller Island	USBR	0.5	11.56	7.25	145	3.23	8.8		64	7.5			0.77	0.33		1.8	2.1	0.03]	0.1	4]	2]	0.45
11/10/09	11:10	2009AIP-073	KR2460	Keno Reservoir at Miller Island	USBR	0.5	6.56	7.46	129	7.65	4.8		58	6.1			0.92	0.45		1.7	2.16	0.03]	0.1	6	<2	0.18
12/8/09	10:00	2009AIP-081	KR2460	Keno Reservoir at Miller Island	USBR	0.5	0.32	7.7	159	10.73	5.1		65	6	1.8		0.93	0.47		2	2.48	0.03]	0.13	35	5]	0.17]
5/27/09	11:50	2009AIP-003	KR2334	Klamath River bel. Keno Dam	USBR	0.5	18.7	8.5	182	8.67	35		74	7.5	2.6		0.11	<0.01		0.9	0.9	0.14	0.19	13	4]	0.14]
6/10/09	10:40	2009AIP-009	KR2334	Klamath River bel. Keno Dam	USBR	0.5	18.08	9.24	190	9.52						7										
6/30/09	7:50	2009AIP-015	KR2334	Klamath River bel. Keno Dam	USBR	0.5	20.9	8.91	128	7.84	23.8		55	8.1	3.93	6	0.15	0.04]		1.5	1.5	0.05	0.15	7	5]	<0.09
7/14/09	11:00	2009AIP-023	KR2334	Klamath River bel. Keno Dam	USBR	0.5	20.68	7.9	181	7.28						4										
7/28/09	10:50	2009AIP-028	KR2334	Klamath River bel. Keno Dam	USBR	0.5	26.61	8.25	148	7.6	26.3		66	9.2	2.94	3	0.66	0.02]		2.1	2.11	0.07	0.17	5]	3]	0.09]
8/11/09	10:00	2009AIP-036	KR2334	Klamath River bel. Keno Dam	USBR	0.5	19.69	8.51	152	8.37						5										
8/25/09	10:30	2009AIP-041	KR2334	Klamath River bel. Keno Dam	USBR	0.5	20.48	7.75	151	7.3	18		57	8.7	2.33	5	0.95	0.02]		2.9	2.95	0.12	0.23	6	4]	
9/8/09	11:00	2009AIP-049	KR2334	Klamath River bel. Keno Dam	USBR	0.5	18.12	8.16	139	7.38						3										
9/22/09	10:45	2009AIP-054	KR2334	Klamath River bel. Keno Dam	USBR	0.5	18.2	8.2	170	7.64	missing		74	9.8		3	1.19	0.04]		3.2	3.25	0.11	0.26	5]	3]	0.2
10/20/09	11:00	2009AIP-066	KR2334	Klamath River bel. Keno Dam	USBR	0.5	10.77	7.47	161	8.94	7.3		70	7.3		<3	0.59	0.36		1.4	1.74	0.04]	0.09	3]	<2	0.3
11/10/09	12:45	2009AIP-074	KR2334	Klamath River bel. Keno Dam	USBR	0.5	7.1	7.66	141	10.55	5.8		60	6.3		<3	0.71	0.52		1.6	2.15	0.03]	0.09	6	<2	0.14]
12/8/09	8:30	2009AIP-082	KR2334	Klamath River bel. Keno Dam	USBR	0.5	0.84	7.6	195	11.84	16		68	7.1	1.64	<3	0.84	0.54		1.9	2.43	0.02]	0.1	20	2]	0.16]
5/25/09	13:00	KR9055	KR2282	Klamath River ab. JC Boyle Res.	PacificCorp	0.5	20.42	8.5	192.9	8.33	27.58	9.52				7.22	2.27	<0.0087	0.049	0.372	0.81	0.19	0.28	13.2	3.2	0.14]
6/23/09	21:20	KR9070	KR2282	Klamath River ab. JC Boyle Res.	PacificCorp	0.5	19.03	7.76	205	7.89						78.3	8.15	0.12	0.4		1.04	0.095	0.12	6	1.6]	
7/21/09	13:50	KR9130	KR2282	Klamath River ab. JC Boyle Res.	PacificCorp	0.5	25.16	7.71	144	7.93	1.13	2.42	57.6	8.42	0.876		0.086	0.76	0.156	1.4	0.19	0.2	3.6	2.4		
8/19/09	11:20	KR9163	KR2282	Klamath River ab. JC Boyle Res.	PacificCorp	0.5	21.3	7.61	143.4	3.86	5.95	9.7	57.9	8.22	1.46		0.13	0.99	0.242	2.47	0.22	0.23	5.2	<0.87		
9/16/09	12:45	KR9202	KR2282	Klamath River ab. JC Boyle Res.	PacificCorp	0.5	19.53	7.99	140	9.23	4.06	10.56	54	9.75	0.525		0.014]	1.55	0.0634	2.18	0.24	0.3	4.8	1.6]		
10/14/09	missing	KR9240	KR2282	Klamath River ab. JC Boyle Res.	PacificCorp	0.5	missing	missing	missing	missing																
11/18/09	11:35	KR9271	KR2282	Klamath River ab. JC Boyle Res.	PacificCorp	0.5	4.52	7.67	160.1	17.64	3.67	2.9	59	6.22	0.536		0.36	0.95	0.0937		2.12	0.12	0.11	4.4	<0.87	
12/16/09	missing	KR9298	KR2282	Klamath River ab. JC Boyle Res.	PacificCorp	0.5	missing	missing	missing	missing																
5/25/09	11:30	KR9053	KR2260	JC Boyle Reservoir	PacificCorp	0.5	missing	missing	missing	missing	19.93	4.49		7.92	1.83		<0.0087	<0.0057	0.31		0.69	0.18	0.29	6	2.4	0.11]
5/25/09	11:35	KR9054	KR2260	JC Boyle Reservoir	PacificCorp	8	18.19	7.67	201.9	7.35				8.08	1.88		0.014]	0.05	0.31		0.79	0.2	0.27	6.8	2	0.14]
6/23/09	20:15	KR9072	KR2260	JC Boyle Reservoir	PacificCorp	8	17.87	7.53	202.3	6.94			80.7	0.27]		8.56	0.22	0.91		0.15]	0.1	4.8	2.4		<0.09	
6/23/09	20:30	KR9071	KR2260	JC Boyle Reservoir	PacificCorp	0.5	20.59	8.16	200.8	8.93			77.1	8.52			0.12	0.26			0.85	0.095	0.13	4	1.6]	<0.09
7/21/09	10:40	KR9128	KR2260	JC Boyle Reservoir	PacificCorp	0.5	24.23	7.51	153.3	6.85	0.74	2.79	60	8.96	1.1		0.35	0.63	0.214		1.52	0.22	0.24	1.6]	<0.87	
7/21/09	11:00	KR9129	KR2260	JC Boyle Reservoir	PacificCorp	8	21.55	7.1	152.7	3.67	0.94	2.33	61.3	8.78	0.579		0.18	0.66	0.117		1.41	0.18	0.23	3.2	2	
8/19/09	12:30	KR9161	KR2260	JC Boyle Reservoir	PacificCorp	0.5	22.18	7.65	146.9	4.02	3.98	4.29	59.7	7.97	0.946		0.13	0.89	0.216		2	0.19	0.18	2	<0.87	0.37
8/19/09	12:40	KR9162	KR2260	JC Boyle Reservoir	PacificCorp	8	19.51	7.12	152.8	2.4	4.22	6.59	61.1	8.48	1		0.21	0.87	0.184		2.01	0.21	0.21	4.8	<0.87	0.24
9/16/09	9:30	KR9200	KR2260	JC Boyle Reservoir	PacificCorp	0.5	18.67	7.23	151.5	5.79	0.62	1.97	58	8.35	0.943		0.16	1.12	0.127		1.52	0.22	0.31	2	<0.87	<0.09
9/16/09	9:40	KR9201	KR2260	JC Boyle Reservoir	PacificCorp	8	18.03	7.22	153.4	4.65	1.84	5.97	58	9.67	1.15		0.3	1.16	0.17		1.71	0.25	0.35	2.8	<0.87	0.09]
10/14/09	10:35	KR9238	KR2260	JC Boyle Reservoir	PacificCorp	0.5	10.47	7.47	167.5	9.29	2.4	4.06	67	8.04	0.483		0.15	0.85	0.0928	1.32	2.9	0.095	0.14	2	1.2]	
10/14/09	10:40	KR9239	KR2260	JC Boyle Reservoir	PacificCorp	8	10.42	7.																		

