

ERRATA

KLAMATH RIVER BASELINE WATER QUALITY SAMPLING – 2014 ANNUAL REPORT –

Prepared for the KHSA Water Quality Monitoring Group

Prepared by
Watercourse Engineering, Inc.
January 11, 2018

Errata

In 2017 PacifiCorp completed a comprehensive quality control data review process for the data collected under Interim Measure 15. Several corrections were made to the 2014 dataset which required the following changes be made to the Klamath River Baseline Water Quality Sampling 2014 Annual Report. Tables and figures in this errata sheet replace tables and figures with the corresponding number (e.g., Errata Figure 4 replaces report Figure 4). Completely new tables and figures are given a new number that would place them in the correct location within the original report (e.g., Errata Figure 3-a would follow report Figure 3). Any changes to the text are referenced to page and paragraph and indicated in ~~strikeout~~ (old text) and underline (new text).

1. Public health data collected in 2014 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 2014 Site IDs and Names and the corresponding Standardized Site IDs and Names.

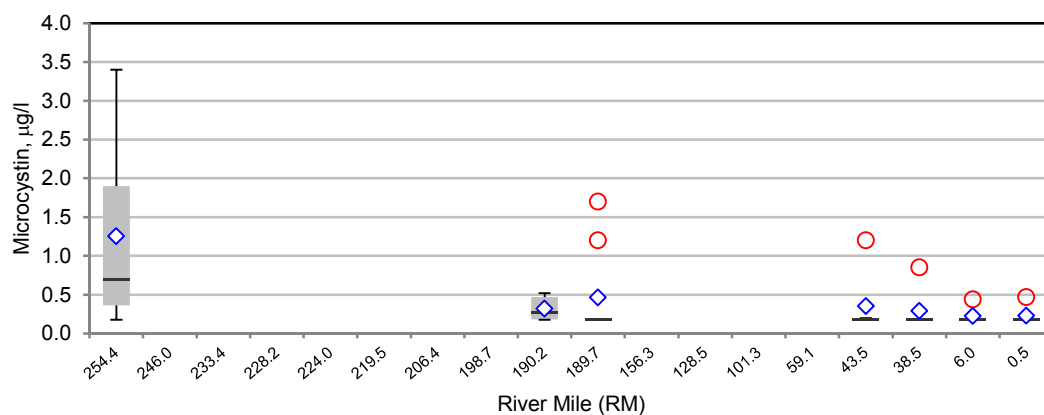
Old Site ID and Name		Corresponding Standardized Site ID and Name	
KR2544	Link Dam (RM - 254.4)	KR25444	Link Dam (RM 254.44; Baseline)
KR2460	Keno Reservoir at Miller Island (RM - 246.0)	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)
KR2330	KR below Keno Dam (RM -233.4)	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)
KR2282	KR above J.C. Boyle Reservoir (RM-228.2)	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)
KR2260	J.C. Boyle Reservoir (RM-226.0)a	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)
KR2240	KR below J.C. Boyle Dam (RM-224.0)	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)
KR2195	KR below USGS Gage (RM-219.5)	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)
KR2064	KR near Stateline (RM-206.4)	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)
KR1990	Copco Reservoir (RM-199.0)b	KR19874	Copco Reservoir (RM 198.74; Baseline)
KR1950	KR below Copco Dam (RM-195.0)	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)
KR1920	Iron Gate Reservoir (RM-192.0)c	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)
KR1897	KR below Iron Gate Dam (RM-189.7)	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)
KR1560	KR at Walker Bridge (RM- 156.0)	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)
KR1285	KR below Seiad (RM - 128.5)	KR12850	Klamath River below Seiad (RM 128.5; Baseline)
KR1006	KR near Happy Camp (RM-106.0)	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)
KR0591	KR at Orleans (USGS) (RM-59.1)	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)
KR0435	KR at Weitchpec (RM-43.5)	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)
KR0385	KR below Trinity River (RM-38.5)	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)
KR0060	KR near Klamath (RM-6.0)	KR00600	Klamath River near Klamath (RM 6.0; Baseline)
KR0005	KR Estuary (RM-0.5)d	KR00050	Klamath River Estuary (RM 0.5; Baseline)
SHR00	Shasta River near mouth	SH00000	Shasta River near mouth (Baseline)
SCR00	Scott River near mouth	SC00000	Scott River near mouth (Baseline)
SAR00	Salmon River near mouth	SA00000	Salmon River near mouth (Baseline)
TRR00	Trinity River near mouth	TR00000	Trinity River near mouth (Baseline)

3. The original methods, MDLs and RLs listed in Table 2 did not present information for all constituents of interest in 2014, nor was the variability of the MDLs and RLs presented. The methods as well as the MDL and RL variation in 2014 are presented in Errata Table 2.

Errata Table 2. 2014 Laboratory methods, method detection limits (MDLs) and reporting limits (RLs). “na” indicates no limit available for a method.

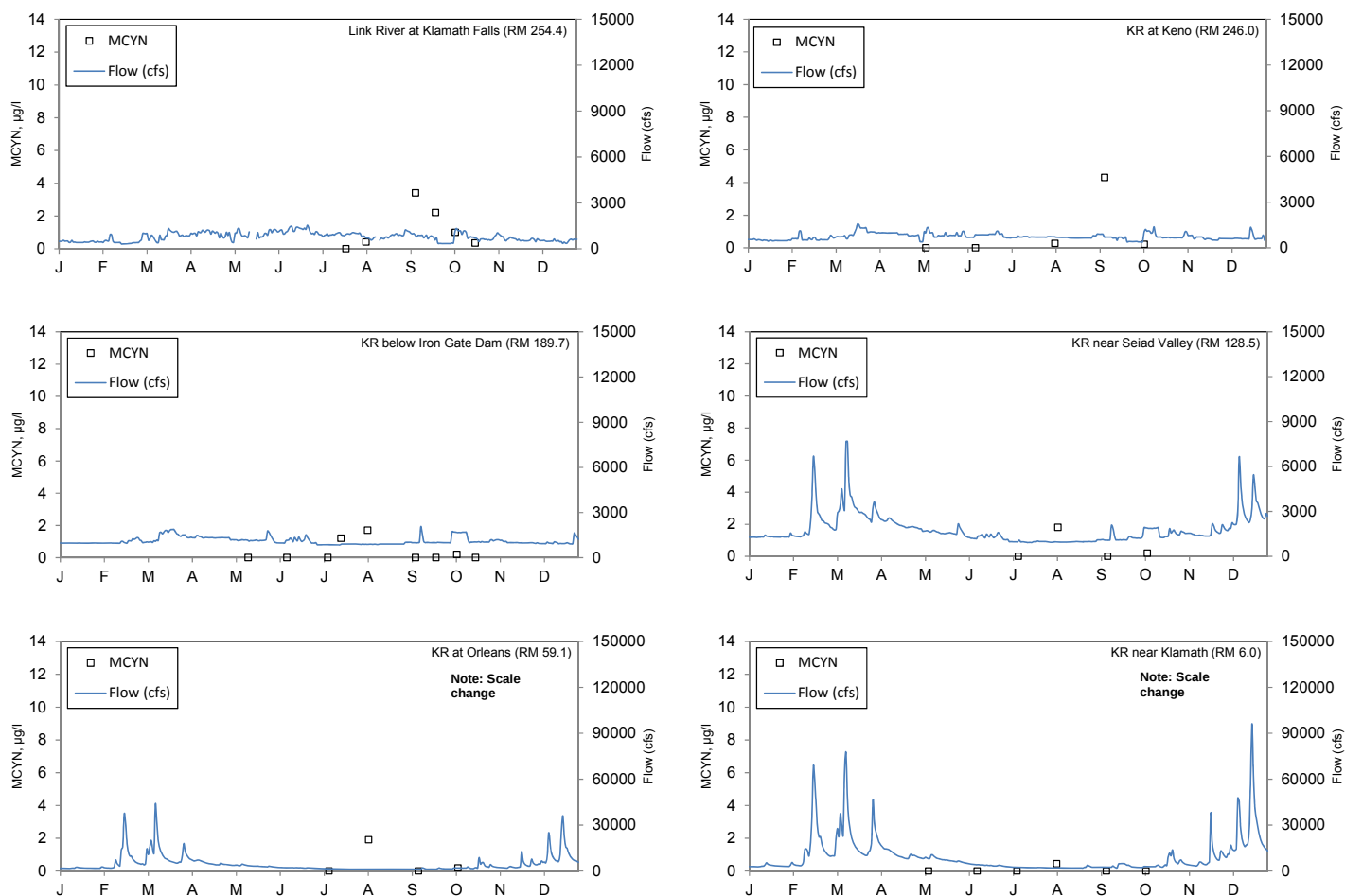
Constituent Name	ID	CH2MHill			Aquatic Research			CBL			EPA		
		Method	MDL	RL	Method	MDL	RL	Method	MDL	RL	Method	MDL	RL
Alkalinity	ALKT	SM 2320B	na	5.0	SM 2320B	1	-	-	-	-	-	-	-
Carbon, Dissolved Organic Carbon	DOC	SM 5310B	0.12	0.5	SM 5310B	0.25	-	-	-	-	-	-	-
Demand, Carbonaceous Biological Oxygen Demand	CBOD	SM 5210B	na	2.0	SM 5210B	2	-	-	-	-	-	-	-
Nitrogen, Ammonia	NH3	EPA 350.1	0.014 0.02	0.05 0.05	SM 4500NH3H	0.01	-	-	-	-	-	-	-
Nitrogen, Nitrate+Nitrite	NO3+ NO2	EPA353.2	0.0028 0.003 0.01	0.01 0.05 0.05	SM 4500NO3F	0.01	-	-	-	-	-	-	-
Nitrogen, Total Kjeldahl Nitrogen	TKN	EPA 351.2	0.051 0.069	0.02 0.2	na	-	-	-	-	-	-	-	-
Nitrogen, Total Nitrogen	TN	SM 4500-N C	0.062 0.048	0.2 0.2	SM 4500 NC	0.05	-	-	-	-	-	-	-
Phosphorus, Phosphate	OPO4	EPA 365.1	0.0014 0.001	0.01 0.01	SM 4500PF	0.001	-	-	-	-	-	-	-
Phosphorus, Total Phosphorus	TP	EPA 365.4	0.022 0.017 0.024	0.05 0.5 0.5	SM 4500PF	0.002	-	-	-	-	-	-	-
Turbidity	TURB	SM 2130B	na	0.1	SM 2130B	0.1	-	-	-	-	-	-	-
Solids, Total Suspended Solids	TSS	SM 2540D	0.6	5	SM 2540D	0.5	-	-	-	-	-	-	-
Solids, Volatile Suspended Solids	VSS	EPA 160.4	na	5	SM 2540E	0.5	-	-	-	-	-	-	-
Algae, Chlorophyll-a	CHLA	-	-	-	SM 10200H	0.1	-	EPA 445.0	0.18	-	-	-	-
Algae, Pheophytin	PHEO	-	-	-	SM 10200H	0.1	-	EPA 445.0	0.18	-	-	-	-
Carbon, Particulate Carbon	PC	-	-	-	-	-	-	EPA 440.0	0.0633	-	-	-	-
Nitrogen, Particulate Nitrogen	PN	-	-	-	-	-	-	EPA 440.0	0.0105	-	-	-	-
Phosphorus, Particulate Phosphorus	PP	-	-	-	-	-	-	EPA 365.1, ASPILA	0.0021	-	-	-	-
Phosphorus, Particulate Inorganic Phosphorus	PIP	-	-	-	-	-	-	EPA 365.1, ASPILA	0.0024	-	-	-	-
Toxins, Microcystin	MYCN	-	-	-	-	-	-	-	-	-	ELISA	0.15	0.18

4. Because of the small sample size at each site during 2014, 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 microcystin data was removed from the dataset; to reflect these changes, the mainstem microcystin boxplot in Figure 8 was revised and is presented below in Errata Figure 8.



Errata Figure 8. Microcystin from Link River to the Klamath River Estuary with median (—), mean (◇), outliers (*), and extreme outliers (○) identified (February 2014 – December 2014). Note: Miller Island at Keno Reservoir (RM 246), Copco Reservoir (RM 199), and Iron Gate Reservoir (RM 192). River mile on x-axis not to scale. Note: No microcystin boxplots are included for River Mile 246.0, 233.4, 228.2, 224.0, 219.5, 206.4, 198.7, 156.3, 128.5, 101.3 and 59.1 because there were fewer than six data points at each of these sites.

6. Erroneous microcystin data was removed from the dataset and missing microcystin data was added; to reflect these changes, the microcystin and USGS flow graph in Figure 17 was revised and is presented below in Errata Figure 17.



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

7. The Appendix B 2014 KHSa dataset has been revised since the original 2014 Annual Report was completed. The revised dataset is presented in the table below in Errata Table B-1.

Errata Table B-1. 2014 KHSa dataset.