Date	Time	Sample ID	Site ID	Site Name	Agency	Depth	Water Temp.	pH	Specific Cond.	Diss. Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Diss. Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate + Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Ortho-Phosphate	Phosphorus, Total Phosphorus	Solids, Total Susp. Solids	Solids, Volat. Susp. Solids	Toxins, Microcystin
						m	C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l
5/23/09	8:00	KR9050	KR2064	Klamath River ab. Shovel Ck	PacificCorp	0.5	20.26	8.66	210.3	9.28	11.58	4.83		7.76	2.75		<0.0087	0.054	0.436		0.82	0.17	0.24	10	3.7	
6/24/09	15:05	KR9076	KR2064	Klamath River ab. Shovel Ck	PacificCorp	0.5	20.02	8.42	190.2	10.27			77.2	7.33		<2	<0.0087	0.34		0.82	0.095	0.11	5.2	1.6j	<0.09	
7/20/09	20:25	KR9105	KR2064	Klamath River ab. Shovel Ck	PacificCorp	0.5	23.32	7.89	152.3	8.41	1.35	2.76	61.4	7.75	0.669	5.1	<0.0087	0.84	0.141		1.1	0.21	0.18	2.8	1.6j	
8/17/09	19:00	KR9138	KR2064	Klamath River ab. Shovel Ck	PacificCorp	0.5	20.84	8.05	144.3	11	4.86	4.71	59.4	7.75	0.983	<2	<0.0087	0.78	0.159	1.58	0.18	0.16	4.4	1.2j	0.17j	
9/15/09	16:30	KR9177	KR2064	Klamath River ab. Shovel Ck	PacificCorp	0.5	16.6	8.63	153.1	11.28	0.54	1.18	65	3.26	0.449	7.62	<0.0087	0.49	0.0589	0.28	0.12	0.15	<0.87	<0.87	<0.09	
10/13/09	16:50	KR9215	KR2064	Klamath River ab. Shovel Ck	PacificCorp	0.5	13.8	7.35	171.5	8.34	1.76	1.56	72	5.6	0.636	<2	0.21	0.66	0.115	1.02	2.03	0.21	0.32	1.6j	<0.87	
11/16/09	16:20	KR9246	KR2064	Klamath River ab. Shovel Ck	PacificCorp	0.5	7.49	7.87	146.1	11.66	1.57	2.19	62	2.98	0.439	6.3	0.018j	0.63	0.067	0.85	0.11	0.098	3.6	<0.87	0.09j	
12/14/09	16:35	KR9273	KR2064	Klamath River ab. Shovel Ck	PacificCorp	0.5	2.81	7.79	177	15.34	4.05	3.48	67.1	5.59	0.63	3.53	0.39	0.89	0.118	2.03	0.1	0.15	11.2	<0.87	0.15j	
6/8/09	12:15	KR9089	CRMC	Copco Reservoir Mallard Cove	PacificCorp	0.5	missing	missing	missing	missing															1.5	
6/22/09	10:00	KR9064	CRMC	Copco Reservoir Mallard Cove	PacificCorp	0.5	missing	missing	missing	missing															<0.09	
7/6/09	10:10	KR9095	CRMC	Copco Reservoir Mallard Cove	PacificCorp	0.5	missing	missing	missing	missing															0.25	
7/20/09	9:55	KR9100	CRMC	Copco Reservoir Mallard Cove	PacificCorp	0.5	missing	missing	missing	missing															8700	
8/3/09	10:50	KR9133	CRMC	Copco Reservoir Mallard Cove	PacificCorp	0.5	missing	missing	missing	missing															7500	
8/17/09	12:00	KR9177A	CRMC	Copco Reservoir Mallard Cove	PacificCorp	0.5	missing	missing	missing	missing															2000	
8/31/09	11:40	KR9167	CRMC	Copco Reservoir Mallard Cove	PacificCorp	0.5	missing	missing	missing	missing															1000	
9/14/09	9:45	KR9172	CRMC	Copco Reservoir Mallard Cove	PacificCorp	0.5	missing	missing	missing	missing																
9/28/09	11:20	KR9205	CRMC	Copco Reservoir Mallard Cove	PacificCorp	0.5	missing	missing	missing	missing																
10/12/09	11:00	KR9210	CRMC	Copco Reservoir Mallard Cove	PacificCorp	0.5	missing	missing	missing	missing																
6/8/09	13:30	KR9080	CRCC	Copco Reservoir Copco Cove	PacificCorp	0.5	missing	missing	missing	missing															290	
6/22/09	11:25	KR9065	CRCC	Copco Reservoir Copco Cove	PacificCorp	0.5	missing	missing	missing	missing															0.18	
7/6/09	11:25	KR9096	CRCC	Copco Reservoir Copco Cove	PacificCorp	0.5	missing	missing	missing	missing															0.23	
7/20/09	11:20	KR9101	CRCC	Copco Reservoir Copco Cove	PacificCorp	0.5	missing	missing	missing	missing															50	
8/3/09	11:25	KR9134	CRCC	Copco Reservoir Copco Cove	PacificCorp	0.5	missing	missing	missing	missing															2200	
8/17/09	13:07	KR9178A	CRCC	Copco Reservoir Copco Cove	PacificCorp	0.5	missing	missing	missing	missing															3800	
8/31/09	13:00	KR9168	CRCC	Copco Reservoir Copco Cove	PacificCorp	0.5	missing	missing	missing	missing															62	
9/14/09	10:35	KR9173	CRCC	Copco Reservoir Copco Cove	PacificCorp	0.5	missing	missing	missing	missing															22000	
9/28/09	12:15	KR9206	CRCC	Copco Reservoir Copco Cove	PacificCorp	0.5	missing	missing	missing	missing																
10/12/09	11:40	KR9211	CRCC	Copco Reservoir Copco Cove	PacificCorp	0.5	missing	missing	missing	missing															36000	
10/28/09	12:00	KR9242	CRCC	Copco Reservoir Copco Cove	PacificCorp	0.5	missing	missing	missing	missing															3200	
5/24/09	11:00	KR9035	KR1990	Copco Reservoir	PacificCorp	0.5	22.41	8.6	206.9	8.96	22.44	2.56		6.05	1.88		<0.0087	<0.0057	0.253		0.59	0.13	0.18	8.4	3.6	
5/24/09	11:05	KR9036	KR1990	Copco Reservoir	PacificCorp	9	17.07	7.86	202.1	8.61	15.41	2.75		6.28	1.16		<0.0087	<0.0057	0.182		0.51	0.15	0.2	3.6	1.2j	
5/24/09	11:10	KR9038	KR1990	Copco Reservoir	PacificCorp	18	11.01	7.2	225.8	3.61				5.6	0.7		0.36	0.036	0.104		0.92	0.27	0.29	2.4	1.2j	
5/24/09	11:15	KR9039	KR1990	Copco Reservoir	PacificCorp	27	missing	missing	missing	missing				5.83	1.72		<0.0087	<0.0057	0.224		0.52	0.14	0.24	4.4	2.4	
5/24/09	11:25	KR9033	KR1990	Copco Reservoir	PacificCorp	0.5	missing	missing	missing	missing																0.14j
5/24/09	11:50	KR9034	KR1990	Copco Reservoir	PacificCorp	INT	19.05	8.61	198.7	10.09	23.97	2.4													0.13j	
6/24/09	12:25	KR9080	KR1990	Copco Reservoir	PacificCorp	0.5	22.2	8.76	205.1	11.95			79.4	6.75			<0.0087	0.083		0.49	0.095	0.16	2.4	1.6j	0.19	
6/24/09	12:55	KR9081	KR1990	Copco Reservoir	PacificCorp	9	18.08	7.58	206.4	7.24			78.4	6.26			0.13	0.17		0.62	0.12073684	0.15	<0.87	<0.87		
6/24/09	13:35	KR9082	KR1990	Copco Reservoir	PacificCorp	18	11.68	7.11	215.9	2.34			79.7	5.66			0.28	0.042		0.65	0.25	0.27	2.8	2		
6/24/09	13:55	KR9083	KR1990	Copco Reservoir	PacificCorp	27	10.6	7.1	238.1	1.86			91.3	6.26			1	<0.0057		0.84	0.62	0.73	3.2	2		
6/24/09	14:00	KR9079	KR1990	Copco Reservoir	PacificCorp	INT	missing	missing	missing	missing																<0.09
7/21/09	14:00	KR9116	KR1990	Copco Reservoir	PacificCorp	INT	missing	missing	missing	missing	5.64	2.2				0.689			0.13							
7/21/09	14:00	KR9117	KR1990	Copco Reservoir	PacificCorp	0.5	missing	missing	missing	missing																
7/22/09	14:00	KR9120	KR1990	Copco Reservoir	PacificCorp	18	missing	missing	missing	missing	0.56	1.19	81.8	5.29	0.421		0.37	0.15	0.0749		0.45	0.31	0.33	1.2j	<0.87	
7/22/09	14:10	KR9118	KR1990	Copco Reservoir	PacificCorp	0.5	24.73	8.71	163.7	10.94	22.01	1	67.5	6.37	3.25		0.032j	0.48	0.585		0.92	0.12	0.16	5.6	5.6	
7/22/09	14:30	KR9119	KR1990	Copco Reservoir	PacificCorp	9	20.69	7.43	168.7	5.49	0.63	3.14	68.4	5.47	0.608		0.091	0.52	0.108		0.69	0.22	0.15	<0.87	<0.87	
7/22/09	14:50	KR9121	KR1990	Copco Reservoir	PacificCorp	27	10.95	7.2	235.8	2.03	0.56	0.83	93.8	5.99	0.579		1.21	<0.0057	0.117		0.82	0.76	0.7	<0.87	<0.87	
8/18/09	14:39	KR9150	KR1990	Copco Reservoir	PacificCorp	0.5	22.28	9.09	155.5	6.93															100	
8/18/09	14:40	KR9151	KR1990	Copco Reservoir	PacificCorp	0.5	missing	missing	missing	missing	62.07	2.54	67.3	6.03	4.03		<0.0087	0.28	0.781		1.27	0.14	0.16	9.6	3.6	8.9
8/18/09	15:00	KR9152	KR1990	Copco Reservoir	PacificCorp	9	20.15	8.13	161.2	4.48	7.81	1.32	67.2	5.81	0.58		<0.0087	0.34	0.123		1	0.14	0.11	4	2	
8/18/09	15:15	KR9153	KR1990	Copco Reservoir	PacificCorp	18	15.2	7.21	213.5	1.44	0.76	0.9	76.3	5.44	0.427		0.41	0.21	0.0786		0.99	0.29	0.28	3.2	<0.87	
8/18/09	15:25	KR9154	KR1990	Copco Reservoir	PacificCorp	27	11.23	7.09	237.4	1.4	0.51	0.78	96	5.69	0.689		1.5	0.015	0.128		1.45	1.4	0.85	3.6	<0.87	
8/18/09	15:35	KR9149	KR1990	Copco Reservoir	PacificCorp	INT	missing	missing	missing	missing																4.7
9/15/09	10:05	KR9189	KR1990	Copco Reservoir	PacificCorp	0.5	missing	missing	missing	missing																15
9/15/09	10:10	KR9190	KR1990	Copco Reservoir	PacificCorp	0.5	19.2	8.69	158	10.88	31.2	0.29	75	6.01	3		<0.0087	0.59	0.582		0.83	0.15	0.25	4.8	3.6	14
9/15/09	10:20	KR9191	KR1990	Copco Reservoir	PacificCorp	9	18.73	8.59	156.2	10.58	13	1.35	74	5.79	1.19		<0.0087	0.6	0.22		0.72	0.14	0.18	3.2	2	2
9/15/09	11:15	KR9192	KR1990	Copco Reservoir	PacificCorp	18	16.99	7.14	169.5	3.39	1.87	1.92	64	5.62	0.775		0.22	0.8	0.124		0.93	0.2	0.28	2.4	1.2j	
9/15/09	11:20	KR9193	KR1990	Copco Reservoir	PacificCorp	27	missing	missing	missing	missing	0.56	0.29	102	5.92	0.189		1.94	0.016	0.0136		0.89	0.8	1.11	2	<0.87	
9/15/09	11:30	KR9198	KR1990	Copco Reservoir	PacificCorp	INT	missing	missing	missing	missing	26.2	1.19		1.64												6.2
10/13/09	10:50	KR9228	KR1990	Copco Reservoir	PacificCorp	0.5	13.1	7.56	166	8.29	4.35	1.77	67	6.18	0.633		0.075	0.88	0.133	1.12	2.74	0.2	0.22	2.4	<0.87	
10/13/09	10:55	KR9229	KR1990	Copco Reservoir	PacificCorp	9	12.81	7.72	166.8	6.78	2.21	2.36	68	6.45	0.548		0.12	0.89	0.0906	1.12	2.52	0.18	0.17			

Date	Time	Sample ID	Site ID	Site Name	Agency	Depth	Water Temp.	pH	Specific Cond.	Diss. Oxygen	Algae, Chlorophyll a	Algae, Pheophytin	Alkalinity	Carbon, Diss. Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Ortho-Phosphate	Phosphorus, Total Phosphorus	Solids, Total Susp. Solids	Solids, Volatile Susp. Solids	Toxins, Microcystin
						m	C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l
6/8/09	14:20	KR9061	IRJW	Iron Gate Reservoir Jay Williams	PacificCorp	0.5	missing	missing	missing	missing																0.84
6/22/09	12:45	KR9066	IRJW	Iron Gate Reservoir Jay Williams	PacificCorp	0.5	missing	missing	missing	missing																0.12
7/6/09	13:20	KR9097	IRJW	Iron Gate Reservoir Jay Williams	PacificCorp	0.5	missing	missing	missing	missing																7.2
7/20/09	12:30	KR9102	IRJW	Iron Gate Reservoir Jay Williams	PacificCorp	0.5	missing	missing	missing	missing																220
8/3/09	12:40	KR9135	IRJW	Iron Gate Reservoir Jay Williams	PacificCorp	0.5	missing	missing	missing	missing																1000
8/17/09	14:00	KR9179A	IRJW	Iron Gate Reservoir Jay Williams	PacificCorp	0.5	missing	missing	missing	missing																160
8/31/09	14:30	KR9169	IRJW	Iron Gate Reservoir Jay Williams	PacificCorp	0.5	missing	missing	missing	missing																0.13
9/14/09	11:20	KR9175	IRJW	Iron Gate Reservoir Jay Williams	PacificCorp	0.5	missing	missing	missing	missing																
9/28/09	13:10	KR9208	IRJW	Iron Gate Reservoir Jay Williams	PacificCorp	0.5	missing	missing	missing	missing																160
10/12/09	12:30	KR9213	IRJW	Iron Gate Reservoir Jay Williams	PacificCorp	0.5	missing	missing	missing	missing																3200
10/26/09	12:50	KR9244	IRJW	Iron Gate Reservoir Jay Williams	PacificCorp	0.5	missing	missing	missing	missing																2400
6/8/09	14:10	KR9062	IRCC	Iron Gate Reservoir Camp Ck	PacificCorp	0.5	missing	missing	missing	missing																0.14
6/22/09	12:05	KR9067	IRCC	Iron Gate Reservoir Camp Ck	PacificCorp	0.5	missing	missing	missing	missing																2.5
7/6/09	12:40	KR9098	IRCC	Iron Gate Reservoir Camp Ck	PacificCorp	0.5	missing	missing	missing	missing																1.1
7/20/09	12:00	KR9103	IRCC	Iron Gate Reservoir Camp Ck	PacificCorp	0.5	missing	missing	missing	missing																11
8/3/09	12:15	KR9136	IRCC	Iron Gate Reservoir Camp Ck	PacificCorp	0.5	missing	missing	missing	missing																10
8/17/09	13:40	KR9180A	IRCC	Iron Gate Reservoir Camp Ck	PacificCorp	0.5	missing	missing	missing	missing																15
8/31/09	13:40	KR9170	IRCC	Iron Gate Reservoir Camp Ck	PacificCorp	0.5	missing	missing	missing	missing																150
9/14/09	11:00	KR9174	IRCC	Iron Gate Reservoir Camp Ck	PacificCorp	0.5	missing	missing	missing	missing																
9/28/09	missing	KR9207	IRCC	Iron Gate Reservoir Camp Ck	PacificCorp	0.5	missing	missing	missing	missing																190
10/12/09	12:12	KR9212	IRCC	Iron Gate Reservoir Camp Ck	PacificCorp	0.5	missing	missing	missing	missing																12
10/26/09	12:30	KR9243	IRCC	Iron Gate Reservoir Camp Ck	PacificCorp	0.5	missing	missing	missing	missing																13
5/24/09	14:00	KR9042	KR1920	Iron Gate Reservoir	PacificCorp	0.5	22.47	8.87	176.9	9.78																0.13
5/24/09	14:05	KR9043	KR1920	Iron Gate Reservoir	PacificCorp	10	13.13	7.53	182.7	8.01				4.9	1.4		<0.0087	<0.0057	0.179		0.43	0.082	0.12	7.2	1.2	
5/24/09	14:10	KR9047	KR1920	Iron Gate Reservoir	PacificCorp	20	7.75	7.38	215.3	6.81				5.3	1.06		<0.0087	<0.0057	0.171		0.37	0.072	0.13	4	<0.87	
5/24/09	14:15	KR9048	KR1920	Iron Gate Reservoir	PacificCorp	30	missing	missing	missing	missing				4.82	0.558		<0.0087	0.52	0.0875		0.84	0.049	0.13	<0.87	<0.87	
5/24/09	14:20	KR9049	KR1920	Iron Gate Reservoir	PacificCorp	40	missing	missing	missing	missing				5.14	0.743		<0.0087	0.72	0.124		1.05	0.12	0.16	<0.87	<0.87	
5/24/09	14:30	KR9040	KR1920	Iron Gate Reservoir	PacificCorp	0.5	missing	missing	missing	missing	10.56	1.34		4.62	0.751		<0.0087	0.79	0.115		1.15	0.11	0.14	<0.87	<0.87	0.15
5/24/09	14:35	KR9041	KR1920	Iron Gate Reservoir	PacificCorp	INT	missing	missing	missing	missing	16.46	2.97														0.14
6/24/09	14:05	KR9085	KR1920	Iron Gate Reservoir	PacificCorp	INT	missing	missing	missing	missing																0.11
6/24/09	18:20	KR9092	KR1920	Iron Gate Reservoir	PacificCorp	40	6.63	7.1	208.2	2.18			77	4.68			<0.0087	0.78		0.95	0.13	0.13	2	<0.87		
6/24/09	18:30	KR9089	KR1920	Iron Gate Reservoir	PacificCorp	10	6.75	7.15	207.5	3.9			79.8	4.31			<0.0087	0.42		0.63	0.11	0.14	<0.87	1.2		
6/24/09	18:45	KR9090	KR1920	Iron Gate Reservoir	PacificCorp	20	8.88	7.23	215.3	6.11			79.8	4.69			<0.0087	0.48		0.64	0.098	0.11	1.6	<0.87		
6/24/09	19:00	KR9091	KR1920	Iron Gate Reservoir	PacificCorp	30	18.19	7.55	181.5	7.6			74.4	5.51			0.081	0.1		0.4	0.16	0.16	1.2	<0.87		
6/24/09	19:15	KR9086	KR1920	Iron Gate Reservoir	PacificCorp	0.5	21.78	8.63	182.3	10.17			73.6	5.83			<0.0087	0.039		0.38	0.1	0.14	<0.87	<0.87	0.14	
7/21/09	10:10	KR9107	KR1920	Iron Gate Reservoir	PacificCorp	INT	missing	missing	missing	missing	13.66	2.04			1.35				0.227							
7/21/09	12:10	KR9108	KR1920	Iron Gate Reservoir	PacificCorp	0.5	missing	missing	missing	missing																
7/22/09	10:00	KR9109	KR1920	Iron Gate Reservoir	PacificCorp	0.5	25.43	9.21	178.2	11.71	17.05	0.42	74.6	6.66	1.84		<0.0087	<0.0057	0.319		0.41	0.075	0.16	6.4	6.4	
7/22/09	10:20	KR9110	KR1920	Iron Gate Reservoir	PacificCorp	10	20.05	7.28	181.8	3.95	5.51	1.96	71.6	5.65	0.555		<0.0087	0.39	0.106		0.49	0.14	0.15	<0.87	<0.87	
7/22/09	10:50	KR9111	KR1920	Iron Gate Reservoir	PacificCorp	20	9.54	7.21	210.6	4.39	0.56	0.51	80.9	5.01	0.299		<0.0087	0.42	0.0573		0.44	0.17	0.1	<0.87	<0.87	
7/22/09	11:30	KR9112	KR1920	Iron Gate Reservoir	PacificCorp	30	6.95	7.16	206.2	2.77	0.56	0.37	78.6	4.69	0.56		<0.0087	0.68	0.165		0.67	0.15	0.13	<0.87	<0.87	
7/22/09	12:00	KR9113	KR1920	Iron Gate Reservoir	PacificCorp	40	6.75	7.16	208.9	2.54	0.56	0.39	79.6	4.5	0.279		0.067	0.66	0.0529		0.7	0.15	0.12	<0.87	<0.87	
8/18/09	11:20	KR9141	KR1920	Iron Gate Reservoir	PacificCorp	0.5	missing	missing	missing	missing																7.4
8/18/09	11:30	KR9142	KR1920	Iron Gate Reservoir	PacificCorp	0.5	23.36	9.29	165.3	6.72	29.22	1.72	72.1	6.48	2.1		<0.0087	<0.0057	0.357		0.67	0.12	0.12	4.8	2.8	12
8/18/09	11:40	KR9143	KR1920	Iron Gate Reservoir	PacificCorp	10	20.6	7.33	169.7	6.83	4.76	1.34	70	5.37	0.161		0.015	0.5	0.0359			0.18	0.16	2.4	<0.87	
8/18/09	12:00	KR9144	KR1920	Iron Gate Reservoir	PacificCorp	20	11.24	7.15	205.4	3.57	1.18	0.79	78.2	4.26	0.214		<0.0087	0.39	0.0427		0.74	0.16	0.16	<0.87	<0.87	
8/18/09	12:20	KR9145	KR1920	Iron Gate Reservoir	PacificCorp	30	7.11	7.16	209.3	1.99	1.38	0.53	79.8	4.72	0.289		0.044	0.6	0.0629		1.07	0.16	0.17	1.6	<0.87	
8/18/09	12:35	KR9146	KR1920	Iron Gate Reservoir	PacificCorp	40	6.85	7.15	211.7	1.73	1.89	0.54	79.8	4.75	0.357		0.17	0.58	0.0674		1.09	0.2	0.16	2	<0.87	
8/18/09	13:10	KR9140	KR1920	Iron Gate Reservoir	PacificCorp	INT	missing	missing	missing	missing																5.6
9/15/09	12:55	KR9181	KR1920	Iron Gate Reservoir	PacificCorp	0.5	19.62	8.88	160.2	11.1	45.89	0.29	68	5.08	3.54		<0.0087	0.12	0.742		0.4	0.15	0.19	5.6	4.4	11
9/15/09	13:00	KR9180	KR1920	Iron Gate Reservoir	PacificCorp	0.5	missing	missing	missing	missing																13
9/15/09	13:00	KR9182	KR1920	Iron Gate Reservoir	PacificCorp	10	19.18	8.11	162	7.05	5.57	0.94	68	5.46	0.65		<0.0087	0.39	0.111		0.39	0.16	0.15	<0.87	<0.87	
9/15/09	13:20	KR9183	KR1920	Iron Gate Reservoir	PacificCorp	20	11.47	7.02	205	1.46	0.78	0.64	76	4.38	0.514		<0.0087	0.15	0.0724		0.11	0.21	0.22	<0.87	<0.87	
9/15/09	13:30	KR9184	KR1920	Iron Gate Reservoir	PacificCorp	30	missing	missing	missing	missing	0.56	0.51	81	4.76	0.647		0.13	0.46	0.0928		0.42	0.16	0.16	<0.87	<0.87	
9/15/09	13:40	KR9185	KR1920	Iron Gate Reservoir	PacificCorp	40	missing	missing	missing	missing	0.56	0.43	81	4.44	0.441		0.24	0.5	0.0611		0.47	0.18	0.22	<0.87	<0.87	
9/15/09	13:50	KR9179	KR1920	Iron Gate Reservoir	PacificCorp	INT	missing	missing	missing	missing	42.19	0.29			2.4				0.464							7.6
10/13/09	14:40	KR9219	KR1920	Iron Gate Reservoir	PacificCorp	0.5	13.98	7.39	169.1	7.61	1.43	1.33	70	5.8	0.432		0.18	0.68	0.0707		1.07	2.11	0.2	2.4	<0.87	
10/13/09	14:45	KR9220	KR1920	Iron Gate Reservoir	PacificCorp	10	13.97	7.62	169.6	7.93	1.38	1.62	69	5.95	0.697		0.19	0.69	0.119		1.14	2.1	0.23	2.4	2	<0.87
10/13/09	14:50	KR9221	KR1920	Iron Gate Reservoir	PacificCorp	20	12.54	7.36	188.3	4.55	0.76	1.52	73	5.77	0.677		0.2	0.59	0.117		0.95	1.95	0.23	2.4	2	1.2
10/13/09	14:55	KR9222	KR1920	Iron Gate Reservoir	PacificCorp	30	7.34	7.18	211.9	1.94	0.56	0.47	82	4.72	0.447		0.2	0.16	0.0685		1.03	0.9	0.23	2.42	1.6	<0.87
10/13/09	15:00	KR9223	KR1920	Iron Gate Reservoir																						