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Phytoplankton mg/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon ppm	Carbon, Particulate Carbon mg/l	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Nitrate-Nitrite mg/l	Nitrogen, Particulate Nitrogen ppm	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
2014KHSa-001	2/19/2014	9:30	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	4.21	7.73	118	11.22	13.06	4.05	51.8	3.24	2.8	<2.0	<0.05	0.3	0.432	0.68	1.05	<0.01	0.083	0.0203	0.0077	17.66	17.4	<5	
2014KHSa-007	3/18/2014	8:15	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	7.57	7.99	110	10.76	17.20	5.74	46	3.08	2.84	<2.0	<0.05	0.056	0.456	0.88	0.93	<0.01	0.095	0.0344	0.0063	28.8	47.6	<5	
2014KHSa-013	4/14/2014	9:20	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	14.07	7.84	114	9.06	9.70	3.33	48.1	3.46	1.6	2.4	<0.05	0.1	0.294		0.8	0.012	0.052	0.0184	0.0102	14.8	9.8	<5	
2014KHSa-019	5/6/2014	9:00	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	12.83	7.79	113	9.27	11.77	2.63	48	4.48	2.36	2	<0.05	<0.01	0.306		0.69	0.044	0.091	0.0331	0.0205	15.1	22.8	5.6	
2014KHSa-025	5/20/2014	8:00	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	15.96	7.92	115	7.71	8.66	1.76	51.1	3.7	0.894		<0.05	<0.01	0.128		0.45	0.058	0.098	0.0311	0.0099	9.8	7.4	<5	
2014KHSa-029	6/10/2014	9:30	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	18.92	8.77	117	7.8	26.22	2.07	55.4	3.71	2.15	9	<0.05	<0.01	0.364		0.92	0.063	0.16	0.0636	0.019	12.73	18.8	6.2	
2014KHSa-035	6/24/2014	8:30	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	18.66	10.27	130	8.93	272.90	8.36	50.5	5.32	13.3	26.4	0.14	0.013	2.75	3.33	2.57	0.26	0.2	0.0975	0.0774	26.1	23.4	13.4	
2014KHSa-040	7/8/2014	7:15	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	23.81	9.75	121	7.26	186.45	<0.18	50.4	6.54	9.81	15.9	0.08	0.013	1.92		3.18	0.16	0.34	0.0743	0.0313	21.7	21.3	16	
2014KHSa-046	7/22/2014	8:30	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	22.48	9.52	117	6.42	136.19	<0.18	50.9	6.02	6.44	18.5	0.08	0.018	1.32		2.36	0.17	0.37	0.0788	0.047	38.3	19.2	12.4	<0.18
2014KHSa-051	8/5/2014	9:00	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	22.86	9.32	115	4.46	90.93	0.28	52.7	7.47	5.12	20.1	0.2	0.075	1.1		2.59	0.15	0.32	0.0626	0.0302	14	18.2	7.6	0.4
2014KHSa-057	8/19/2014	9:40	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	21.75	7.37	128	4.07	12.92	2.27	54.8	5.16	0.12	<2.0	0.12	0.37	0.025		1.42	0.01	0.16	0.0161	0.0063	12.2	7.2	<5	
2014KHSa-062	9/9/2014	9:15	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	17.86	8.16	129	7.19	9.88	2.89	52.9	4.88	1.83	4.1	0.058	0.012	0.288		0.81	0.029	0.11	0.022	0.0156	16.5	14	<5	3.4
2014KHSa-068	9/23/2014	10:00	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	18.23	7.58	135	6.83	8.82	2.25	53.6	4.56	1.25	<2.0	0.09	<0.01	0.195		0.94	0.029	0.13	0.0194	0.0026	8.4	7.2	<5	2.2
2014KHSa-073	10/7/2014	10:20	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	16.06	8.14	132	8.98	24.97	1.97	54.9	4.36	2.21	5.8	0.067	0.035	0.398		1.18	0.016	0.06	0.0266	0.0157	8.3	6.6	<5	1
2014KHSa-079	10/21/2014	10:20	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	11.02	7.82	128	9.31	34.29	2.08	57.3	3.95	2.97		0.059	0.11	0.579		1.18	0.021	0.083	0.0605	0.0364	9.3	8.6	<5	0.35
2014KHSa-083	11/18/2014	9:30	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	2.41	7.29	127	10.95	16.90	5.77	54.8	4.3	2.96	2.7	0.19	0.29	0.431		1.27	0.012	0.1	0.0264	0.0062	38.2	68	5.3	
2014KHSa-089	12/16/2014	10:00	KR25444	Link Dam (RM 254.44; Baseline)	USBR	0.5	R	3.06	7.38	117	7.38	21.29	5.75	49.9	3.7	2.97	4.1	0.11	0.4	0.473	1.14	0.89	<0.01	0.079	0.0446	0.0099	37.8	63.3	6.7	
2014KHSa-004	2/19/2014	11:10	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	5.28	7.81	194	10.41	11.51	4.09	81.5	3.45	1.14	<2.0	0.12	0.4	0.165	0.76	0.95	0.072	0.14			13.4	7.8	<5	
2014KHSa-010	3/18/2014	10:00	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	8.09	8.09	133	11.1	26.44	4.17	52.3	2.8	1.81	<2.0	<0.05	0.11	0.304	0.97	1	<0.01	0.12			15.4	14	<5	
2014KHSa-016	4/14/2014	6:40	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	13.61	7.36	119	8.5	13.00	4.08	48.5	3.33	1.31	2.1	0.076	0.12	0.214		0.84	0.027	0.054			18.8	14	<5	
2014KHSa-022	5/6/2014	10:10	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	14.21	8.11	120	9.3	15.54	2.88	49.5	4.09	1.22	4.2	<0.05	0.013	0.175		0.64	0.058	0.093			10.1	9.8	<5	<0.18
2014KHSa-032	6/10/2014	10:10	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	20	9.05	123	10.51	60.10	<0.18	54.8	3.72	3.59	14.1	<0.05	<0.01	0.66		1.09	0.078	0.19			7.5	11.8	7.2	<0.18
2014KHSa-043	7/8/2014	8:40	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	23.82	9.19	128	2.48	161.53	4.42	54.4	6.51	10.7	13.6	0.69	<0.01	2.27		4.17	0.21	0.44			14.3	25.1	19.7	
2014KHSa-054	8/5/2014	7:00	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	23.35	8.59	138	2.78	24.20	5.49	58.3	7.97	5.72	9.3	1.48	0.0098	1.31		4	0.23	0.53			11.8	12	8	0.32
2014KHSa-065	9/9/2014	10:40	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	19.51	7.39	133	5.65	27.47	6.57	53.4	5.13	2.4	3	<0.05	0.086	0.416		0.98	0.015	0.1			15.7	13.4	<5	6.3

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2014KHS-076	10/7/2014	11:55	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	16.85	8.57	154	11.45	35.89	10.31	59.2	4.79	3.21	6.3	<0.05	<0.01	0.536	1.16	<0.01	0.05	8.1	10	5	1.1			
2014KHS-086	11/18/2014	11:40	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	4.2	7.08	140	8.76	11.95	4.53	56.7	5.1	1.76	<2.0	0.26	0.4	0.272	1.39	0.026	0.092	26.8	31.7	<5				
2014KHS-092	12/16/2014	12:10	KR24600	Keno Reservoir at Miller Island (RM 246.0; Baseline)	USBR	0.5	P	4.06	7.54	198	10.12	25.99	6.45	79.3	3.67	1.96	2.4	0.18	0.46	0.321	1.1	1.22	0.04	0.093	21.4	23.9	<5			
2014KHS-005	2/19/2014	8:30	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	4.61	7.45	165	11.81	14.86	5.99	62.1	3.86	1.07	2.2	<0.05	0.38	0.166	0.74	1.05	0.03	0.089	0.0218	0.0045	15.9	9	<5	
2014KHS-011	3/18/2014	7:25	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	8.57	8.19	177	12.11	33.92	7.55	68.6	3.97	2.19	6.7	<0.05	0.056	0.388	1.14	1.12	0.013	0.14	0.0424	0.0113	19.8	11.4	<5	
2014KHS-017	4/14/2014	7:30	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	13.42	7.61	173	9.68	11.09	5.77	65.8	4.63	1.52	4.8	0.18	0.14	0.207	1.12	0.054	0.1	0.031	0.0103	26.1	23.6	<5		
2014KHS-023	5/6/2014	7:10	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	13.47	7.55	192	10.24	11.70	4.99	66	6.07	1.48	<2.0	<0.05	0.017	0.212	0.92	0.073	0.12	0.0265	0.0129	12.8	15	<5	<0.18	
2014KHS-033	6/10/2014	7:00	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	20.45	8.79	129	7.88	16.66	0.92	56.5	4.07	1.4	4	0.065	<0.01	0.274	0.8	0.099	0.17	0.0235	0.0112	6.9	<5	<5	<0.18	
2014KHS-038	6/24/2014	6:35	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	18.72	9.21	133	6.29			57.3			12.2	0.25	0.023	1.76	1.68	0.1	0.21			10.3				
2014KHS-044	7/8/2014	6:30	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	22.95	9.12	122	5.9	36.02	1.98	52.4	5.95	2.59	4.2	0.46	0.017	0.583	1.92	0.23	0.32	0.0328	0.0444	4.9	5	<5		
2014KHS-049	7/22/2014	7:30	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	23.86	7.96	140	6.88			60.7	5.79		7.4	1.1	0.018		2.55	0.18	0.35			4.93				
2014KHS-055	8/5/2014	8:00	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	22.47	8.7	125	7.26	55.90	3.22	54.1	6.96	3.37	8.9	0.65	0.013	0.735	2.47	0.29	0.46	0.0596	0.023	9.2	9.6	7	0.26	
2014KHS-060	8/19/2014	8:10	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	21.74	7.14	144	7.14			61.1			12.7	1.29	0.03		3.43	0.11	0.31			8.2				
2014KHS-066	9/9/2014	7:55	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	18.44	7.4	140	8.09	33.80	17.24	56.2	4.74	2.5	3	0.12	0.043	0.451	1.29	0.013	0.13	0.0491	0.0378	18.1	16	5.6	4.3	
2014KHS-071	9/23/2014	8:30	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	18.26	7.3	145	8.51			57.9			2.3	0.11	0.010		1.19	0.011	0.2			11				
2014KHS-077	10/7/2014	8:10	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	15.05	7.07	143	8.3	19.67	14.90	55.9	4.73	2.1	<2.0	0.062	0.026	0.342	1.09	<0.01	<0.05	0.0365	0.0167	11	10.2	<5	0.2	
2014KHS-087	11/18/2014	8:35	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	5.13	6.97	136	11.16	8.92	4.83	53.9	4.8	1.52	<2.0	0.13	0.46	0.219	1.35	0.031	0.07	0.0166	0.004	20.6	15.6	<5		
2014KHS-093	12/16/2014	8:50	KR23340	Klamath River below Keno Dam near a USGS gage (RM 233.4; Baseline)	USBR	0.5	P	3.97	7.18	169	11.22	19.74	6.06	59.5	3.88	1.74	2.4	0.1	0.51	0.292	1.47	1.32	0.03	0.12	0.0312	0.014	22.3	19.7	<5	
KR14002	2/17/2014	14:40	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	5.49	7.48	162	10.83	5.15	5.33	58	3.67	0.822		<0.05	0.48	0.118	1.25	0.061	0.11			6	<5			
KR14022	3/19/2014	13:25	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	9.58	8.52	222	9.83	9.59	12.62	83.1	4.66	1.33		0.077	0.094	0.183	1.32	0.16	<0.05			27.1	7.7			
KR14042	4/7/2014	16:30	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P					4.87	5.23	63.1	5.01	2.19		0.15	0.32	0.238	1.19	0.099	0.1			25	26	<5		
KR14062	5/12/2014	16:15	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	17.37	8.1	150	8.56	3.38	3.22	55	5.68	0.713		0.097	0.11	0.097	0.82	0.11	0.15			12.6	<5			
KR14085	6/17/2014	17:30	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	17.49	8.9	147	8.13	3.11	2.65			0.88			0.128											
KR14108	7/7/2014	17:30	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	24.86	8.01	130	6.53	1.19	1.51	47.2	5.85	0.301		0.097	0.87	0.040	2.41	0.29	0.29			6	<5			
KR14177	10/6/2014	10:25	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	13.41	7.82	141	9.15	11.86	12.68	55.4	4.68	1.08		<0.05	0.29	0.158	1.06	0.043	0.072			12	<5			
KR14199	11/18/2014	15:50	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	5.57		113	11.35	5.91	4.06	54.1	5.2	0.817		0.085	0.58	0.126	1.33	0.055	0.092			16.5	<5			
KR14219	12/4/2014	13:15	KR22822	Klamath River above J.C. Boyle Reservoir (RM 228.22; Baseline)	PacifiCorp	0.5	P	4.98	7.8	118	7.8			55.8	5	1.1		0.082	0.64	0.171	1.43	0.047	0.16			17.2	<5			
KR14064	5/12/2014	17:35	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	17.4	8.13	145	9.14																		<0.18	

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KR14086	6/17/2014	17:30	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	17.57	8.88	145	8.68	1.66	1.52	58.4	5.19	0.482	0.064	0.12	0.0682	1.04	0.12	0.2	9.4	<5	0.28	
KR14109	7/7/2014	15:50	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	26.87	8.15	132	7.51	1.11	1.70			0.531			0.0691						<0.18	
KR14155	9/9/2014	14:40	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	19.4	8.1	140	7.66	6.58	7.11	54.8	5.76	0.915	0.063	0.29	0.122	1.35	0.065	0.18	14.2	<5	2	
KR14178	10/6/2014	11:15	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P	14.73	8.41	141	9.75	15.31	10.65			1.14			0.184						0.19	
KR14200	11/18/2014	14:25	KR22478	J.C. Boyle Reservoir (RM 224.78; Baseline)	PacifiCorp	0.5	P					5.27	3.70	54.7	5.6	0.594	0.064	0.5	0.0961	1.09	0.053	0.08	11.3	<5		
KR14001	2/17/2014	15:30	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P	4.26	7.03	144	11.46	4.04	3.89	53	3.57	0.105	0.06	0.4	0.73	1.14	0.053	0.12	5	<5		
KR14021	3/19/2014	12:20	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P	8.95	8.42	184	10.35	3.35	4.79	65.3	4.79	0.128	0.069	0.14	0.965	1.06	0.097	<0.05	9.6	<5		
KR14041	4/7/2014	17:00	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P	11.31	7.92	164	9.21	4.94	5.62	67.4	6.33	0.214	0.17	0.33	2.07	1.38	0.11	0.1	25.6	<5		
KR14061	5/12/2014	19:05	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P	14.62	8.01	144	9.04	2.83	4.11	54.8	7.69	0.129	0.11	0.092	0.801	0.75	0.11	0.19	9	<5		
KR14084	6/17/2014	18:55	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P	17.64	8.75	145	8.36	2.22	1.89	60.2	4.8	0.101	0.13	0.11	0.772	0.84	0.14	0.19	8.2	<5		
KR14107	7/7/2014	16:40	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P	23.82	7.87	132	7.21	1.78	2.26	49.1	5.79	0.0702	0.22	0.85	0.603	2.49	0.27	0.27	<5	<5		
KR14130	8/4/2014	not sampled	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P																			
KR14153	9/9/2014	13:00	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P					5.51	6.21	56.2	5.22	0.145	0.12	0.27	1.01	1.27	0.078	0.17	9.4	<5		
KR14176	10/6/2014	12:45	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P	14.71	8.2	141	9.22	11.49	10.13	56.3	4.64	0.144	0.097	0.26	0.947	1.19	0.055	<0.05	7.2	<5		
KR14198	11/18/2014	15:10	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P	4.57		115	11.91	5.99	4.19	55.8	5.1	0.168	0.089	0.54	0.992	1.3	0.056	0.083	12.6	<5		
KR14218	12/4/2014	12:35	KR22460	Klamath River below J.C. Boyle Dam (RM 224.60; Baseline)	PacifiCorp	0.5	P	4.53	7.87	119	11.83			56.6	5.6	1.1	0.11	0.6	0.162	1.32	0.054	0.13	18.4	<5		
KR14003	2/17/2014	16:20	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	5.66	7.12	144	11.08	3.34	3.37	55.2	2.94	0.562	0.07	0.35	0.0812	0.89	0.05	0.078	8.5	<5	<5	
KR14023	3/19/2014	12:50	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	9.42	8.6	179	10.5	2.66	3.91	64.8	4.23	0.571	<0.05	0.15	0.0769	0.95	0.12	<0.05	9.2	8.6	<5	
KR14043	4/7/2014	15:15	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	10.56	8.02	176	9.74	3.58	4.64	57.9	4.69	1.78	0.15	0.33	0.203	1.33	0.1	0.13	30.4	<5		
KR14063	5/12/2014	18:30	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	18.26	8.05	144	9.1	5.41	4.10	56	4.38	0.753	0.058	0.1	0.106	0.66	0.093	0.14	9.1	8.8	<5 0.18	
KR14087	6/17/2014	18:20	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P					2.19	1.84	61.1	4.53	0.413	0.13	0.12	0.058	0.78	0.12	0.19	6.9	<5	<5 <0.18	
KR14110	7/7/2014	15:15	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	23.22	7.68	132	6.83	1.33	1.71	49.7	5.79	0.557	0.15	0.86	0.0747	2.25	0.26	0.26	3.3	<5	<5 <0.18	
KR14156	9/9/2014	12:40	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	18.27	7.89	140	8.42	5.46	6.84	56	5.19	0.868	0.07	0.25	0.12	1.09	0.071	0.2	8.6	<5		
KR14179	10/6/2014	12:10	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	13.86	8.3	140	9.49			60.2	3.71		<0.05	0.25		0.88	0.051	0.06	7.1	5.2	<5 <0.18	
KR14220	12/4/2014	11:20	KR21950	Klamath River below USGS Gage (RM 219.50; Baseline)	PacifiCorp	0.5	P	5.28	7.81	117	10.56			64.2	1.2	0.525	0.082	0.64	0.078	1.43	0.047	0.16	17.2	<5		
KR14008	2/18/2014	9:30	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	5.49	7.6	149	11.6	2.48	2.87	59.3	2.59	0.36	<2.0	<0.05	0.39	0.0542	0.97	0.054	0.08	0.0071	<0.0024 7	<5 <5
KR14028	3/19/2014	10:25	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P					1.88	2.60	61.7	3.61	0.436	3.9	0.054	0.22	0.0579	0.85	0.12	<0.05	0.0087	0.003 11	5.6 <5
KR14048	4/8/2014	11:15	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	10.45	8.47	164	10.44	2.88	3.41	66.2	3.09	0.951	7.2	<0.05	0.39	0.102	0.78	0.086	0.082	0.0204	0.0057 13	15.6 <5
KR14069	5/13/2014	12:35	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P					1.35	1.70	60	3.1	0.329	<0.05	0.13	0.0513	0.54	0.079	0.12	0.0111	0.0049 7.1	6.4 <5 <0.18	
KR14092	6/10/2014	11:00	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	15.55	8.62	149	10.26	2.46	0.75	62.4	3.28	0.361	2.9	<0.05	0.085	0.0468	0.55	0.11	0.17	6.7	<5 <5 <0.18	
KR14105	6/24/2014	12:30	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P							63.9			3.1	<0.05	0.27		0.67	0.084	0.11	<5	<5	
KR14115	7/8/2014	11:15	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	21.14	8.44	140	8.75	1.45	1.55	54	3.96	0.472	2.9	<0.05	0.94	0.0669	1.84	0.22	0.22	2.6	<5	<5 <0.18

KR14128	7/17/2014	16:40	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	20.33	8.38	145	8.51				6.1	<0.05	0.78		1.31	0.23	0.17								
KR14151	8/19/2014	10:40	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	20.46	8.03	136	9.94				8.9	0.064	1.71		2.59	0.25	0.3								
KR14161	9/8/2014	13:05	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P				2.70	2.98	3.13	0.394	2.9	<0.05	0.27	0.0545	0.51	0.065	0.11	0.0081	0.0072	3.9	1.2				
KR14175	9/22/2014	17:50	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	18.45	8.31	146	8.47				3.2	<0.05	0.33		1.05	0.064	0.13		6.8	<5					
KR14184	10/6/2014	13:10	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	13.18	8.56	143	10.37	3.74	3.19	63.1	2.01	0.408	4.9	<0.05	0.21	0.0579	0.49	0.054	<0.05	0.0097	0.0024	4.4	<5	<5	<0.18
KR14205	11/3/2014	17:20	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	10.03		111	10.4	1.77	2.36	60	3.57	0.597	3.3	<0.05	0.39	0.0838	0.86	0.067	0.092	0.0062	0.0025	9.1	5.6	<5	
KR14225	12/9/2014	10:00	KR20642	Klamath River above Shovel Creek (RM 206.42; Baseline)	PacifiCorp	0.5	P	7.06		119	11.43			64.2	1.2	0.623	<2.0	0.066	0.45	0.088	0.72	0.053	0.096			8.2	5.6	<5	
KR14009	2/18/2014	11:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I				3.46	2.66			0.601			0.085											
KR14010	2/18/2014	10:50	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	5.46	8.11	167	10.67	3.27	2.58	64.3	2.7	0.458		0.17	0.38	0.0688	0.87	0.044	0.076			<5	<5		
KR14012	2/18/2014	11:10	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	30.0	P					2.10	2.21	66	2.83	0.468		0.055	0.39	0.064	0.89	0.047	0.087			<5	<5		
KR14011	2/18/2014	11:30	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	15.0	P					2.97	2.58	64	2.81	0.451		0.29	0.37	0.067	0.78	0.046	0.083			<5	<5		
KR14029	3/18/2014	15:35	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					0.62	0.87			0.457				0.054									
KR14030	3/18/2014	15:40	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	9.77	8.19	168	10	0.71	1.09	65	3.3	0.25		0.085	0.27	0.0368	0.79	0.11	0.053			<5	<5		
KR14032	3/18/2014	16:00	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	25.0	P					1.16	1.98	63.9	2.77	<0.0633		0.15	0.34	0.049	0.95	0.1	0.069			<5	<5		
KR14031	3/18/2014	16:15	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	13.0	P					0.74	1.17	65.7	3.03	0.297		0.06	0.29	0.041	0.79	0.093	0.055			<5	<5		
KR14049	4/8/2014	13:30	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I					1.02	1.14			0.411				0.043									
KR14050	4/8/2014	13:25	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	12.74	8.23	172	9.5	1.13	1.44	63.6	4.28	0.414		0.075	0.34	0.0557	0.93	0.							

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KR14163	9/23/2014	10:15	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	18.79	9.21	143	9.51	19.12	1.81	61.2	4.31	3.06	0.05	0.062	0.524	1.2	0.094	0.16	5.2	5.4	4.6
KR14165	9/23/2014	10:30	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	29.0	P							77.4	3.71		0.76	0.011		1.19	0.6	0.7	6.8	<5	
KR14164	9/23/2014	10:50	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	15.0	P					13.74	1.16	62.8	4.31	1.19	<0.05	0.059	0.196	0.79	0.093	15	6.2	7	
KR14185	10/6/2014	not sampled	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I																		
KR14186	10/20/2014	18:25	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	14.31	7.84	152	7.39	2.11	0.83	62.9	3.66	0.334	0.14	0.17	0.0534	0.75	0.071	<0.05	<5	<5	<0.18
KR14206	11/4/2014	not sampled	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I																		
KR14207	11/4/2014	9:40	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0.5	P	11.7		114	8.24	8.56	0.99	64.2	3.24	0.604	0.15	0.28	0.0994	1.05	0.083	0.11	5	<5	
KR14226	12/9/2014	not sampled	KR19874	Copco Reservoir (RM 198.74; Baseline)	PacifiCorp	0-8	I																		
KR14013	2/18/2014	12:15	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	5.28	8.22	169	10.69	2.99	2.24	65.2	2.67	0.449	<0.05	0.39	0.0632	0.84	0.047	0.087	<5	<5	
KR14053	4/8/2014	14:55	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	11.24	8.16	175	9.23	0.91	1.20	62.8	3.89	0.391	0.084	0.34	0.0468	0.92	0.11	0.096	<5	<5	
KR14074	5/20/2014	15:20	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	16.18	8.49	168	8.88	2.01	1.23	62.3	3	0.296	<0.05	0.097	0.0401	0.47	0.079	0.093	<5	<5	<0.18
KR14097	6/9/2014	14:45	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	19.15	8.4	157	8.2	2.95	1.56	60.9	2.99	0.339	<0.05	0.051	0.0513	0.38	0.1	0.16	<5	<5	<0.18
KR14120	7/9/2014	15:00	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	21.26	8.06	154	6.7	0.78	0.60	57.7	3.76	0.445	0.053	0.5	0.0735	1.14	0.15	0.15	<5	<5	<0.18
KR14166	9/23/2014	9:20	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	17.61	8.56	146	7.67	1.20	1.24	62.1	4.68	0.413	0.069	0.19	0.0445	0.74	0.11	0.15	<5	<5	0.2
KR14189	10/7/2014	9:15	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	15.71	8.07	149	7.3	1.17	1.29	63.3	3.96	0.449	0.084	0.23	0.0657	0.8	0.1	0.07	<5	<5	0.19
KR14210	11/4/2014	10:30	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	11.43		121	8.65	0.97	1.28	61.2	3.93	0.323	0.15	0.31	0.0492	0.89	0.076	0.095	<5	<5	
KR14230	12/9/2014	11:00	KR19645	Klamath River below Copco Dam (RM 196.45; Baseline)	PacifiCorp	0.5	P	6.07	7.6	121	10.41			60.1	2.2	0.414	0.15	0.48	0.056	0.9	0.048	0.12	<5	<5	
KR14014	2/18/2014	13:15	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					1.33	1.00			0.485			0.07						
KR14015	2/18/2014	13:10	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	5.62	8.06	170	10.59	0.66	0.68	66.1	2.5	0.329	0.063	0.41	0.0485	0.86	0.047	0.098	<5	<5	
KR14017	2/18/2014	13:25	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	40.0	P					0.91	1.02	64.2	2.76	0.3	<0.05	0.45	0.037	0.87	0.05	0.083	<5	<5	
KR14016	2/18/2014	13:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	21.0	P					1.13	0.93	65.6	2.48	0.26	0.053	0.45	0.036	0.83	0.049	0.089	<5	<5	
KR14034	3/18/2014	13:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					0.57	0.77			0.518			0.060						
KR14035	3/18/2014	12:50	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	9.03	7.82	165	10.01	0.42	0.66	67	3.15	0.324	<0.05	0.35	0.0501	0.79	0.9	0.051	<5	<5	
KR14037	3/18/2014	13:10	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	45.0	P					0.64	1.14	68.1	2.88	0.345	0.072	0.55	0.043	1.26	0.11	0.078	<5	<5	
KR14036	3/18/2014	13:25	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	24.0	P					0.53	0.81	66.8	3.04	0.12	<0.05	0.47	0.038	0.85	0.054	<0.05	<5	<5	
KR14054	4/8/2014	15:50	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					0.71	0.78			0.42			0.045						
KR14055	4/8/2014	15:45	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	13.59	8.34	177	9.78	0.44	0.56	65.9	3.47	0.234	<0.05	0.26	0.0334	0.74	0.053	0.068	<5	<5	
KR14057	4/8/2014	16:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	44.0	P							64.8	3.31		<0.05	0.56		0.95	0.079	0.082	<5	<5	
KR14056	4/8/2014	16:10	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	3.0	P					0.40	0.48	65.6	3.56		<0.05	0.26		0.74	0.053	0.079	<5	<5	
KR14076	5/20/2014	13:20	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					2.80	1.78			0.409			0.051						<0.18
KR14077	5/20/2014	13:10	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	18.95	8.9	169	11.58	1.10	1.60	63.1	2.96	0.274	<0.05	<0.01	0.0301	0.46	0.035	0.05	5.4	<5	0.19
KR14079	5/20/2014	13:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	45.0	P							65.3	2		<0.05	0.58		0.76	0.072	0.05	<5	<5	