Date	Time	Sample ID	Site ID	Site Name	Agency	Depth	Water Temp.	pH	Specific Cond.	Diss. Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Diss. Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Ortho-Phosphate	Phosphorus, Total Phosphorus	Solids, Total Susp. Solids	Solids, Volatile Susp. Solids	Toxins, Microcystin	
						m	C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	
5/14/09	10:15	KR9030	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	missing	missing	missing	missing			71	5.71		<2	0.011	0.084		0.12	0.092	0.11	2.4	<0.87			
5/24/09	17:00	KR9031	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	18.06	8.42	179.5	9.78	18.9	2.65		5.63	1.54	2.6	<0.0087	0.02	0.215		0.46	0.1	0.19	4.4	<0.87	0.12	
6/8/09	15:00	KR9063	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	missing	missing	missing	missing																0.14	
6/9/09	15:40	KR9068	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	missing	missing	missing	missing			76.5	5.62			<0.0087	0.032		0.4	0.14	0.16	<0.87	<0.87	0.12	0.12	
6/22/09	13:14	KR9068	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	missing	missing	missing	missing																0.09	
6/24/09	20:30	KR9078	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	20.5	8.25	183.1	10.33			69.8	5.76		<2	0.028	0.075		0.41	0.12	0.12	1.2	<0.87	0.1	0.1	
7/6/09	14:20	KR9099	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	missing	missing	missing	missing																2	
7/6/09	14:30	KR9094	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	missing	missing	missing	missing							0.017	0.17		0.54		0.12	1.2	1.2	0.45	13	
7/20/09	12:55	KR9104	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	missing	missing	missing	missing																	
7/21/09	17:00	KR9106	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	22.34	8.27	178.4	9.55	9.97	2.99	73.2	5.49	0.848	4.98	<0.0087	0.22	0.149	0.43	0.12	0.13	3.6	3.2			1700
8/3/09	13:10	KR9132	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	missing	missing	missing	missing																	5
8/10/09	10:15	KR9137	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	missing	missing	missing	missing																	2
8/17/09	14:20	KR9181A	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	missing	missing	missing	missing																	2
8/18/09	16:50	KR9139	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	21.93	8.82	166.8	5.04	13.35	1.94	70.1	5.99	1.02	<2	<0.0087	0.19	0.186	0.73	0.13	0.11	3.2	<0.87	2	8.8	
8/24/09	12:00	KR9165	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	missing	missing	missing	missing																	0.13
8/31/09	14:50	KR9166	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	missing	missing	missing	missing																	0.64
9/8/09	11:00	KR9171	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	missing	missing	missing	missing																	
9/14/09	11:30	KR9176	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	missing	missing	missing	missing																	
9/15/09	14:50	KR9178	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	19.71	8.78	162.9	10.46	16.73	0.47	68	5.48	1.68	7.02	<0.0087	0.22	0.327	0.47	0.15	0.21	3.6	2.4	8.7		
9/15/09	15:30	KR9187MS	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	missing	missing	missing	missing																	
9/21/09	11:10	KR9204	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	missing	missing	missing	missing																	9.8
9/28/09	13:30	KR9209	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	missing	missing	missing	missing																	11
10/12/09	12:40	KR9214	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	missing	missing	missing	missing																	2.1
10/13/09	18:25	KR9216	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	13.8	7.35	171.5	8.34	1.92	4.14	67	6.86	0.813	<2	<0.0087	0.88	0.137	1.11	2.51	0.11	0.15	4	2.4		
10/26/09	13:10	KR9245	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	missing	missing	missing	missing																	5.1
11/17/09	8:30	KR9247	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	9.47	7.3	168.8	8.69			69	5.46		6.15	0.15	0.77	0.0804		1.44	0.14	0.15	2	<0.87	0.15	
11/17/09	8:35	KR9248MS	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	missing	missing	missing	missing																	
12/15/09	14:25	KR9274	KR1897	Klamath River bel. Iron Gate Dam	PacifiCorp	0.5	4.73	7.55	161.2	11.19	0.62	0.93	65.9	5.47	0.413	2.91	0.16	0.86	0.0549		1.55	0.1	0.11	1.6	<0.87	0.14	
5/14/09	11:15	WA051409-OC	KR1767	Klamath River at Walker Bridge	Kanuk	0.5	13.17	8.15	203	10.52	9.07	4.37	89.7	4.15			<0.010	0.095		0.56	0.078	0.1	5.5	2.5	0.13		
5/28/09	11:13	WA052809-OC	KR1767	Klamath River at Walker Bridge	Kanuk	0.5	17.97	9.47	79	9.47	10.68	4.45	85.4	4.57			<0.010	0.012		0.5	0.073	0.11	5.37	2.12	0.12		
6/11/09	11:27	WA061109-OC	KR1767	Klamath River at Walker Bridge	Kanuk	0.5	18.7	8.25	150	9.09	6.76	3.57	95	4.91			<0.010	0.02		0.52	0.1	0.15	5	1.75			
6/25/09	12:35	WA062509-OC	KR1767	Klamath River at Walker Bridge	Kanuk	0.5	20.12	8.42	202	9.64	2.93	3.04	91.7	4.84			<0.010	0.07		0.61	0.082	0.13	3.75	2	<0.09		
7/9/09	11:50	WA070909-OC	KR1767	Klamath River at Walker Bridge	Kanuk	0.5	20.84	7.51	207	missing	2.93	3.04	96.5	5.3			<0.010	0.14		0.63	0.086	0.11	2.25	1.62		0.39	
7/23/09	12:05	WA072309-OC	KR1767	Klamath River at Walker Bridge	Kanuk	0.5	23.75	8.52	192	9.55	5.6	4.48	86.1	5.07			<0.010	0.2		0.81	0.098	0.13	3.12	1.62	0.17		
8/6/09	12:00	WA080609-OC	KR1767	Klamath River at Walker Bridge	Kanuk	0.5	21.28	8.45	184	8.55	13.88	4.05	85.6	5.03			<0.010	0.21		0.98	0.11	0.16	5.33	3.33			
8/20/09	12:13	WA082009-OC	KR1767	Klamath River at Walker Bridge	Kanuk	0.5	22.86	8.64	181	9.29	8.54	4.53	83.3	4.69			<0.010	0.18		0.82	0.12	0.15	3.5	2.12			
9/3/09	11:40	WA090309-OC	KR1767	Klamath River at Walker Bridge	Kanuk	0.5	20.67	8.66	174	9.29	16.02	4.72	83.1	5.19			<0.010	0.14		0.96	0.11	0.15	5.16	3.16			
9/17/09	missing	WA091709-OC	KR1767	Klamath River at Walker Bridge	Kanuk	0.5	missing	missing	missing	missing	10.14	4.8	84.8	4.64			0.017	0.27		1	0.12	0.16	5	3.16		4.9	
10/1/09	11:22	WA100109-OC	KR1767	Klamath River at Walker Bridge	Kanuk	0.5	15.37	8.4	184	10.1	18.69	10.09	84.3	4.76			<0.010	0.33		1.6	0.12	0.2	12.75	6		10	
10/15/09	11:47	WA101509-OC	KR1767	Klamath River at Walker Bridge	Kanuk	0.5	14.17	8.2	199	10.13	5.34	5.12	93.6	4.18			0.038	0.72		1.69	0.15	0.19	6.16	2.66		0.96	
11/12/09	12:00	WA111209-OC	KR1767	Klamath River at Walker Bridge	Kanuk	0.5	9.64	8.22	182	11.3	2.67	3.31	95.4	4.01			0.038	0.76		1.39	0.11	0.13	3.12	0.87			
12/10/09	12:40	WA121009-OC	KR1767	Klamath River at Walker Bridge	Kanuk	0.5	2.98	8.18	110	13.04	2.93	3.79	87.5	3.56			0.044	0.82		1.62	0.077	0.1	2.75	0.87			
5/14/09	10:10	SV051409-OC	KR1285	Klamath River bel. Seiad	Kanuk	0.5	12.55	8.09	168	10.7	6.94	3.33	82	2.93			0.011	0.03		0.33	0.039	0.065	6	2.16	0.11		
5/28/09	10:12	SV052809-OC	KR1285	Klamath River bel. Seiad	Kanuk	0.5	17.71	8.1	42	9.27	6.14	3.76	81.1	3.28			<0.010	<0.010		0.35	0.043	0.079	11.5	2.62	0.14		
6/11/09	10:05	SV061109-OC	KR1285	Klamath River bel. Seiad	Kanuk	0.5	18.13	8.24	200	9.06	4.8	3.29	97.3	3.86			0.01	0.013		0.44	0.075	0.12	7.5	2.33	<0.09		
6/25/09	11:20	SV062509-OC	KR1285	Klamath River bel. Seiad	Kanuk	0.5	20.19	8.4	202	9.59	2.13	3.65	96.6	4.28			<0.010	0.034		0.47	0.081	0.12	5.12	1.37	<0.09		
7/9/09	10:36	SV070909-OC	KR1285	Klamath River bel. Seiad	Kanuk	0.5	20.38	8.48	212	9.22	3.47	4.75	101.3	4.69			<0.010	<0.010		0.43	0.061	0.1	4.87	1.75		0.19	
7/23/09	10:45	SV072309-OC	KR1285	Klamath River bel. Seiad	Kanuk	0.5	23.65	8.43	199	9.28	5.07	4.45	89.7	4.72			0.013	0.075		0.62	0.082	0.11	2.87	1.62		0.18	
8/6/09	10:20	SV080609-OC	KR1285	Klamath River bel. Seiad	Kanuk	0.5	20.89	8.2	192	8.84	9.87	3.76	88.6	4.54			0.01	0.19		0.76	0.1	0.14	2.62	2			
8/20/09	10:21	SV082009-OC	KR1285	Klamath River bel. Seiad	Kanuk	0.5	22.46	8.49	185	9.36	8.54	5.84	90	4.66			<0.010	0.05		0.65	0.1	0.13	2.5	1.75			
9/3/09	10:05	SV090309-OC	KR1285	Klamath River bel. Seiad	Kanuk	0.5	20.32	8.24	185	8.85	6.94	5.2	87.9	4.76			0.014	0.18		0.81	0.11	0.14	5.62	3.37			
9/17/09	10:45	SV091709-OC	KR1285	Klamath River bel. Seiad	Kanuk	0.5	19.89	8.49	184	9.49	14.95	5.6	88	4.41			<0.010	0.21		0.93	0.11	0.16	9.16	4.16		7.2	
10/1/09	9:50	SV100109-OC	KR1285	Klamath River bel. Seiad	Kanuk	0.5	14.24	8.48	186	10.54	16.55	4.37	88.6	4.48			<0.010	0.13		1.27	0.1	0.17	8.25	6.5		1.4	
10/15/09	10:25	SV101509-OC	KR1285	Klamath River bel. Seiad	Kanuk	0.5	13.92	8.17	204	10.13	5.34	6.99	93	4.05			0.025	0.66		1.43	0.15	0.17	6.5	2.5		0.42	
11/12/09	10:45	SV111209-OC	KR1285	Klamath River bel. Seiad	Kanuk	0.5	9.38																				