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KR14078	5/20/2014	13:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	15.0	P					1.01	1.07	62.1	2.46	0.322		<0.05	0.43	0.031	0.7	0.072	0.091			<5	<5		
KR14098	6/18/2014	13:20	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					4.92	1.26			0.423				0.058								<-0.18	
KR14099	6/18/2014	13:05	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	21.03	8.53	159	8.59	0.21	0.31	63.4	3.69	0.156		<0.05	<0.01	0.0234	0.52	0.079	0.11			<5	<5	<-0.18	
KR14100	6/18/2014	13:15	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	10.0	P					3.35	0.93	65.5	3.03	0.133		<0.05	0.062	0.021	0.36	0.083	0.12			<5	<5	<-0.18	
KR14101	6/18/2014	13:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	44.0	P							67	2.46			<0.05	0.56		1.03	0.1	0.12			<5	<5		
KR14121	7/9/2014	10:50	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					1.41	0.56			0.56				0.087								0.2	
KR14122	7/9/2014	10:45	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	25.27	8.97	157	8.72	1.81	0.45	63.5	4.43	0.391		<0.05	0.01	0.0647	0.53	0.072	0.072			<5	<5	0.51	
KR14124	7/9/2014	10:55	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	45.0	P							67.4	3.45			0.088	0.58		1.13	0.16	0.16		6.7	<5	<5		
KR14123	7/9/2014	11:05	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	13.0	P					0.80	0.57	62.6	3.08	0.402		<0.05	0.19	0.07	0.59	0.11	0.11			<5	<5	<-0.18	
KR14144	8/5/2014	not sampled	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I																						
KR14139	8/13/2014	13:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					25.68	<0.18			2.59				0.382								0.87	
KR14140	8/13/2014	12:40	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P					30.40	1.39	64.6	9.71	3.22		<0.05	<0.01	0.446	1.77	0.15	0.23			8.2	5.8	0.52	
KR14142	8/13/2014	13:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	44.0	P							66.6	3.98			<0.05	0.61		1	0.14	0.18			<5	<5		
KR14141	8/13/2014	13:30	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	13.0	P					3.27	0.75	61.5	5.51	0.846		0.076	0.34	0.119	0.77	0.17	0.21			<5	<5		
KR14167	9/8/2014	10:15	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I					31.11	0.84			2.4				0.376								0.21	
KR14168	9/8/2014	10:00	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	20.24	9.78	144	12.85			63.4	5.51			<0.05	<0.01		2.9	0.16	0.43			37.6	32.8	0.35	
KR14190	10/7/2014	not sampled	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I																						
KR14191	10/20/2014	16:35	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P					3.32	0.93	65	3.69	0.454		0.18	0.18	0.0679	0.77	0.11	<0.05			<5	<5	<-0.18	
KR14211	11/4/2014	not sampled	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I																						
KR14212	11/4/2014	11:55	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0.5	P	13.03		126	6.84	3.97	1.40	64.4	3.29	0.269		0.21	0.21	0.0391	0.89	0.11	0.13			<5	<5		
KR14231	12/9/2014	not sampled	KR19019	Iron Gate Reservoir (RM 190.19; Baseline)	PacifiCorp	0-8	I																						
KR14007	2/18/2014	15:00	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	4.96	8.04	175	11.81	0.93	0.96	66.3	2.73	<0.0633	<2.0	<0.05	0.43	0.283	0.87	0.049	0.11		6.6	<5	<5		
KR14027	3/18/2014	14:15	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	9.19	8.35	169	10.73	0.37	0.83	66.9	3.31	<0.0633	<2.0	<0.05	0.35	0.271	0.77	0.11	0.053	0.0044	0.0024	6.2	<5	<5	
KR14047	4/8/2014	17:10	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R					0.75	0.81	64.9	3.81	<0.0633	<2.0	<0.05	0.28	0.219	0.72	0.054	0.066	0.0043	0.0024	5.6	<5	<5	
KR14068	5/13/2014	10:30	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	15.24	8.55	166	9.93	1.74	3.22	63.3	3.78	0.0803	5.8	0.057	0.13	0.592	0.78	0.037	0.085	0.0119	0.003	7.2	6.4	<5	<-0.18
KR14083	5/26/2014	11:40	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R					1.83	2.63	65	3.07	<0.0633		<0.05	0.14	0.272	0.46	0.055	0.14		4.9	<5	<5		
KR14091	6/9/2014	15:25	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R					0.57	1.06	64	3.01	<0.0633	3.8	<0.05	0.035	0.432	0.38	0.062	0.1		4.1	<5	<5	<-0.18	
KR14106	6/24/2014	11:05	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P	19.96	8.63	163	9.35	0.79	1.45	63.4	3.36	<0.0633	2.5	0.018	0.037	0.198	0.48	0.091	0.12		3.1	<5	<5		
KR14114	7/8/2014	13:35	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	21.45	8.25	155	8.36	0.98	0.53	62.2	3.59	<0.0633	3.2	<0.05	0.15	0.22	0.69	0.1	0.1		1.7	<5	<5	<-0.18	
KR14129	7/17/2014	18:30	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P	18.42	8.53	151	7.88	4.81	1.73	59.9	3.44	0.141	5.2	<0.05	0.24	0.844	0.59	0.13	0.17		2.4	<5	<5	1.2	
KR14137	8/5/2014	13:40	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R	22.11	8.76	143	8.16	18.16	1.96			0.213				1.4			0.0212	0.0074				1.7	
KR14152	8/19/2014	12:45	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P		9.27	141	9.25	14.37	1.10	4.66	0.262	4.6	<0.05	0.033	1.69	1.68	0.18	0.25			6.6	<5			

KR14160	9/8/2014	7:05	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R					4.34	1.13		4.29	0.1	7	0.019	0.066	0.925		0.54	0.17	0.23	0.0062	0.0057	2.3				<0.18
KR14174	9/22/2014	16:40	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P	16.46	9.12	142	9.65	4.60	0.76	62.1	4.76	0.098	9.5	<0.05	0.068	0.705		0.66	0.14	0.2				<5	<5	<0.18	
KR14183	10/7/2014	11:45	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R					2.54	1.47	64.2	4.69	0.0646	4.3	0.096	0.18	0.418		0.77	0.12	0.12	0.0071	0.004	3.1	<5	<5	0.19	
KR14197	10/20/2014	15:00	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	P					1.64	0.84	65.9	3.52	0.0798		0.16	0.2	0.424		0.76	0.11	0.069			2.2	<5	<5	<0.18	
KR14204	11/4/2014	12:45	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R					2.79	1.19	66.4	3.28	<0.0633	<2.0	0.16	0.26	0.338		0.87	0.11	0.13	0.0053	0.0047	3.7	<5	<5		
KR14224	12/9/2014	12:00	KR18973	Klamath River below Iron Gate Dam (RM 189.73; Baseline)	PacifiCorp	0.5	R							61.6	2.3	0.414	<2.0	0.13	0.48	0.0626		0.88	0.063	0.14			4.7	<5	<5		
WA021914-OC	2/19/2014	11:59	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	R	6.21	8.23	217	11.63	2.10	3.10		3.92	0.833		0.015	0.396		0.911	0.055	0.077				5.6	1.4			
WA031914-OC	3/19/2014	11:56	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	R	8.2	8.2	196	10.81	1.60	4.80		3.29	0.686		<0.010	0.293		0.797	0.058	0.085				3.7	1			
WA041614-OC	4/16/2014	12:03	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	R	12.8	8.29	188	10.79	2.10	5.30		3.74	0.732		0.013	0.257		0.979	0.053	0.08				4.3	1.8			
WA050714-OC	5/7/2014	11:33	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	R					11.00	9.50		4.22	0.778		0.023	0.193		0.703	0.05	0.095				6.5	2			
WA061114-OC	6/11/2014	11:47	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	R	20.09	8.48	176	9.55	1.10	2.70		3.65	0.503		0.013	0.027		0.367	0.075	0.098				4.5	2			
WA070914-OC	7/9/2014	12:24	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	R	23.24	8.31	160	9.13	1.10	1.50		3.94	0.386		<0.010	0.119		0.545	0.125	0.142			1.9	2.8	1	<0.18		
WA080614-OC	8/6/2014	12:15	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	R					16.00	3.80		4.39	2.7		<0.010	0.047		0.719	0.183	0.264			4.5	8	5.5	1.1		
WA091014-OC	9/10/2014	11:17	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	R	19.53	9.39	162	9.08	9.90	4.70		6.11	2.06		0.019	0.018		0.886	0.186	0.252			3	8.7	4.7	<0.18		
WA100814-OC	10/8/2014	11:42	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	R	15.7	8.32	173	10.09	1.90	3.20		4.73	0.633		0.03	0.21		0.68	0.138	0.171				6.3	2.8			
WA111914-OC	11/19/2014	13:27	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	R	8.71	8.25	196	11.44	1.60	3.30		3.53	0.58		0.027	0.368		0.703	0.108	0.132				2.6	1			
WA121714-OC	12/17/2014	12:18	KR15626	Klamath River at Walker Bridge (RM 156.26; Baseline)	Karuk	0.5	R	6.99	8.11	229	11.71	1.30	2.00		3.71	0.724		0.022	0.506		1.07	0.08	0.114			4	5	1.5			
SV021914-OC	2/19/2014	10:54	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	R	6.62	8.09	176	11.49	2.10	3.10		3.29	0.48	<2.0.00	<0.010	0.276	0.0488		0.609	0.033	0.062	0.0166	0.0137	4.5	23	2.6		
SV031914-OC	3/19/2014	10:55	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	R	8.33	8.15	181	10.75	2.10	3.50		2.79	0.597	<2.0.00	<0.010	0.252	0.0701		0.544	0.037	0.065	0.0119	0.0035	4.6	6.2	1.5		
SV041614-OC	4/16/2014	10:52	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	R	12.33	8.28	186	10.93	2.10	3.80	83.8	2.88	0.651	<2.0.00	0.01	0.161	0.069		0.639	0.035	0.058	0.0124	0.0046	4.1	4	1.5		
SV050714-OC	5/7/2014	10:27	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	R	13.53	8.42	188	10.32	8.50	6.40		3.09	0.639	<2.0.00	<0.010	0.081	0.0967		0.46	0.03	0.062	0.0194	0.0083	4.6	16	2.5		
SV061114-OC	6/11/2014	10:42	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	R	20.08	8.37	183	9.24	1.10	1.90		3.48	0.432	<2.0.00	<0.010	0.03	0.0577		0.356	0.062	0.084	0.0108	0.0024	4.5	4	1.3		
SV070914-OC	7/9/2014	10:40	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	R	23.77	8.14	173	8.37	<0.1	1.90		3.95	0.526		<0.010	<0.010	0.0728		0.398	0.116	0.131	0.0107	0.0028	1.5	2	1	<0.18	
SV080614-OC	8/6/2014	10:50	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	R	22.34	8.37	168	9.01	15.00	4.70		3.94	2.69		0.011	0.025	0.423		0.667	0.182	0.232	0.0328	0.0131	4.4	8.5	5.5	1.8	
SV091014-OC	9/10/2014	10:12	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	R	18.37	8.94	167	9.53	4.80	3.00		5.45	1.51		0.011	0.024	0.25		0.783	0.183	0.231	0.0274	0.0106	2.4	28	4	<0.18	
SV100814-OC	10/8/2014	10:11	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	R	15.68	8.26	178	10.32	2.10	3.70	84.3	4.82	0.593	<2.0.00	0.012	0.185	0.0707		0.587	0.136	0.163	0.0119	0.0033	2.4	6.7	2.3	0.18	
SV111914-OC	11/19/2014	11:11	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	R	7.57	8.23	203	11.8	1.60	5.90		3.21	0.523	<2.0.00	<0.010	0.297		0.581	0.09	0.106	0.0087	0.0049	2.4	2.6	0.87			
SV121714-OC	12/17/2014	11:11	KR12850	Klamath River below Seiad (RM 128.5; Baseline)	Karuk	0.5	R	6.85	8.04	204	11.7	1.30	1.80		3.05	0.551		0.015	0.383		0.771	0.052	0.082	0.0168	0.0153	3.8	13	1.7			
HC021914-OC	2/19/2014	10:17	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	R	6.85	8.02	145	11.52	1.10	3.00		8.21	0.506		<0.010	0.193		0.382	0.024	0.038				4.5	1.2			
HC031914-OC	3/19/2014	10:18	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	R	8.01	8.09	169	11.07	1.60	4.00		2.34	0.598		<0.010	0.192		0.511	0.033	0.055				7	1.8			
HC041614-OC	4/16/2014	10:09	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	R	12.28	8.1	172	10.59	1.90	5.00		2.57	0.666		<0.010	0.081		0.403	0.023	0.042				3.8	1.4			
HC050714-OC	5/7/2014	9:40	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	R	13.25	8.21	179	9.75	4.30	6.20		2.81	0.679		<0.010	0.052		0.484	0.026	0.053				6	2.8			

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HC061114-OC	6/11/2014	9:31	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	R	20.36	8.14	184	8.8	1.10	2.30	2.97	0.462	0.015	0.022	0.306	0.055	0.08	3.3	1.8			
HC070914-OC	7/9/2014	9:31	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	R	23.01	7.9	174	8.15	<0.1	1.50	3.49	0.415	<0.010	<0.010	0.344	0.102	0.109	0.79	1.3	1	0.18	
HC080614-OC	8/6/2014	9:51	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	R	21.83	8.12	171	8.66	18.00	6.50	3.95	3.57	<0.010	0.011	0.609	0.139	0.243	5	10	4.5	1.8	
HC100814-OC	10/8/2014	9:20	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	R	14.47	8.46	153	10.43	4.00	4.60	4.56	0.548	0.016	0.147	0.603	0.133	0.176	13	4	<0.18		
HC111914-OC	11/19/2014	10:28	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	R	6.94	8.12	198	11.86	5.10	4.50	3.02	0.712	<0.010	0.229	0.54	0.069	0.094	7.3	2.3			
HC121714-OC	12/17/2014	10:21	KR10130	Klamath River below Happy Camp (RM 101.3; Baseline)	Karuk	0.5	R	7.35	8.05	185	11.6	1.10	2.20	2.81	0.65	<0.010	0.275	0.612	0.038	0.059	5.6	1.4			
OR021914-OC	2/19/2014	9:00	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	R	7.8	7.98	108	11.82	1.60	2.10	54	1.82	0.617	<0.010	0.096	0.328	0.013	0.025	3.9	9.8	1.8	
OR031914-OC	3/19/2014	8:55	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	R	8.35		137	12	1.10	1.90	65.7	1.49	0.336	<0.010	0.112	0.222	0.019	0.032	2.7	5	1.3	
OR041614-OC	4/16/2014	8:52	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	R	12.56	8.13	137	11.16	1.10	2.30	1.6	0.445	<0.010	0.016	0.249	0.01	0.026	1.6	1.8	0.67		
OR050714-OC	5/7/2014	8:06	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	R	13.18	8.33	137	10.41	3.20	3.90	68.4	2.26	0.384	<0.010	0.011	0.224	0.008	0.026	2.1	3.2	1.3	
OR061114-OC	6/11/2014	7:53	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	R	20.97	8.18	166	8.86	<0.1	3.70	76	2.11	0.312	0.012	0.018	0.204	0.036	0.046	2.2	4	1.6	
OR070914-OC	7/9/2014	7:58	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	R	23.72	8.01	164	8.05	0.80	1.30	81.7	2.6	0.338	<0.010	<0.010	0.307	0.059	0.064	0.46	1.2	0.67	<0.18
OR080614-OC	8/6/2014	8:03	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	R	22.41	8.27	169	8.38	33.00	22.00	76.7	2.92	7.71	<0.010	0.013	1.38	0.095	0.321	8.1	71	17	1.9
OR091014-OC	9/10/2014	8:00	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	R	19.13	8.38	172	8.95	3.70	3.60	77.6	4.3	1.47	<0.010	<0.010	0.637	0.128	0.162	0.93	6.5	3.3	<0.18
OR100814-OC	10/8/2014	7:55	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	R	16.61	8.39	180	10.16	2.90	3.00	3.95	0.5		0.013	0.115	0.478	0.111	0.144	2.4	7.5	3.3	0.18
OR111914-OC	11/19/2014	9:05	KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	R					2.90	4.20	80	2.21	0.463	<0.010	0.124	0.226	0.044	0.058	1.5	2.1	0.63	
OR121714-OC	12/17/2014		KR05910	Klamath River at Orleans (USGS) (RM 59.1; Baseline)	Karuk	0.5	R	8.09	8.92	144	11.61	1.60	0.40	69	2.21	0.54	<0.010	0.158	0.252	0.22	0.038	2.5	3.5	0.75	
WE021419-OC	2/19/2014	11:09	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	7.88	7.81	107	12.15	2.10	0.90	2.13	0.566	<0.010	0.079	0.179	0.015	0.031	4.7	12	1		
WE031419-OC	3/19/2014	10:55	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	8.5	8	132	11.67	0.30	2.00	1.28	0.135	<0.010	0.096	0.24	0.019	0.032	2.5	3.5	0.75		
WE041614-OC	4/16/2014	11:17	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	12.61	8.07	133	10.84	1.20	1.60	1.45	0.304	<0.010	0.015	0.0323	0.196	0.011	0.025	1.6	1.7	0.67	
WE050714-OC	5/7/2014	11:43	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	14.57	7.93	139	10.27	2.10	1.40	1.74	0.302	<0.010	<0.010	0.169	0.012	0.026	2	2.5	0.75	<0.18	
WE061114-OC	6/11/2014	11:34	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	21.02	8.29	163	9.16	1.87	0.75	2.12	0.406	<0.010	<0.010	0.214	0.029	0.044	2.6	3	1.13	<0.18	
WE070914-OC	7/9/2014	11:46	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	23.8	8.36	171	9.09	0.50	1.00	2.02	2.75	<0.010	<0.010	0.263	0.045	0.049	0.5	2	1.2	0.2	
WE080614-OC	8/6/2014	11:19	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	22.86	8.44	170	9.52	11.00	1.40	2.63	2.4	<0.010	<0.010	0.515	0.085	0.128	4.4	8.5	7	1.2	
WE091014-OC	9/10/2014	10:54	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	19.04	8.27	168	9.78	2.70	2.00	4.46	0.686	<0.010	<0.010	0.553	0.094	0.145	0.72	2.5	1.3	<0.18	
WE100814-OC	10/8/2014	11:01	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	17.05	7.99	183	9.45	2.94	3.04	3.634	0.861	0.0102	0.0976	0.679	0.111	0.1323	2.1	5.75	2.25	0.18	
WE111914-OC	11/19/2014	11:07	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R					1.60	1.00	2.06	0.334	<0.010	0.092	0.038	0.333	0.04	0.053	1.4	1	<0.50	
WE121714-OC	12/17/2014	10:18	KR04350	Klamath River at Weitchpec (RM 43.5; Baseline)	Yurok	0.5	R	8.42	7.91	138	11.75	1.50	<0.1	2	0.232	<0.010	0.121	0.352	0.02	0.034	2.9	5.8	0.75		
TC021914-OC	2/19/2014	10:22	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	8.09	7.78	111	11.96	1.10	2.30	2.61	0.603	<0.010	0.08	0.22	0.013	0.025	5.1	13	1.5		
TC031914-OC	3/19/2014	10:13	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	8.95	8.04	136	11.45	0.50	1.50	1.18	0.254	<0.010	0.08	0.169	0.015	0.025	2.6	4.8	1		
TC041614-OC	4/16/2014	10:26	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	12.93	8	138	10.57	2.40	1.10	1.15	0.254	<0.010	0.014	0.0267	0.144	0.008	0.02	1.5	1.8	<0.50	
TC050714-OC	5/7/2014	10:17	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	14	8.06	139	10.17	1.30	1.70	1.35	0.296	<0.010	<0.010	0.09	0.007	0.019	2	2.4	0.75	<0.18	