Date	Time	Sample ID	Site ID	Site Name	Agency	Depth	Water Temp.	pH	Specific Cond.	Diss. Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Diss. Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Ortho-Phosphate	Phosphorus, Total Phosphorus	Solids, Total Susp. Solids	Solids, Volatile Susp. Solids	Toxins, Microcystin
						m	C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l
5/28/09	11:06	WE052809	KR0435	Klamath River At Weitchpec	Yurok	0.5	17.38	8.11	123	9.57	6.68	1.17	62.2	1.64	2.26		<0.010	<0.010			0.22	0.019	0.038	4	1.38	
6/25/09	11:24	WE062509	KR0435	Klamath River At Weitchpec	Yurok	0.5	20.15	8.4	169	9.39	1.87	1.5	82.5				<0.010	<0.010			0.22	0.036	0.057	1.88	0.87	
6/25/09	11:24	WE062509-SG	KR0435	Klamath River At Weitchpec	Yurok	0.5																				<0.09
7/23/09	11:12	WE072309-SG	KR0435	Klamath River At Weitchpec	Yurok	0.5																				0.3
7/23/09	11:19	WE072309-OC	KR0435	Klamath River At Weitchpec	Yurok	0.5	22.66	8.32	181	8.94	4.01	2.72	86.9	2.58			<0.010	<0.010			0.34	0.037	0.054	2.75	1.75	
8/20/09	11:35	WE082009-OC	KR0435	Klamath River At Weitchpec	Yurok	0.5	22.09	8.24	179	9.02	5.87	1.6	85.8	2.82			<0.010	0.011			0.35	0.054	0.072	3.25	2.13	
8/20/09	11:35	WE082009-OC	KR0435	Klamath River At Weitchpec	Yurok	0.5																				0.89
8/20/09	11:47	WE082009-SG	KR0435	Klamath River At Weitchpec	Yurok	0.5																				0.22
9/17/09	11:37	WE091709-OC	KR0435	Klamath River At Weitchpec	Yurok	0.5	19.78	8.2	180	9.48	5.61	4.3	86.9	2.92			<0.010	0.049			0.39	0.063	0.086	2.75	1.5	
9/17/09	11:40	WE091709-OC	KR0435	Klamath River At Weitchpec	Yurok	0.5																				1.1
9/17/09	11:51	WE091709-SG	KR0435	Klamath River At Weitchpec	Yurok	0.5																				<0.09
10/15/09	11:36	WE101509-OC	KR0435	Klamath River At Weitchpec	Yurok	0.5	13.29	7.92	152	10.18	25.63	20.35	71	3.77			<0.010	0.26			1.05	0.048	0.19	33.75	9.75	
10/15/09	11:36	WE101509-OC	KR0435	Klamath River At Weitchpec	Yurok	0.5																				0.92
10/15/09	11:50	WE101509-SG	KR0435	Klamath River At Weitchpec	Yurok	0.5																				1.1
11/12/09	12:02	WE111209-OC	KR0435	Klamath River At Weitchpec	Yurok	0.5	9.75	8.21	171	12.03	3.74	4.3	83.7	2.66			0.013	0.33			0.58	0.056	0.067	1.88	0.63	
12/17/09	11:32	WE121709-OC	KR0435	Klamath River At Weitchpec	Yurok	0.5	6.67	7.63	117	12.1	9.61	7.21	57.5	2.77			<0.010	0.21			0.52	0.017	0.063	11	3.75	
5/28/09	10:22	TC052809	KR0425	Klamath River bel. Trinity River	Yurok	0.5	16.91	8.07	122	9.68	4.27	0.96	62.5	1.33			<0.010	<0.010			0.14	0.012	0.026	4	1	
5/28/09	10:22	TC052809-OC	KR0425	Klamath River bel. Trinity River	Yurok	0.5																				<0.09
5/28/09	10:22	TC052809	KR0425	Klamath River bel. Trinity River	Yurok	0.5																				0.1
6/25/09	10:38	TC062509	KR0425	Klamath River bel. Trinity River	Yurok	0.5	19.88	8.27	164	9	1.87	1.12	81.8	1.71			<0.010	<0.010			0.19	0.022	0.041	1.5	0.62	
6/25/09	10:38	TC062509-OC	KR0425	Klamath River bel. Trinity River	Yurok	0.5																				
6/25/09	10:38	TC062509-OC	KR0425	Klamath River bel. Trinity River	Yurok	0.5																				
7/23/09	10:24	TC072309-OC	KR0425	Klamath River bel. Trinity River	Yurok	0.5	22.52	8.32	181	8.4	2.67	3.31	83.5	2.04			<0.010	<0.010			0.22	0.024	0.042	2.5	1.5	
7/23/09	10:24	TC072309-OC	KR0425	Klamath River bel. Trinity River	Yurok	0.5																				0.16
7/23/09	10:24	TC072309-OC	KR0425	Klamath River bel. Trinity River	Yurok	0.5																				
8/20/09	10:52	TC082009-OC	KR0425	Klamath River bel. Trinity River	Yurok	0.5	22.38	8.26	174	8.58	4.54	1.63	87.6	2.23			<0.010	<0.010			0.26	0.033	0.05	2.5	1.75	
8/20/09	10:52	TC082009-OC	KR0425	Klamath River bel. Trinity River	Yurok	0.5																				0.43
9/17/09	10:58	TC091709-OC	KR0425	Klamath River bel. Trinity River	Yurok	0.5	19.99	8.2	173	9.08	4.54	3.5	83.6	2.01			<0.010	0.025			0.27	0.043	0.06	1.88	1.13	
9/17/09	10:58	TC091709-OC	KR0425	Klamath River bel. Trinity River	Yurok	0.5																				0.64
9/17/09	10:58	TC091709-OC	KR0425	Klamath River bel. Trinity River	Yurok	0.5																				
10/15/09	10:51	TC101509-OC	KR0425	Klamath River bel. Trinity River	Yurok	0.5																				0.67
10/15/09	10:59	TC101509-OC	KR0425	Klamath River bel. Trinity River	Yurok	0.5	13.44	7.85	158	10.03	27.23	18	73.8	2.83			<0.010	0.16			0.82	0.031	0.14	34	10	
10/15/09	10:59	TC101509-OC	KR0425	Klamath River bel. Trinity River	Yurok	0.5																				
11/12/09	11:14	TC111209-OC	KR0425	Klamath River bel. Trinity River	Yurok	0.5	9.73	8.14	172	11.73	2.94	3.23	85.7	2.09			0.011	0.24			0.45	0.041	0.05	1.88	0.63	
11/12/09	11:16	TC111209-OC	KR0425	Klamath River bel. Trinity River	Yurok	0.5																				<0.09
12/17/09	10:59	TC121709-OC	KR0425	Klamath River bel. Trinity River	Yurok	0.5	6.75	7.68	131	11.95	14.42	10.25	64.3	2.24			0.011	0.16			0.77	0.011	0.1	38	6.5	
5/28/09	8:20	TG052809	KR0060	Klamath River near Klamath	Yurok	0.5	16.59	8.07	123	9.4	4.54	1.07	63.2	1.08			<0.010	0.011			0.15	0.009	0.024	4.88	1.25	
5/28/09	8:20	TG052809-OC	KR0060	Klamath River near Klamath	Yurok	0.5																				<0.09
6/25/09	8:53	TG062509	KR0060	Klamath River near Klamath	Yurok	0.5	18.96	8.09	163	8.96	2.67	1.82	80.4	1.42			<0.010	0.018			0.19	0.014	0.032	5	1.25	
6/25/09	8:53	TG062509-OC	KR0060	Klamath River near Klamath	Yurok	0.5																				<0.09
6/25/09	9:40	TG062509-SG	KR0060	Klamath River near Klamath	Yurok	0.5																				<0.09
7/23/09	8:06	TG072309-SG	KR0060	Klamath River near Klamath	Yurok	0.5																				0.26
7/23/09	8:10	TG072309-OC	KR0060	Klamath River near Klamath	Yurok	0.5	20.72	7.68	178	7.2	5.07	2.59	86.5	1.46			<0.010	0.022			0.22	0.012	0.027	2	1.25	
7/23/09	8:10	TG072309-OC	KR0060	Klamath River near Klamath	Yurok	0.5																				0.15
8/20/09	8:28	TG082009-OC	KR0060	Klamath River near Klamath	Yurok	0.5	21.47	8.26	175	7.65	6.14	2.27	85.9	1.87			<0.010	0.013			0.25	0.02	0.042	2.75	1.75	
8/20/09	8:28	TG082009-OC	KR0060	Klamath River near Klamath	Yurok	0.5																				0.49
8/20/09	8:41	TG082009-SG	KR0060	Klamath River near Klamath	Yurok	0.5																				0.29
9/17/09	9:03	TG091709-OC	KR0060	Klamath River near Klamath	Yurok	0.5	20.01	8.19	174	8.13	7.74	4.97	84.7	1.96			<0.010	<0.010			0.27	0.031	0.054	3.75	1.5	
9/17/09	9:06	TG091709-OC	KR0060	Klamath River near Klamath	Yurok	0.5																				1.7
9/17/09	9:16	TG091709-SG	KR0060	Klamath River near Klamath	Yurok	0.5																				1.7
10/15/09	8:43	TG101509-OC	KR0060	Klamath River near Klamath	Yurok	0.5	13.78	7.87	167	9.57	26.7	23.02	78.4	2.51			<0.010	0.22			0.8	0.046	0.15	30.25	7.25	
10/15/09	8:53	TG101509-OC	KR0060	Klamath River near Klamath	Yurok	0.5																				1.2
10/15/09	9:01	TG101509-SG	KR0060	Klamath River near Klamath	Yurok	0.5																				1.2
11/12/09	9:16	TG111209-OC	KR0060	Klamath River near Klamath	Yurok	0.5	10.2	7.84	171	10.71	2.31	4.54	84.6	1.65			0.012	0.23			0.4	0.033	0.044	2.13	1	
11/12/09	9:16	TG111209-OC	KR0060	Klamath River near Klamath	Yurok	0.5																				<0.09
12/17/09	9:00	TG121709-OC	KR0060	Klamath River near Klamath	Yurok	0.5	7.01	7.61	128	11.73	19.22	13.67	62.8	1.97			0.019	0.16			0.7	0.011	0.12	51	7.5	
5/28/09	7:33	LES052809	KR0005	Klamath River Estuary	Yurok	0.5	16.5	8.05	127	9.28	4.27	1.71	61.2	1.24			<0.010	<0.010			0.16	0.01	0.073	17.88	2.25	
5/28/09	7:33	LES052809-OC	KR0005	Klamath River Estuary	Yurok	0.5																				<0.09
6/25/09	7:41	LES062509	KR0005	Klamath River Estuary	Yurok	0.5	19.14	8.01	2512	8.21	1.87	1.68	81.8	1.82			<0.010	0.012			0.2	0.017	0.034	3.5	1.38	
6/25/09	7:41	LES062509-OC	KR0005	Klamath River Estuary	Yurok	0.5																				<0.09
7/23/09	7:10	LES072309-OC	KR0005	Klamath River Estuary	Yurok	0.5	19.5	8.17	100 to 1																	