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TC061114-OC	6/11/2014	10:38	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	20.59	7.18	152	8.88	1.60	0.64	1.464	0.332	<0.010	<0.010	0.175	0.02	0.026	2	2.13	0.5	<0.18			
TC070914-OC	7/9/2014	10:07	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	23.8	8.27	167	8.26	1.10	1.20	1.81	0.227	<0.010	<0.010	0.22	0.032	0.034	0.5	2	0.5	<0.18			
TC080614-OC	8/6/2014	10:11	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	23	8.23	165	8.35	11.00	3.90	2.02	1.86	<0.010	<0.010	0.423	0.06	0.093	3.8	3.7	3.3	0.85			
TC091014-OC	9/10/2014	9:56	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	18.95	8.14	151	9.02	2.10	1.40	3.02	0.487	<0.010	<0.010	0.333	0.064	0.086	0.73	2.2	1.2	<0.18			
TC100814-OC	10/8/2014	10:19	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	17.03	7.93	177	9.41	2.14	2.72	3.137	0.793	<0.010	0.074	0.332	0.0832	0.1011	1.5	5	2	<0.18			
TC111914-OC	11/19/2014	10:14	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R					1.40	0.60	1.83	0.508	<0.010	0.071	0.0527	0.222	0.03	0.032	1.4	1.1	<0.50			
TC121714-OC	12/17/2014	9:33	KR03850	Klamath River below Trinity River (RM 38.5; Baseline)	Yurok	0.5	R	8.63	7.83	146	11.65	2.00	<0.1	1.8	0.792	<0.010	0.105	0.0609	0.344	0.014	0.027	0.019	0.012	4.6	8.8	1.5	
TG021912-OC	2/19/2014	8:22	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	8.64	7.92	105	11.41	2.10	1.20	1.67	0.593	<0.010	0.126	0.0391	0.23	0.013	0.029	0.012	0.009	7.5	14	1.6	
TG031912-OC	3/19/2014	8:03	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	9.65	7.95	131	10.86	0.50	1.70	1.04	0.189	<0.010	0.102	0.0107	0.193	0.015	0.026	0.0038	0.0021	3.1	4.9	<0.50	
TG041614-OC	4/16/2014	8:12	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	12.95	7.87	138	10.1	6.10	4.10	0.827	0.25	<0.010	0.037	0.179	0.286	0.007	0.077	0.0389	0.0366	7.2	5.8	5.3	
TG050714-OC	5/7/2014	8:05	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	13.64	7.78	139	9.56	1.30	1.30	1.1	0.313	<0.010	0.047	0.0328	0.194	0.005	0.018	0.0094	0.0024	1.6	1.9	0.63	<0.18
TG061014-OC	6/10/2014	12:28	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R																		<0.18		
TG061114-OC	6/11/2014	8:08	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	18.75	7.65	160	8.12	0.53	1.15	1.37	0.204	<0.010	0.08	0.037	0.188	0.012	0.018	0.007	0.002	1.6	0.89	0.51	
TG070814-OC	7/8/2014	12:38	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5																			<0.18		
TG070914-OC	7/9/2014	7:38	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	20.55	7.72	168	7.07	0.50	1.90	1.58	1.34	<0.010	0.067	0.184	0.219	0.018	0.023	0.0339	0.0175	0.61	2	1	
TG080514-OC	8/5/2014	12:43	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5																			0.44		
TG080614-OC	8/6/2014	7:54	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	20.71	7.84	170	6.95	9.10	4.40	1.57	1.68	<0.010	0.014	0.242	0.429	0.032	0.064	0.0233	0.0102	3.5	6.7	5	
TG090914-OC	9/9/2014	13:13	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5																			<0.18		
TG091014-OC	9/10/2014	7:31	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	17.94	7.87	160	7.75	5.10	4.60	2.49	1.32	<0.010	0.041	0.208	0.334	0.039	0.067	0.0165	0.0083	1.4	4.8	2	
TG100714-OC	10/7/2014	12:38	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5																			<0.18		
TG100814-OC	10/8/2014	7:48	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	17.5	7.97	183	8.62	6.68	2.86	2.446	0.394	<0.010	0.015	0.0504	0.307	0.0626	0.0767	0.0085	0.0024	0.65	1.9	0.9	
TG111914-OC	11/19/2014	8:00	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	10.36	7.59	167	9.91	1.40	1.70	1.36	0.37	<0.010	0.147	0.0215	0.371	0.021	0.03	0.0038	0.0024	0.56	1	<0.50	
TG121714-OC	12/17/2014	7:15	KR00600	Klamath River near Klamath (RM 6.0; Baseline)	Yurok	0.5	R	9.04	7.7	138	11.27	2.10	0.60	1.47	0.288	<0.010	0.125		0.318	0.017	0.043			6.5	20	1.4	
LE5021914-OC	2/19/2014	7:35	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	8.73	8.08	117	11.51	2.10	2.70	1.45	0.858	0.01	0.216		0.309	0.013	0.045			9.4	21	2	
LE5031914-OC	3/19/2014	7:13	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	9.6	7.92	139	10.81	1.10	1.20	1.03	0.357	<0.010	0.11		0.215	0.015	0.032			3.8	7.9	0.75	
LE5041614-OC	4/16/2014	7:30	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	12.94	7.86	136	10.1	1.90	1.90	0.924	0.401	0.01	0.034	0.037	0.223	0.008	0.031			2.4	6.2	1.2	
LE5050714-OC	5/7/2014	7:08	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	13.87	7.62	139	9.6	1.90	0.70	1.24	0.24	<0.010	0.022		0.141	0.005	0.015			1.5	1.8	<0.50	<0.18
LE5061014-OC	6/10/2014	7:12	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R																		<0.18		
LE5061114-OC	6/11/2014	7:12	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	20.51	8.02	162	7.93	1.34	0.35	1.477	0.296	0.015	0.045		0.333	0.016	0.020			2.2	2.7	2.2	
LES 070814-OC	7/8/2014	11:37	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R																		<0.18		
LE5070914-OC	7/9/2014	6:40	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	21.2	8.14	2752	7.96	0.80	0.90	1.71	0.275	<0.010	0.017		0.235	0.021	0.024			0.49	1.3	0.83	
LES 080514-OC	8/5/2014	11:14	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R																		0.47		

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LES080614-OC	8/6/2014	7:05	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	21.07	7.99	6041	7.16	11.00	2.60	1.66	1.42	<0.010	<0.010	0.429	0.034	0.064	2.6	4.7	2.3		
LES090914-OC	9/9/2014	12:30	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R																		
LES091014-OC	9/10/2014	6:58	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	14.97	8.18	41436	8.99	1.30	1.80	2.62	0.326	0.02	0.01	0.35	0.05	0.07	0.81	2.2	1		
LES100714-OC	10/7/2014	13:17	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R																		
LES100814-OC	10/8/2014	7:22	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	17.39	7.99	999	9.34	0.53	1.30	2.494	0.31	0.018	0.014	0.576	0.058	0.07	0.6	1.2	0.8		
LES111914-OC	11/19/2014	7:27	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	10.07	7.52	691	10.86	0.70	1.40	1.66	0.316	0.029	0.126	0.0311	0.401	0.028	0.039	1.7	2	0.75	
LES121714-OC	12/17/2014	6:42	KR00050	Klamath River Estuary (RM 0.5; Baseline)	Yurok	0.5	R	9.07	6.99	1125	11.25	1.60	1.00	1.69	0.45	0.012	0.127	0.292	0.014	0.041	6	12	2.6		
SA021914-OC	2/19/2014	9:30	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	7.16	7.89	74	11.87	0.5	0.6	1.96	0.39	<0.010	0.041	0.276	0.004	0.012	1.5	3.5	1.3		
SA031914-OC	3/19/2014	9:33	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	6.93	8.01	96	11.63	1.6	0.6	0.98	0.53	<0.010	0.030	0.317	0.004	0.030	2.5	3.4	2.1		
SA041614-OC	4/16/2014	9:22	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	10.64	7.96	90	11.23	1.5	<0.1	0.88	0.33	<0.010	<0.010	0.094	0.002	0.004	1.0	3.0	0.57		
SA050714-SG	5/7/2014	8:33	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	11.57	8.04	89	10.23	1.3	0.5	1.08	0.56	<0.010	<0.010	0.053	<0.001	0.019	1.3	15	3.1		
SA061114-OC	6/11/2014	8:31	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	18.41	7.86	115	9.06	1.1	1.2	0.86	0.23	0.022	0.011	0.117	0.002	0.013	1.6	12	2.2		
SA070914-OC	7/9/2014	8:35	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	20.44	8.00	129	8.59	0.8	0.1	0.84	0.20	<0.010	<0.010	0.114	0.005	0.005	0.21	0.75	<0.50		
SA080614-OC	8/6/2014	8:31	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	20.50	8.04	144	8.59	1.6	0.3	0.43	0.40	<0.010	0.012	<0.050	0.001	0.010	0.79	4.9	0.87		
SA091014-OC	9/10/2014	15:00	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P				0.9	<0.1		1.05	0.40	<0.010	<0.010	0.058	0.004	0.007	0.65	<0.50	<0.50		
SA100814-OC	10/8/2014	8:20	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	14.47	8.46	153	10.43	1.8	<0.1	0.70	0.57	<0.010	<0.010	<0.050	0.002	0.007	0.31	2.7	1.3		
SA111914-OC	11/19/2014	9:35	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	7.16	8.38	110	8.38	1.6	<0.1	1.29	0.24	<0.010	<0.010	<0.050	0.003	0.005	0.3	0.8	0.63		
SA121714-OC	12/17/2014	9:30	SA00000	Salmon River near mouth (Baseline)	Karuk	0.5	P	7.72	8.24	96	11.89	1.2	<0.1	3.06	0.34	<0.010	0.071	0.086	0.003	0.008	0.6	3.1	1		
SC021914-OC	2/19/2014	11:28	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	6.32	8.05	115	11.54	1.6	1.4	3.08	0.39	<0.010	0.142	0.328	0.007	0.019	4.3	7	1.2		
SC031914-OC	3/19/2014	11:26	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	6.91	8.14	148	11.13	1.1	1.5	1.79	0.27	<0.010	0.184	0.241	0.006	0.012	1.5	2.8	0.7		
SC041614-OC	4/16/2014	11:30	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	11.53	8.36	165	10.87	1.6	1.4	1.26	0.30	0.011	0.095	0.250	<0.001	0.003	1.0	1.3	0.57		
SC050714-OC	5/7/2014	12:23	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	11.83	8.38	181	10.25	2.4	1.7	1.06	0.36	<0.010	0.014	0.193	<0.001	0.006	0.98	2.6	1.0		
SC061114-OC	6/11/2014	11:14	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	19.53	8.45	230	8.95	1.6	1.0	1.37	0.24	<0.010	0.149	0.239	<0.001	0.009	1.7	6.3	1.0		
SC070914-OC	7/9/2014	11:31	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	24.65	8.40	234	8.53	<0.1	0.9	1.36	0.25	<0.010	<0.010	0.166	0.001	0.003	0.41	<0.50	<0.50		
SC080614-OC	8/6/2014	11:36	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	22.91	8.54	264	9.17	0.5	0.6	0.78	0.31	<0.010	0.012	0.086	0.001	0.008	0.66	0.63	0.50		
SC100814-OC	10/8/2014	11:04	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	14.24	8.58	284	11.38	1.6	0.6	1.17	0.21	0.019	<0.010	0.091	0.005	0.010	0.31	<0.50	<0.50		
SC111914-OC	11/19/14	11:48	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	6.26	8.32	214	11.92	2.10	1.20	1.180	0.259	<0.010	0.021	<0.050	0.003	0.004	0.35	0.9	0.37	0.9	0.4
SC121714-OC	12/17/14	11:41	SC00000	Scott River near mouth (Baseline)	Karuk	0.5	P	6.41	7.98	148	11.64	2.80	2.40	2.530	1.220	0.011	0.207	0.518	0.007	0.058	3.80	24.0	4.50	24.0	4.5
SH021914-OC	2/19/14	12:43	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	8.91	8.71	480	11.29	4.30	8.10	4.180	1.930	<0.010	0.175	0.642	0.173	0.229	5.00	24.0	4.8		
SH031914-OC	3/19/14	12:53	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	10.01	8.85	440	11.47	5.30	3.30	2.160	1.110	<0.010	<0.010	0.279	0.15	0.215	2.50	11.0	2.3		
SH041614-OC	4/16/14	12:45	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	14.50	8.77	583	11.42	0.80	2.40	293	5.570	0.460	<0.010	<0.010	0.611	0.174	0.205	1.10	1.8	0.7	
SH050714-OC	5/7/14	14:24	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	16.38	8.81	587	10.34	2.10	1.20	5.230	0.279	<0.010	<0.010	0.397	0.152	0.36	1.10	2.2	0.8		