Date	Time	Sample ID	Site ID	Site Name	Agency	Depth	Water Temp.	pH	Specific Cond.	Diss. Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Diss. Organic Carbon	Carbon, Particulate Carbon	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Ortho-Phosphate	Phosphorus, Total Phosphorus	Solids, Total Susp. Solids	Solids, Volatile Susp. Solids	Toxins, Microcystin
						m	C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l
5/14/09	12:06	SH051409-OC	SHR00	Shasta River near mouth	Karuk	0.5	15.79	8.62	556	10.81	4.27	3.57	307	5.52			<0.010	<0.010			0.52	0.15	0.18	9.16	3.5	0.12]
5/28/09	12:11	SH052809-OC	SHR00	Shasta River near mouth	Karuk	0.5	21.41	8.57	607	9.83	1.33	1.46	318.2	5.49			<0.010	<0.010			0.45	0.2	0.24	0.75	<0.50	0.16]
6/11/09	13:30	SH061106-OC	SHR00	Shasta River near mouth	Karuk	0.5	20.62	8.57	600	8.51	5.87	7.95	314.8	6.16			<0.010	<0.010			0.83	0.15	0.25	25.25	6.75	
6/25/09	14:15	SH062509-OC	SHR00	Shasta River near mouth	Karuk	0.5	23.87	8.69	577	8.93	1.6	4.75	304	5.94			<0.010	<0.010			0.54	0.17	0.22	7.12	1.87	<0.09
7/9/09	14:00	SH070909-OC	SHR00	Shasta River near mouth	Karuk	0.5	missing	missing	missing	missing	1.33	3.15	328.2	6.22			<0.010	<0.010			0.54	0.17	0.21	4.76	1.87	<0.09
7/23/09	12:50	SH072309-OC	SHR00	Shasta River near mouth	Karuk	0.5	25.26	8.71	627	9.49	1.33	3.33	322.4	7.19			<0.010	<0.010			0.69	0.22	0.28	3.5	1.12	
8/6/09	13:00	SH080609-OC	SHR00	Shasta River near mouth	Karuk	0.5	19.17	8.65	598	9.08	1.6	2.69	313.6	5.32			<0.010	<0.010			0.47	0.21	0.22	1.87	0.5	1
8/20/09	13:00	SH082009-OC	SHR00	Shasta River near mouth	Karuk	0.5	23.35	8.77	593	9.51	1.86	2.42	286.4	5.21			<0.010	<0.010			0.46	0.17	0.21	3	2.37	
9/3/09	12:23	SH090309-OC	SHR00	Shasta River near mouth	Karuk	0.5	19.82	8.69	612	10.09	1.86	1.86	304.8	5.75			<0.010	<0.010			0.46	0.17	0.2	1.37	0.75	
9/17/09	13:00	SH091709-OC	SHR00	Shasta River near mouth	Karuk	0.5	20.16	8.77	626	9.72	4.27	6.19	323.4	5.36			<0.010	<0.010			0.61	0.2	0.24	17.66	4.16	<0.09
10/1/09	12:04	SH100109-OC	SHR00	Shasta River near mouth	Karuk	0.5	11.48	8.59	617	10.36	14.95	21.68	298.4	5.36			0.007	0.076			1.18	0.16	0.28	55	15	<0.09
10/15/09	12:50	SH101509-OC	SHR00	Shasta River near mouth	Karuk	0.5	12.72	8.58	466	10.5	3.73	5.6	236.6	2.32			<0.010	0.09			0.36	0.16	0.18	8.66	1.83	0.09]
11/12/09	12:45	SH111209-OC	SHR00	Shasta River near mouth	Karuk	0.5	8.07	8.74	397	12.08	3.02	4.45	224.8	1.33			<0.010	0.084			0.23	0.15	0.17	4.37	1.12	
12/10/09	13:15	SH121009-OC	SHR00	Shasta River near mouth	Karuk	0.5	0.01	8.49	223	13.73	7.2	3.63	215.4	1.03			<0.010	0.21			0.37	0.17	0.2	7.62	2	
5/14/09	10:45	SC051409-OC	SCR00	Scott River near mouth	Karuk	0.5	10.96	8.2	115	11.18	2.13	0.66	67.1	1.54			<0.010	0.058			0.15	0.004	0.014	5	0.87	0.11]
5/28/09	10:42	SC052809-OC	SCR00	Scott River near mouth	Karuk	0.5	15.64	8.33	116	9.77	2.13	1.41	67.4	1.43			<0.010	<0.010			0.1	0.001	0.009	3.5	1.37	0.19
6/11/09	0:00	SC061109-OC	SCR00	Scott River near mouth	Karuk	0.5	16.12	8.41	172	9.5	1.86	2.61	94.4	1.41			<0.010	0.064			0.16	<0.001	0.009	2.66	1.16	0.09]
6/25/09	12:05	SC062509-OC	SCR00	Scott River near mouth	Karuk	0.5	19.45	8.49	215	9.37	0.8	2.75	115.8	0.99			<0.010	0.11			0.2	<0.001	0.012	1.37	0.87	0.09]
7/9/09	11:08	SC070909-OC	SCR00	Scott River near mouth	Karuk	0.5	19.16	8.51	228	9.41	1.06	0.92	122.7	1.18			<0.010	0.011			0.1	<0.001	0.007	1.12	0.62	<0.09
7/23/09	11:25	SC072309-OC	SCR00	Scott River near mouth	Karuk	0.5	23.68	8.51	223	9.27	1.42	1.44	115.7	0.86			<0.010	<0.010			0.1	<0.001	0.006	0.5	<0.50	0.12]
8/6/09	11:10	SC080609-OC	SCR00	Scott River near mouth	Karuk	0.5	19.57	8.37	237	9.08	0.93	1.21	120.8	0.83			0.011	0.011			0.084	0.002	0.008	0.87	0.75	
8/20/09	11:19	SC082009-OC	SCR00	Scott River near mouth	Karuk	0.5	22.31	8.58	250	9.31	1.06	<0.1	120.4	0.95			<0.010	<0.010			0.14	0.001	0.007	0.99	0.99	
9/3/09	10:50	SC090309-OC	SCR00	Scott River near mouth	Karuk	0.5	19.81	8.55	256	9.6	0.71	1.15	123.9	0.99			<0.010	<0.010			0.077	<0.001	0.01	1.5	0.62	
9/17/09	11:25	SC091709-OC	SCR00	Scott River near mouth	Karuk	0.5	20.32	8.71	259	9.91	1.6	1.01	128.9	0.79			0.02	<0.010			0.076	<0.001	0.009	0.87	0.87	<0.09
10/1/09	10:30	SC100109-OC	SCR00	Scott River near mouth	Karuk	0.5	12.29	8.49	177	11.18	1.6	0.51	126.2	0.78			<0.010	<0.010			0.079	<0.001	0.006	0.75	<0.50	0.1]
10/15/09	11:12	SC101509-OC	SCR00	Scott River near mouth	Karuk	0.5	12.89	8.35	208	10.74	2.93	1.54	104.1	2.93			<0.010	<0.010			0.17	0.001	0.012	2.62	1.25	0.09]
11/12/09	11:30	SC111209-OC	SCR00	Scott River near mouth	Karuk	0.5	7.75	8.59	234	12.55	1.73	1.06	133.4	0.75			<0.010	0.024			0.078	0.001	0.003	<0.50	<0.50	
12/10/09	11:45	SC121009-OC	SCR00	Scott River near mouth	Karuk	0.5	0.01	8.34	152	13.77	4.09	0.26	148	0.78			<0.010	0.34			0.37	<0.001	0.002	0.99	0.5	
5/14/09	8:35	SA051409-OC	SAR00	Salmon River near mouth	Karuk	0.5	9.85	7.78	73	11.76	1.33	0.16	38.2	1.11			<0.010	<0.010			0.06	0.003	0.012	3.62	0.75	0.13]
5/28/09	8:33	SA052809-OC	SAR00	Salmon River near mouth	Karuk	0.5	14.78	7.76	69	9.92	1.6	0.26	36.2	0.87			<0.010	<0.010			0.064	0.002	0.014	5.75	1.5	0.12]
6/11/09	8:21	SA061109-OC	SAR00	Salmon River near mouth	Karuk	0.5	14.95	7.98	88	9.7	0.66	0.64	45.2	0.66			<0.010	<0.010			<0.050	0.002	0.006	0.75	0.5	<0.09
6/25/09	8:52	SA062509-OC	SAR00	Salmon River near mouth	Karuk	0.5	17.75	8.08	105	9.55	1.33	0.16	54	0.66			<0.010	<0.010			<0.050	0.005	0.011	<0.50	<0.50	<0.09
7/9/09	8:45	SA070909-OC	SAR00	Salmon River near mouth	Karuk	0.5	17.64	8.16	119	9.39	0.89	0.48	61	0.64			<0.010	<0.010			<0.050	0.003	0.006	<0.50	<0.50	<0.09
7/23/09	8:45	SA072309-OC	SAR00	Salmon River near mouth	Karuk	0.5	20.35	8.09	130	9.2	0.87	5.25	65.3	0.52			<0.010	<0.010			0.13	<0.001	0.019	10	3.62	0.09]
8/6/09	8:32	SA080609-OC	SAR00	Salmon River near mouth	Karuk	0.5	19.92	8.01	128	8.96	1.46	0.86	70.5	0.68			<0.010	<0.010			0.075	0.005	0.01	1.5	1.12	
8/20/09	8:26	SA082009-OC	SAR00	Salmon River near mouth	Karuk	0.5	19.7	8.12	144	8.68	0.8	1.06	72.1	0.48			<0.010	<0.010			0.059	0.001	0.007	<0.50	<0.50	
9/3/09	8:15	SA090309-OC	SAR00	Salmon River near mouth	Karuk	0.5	18.04	8.05	146	9.01	1.06	1.73	74.9	0.62			<0.010	<0.010			0.073	0.002	0.007	5.12	0.99	
9/17/09	9:15	SA091709-OC	SAR00	Salmon River near mouth	Karuk	0.5	17.74	8.13	148	9.24	1.24	1.37	74.8	0.47			<0.010	0.014			<0.050	0.002	0.005	1.25	<0.50	0.1]
10/1/09	missing	SA100109-OC	SAR00	Salmon River near mouth	Karuk	0.5	missing	missing	missing	missing	1.6	1.13	73.5	0.53			<0.010	<0.010			0.069	0.001	0.007	1.87	1	<0.09
10/15/09	8:38	SA101509-OC	SAR00	Salmon River near mouth	Karuk	0.5	12.18	7.92	95	10.6	12.81	9.23	43.6	3.52			<0.010	0.22			0.76	0.003	0.085	34.66	10.66	0.09]
11/12/09	8:30	SA111209-OC	SAR00	Salmon River near mouth	Karuk	0.5	8.71	8.02	115	11.65	1.33	1.09	62.3	1.05			<0.010	0.016			0.076	0.004	0.008	2	0.75	
12/10/09	9:15	SA121009-OC	SAR00	Salmon River near mouth	Karuk	0.5	0.05	8.03	65	14.31	4.53	0.5	61.9	0.51			<0.010	0.015			0.075	0.002	0.014	6.62	2.75	
5/28/09	11:24	TR052809	TRR00	Trinity River near mouth	Yurok	0.5	16.38	8.03	122	9.62	1.34	0.16	64.8	0.73			<0.010	<0.010			0.084	0.002	0.01	2.38	1	
6/25/09	11:46	TR062509	TRR00	Trinity River near mouth	Yurok	0.5	19.82	8.33	154	9.4	1.07	0.99	77.1	0.61			<0.010	<0.010			0.072	0.002	0.008	1.63	0.75	
7/23/09	11:35	TR072309-OC	TRR00	Trinity River near mouth	Yurok	0.5	22.47	8.24	167	8.73	1.34	1.09	83	0.56			<0.010	<0.010			0.072	0.003	0.006	0.87	0.87	
8/20/09	11:55	TR082009-OC	TRR00	Trinity River near mouth	Yurok	0.5	22.32	8.28	163	8.98	0.8	0.51	80	0.82			<0.010	<0.010			0.057	<0.001	0.006	1	0.88	
9/17/09	11:58	TR091709-OC	TRR00	Trinity River near mouth	Yurok	0.5	19.84	8.27	157	9.56	1.6	0.64	76.1	0.78			<0.010	<0.010			0.053	<0.001	0.006	0.75	0.63	
10/15/09	12:00	TR101509-OC	TRR00	Trinity River near mouth	Yurok	0.5	13.51	7.95	167	10.11	24.03	11.11	81.7	1.47			<0.010	<0.010			0.59	<0.001	0.092	35.25	11	
11/12/09	12:30	TR111209-OC	TRR00	Trinity River near mouth	Yurok	0.5	9.92	8.3	178	12.04	1.47	0.12	85.4	0.76			<0.010	<0.010			<0.050	0.003	0.005	<0.50	<0.50	
12/17/09	11:48	TR121709-OC	TRR00	Trinity River near mouth	Yurok	0.5	6.83	7.9	158	11.88	18.69	12.34														

Appendix B: 2009 Klamath River AIP Sampling Lab Cross



Technical Memorandum

Date: April 2, 2010

To: Rick Carlson, U.S. Bureau of Reclamation
Susan Corum, Karuk Tribe
Clayton Creager, North Coast Regional Water Quality Control Board
Rich Fadness, 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
Linda Prendergast, PacifiCorp
Chantell Royer, Humboldt State University

From: Mike Deas, Watercourse Engineering, Inc.
Jennifer Vaughn, Watercourse Engineering, Inc.

Re: 2009 Klamath River AIP Sampling Lab Cross Comparison (DRAFT)

1. Abstract

As there are several sampling crews using different analytical laboratories participating in the monitoring of water quality in the Klamath River, a comparison of laboratory results was undertaken to determine the similarity of the results of the different laboratories. Five sets of triplicate samples were collected by Reclamation staff at Link Dam from June 10 through December 8, 2009 and sent to three different laboratories to be analyzed for the same constituents. The relative percent difference between each laboratory was calculated for each result pair in a triplicate set (the first laboratory compared with the second, the first laboratory compared with the third, and the second laboratory compared with the third), resulting in 231 result pairs for all seven sample sets. The comparison of the result pairs indicated that some constituents were similar at all labs for all seven sampling sets (such as nitrate + nitrite), while other constituents had dissimilar results when the laboratories were compared (such as total nitrogen). A 20 percent relative percent difference (RPD) criteria was applied as a threshold to ascertain differences – this was an arbitrary threshold only for purposes of general comparison. Based on the 20 percent criteria, the total amount of similar result pairs for all seven sampling sets was 168 (73 percent of total result pairs). Of the 63 dissimilar result pairs, 22 percent were from comparisons between Basic Laboratory and CH2MHill Analytical Services Lab, 27 percent were from comparisons between Basic Laboratory and Aquatic Research and 51 percent were from comparisons between CH2MHill and Aquatic Research.

2. Introduction

There are multiple stakeholders along the Klamath River, many of whom use different laboratories to analyze the water samples collected for Klamath River water quality monitoring. Laboratory cross comparison was performed during 2009 to provide insight into laboratory performance measures at the three principal laboratories employed in the 2009 sampling season: Basic Laboratory in Redding, California, CH2MHill Applied Sciences Laboratory in Corvallis, Oregon; and Aquatic Research, Inc. in Seattle, Washington. The laboratory cross comparisons were performed by collecting a single sample volume at Link Dam, splitting each volume into a triplicate, and sending a sample set to each of the three laboratories. This was completed throughout the 2009 sampling season. Water quality analysis included alkalinity, ammonia, carbonaceous biological oxygen demand – 5 day (CBOD5), dissolved organic carbon (DOC), nitrate plus nitrite (NO3+NO2), total nitrogen (TN), ortho-phosphate (OPO4) for Basic Laboratory and CH2MHill, or soluble reactive phosphate (SRP) for Aquatic Research, Inc., total phosphorus (TP), total Kjeldahl nitrogen (TKN), total suspended solids (TSS), and volatile suspended solids (VSS).

3. Comparison

3.1. 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. The analytical methods and associated limits for each constituent at each laboratory are presented in Table 5.

The topic of precision (measure of the degree of agreement among replicate analysis of a sample, often expressed as a standard deviation) is an important element of this discussion. This holds for both within lab and between lab comparisons for the same method and where different methods for the same constituent are applied. Standard Methods (2005) and EPA methods identify precision for all methods, typically for a range of constituent concentrations. Not only does precision change among methods, but also laboratory equipment and personnel can further modify precision of methods. A 20 percent relative percent difference (RPD) criteria was applied as a threshold to ascertain differences – this was an arbitrary threshold only for purposes of general comparison and may be overly stringent given the inherent variability within labs, among labs, and among methods. Nonetheless, this approach provides a mechanism to compare laboratories across a wide range of parameters.

Table 5. 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	E310.1	0.55	5.00	SM18 2320B	1	-
Ammonia	mg/l	EPA 350.1	0.02	0.05	E350.1	0.0087	0.050	SM184500NH3H	0.01	-
CBOD5	mg/l	SM 5210	3	3	SM5210B	2.00	2.00	SM205210B	2	-
DOC	mg/l	SM5310C	0.3	0.5	E415.1	0.052	0.50	SM205310B	0.25	-
NO3+NO2	mg/l	EPA 353.2	0.01	0.05	E353.2	0.0017	0.010	SM184500N03F	0.01	-
TN	mg/l	EPA 351.2	(calc)	0.2	SM4500-N C	0.020	0.020	SM204500NC	0.05	-
OPO4	mg/l	SM 4500P-E	0.01	0.05	E365.1	0.0018	0.010	SM18 4500PF	0.001	-
TP	mg/l	SM 4500P-BE	0.02	0.05	E365.4	0.0078	0.050	SM18 4500PF	0.002	-
TKN	mg/l	EPA 351.2	0.1	0.2	E351.2	0.038	0.20	EPA 351.1	0.2	-
TSS	mg/l	SM 2540D	2 (1)	6 (5)	E160.2	0.87	2.00	SM20 2540D	0.5	-
VSS	mg/l	SM 2540D	2 (1)	6 (5)	E160.4	0.87	2.00	SM20 2540E	0.5	-

Notes:

- Three, 14 L churn sample splitter volumes were used to process the triplicate samples. Nutrients were processed together to ensure comparability among inorganic and organic forms.
- Only CBOD was analyzed with the same method at all three laboratories, but it had a higher MDL at Basic Laboratories than at the other two laboratories.
- When laboratories used the same method for a constituent analysis, the MDL and RL (if applicable) were not necessarily the same.
- There is not an MDL for TN at Basic, because it is a calculated value.
- The MDL and RL for TSS and VSS were lowered by collecting a larger water sample. The higher values apply to the June 10 and July 14 sampling collections. The lower values apply to all other sample collections.

3.2. Results Comparison

To compare the results from each laboratory, the relative percent difference was calculated for each pair of results: Basic and CH2MHill, Basic and Aquatic Research, and CH2MHill and Aquatic Research. The values of the three samples used to determine the relative percent difference (RPD) and criteria values for each day are presented in Table 6 through Table 14. All comparisons are made based on samples collected only at Link Dam.

The RPD was calculated using the following formula:

$$RPD = ((X1 - X2)/((X1 + X2)/2))$$

Where: X1 = Value of sample from laboratory 1

X2 = Value of sample from laboratory 2

The criteria used to determine if the paired samples were similar was an RPD of 20 percent or less for values greater than five times the reporting limit. For values less than or equal to five times the reporting limit, the RPD criteria was plus or minus the reporting limit (USBR, 2009). If the paired samples had an RPD greater than 20percent (or a difference greater than plus or minus the reporting limit), the samples were considered dissimilar.

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 (except for data from Aquatic Research, which was replaced with the appropriate MDL). When comparing Basic with either CH2MHill or Aquatic Research, Basic reporting limits were used as necessary to determine the RPD criteria. When CH2MHill was compared to Aquatic Research, CH2MHill reporting limits were used. The compliance with the RPD criteria for the pairs of samples for each date is presented below in Table 7 through Table 15. Where RPD was greater than 20 percent, the actual percent was placed in the tables to identify the actual difference.

Under certain circumstances where concentrations were low and/or reporting limits high, calculation of the RPD was not feasible. For example, when assessing similarity/dissimilarity for the June 10, 2009 comparisons for TSS, the RPD was not calculated. As shown in Table 6, the TSS values from Basic, CH2MHill Applied Sciences and Aquatic Research were 6.0 mg/l, 12.8 mg/l, and 10.0 mg/l, respectively. When comparing the results from Basic and CH2MHill, Basic’s reporting limit of 6.0 mg/l was used. Neither the Basic nor the CH2MHill Applied Sciences results were greater than five times the reporting limit; therefore, the RPD calculation could not be used. Instead, the absolute difference between the two values was determined to be 6.8 mg/l, which was higher than Basic’s reporting limit of 6.0 mg/l. As such, this comparison did not meet the assumed criteria and results were not considered similar.

Similarly, when comparing the results from Basic and Aquatic Research, Basic's reporting limit of 6.0 mg/l was used. Neither the Basic nor the Aquatic Research results were greater than five times the reporting limit, therefore the RPD calculations could not be used. Instead the absolute difference between the two values was determined to be 4.0 mg/l, which was less than the Basic reporting limit of 6.0 mg/l. This comparison did meet the assumed criteria and were considered similar.

When comparing the results from CH2MHill Applied Sciences and Aquatic Research, CH2MHill's reporting limit of 2.0 mg/l was used. The TSS value from CH2MHill was greater than five times the reporting limit, which allowed for the calculation of the RPD. The resulting RPD was 24.5 percent, which was greater than 20 percent. Therefore, this comparison did not meet the assumed criteria and were not considered similar.

Table 6. Result values used to determine RPD and criteria values, June 10, 2009.

Laboratory		Basic	CH2MHill Applied Sciences	Aquatic Research, Inc.
Sample ID / units		2009AIP-004	2009AIP-006	2009AIP-007
Alkalinity	mg/l	54	51.6	58.3
Ammonia	mg/l	0.08	0.05 ^d	0.010
CBOD5	mg/l	7	6.85	7.32
DOC	mg/l	5.7	5.59	5.28
NO3+NO2	mg/l	0.05 ^a	0.010 ^e	0.01 ^g
TN	mg/l	1.36	1.23	1.16
OPO4	mg/l	0.05 ^b	0.010 ^f	0.0031
TP	mg/l	0.05	0.088	0.06
TKN	mg/l	1.3	1.72	1.33
TSS	mg/l	6	12.8	10
VSS	mg/l	6 ^c	9.6	7.5

^a Basic Laboratory reported results for NO3+NO2 was 0.03 mg/l and was replaced with the appropriate RL. .

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

^c Basic Laboratory reported result for VSS was 3.0 mg/l and was replaced with the appropriate RL. .

^d CH2MHill reported result for ammonia was -0.056 mg/l and was replaced with the appropriate RL. .

^e CH2MHill reported result for NO3+NO2 was -0.0044 mg/l and was replaced with the appropriate RL.

^f CH2MHill reported result for OPO4 was 0.004 mg/l and was replaced with the appropriate RL.

^g Aquatic Research reported result for NO3+NO2 was "<0.010 mg/l" and was replaced with the appropriate MDL.

Table 7. Comparison of similarity criteria compliance (non-compliance noted) for June 10, 2009.

Constituent	Basic versus CH2MHill Applied Sciences	Basic versus Aquatic Research, Inc.	CH2MHill Applied Sciences versus Aquatic Research, Inc.
Alkalinity	OK	OK	OK
Ammonia	OK	0.07 mg/l^a	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	27.8%	OK	25.4%
TSS	6.8 mg/l^b	OK	24.5%
VSS	OK	OK	2.1 mg/l^c

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

^b Basic TSS reporting limit was 6.0 mg/l.

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

Table 8. Result values used to determine RPD and criteria values, July 14, 2009.

	Laboratory Sample ID / units	Basic 2009AIP-018	CH2MHill Applied Sciences 2009AIP-020	Aquatic Research, Inc. 2009AIP-021
Alkalinity	mg/l	53	47.3	58.1
Ammonia	mg/l	0.11	0.05 ^c	0.072
CBOD5	mg/l	10	7.04	8.14
DOC	mg/l	7.9	6.86	7.39
NO3+NO2	mg/l	0.05 ^a	0.019	0.015
TN	mg/l	1.86	0.86	2.78
OPO4	mg/l	0.05 ^b	0.043	0.020
TP	mg/l	0.12	0.14	0.12
TKN	mg/l	1.8	2.08	2.89
TSS	mg/l	10	4	7.5
VSS	mg/l	7	3.2	6

^a Basic Laboratory reported results for NO3+NO2 was 0.02 mg/l and was replaced with the appropriate RL value.

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

^c CH2MHill reported result for ammonia was -0.12 mg/l and was replaced with the appropriate RL.

Table 9. Comparison of similarity criteria compliance (non-compliance noted) for July 14, 2009.

Constituent	Basic versus CH2MHill Applied Sciences	Basic versus Aquatic Research, Inc.	CH2MHill Applied Sciences versus Aquatic Research, Inc.
Alkalinity	OK	OK	20.5%
Ammonia	0.06 mg/l^a	OK	OK
CBOD5	OK	OK	OK
DOC	OK	OK	OK
NO3+NO2	OK	OK	OK
TN	73.5%	39.7%	105.6%
OPO4	OK	OK	0.03 mg/l^b
TP	OK	OK	OK
TKN	OK	46.4%	32.5%
TSS	OK	OK	3.5 mg/l^c
VSS	OK	OK	2.8 mg/l^d

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

^b CH2MHill OPO4 reporting limit was 0.01 mg/l.

^c CH2MHill TSS reporting limit was 2.0 mg/l.

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

Table 10. Result values used to determine RPD and criteria values, August 11, 2009.

	Laboratory	Basic	CH2MHill Applied Sciences	Aquatic Research, Inc.
	Sample ID / units	2009AIP-030	2009AIP-033	2009AIP-034
Alkalinity	mg/l	58	60	72
Ammonia	mg/l	0.16	0.05 ^b	0.028
CBOD5	mg/l	23	34.2	32.5
DOC	mg/l	7.9	8	7.55
NO3+NO2	mg/l	0.05	0.012	0.012
TN	mg/l	5.08	5.37	7.06
OPO4	mg/l	0.05 ^a	0.033	0.045
TP	mg/l	0.37	0.32	0.42
TKN	mg/l	5.1	5.45	7.02
TSS	mg/l	24	18.8	27
VSS	mg/l	18	15.2	25

^a Basic Laboratory reported result for OPO4 was 0.02 mg/l and was replaced with the appropriate RL value.

^b CH2MHill reported result for ammonia was 0.013 mg/l and was replaced with the appropriate RL.

Table 11. Comparison of similarity criteria compliance (non-compliance noted) for August 11, 2009.

Constituent	Basic versus CH2MHill Applied Sciences	Basic versus Aquatic Research, Inc.	CH2MHill Applied Sciences versus Aquatic Research, Inc.
Alkalinity	OK	21.5%	OK
Ammonia	0.11 mg/l ^a	0.13 mg/l ^a	OK
CBOD5	39.2%	34.2%	OK
DOC	OK	OK	OK
NO3+NO2	OK	OK	OK
TN	OK	32.6%	27.2%
OPO4	OK	OK	0.012 mg/l ^b
TP	OK	OK	26.1%
TKN	OK	31.7%	25.2%
TSS	OK	OK	35.8%
VSS	OK	7.0 mg/l ^c	48.8%

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

^b CH2MHill OPO4 reporting limit was 0.01 mg/l.

^c Basic VSS reporting limit was 6.0 mg/l.