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SH061114-OC	6/11/14	12:50	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	21.67	8.72	560	9.97	3.20	2.40	4.560	0.313	<0.010	0.012	0.407	0.188	0.246	2.60	5.0	1.2	
SH070914-OC	7/9/14	13:17	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P					1.10	0.40	5.200	0.504	0.016	0.017	0.490	0.21	0.236	0.45	2.5	1.0	
SH080614-OC	8/6/14	13:15	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	24.00	8.72	573	10.12	1.80	<0.1	4.540	0.437	<0.010	<0.010	0.376	0.176	0.205	1.00	2.0	1.1	
SH091014-OC	9/10/14	12:02	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	17.04	8.67	599	10.6	26.00	16.00	5.870	1.040	<0.010	<0.010	1.340	0.156	0.26	2.70	48.0	11.0	
SH100814-OC	10/8/14	12:31	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	13.31	8.58	429	11.01	3.40	<0.1	1.780	1.060	<0.010	0.021	0.140	0.182	0.199	1.60	9.7	2.5	
SH111914-OC	11/19/14	13:11	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	6.56	8.52	424	12.08	5.90	9.50	1.550	1.270	<0.010	0.116	0.321	0.156	0.191	1.30	7.3	2.0	
SH121714-OC	12/17/14	13:20	SH00000	Shasta River near mouth (Baseline)	Karuk	0.5	P	6.39	8.31	501	11.5	2.40	0.60	4.500	0.603	0.025	0.512	9.440	0.171	0.229	2.60	6.0	1.6	
TR021914-OC	2/19/14	11:25	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	8.69	8.00	127	11.65	2.10	0.50	3.630	0.282	<0.010	0.041	0.178	0.007	0.016	3.50	5.8	1.0	
TR031914-OC	3/19/14	11:17	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	9.62	8.03	150	11.24	0.30	1.00	0.813	0.294	<0.010	0.040	0.085	0.006	0.012	1.70	3.0	0.6	
TR041614-OC	4/16/14	11:37	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	13.58	8.11	151	10.55	0.70	1.80	0.882	0.032	<0.010	<0.010	0.304	0.146	0.003	0.009	1.90	2.3	0.8
TR050714-OC	5/7/14	12:04	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	14.19	8.08	137	10.49	1.10	0.80	1.070	0.171	<0.010	<0.010	0.091	<0.001	0.0080	1.40	1.5	0.5	
TR061114-OC	6/11/14	12:00	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	20.83	8.06	135	8.98	1.34	0.16	0.998	0.178	<0.010	<0.010	0.071	0.0027	0.0059	1.10	1.0	<0.50	
TR070914-OC	7/9/14	12:16	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	24.46	8.29	155	8.7	1.60	0.60	1.040	0.147	<0.010	<0.010	0.148	0.0030	0.0030	0.25	0.8	0.7	
TR080614-OC	8/6/14	11:47	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	23.37	8.16	147	8.74	<0.1	0.70	0.726	0.129	<0.010	<0.010	0.088	0.002	0.0050	0.54	<0.50	<0.50	
TR091014-OC	9/10/14	11:17	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	18.39	8.01	123	9.65	1.10	0.30	1.250	0.192	<0.010	0.015	0.131	0.002	0.0060	0.35	0.7	<0.50	
TR100814-OC	10/8/14	11:25	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	17.06	8.16	153	10.09	0.53	0.34	0.875	0.151	<0.010	<0.010	<0.050	<0.001	0.0046	0.19	<0.50	<0.50	
TR111914-OC	11/19/14	11:25	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P					1.00	<0.1	1.110	0.120	<0.010	<0.010	0.011	0.104	0.003	0.0040	0.29	<0.50	<0.50
TR121714-OC	12/17/14	10:33	TR00000	Trinity River near mouth (Baseline)	Yurok	0.5	P	8.97	7.96	161	11.52	2.10	0.40	1.620		<0.010	0.073	0.096	0.004	0.0190	5.90	7.6	1.8	

End of Errata

KLAMATH RIVER BASELINE WATER QUALITY SAMPLING 2014 ANNUAL REPORT

Prepared for the
KHSa Water Quality Monitoring Group

Prepared by
Watercourse Engineering, Inc.
April 28, 2015



Photo: Grant Johnson

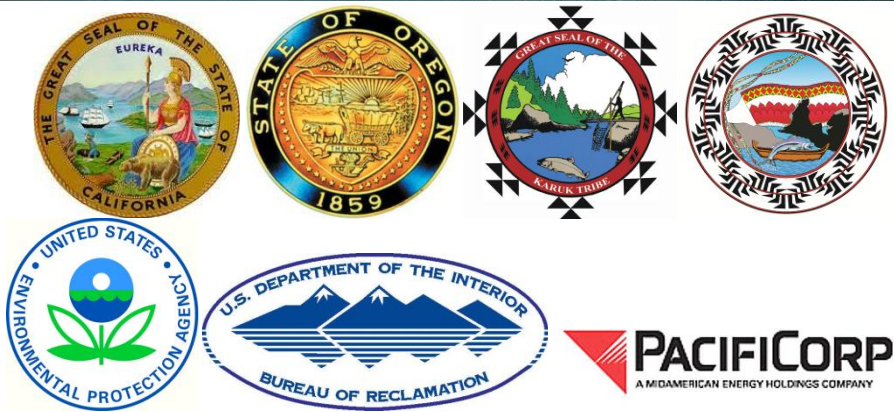


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Introduction

On November 13, 2008, the United States, the states of California and Oregon, and PacifiCorp executed an Agreement in Principle (AIP) describing a framework for possible removal of PacifiCorp's dams on the Klamath River. Interim Measure 12 of the AIP stipulated a water quality monitoring program, including on-going monitoring of blue-green algae (cyanobacteria) and associated toxins. The Klamath Hydroelectric Settlement Agreement (KHSa), signed on February 18, 2010, supersedes the AIP. Interim Measure 15 (IM 15) - Water Quality Monitoring states that PacifiCorp shall fund (\$500,000 per year) long-term baseline water quality monitoring to support water quality improvement activities, dam removal studies, permitting studies, and form a long-term record to assess trends and other potential changes in the basin. This includes funding for blue-green algae (BGA) and BGA toxin monitoring, as necessary to protect public health. The monitoring is performed by an entity or entities agreed upon by the parties to the KHSa and in consultation with the appropriate water quality agencies. The 2014 water quality monitoring was conducted under IM 15 and represents the fourth year of water quality monitoring under the KHSa.

The monitoring program is a cooperative effort of the KHSa Monitoring Group¹. This group developed the KHSa IM15 monitoring study plan that is located on PacifiCorp's Klamath website², as well as the Klamath Basin Monitoring Program (KBMP) website³. Actual monitoring is completed by a sub-set of the group that includes the Yurok Tribe, Karuk Tribe, PacifiCorp, and the U.S. Bureau of Reclamation (USBR). The program continues to collect data from 254 miles of river and reservoirs from Link Dam near Klamath Falls in Oregon to the Klamath River Estuary in California. Annual planning and coordination meetings include the IM 15 Monitoring Group and interested stakeholders. The IM 15 Monitoring Group ensures that the intent of IM 15 is met, appropriate quality assurance protocols and standard operating procedures are in place, water quality conditions and sampling matters are tracked in a timely fashion, and the process is transparent.

This report summarizes the results from the 2014 grab sampling data collection and available water quality probe data. Four appendices accompany this report: the sampling locations (Appendix A); the 2014 baseline grab sample results (Appendix B); the phytoplankton species charts and biovolume graphs (Appendix C); and the 2014 inter-laboratory comparison tech memo (Appendix D).

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

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

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

Program Elements

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

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

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

Baseline Program Water Quality Sampling

In 2014, sampling was conducted at twenty-four sites along the Klamath River and its tributaries, from Link Dam to the Klamath River Estuary (Figure 1), by the four sampling entities: U.S. Bureau of Reclamation (USBR), PacifiCorp, Karuk Tribe, and Yurok Tribe. Sixteen of those sites were located on the mainstem of the Klamath River, four sites were located in the reservoirs on the Klamath River, and four sites were located on the major tributaries of the Klamath River (Shasta, Scott, Salmon and Trinity River). Sampling locations, sampling frequency and sampling entity are presented in Table 1.

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

The following constituents were analyzed: inorganic nitrogen (total nitrogen, nitrate+nitrite, and ammonia), particulate nitrogen, particulate phosphorus, particulate inorganic phosphorus, inorganic phosphorus (total phosphorus and orthophosphate), particulate carbon, dissolved organic carbon, total and volatile suspended solids, carbonaceous biological oxygen demand, turbidity, chlorophyll-a, pheophytin, and microcystin. Phytoplankton species samples were also collected. Not all parameters were collected at every site; please refer to Table 1 for the parameters analyzed at each sampling location. Data results from the 2014 baseline grab samples are presented in Appendix B.

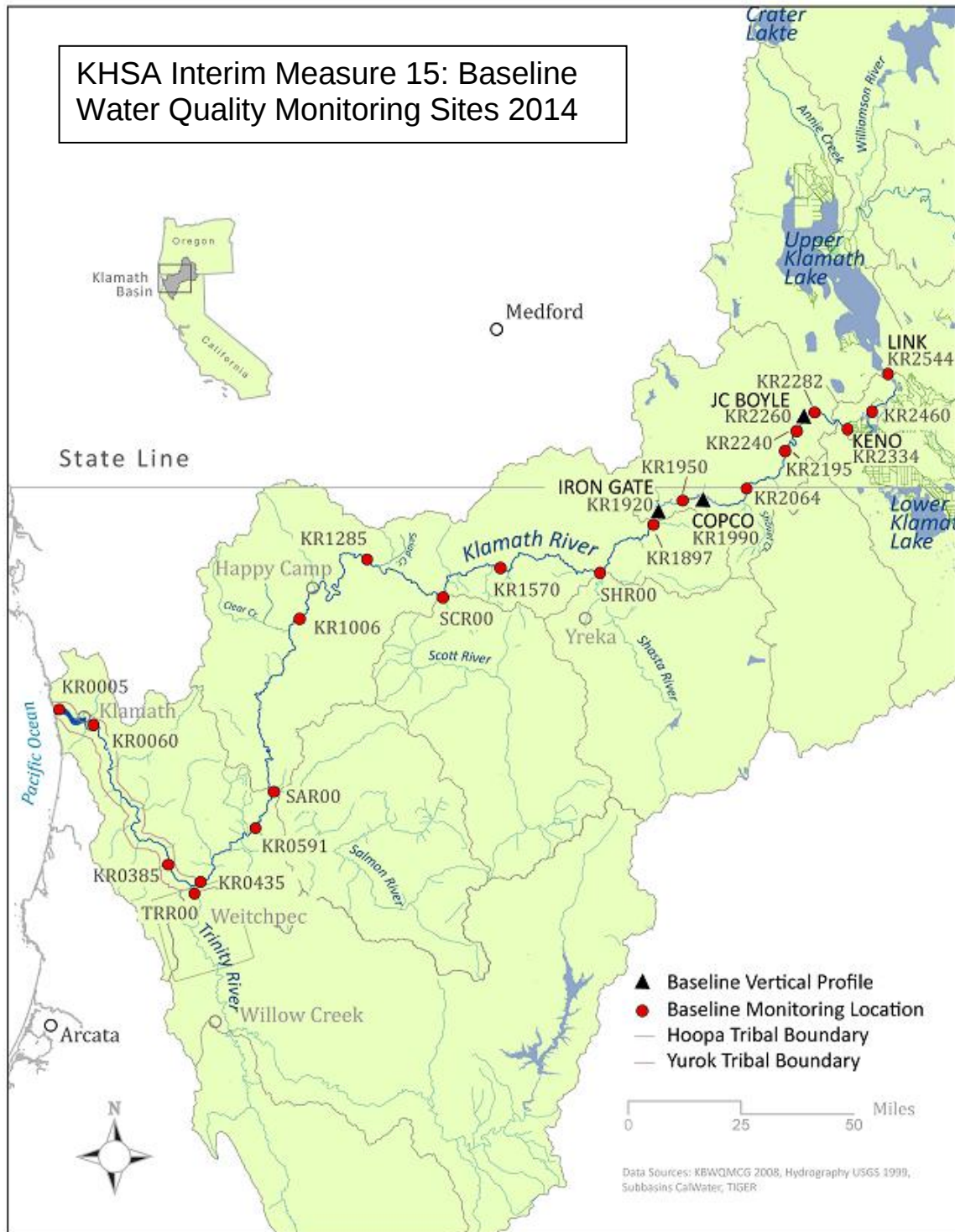


Figure 1. 2014 KHSA Klamath River baseline monitoring sampling sites.