Table 12. Result values used to determine RPD and criteria values, September 8, 2009.

Laboratory		Basic	CH2MHill Applied Sciences	Aquatic Research, Inc.
Sample ID / units		2009AIP-043	2009AIP-047	2009AIP-046
Alkalinity	mg/l	54	53.9	61.2
Ammonia	mg/l	0.22	0.05 ^b	0.053
CBOD5	mg/l	17	11.2	18.7
DOC	mg/l	9.4	9.26	7.06
NO3+NO2	mg/l	0.05 ^a	0.01 ^c	0.010 ^d
TN	mg/l	3.98	2.24	3.66
OPO4	mg/l	0.06	0.074	0.079
TP	mg/l	0.3	0.31	0.33
TKN	mg/l	4	3.37	3.48
TSS	mg/l	21	29.6	21
VSS	mg/l	13	24.4	15

^a Basic Laboratory reported result for NO3+NO2 was ND and was replaced with the appropriate RL value.

^b CH2MHill reported result for ammonia was -0.0079 mg/l and was replaced with the appropriate RL value.

^c CH2MHill reported result for NO3+NO2 was 0.0063 mg/l and was replaced with the appropriate RL value.

^d Aquatic Research reported result for NO3+NO2 was <0.010 mg/l and was replaced with the appropriate RL value.

Table 13. Comparison of similarity criteria compliance (non-compliance noted) for September 8, 2009.

Constituent	Basic versus CH2MHill Applied Sciences	Basic versus Aquatic Research, Inc.	CH2MHill Applied Sciences versus Aquatic Research, Inc.
Alkalinity	OK	OK	OK
Ammonia	0.17 mg/l^a	0.17 mg/l^a	OK
CBOD5	OK	OK	50.2%
DOC	OK	28.4%	27.0%
NO3+NO2	OK	OK	OK
TN	56.0%	OK	48.1%
OPO4	OK	OK	OK
TP	OK	OK	OK
TKN	OK	OK	OK
TSS	8.6 mg/l^b	OK	34.0%
VSS	11.4 mg/l^c	OK	47.7%

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

^b Basic TSS reporting limit was 6.0 mg/l.

^c Basic VSS reporting limit was 6.0 mg/l.

Table 14. Result values used to determine RPD and criteria values, October 20, 2009.

	Laboratory Sample ID / units	Basic 2009AIP-060	CH2MHill Applied Sciences 2009AIP-063	Aquatic Research, Inc. 2009AIP-064
Alkalinity	mg/l	61	58	63.1
Ammonia	mg/l	0.4	0.39	0.340
CBOD5	mg/l	3	12.9	3.32
DOC	mg/l	7.9	7.55	6.31
NO3+NO2	mg/l	0.33	0.28	0.300
TN	mg/l	2.02	1.02	1.49
OPO4	mg/l	0.05 ^a	0.01 ^d	0.010
TP	mg/l	0.11	0.23	0.10 ^e
TKN	mg/l	1.7	1.74	1.49
TSS	mg/l	6 ^b	6.8	10
VSS	mg/l	6 ^c	4.4	5.3

^a Basic Laboratory reported result for OPO4 was 0.01 mg/l and was replaced with the appropriate RL value for RPD determination.

^b Basic Laboratory reported result for TSS was 5 mg/l and was replaced with the appropriate RL value for RPD determination.

^c Basic Laboratory reported result for VSS was 2 mg/l and was replaced with the appropriate RL value for RPD determination.

^d CH2MHill reported result for OPO4 was 0.008 mg/l and was replaced with the appropriate RL value for RPD determination.

^e Aquatic Research reported result for TP was 0.096 mg/l and was replaced with the appropriate RL value for RPD determination.

Table 15. Comparison of similarity criteria compliance (non-compliance noted) for October 20, 2009.

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	9.9 mg/l^a	OK	9.6 mg/l^b
DOC	OK	22.4%	OK
NO3+NO2	OK	OK	OK
TN	65.8%	30.2%	37.5%
OPO4	OK	OK	OK
TP	0.12 mg/l^c	OK	0.13 mg/l^d
TKN	OK	OK	OK
TSS	OK	OK	3.2 mg/l^e
VSS	OK	OK	OK

^a Basic CBOD5 reporting limit was 3.0 mg/l.

^b CH2MHill CBOD5 reporting limit was 2.0 mg/l.

^c Basic TP reporting limit was 0.05 mg/l.

^d CH2MHill TP reporting limit was 0.05 mg/l.

^e CH2MHill TSS reporting limit was 2.0 mg/l.

Table 16. Result values used to determine RPD and criteria values, November 10, 2009.

	Laboratory Sample ID / units	Basic 2009AIP-068	CH2MHill Applied Sciences 2009AIP-072	Aquatic Research, Inc. 2009AIP-071
Alkalinity	mg/l	58	58	64.2
Ammonia	mg/l	0.71	0.72	0.837
CBOD5	mg/l	3 ^a	3.23	2.4
DOC	mg/l	6.3	6.94	4.82
NO3+NO2	mg/l	0.36	0.34	0.319
TN	mg/l	2.11	2	1.97
OPO4	mg/l	0.05 ^b	0.024	0.011
TP	mg/l	0.08	0.1	0.06
TKN	mg/l	1.7	1.98	2.01
TSS	mg/l	11	9.6	13
VSS	mg/l	6 ^c	2	4.4

^a Basic Laboratory reported result for CBOD5 was ND and was replaced with the appropriate RL value for RPD determination.

^b Basic Laboratory reported result for OPO4 was ND and was replaced with the appropriate RL value for RPD determination.

^c Basic Laboratory reported result for VSS was 3 mg/l and was replaced with the appropriate RL value for RPD determination.

Table 17. Comparison of similarity criteria compliance (non-compliance noted) for November 10, 2009.

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	26.6%	36.1%
NO3+NO2	OK	OK	OK
TN	OK	OK	OK
OPO4	OK	OK	0.013 mg/l^a
TP	OK	OK	OK
TKN	OK	OK	OK
TSS	OK	OK	30.1%
VSS	OK	OK	2.4 mg/l^b

^a CH2MHill OPO4 reporting limit was 0.01 mg/l.

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

Table 18. Result values used to determine RPD and criteria values, December 8, 2009.

Laboratory		Basic	CH2MHill Applied Sciences	Aquatic Research, Inc.
Sample ID / units		2009AIP-076	2009AIP-080	2009AIP-079
Alkalinity	mg/l	59	59	62.7
Ammonia	mg/l	0.84	0.91	0.862
CBOD5	mg/l	3 ^a	3.53	2.72
DOC	mg/l	6	6.34	5.00
NO3+NO2	mg/l	0.4	0.33	0.306
TN	mg/l	2.25	2.14	1.88
OPO4	mg/l	0.05 ^b	0.022	0.006
TP	mg/l	0.13	0.093	0.06
TKN	mg/l	1.8	2.02	1.88
TSS	mg/l	27	26.8	34
VSS	mg/l	6 ^c	3.2	6

^a Basic Laboratory reported result for CBOD5 was ND and was replaced with the appropriate RL value for RPD determination.

^b Basic Laboratory reported result for OPO4 was ND and was replaced with the appropriate RL value for RPD determination.

^c Basic Laboratory reported result for VSS was 3 mg/l and was replaced with the appropriate RL value for RPD determination.

Table 19. Comparison of similarity criteria compliance (non-compliance noted) for December 8, 2009.

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	23.6%
NO3+NO2	OK	26.6%	OK
TN	OK	OK	OK
OPO4	OK	OK	0.016 mg/l ^b
TP	OK	0.068 mg/l ^a	OK
TKN	OK	OK	OK
TSS	OK	23.0%	23.7%
VSS	OK	OK	2.8 mg/l ^c

^a CH2MHill TP reporting limit was 0.05 mg/l.

^b CH2MHill OPO4 reporting limit was 0.01 mg/l.

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

3.3. Comparison Summary

For each constituent there were 21 laboratory cross comparisons (three for each of the seven sampling dates). For each comparison, if the RPD was within the assumed 20 percent limit, the result pair was considered similar. If the RPD was outside of 20 percent limit, the result pair of that comparison was considered dissimilar and the percent difference entered in the tables. The number of similar and dissimilar results is presented in Table 20 and Figure 10.

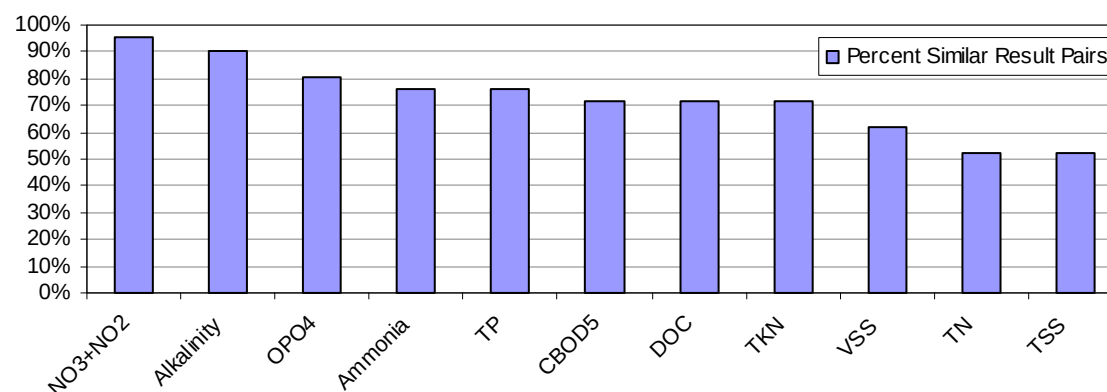
The constituents for which comparisons produced greater than 80 percent similar result pairs were NO3+NO2, Alkalinity and OPO4. Constituents for which comparisons

produced between 71 to 80 percent similar result pairs were ammonia, total phosphorus, CBOD5, DOC and TKN. The constituent for which comparisons produced between 61 to 70 percent similar result pairs was VSS. Constituents for which comparisons produced between 51 and 60 percent similar result pairs were total nitrogen and TSS. A potential reason for the dissimilar results in TSS and VSS was that the reporting limit was notably higher at Basic Laboratory (6 mg/l) than at CH2MHill (2 mg/l) or Aquatic Research (RL not included, MDL = 0.5 mg/l). A potential reason for the dissimilar results in total nitrogen analysis at CH2MHill was the implementation of a new method which produced inconsistent results during portions of 2009.

There were a total of 231 laboratory cross comparisons calculated (33 for each sampling date). There were 63 result pairs that were dissimilar (27 percent). Of those 63 dissimilar result pairs, 22 percent were from comparing results from Basic and CH2MHill, 27 percent were from comparing results from Basic and Aquatic Research, and 51 percent were from comparing CH2MHill and Aquatic Research. These results indicate that when comparing Basic to CH2MHill or Basic to Aquatic Research, the values will be similar more often than when comparing CH2MHill with Aquatic Research. These results do not identify if one laboratory is more “accurate” than another, but rather identify differences or similarities based on RPD among the laboratories.

Table 20. Number of similar result pairs and dissimilar results pairs per constituent and per laboratory comparison

	Alkalinity	Ammonia	CBOD5	DOC	NO3+ NO2	TN	OPO4	TP	TKN	TSS	VSS	Totals
Total Number of similar result pairs (Percent of total results pairs)	19 (90%)	16 (76%)	15 (71%)	15 (71%)	20 (95%)	11 (52%)	17 (81%)	16 (76%)	15 (71%)	11 (52%)	13 (62%)	168 (73%)
Total number of dissimilar result pairs	2	5	6	6	1	10	4	5	6	10	8	63
<i>Dissimilar Basic and CH2MHill results</i>	0	2	3	0	0	3	0	2	1	2	1	14
<i>Dissimilar Basic and Aquatic Research results</i>	1	3	1	3	1	3	0	1	2	1	1	17
<i>Dissimilar CH2MHill and Aquatic Research Results</i>	1	0	2	3	0	4	4	2	3	7	6	32

**Figure 10. Percent of similar result pairs from June 10, 2009 through December 8, 2009**

4. 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.

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