Table 1. 2014 Baseline monitoring locations, sampling frequency, and sampling entities.

Monitoring Location		Water Temperature (°C)	Dissolved Oxygen (mg/l)	pH (log(H+))	Conductance (uS/cm)	Total N (mg/l)	Ammonia N (mg/l)	Nitrite + Nitrate (mg/l)	Total P (mg/L)	Ortho P (mg/L)	Particulate P & Particulate Inorganic P (mg/l)	Dissolved Organic N & P (mg/l)	Particulate and Dissolved C (mg/l)	Particulate N (mg/l)	TSS/VSS (mg/l)	Alkalinity (mg/l)	Water Column chl_a/Phaeo (ug/l)	Phytoplankton species	Microcystin (ug/l)	LCMS confirmation	CBOD (mg/l)	Turbidity (NTU)	Sampling Entity
Site ID	Sampling Location:	T,P	P	P	P	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
KR2544	Link Dam (RM - 254.4)	H	H	H	H		M/BM	M/BM	M/BM	M/BM	M/BM	M/BM	M/BM	M/BM	M/BM	M/BM	M/BM	M/BM	M/BM	BM/S	M2/BM2	M2/BM2**	USBR
KR2460	Keno Reservoir at Miller Island (RM - 246.0)	H	H	H	H		M	M	M	M			M		M	M	M	M	M/S	M	M		USBR
KR2330	KR below Keno Dam (RM -233.4)	H	D	D	D		M2/BM2	M2/BM2	M2/BM2	M2/BM2	M		M	M	M	M2/BM2**	M	M	M/S	M2/BM2	M2/BM2**		USBR
KR2282	KR above J.C. Boyle Reservoir (RM-228.2)	H	D	D	D	M	M	M	M	M			M		M	M	M	M-					PacifiCorp
KR2260	J.C. Boyle Reservoir (RM-226.0) ^a	VP	VP	VP	VP												M/S	M/S	M/S				PacifiCorp
KR2240	KR below J.C. Boyle Dam (RM-224.0)	H	D	D	D	M	M	M	M	M			M		M	M	M	M-					PacifiCorp
KR2195	KR below USGS Gage (RM-219.5)	H	D	D	D	M	M	M	M	M			M		M	M	M	M	M/S		M		PacifiCorp
KR2064	KR near Stateline (RM-206.4)	H	D	D	D	M2/BM2	M2/BM2	M2/BM2	M2/BM2	M2/BM2	M		M	M	M	M	M	M	M/S	M2/BM2	M		PacifiCorp
KR1990	Copco Reservoir (RM-199.0) ^b	VP	VP	VP	VP	M	M	M	M	M			M		M	M	M	M-	M/S				PacifiCorp
KR1950	KR below Copco Dam (RM-195.0)	H	D	D	D	M	M	M	M	M			M		M	M	M	M-	M/S				PacifiCorp
KR1920	Iron Gate Reservoir (RM-192.0) ^c	VP	VP	VP	VP	M	M	M	M	M			M		M	M	M	M-	M/S				PacifiCorp
KR1897	KR below Iron Gate Dam (RM-189.7)	H	H	H	H	M/BM	M/BM	M/BM	M/BM	M/BM	M/BM		M/BM	M/BM	M/BM	M/BM	M/BM	M/BM	M/BM	BM/S	M2/BM2	M/BM	PacifiCorp
KR1560	KR at Walker Bridge (RM- 156.0)	H	D	D	D	M	M	M	M	M			M		M	*	M	M-	M/S	S2			Karuk
KR1285	KR below Seiad (RM - 128.5)	H	H	H	H	M	M	M	M	M	M		M	M	M	*	M	M	M/S	M	M		Karuk
KR1060	KR near Happy Camp (RM-106.0)	H	D	D	D	M	M	M	M	M			M		M	*	M	M-	M/S				Karuk
KR0591	KR at Orleans (USGS) (RM-59.1)	H	H	H	H	M	M	M	M	M			M		M	M	M	M	M/S		M		Karuk
KR0435	KR at Weitchpec (RM-43.5)	H	H	H	H	M	M	M	M	M			M		M	*	M	M-	M/S	S2			Yurok
KR0385	KR below Trinity River (RM-38.5)	H	H	H	H	M	M	M	M	M			M		M	*	M	M-	M/S				Yurok
KR0060	KR near Klamath (RM-6.0)	H	H	H	H	M	M	M	M	M	M		M	M	M	*	M	M	M/S		M		Yurok
KR0005	KR Estuary (RM-0.5) ^d	HP	D	D	D	M	M	M	M	M			M		M	*	M	M-	M/S				Yurok
SHR00	Shasta River near mouth	H	H	H	H	M	M	M	M	M			M		M	*	M	*			M		Karuk
SCR00	Scott River near mouth	H	H	H	H	M	M	M	M	M			M		M	*	M	*			M		Karuk
SAR00	Salmon River near mouth	H	H	H	H	M	M	M	M	M			M		M	*	M	*			M		Karuk
TRR00	Trinity River near mouth	H	H	H	H	M	M	M	M	M			M		M	*	M	*			M		Yurok

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

1. Water Quality Sample Collection

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

1.1. Analytical Samples

Grab water samples were collected for analytical determination of:

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

Six laboratories completed the analytical work during the field season:

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

1.2. Physical Measurements

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

1.3. Quality Assurance

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

1.4. Laboratory Comparison

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

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

Because analyses of samples collected by USBR are now analyzed by CH2MHill, Basic Laboratory will no longer be considered for the laboratory comparison. Furthermore, IM15 entities decided to add an additional field sampling event. In 2014, duplicate samples were collected on four days (July 9th, August 6th, September 24th, and October 8th) and submitted for analysis at two laboratories: Aquatic Research, Inc and CH2MHill Applied Sciences Laboratory. IM15 entities also decided to drop constituents that were consistent (e.g., R^2 values greater than 0.9) among laboratories or challenging to analyze due to low field concentrations. Constituents that were dropped in 2014 include: alkalinity, nitrite+nitrate, ammonia, and five-day carbonaceous biological oxygen demand (CBOD5). Other details of the field sampling plan for the laboratory comparison are detailed in the technical memorandum (Appendix D).

1.5. Water Quality Analytical Methods

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

For dissolved organic carbon (DOC) samples collected in November and December, CH2MHill sent dissolved samples to other laboratories for analysis due to equipment maintenance, and thus an inability to process these in-house. Specifically, on December 1, 2014, the Shimadzu Total Organic Carbon analyzer was out of operation until CH2MHill purchased a new machine which was operational on January 27, 2015.

Therefore, two laboratories were used to analyze for DOC: TestAmerica Laboratories, Inc (TLI) in Beaverton, Oregon; and Neilson Research Corporation (NRC) in Medford, Oregon. For PacifiCorp, DOC samples were sent to TLI. For USBR, DOC samples collected in November were sent to TLI and DOC samples collected in December were sent to NRC because NRC's turnaround time was shorter than TLI (pers. comm. K. McKinley).

1.5.1. Algae Samples

Analysis of chlorophyll-a and pheophytin was performed by three of the aforementioned laboratories. Algae samples collected by USBR, PacifiCorp, Karuk Tribe, and Yurok Tribe were sent to Aquatic Analysts in Friday Harbor, Washington.

Microcystin analysis was performed using the Enzyme-Linked ImmunoSorbent Assay (ELISA) method at the EPA laboratory. Additional microcystin analysis was completed by the California Department of Fish and Wildlife laboratory using liquid chromatography-tandem mass spectrometry (LCMS/MS) for selected locations.

Table 2. Analyzing laboratory method references, method detection limits and method reporting limits for water quality constituents. Units presented in milligrams per liter (mg/L) or parts per million (ppm) unless otherwise noted.

Constituent Name	Constituent ID	CH2MHill			ARI			CBL		
		Method	MDL ¹	RL ²	Method	MDL	RL	Method	MDL	RL
Alkalinity	ALKT	SM2320B	n/a	5.0	SM18 2320B	0.2	1.0	-	-	-
Ammonia	NH4	EPA 350.1	0.020	0.050	SM18 4500NH3H	0.006	0.01	EPA 350.1	0.001	-
Carbonaceous Biological Oxygen Demand – 5 day	CBOD5	SM5210B	n/a	2.0	SM20 5120B	2.0	2.0	SM5210B	n/a	-
Dissolved Organic Carbon	DOC ³	SM5310B	0.12	0.5	SM20 5310B	0.095	0.250	EPA 415.1	0.24	-
Nitrate + Nitrite	NO3+NO2	EPA 353.2	0.0028	0.010	SM18 4500N03F	0.005	0.01	EPA 353	0.0007	-
Total Nitrogen	TN	SM4500-N C	0.048	0.20	SM204500NC	0.03	0.05	EPA 353.2	0.05	-
Ortho-phosphate	OPO4	EPA 365.1	0.0014	0.010	SM18 4500PF	0.001	0.001	EPA 365.1	0.0006	-
Total Phosphorus	TP	EPA 365.4	0.017	0.050	SM18 4500PF	0.002	0.002	EPA 365.1	0.0015	-
Total Kjeldahl Nitrogen	TKN	EPA 351.2	0.069	0.20	EPA 351.1	0.1	0.2	EPA 353.2	0.05	-
Total Suspended Solids	TSS	SM2540D	0.6	5.0	SM20 2540D	0.1	0.5	EPA 160.2	2.4	-
Volatile Suspended Solids	VSS	EPA 160.4	0.6	5.0	SM20 2540E	0.1	0.5	SM 208E	0.9	-
Chlorophyll-a ⁴	CHLOR-A	-	-	-	SM1810200H	0.1	-	SM1810200H	0.18	-
Filtered Ammonia	NH3 filtered	EPA 350.1	0.020	0.050	SM18 4500NH3H	0.01	-	EPA 350.1	0.001	-
Filtered Nitrate + Nitrite	NO3+NO2 filtered	EPA 353.2	0.0028	0.010	SM18 4500N03F	0.01	-	EPA 353	0.0007	-
Particulate Carbon	PC	-	-	-	-	-	-	EPA 440.0	0.0633	-
Particulate Inorganic Phosphorus	PIP	-	-	-	-	-	-	EPA 440.0	0.0024	-
Particulate Organic Phosphorus	PP	-	-	-	-	-	-	EPA 440.0	0.0021	-
Particulate Nitrogen	PN	-	-	-	-	-	-	EPA 440.0	0.0105	-
MDL – method detection limit RL – method reporting limit ¹ CH2MHill uses the term limit of detection (LOD) instead of MDL ² CH2M Hill uses the term limit of quantification (LOQ) instead of RL ³ TestAmerica Laboratory Inc – Method: SM5310B, MDL: 0.33 mg/L, RL: 1.0 mg/L Neilson Research, Inc –Method: SM5310B, MDL: 0.019 mg/L, RL: 1.0 mg/L ⁴ Units for chlorophyll-a in µg/L (or ppb).										

2. Baseline Program Water Quality Data

Water quality samples for the 2014 IM15 baseline water quality monitoring program were collected from February through December. Sampling crews from the various entities collected samples within a few days of each other. Sampling on the same day throughout the basin was infeasible due to other obligations, shipping constraints, travel considerations, and other factors. In most cases all twenty-four sites were sampled each month. There were periods when one or more sites were omitted or one or more constituents were not sampled. The data is summarized in the appendices.

2.1. Data Summary

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

Data are summarized herein to illustrate general spatial and temporal patterns during the 2014 sampling period. Data are presented in three formats: (1) longitudinal boxplots⁴ based on seasonal grab sample data, (2) physical water quality sonde data (hourly) at specific locations, and (3) charts and bar graphs representing the types of algae and respective biovolumes at the sampling locations. The first two formats are presented in the main report; the third format is presented in Appendix C. The mainstem sites and major tributaries (Shasta, Scott, Salmon, and Trinity Rivers) are graphed separately. Constituents presented include: dissolved oxygen, dissolved organic carbon, total nitrogen, total phosphorus, and microcystin.

Time series data are presented for individual constituents at locations on the Klamath River for which there are United States Geological (USGS) flow gages⁵ (Table 3). While algae data are available for the May to October period, herein September percent biovolume are presented for illustration for eight locations: (1) Link River, (2) Klamath River below Keno Dam, (3) Copco Reservoir near Copco Dam, (4) Hatchery Bridge, (5) Klamath River near Seiad Valley, (6) Klamath River near Orleans, (7) Klamath River at Weitchpec, and (8) Klamath River Estuary (Figure 2). Plots representing algae species for other months are presented in Appendix C.

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

⁵ <http://water.usgs.gov/>

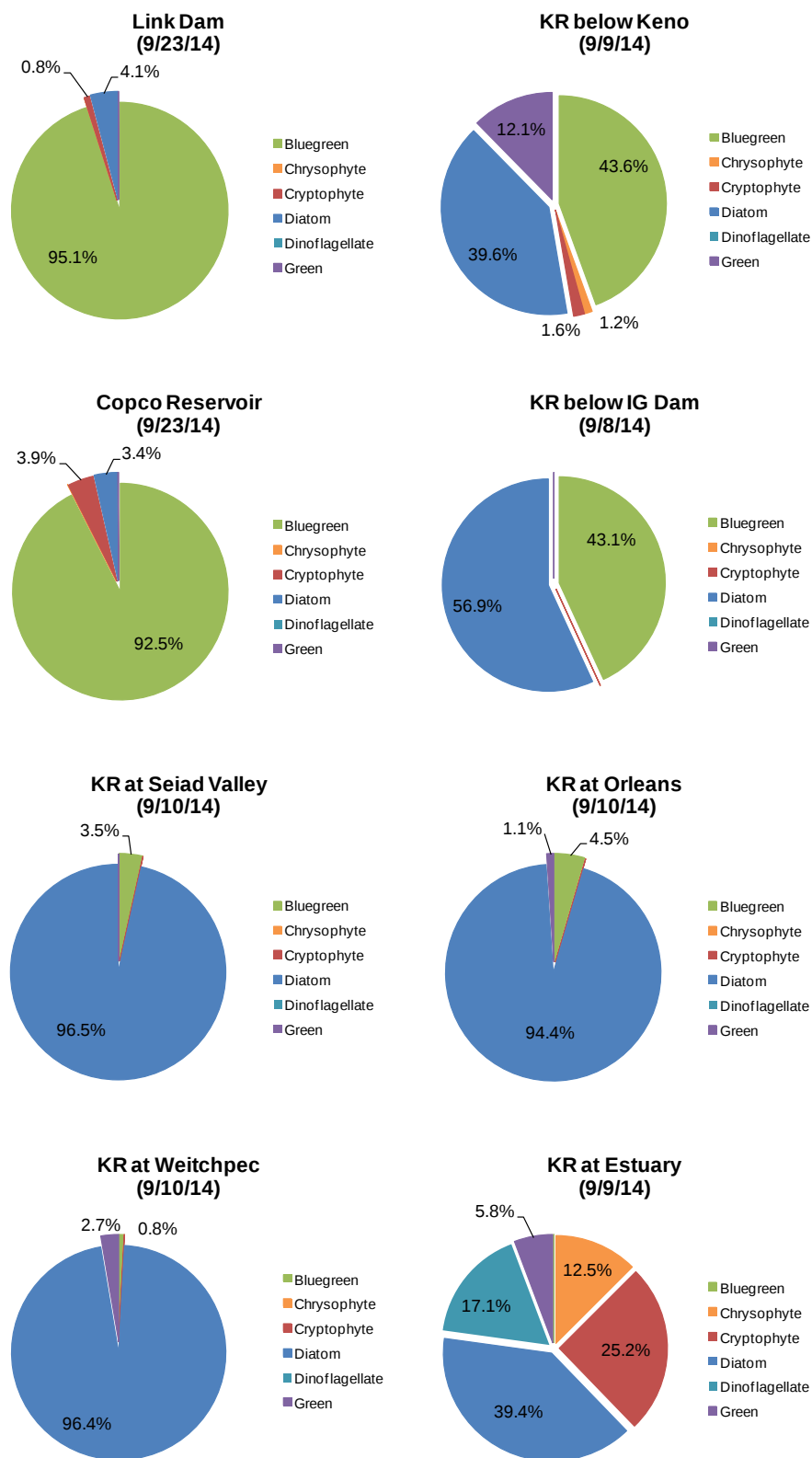


Figure 2. Phytoplankton species percent biovolume for the eight locations in the Klamath River: September 2014.

Table 3. United States Geological Survey (USGS) flow gage locations for time series data. River mile and gage number presented.

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

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

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

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

2.1.1. Major Tributaries (Boxplot)

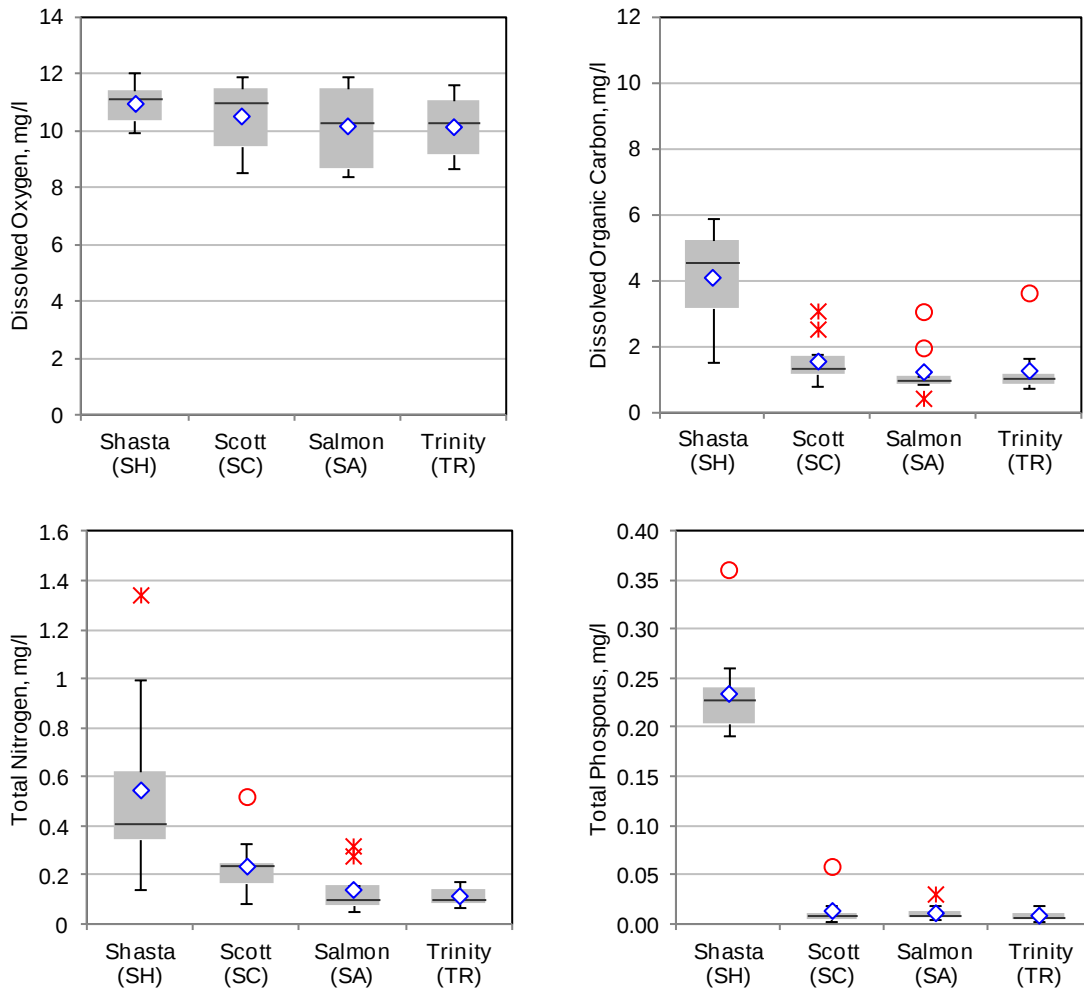


Figure 3. Baseline data for dissolved oxygen, dissolved organic carbon, total nitrogen, and total phosphorus for the Shasta, Scott, Salmon, and Trinity Rivers with median (—), mean (◊), outliers (*), and extreme outliers (o) identified (February 2014 – December 2014).

2.1.2. Mainstem Locations (Boxplot)

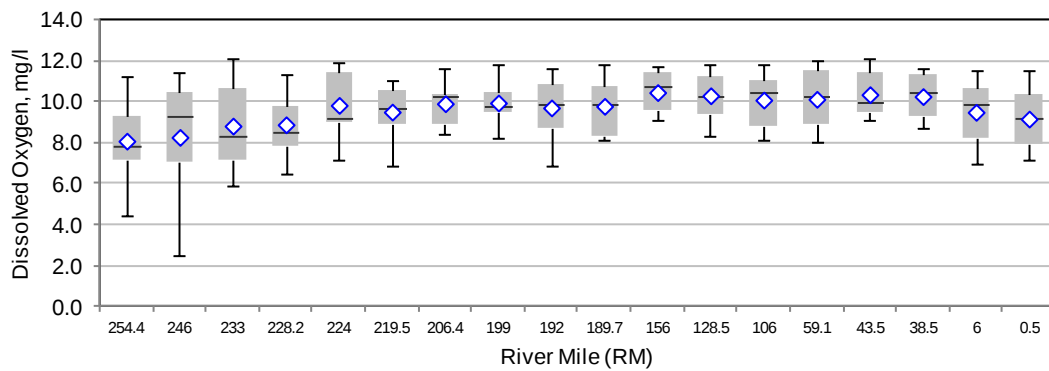


Figure 4. Dissolved oxygen concentration from Link River to the Klamath River Estuary with median (—), mean (◇), outliers (*), and extreme outliers (○) identified (February 2014 – December 2014). Note: Miller Island at Keno Reservoir (RM 246), Copco Reservoir (RM 199), and Iron Gate Reservoir (RM 192). River mile on x-axis not to scale.

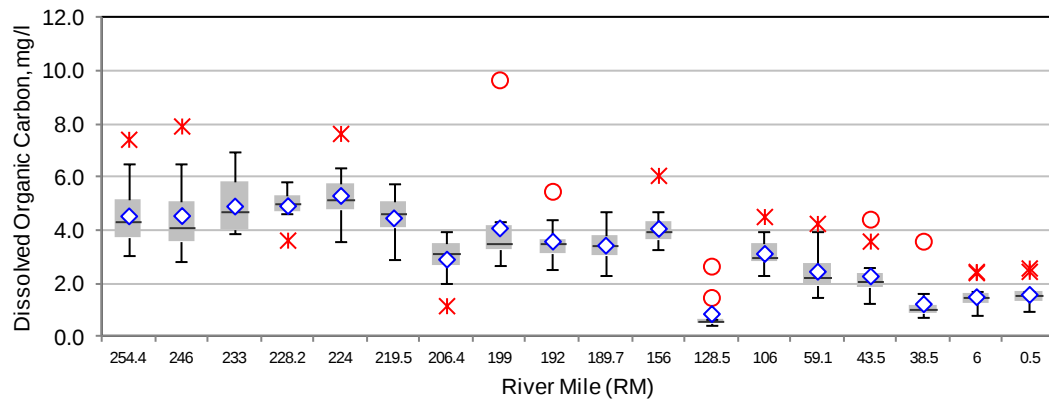


Figure 5. Dissolved organic carbon from Link River to the Klamath River Estuary with median (—), mean (◇), outliers (*), and extreme outliers (○) identified (February 2014 – December 2014). Note: Miller Island at Keno Reservoir (RM 246), Copco Reservoir (RM 199), and Iron Gate Reservoir (RM 192). River mile on x-axis not to scale.

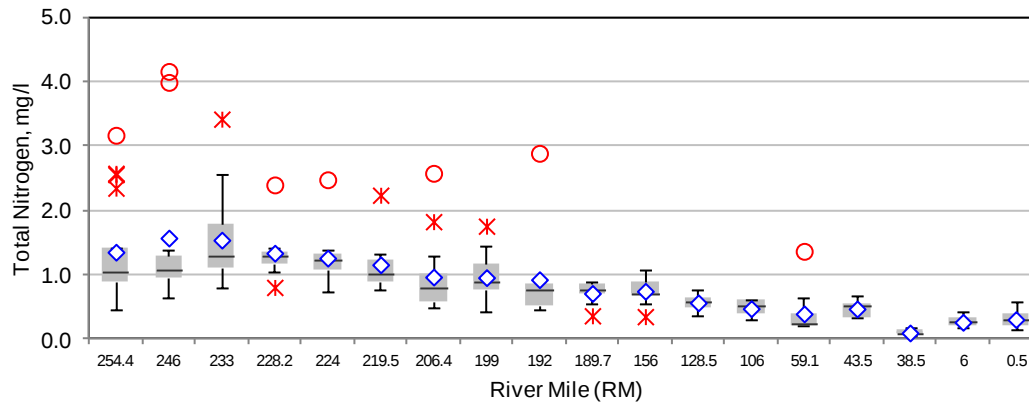


Figure 6. Total nitrogen from Link River to the Klamath River estuary with median (—), mean (◊), outliers(*), and extreme outliers (◊) identified (February 2014 – December 2014). Note: Miller Island at Keno Reservoir (RM 246), Copco Reservoir (RM 199), and Iron Gate Reservoir (RM 192). River mile on x-axis not to scale.

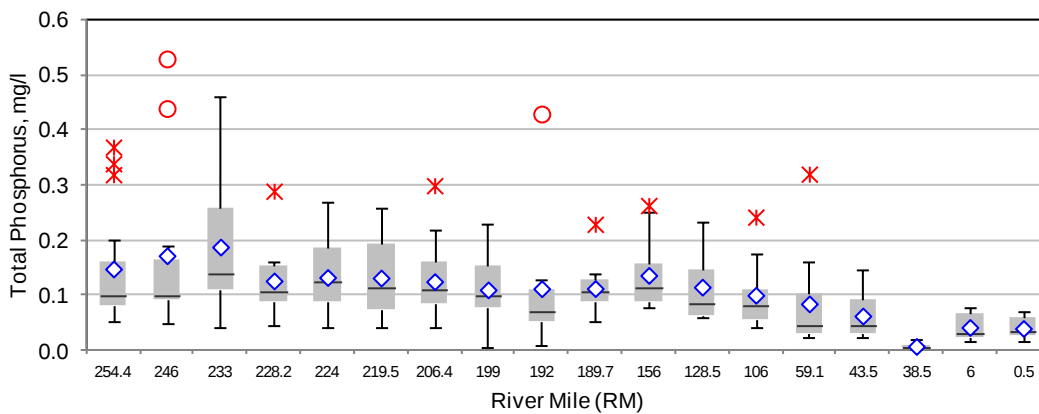


Figure 7. Total phosphorus from Link River to the Klamath River Estuary with median (—), mean (◊), outliers (*), and extreme outliers (◊) identified (February 2014 – December 2014). Note: Miller Island at Keno Reservoir (RM 246), Copco Reservoir (RM 199), and Iron Gate Reservoir (RM 192). River mile on x-axis not to scale.

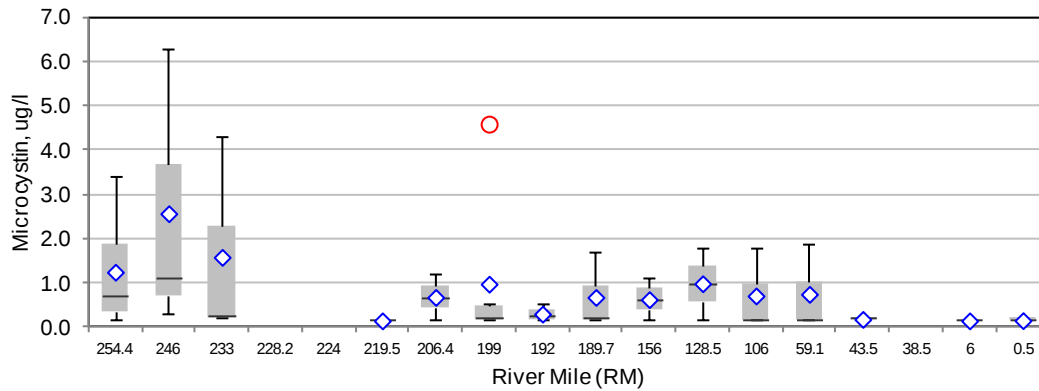


Figure 8. Microcystin from Link River to the Klamath River Estuary with median (—), mean (◊), outliers (*), and extreme outliers (○) identified (February 2014 – December 2014). Note: Miller Island at Keno Reservoir (RM 246), Copco Reservoir (RM 199), and Iron Gate Reservoir (RM 192). River mile on x-axis not to scale.

2.1.3. Major Tributaries (Time Series)

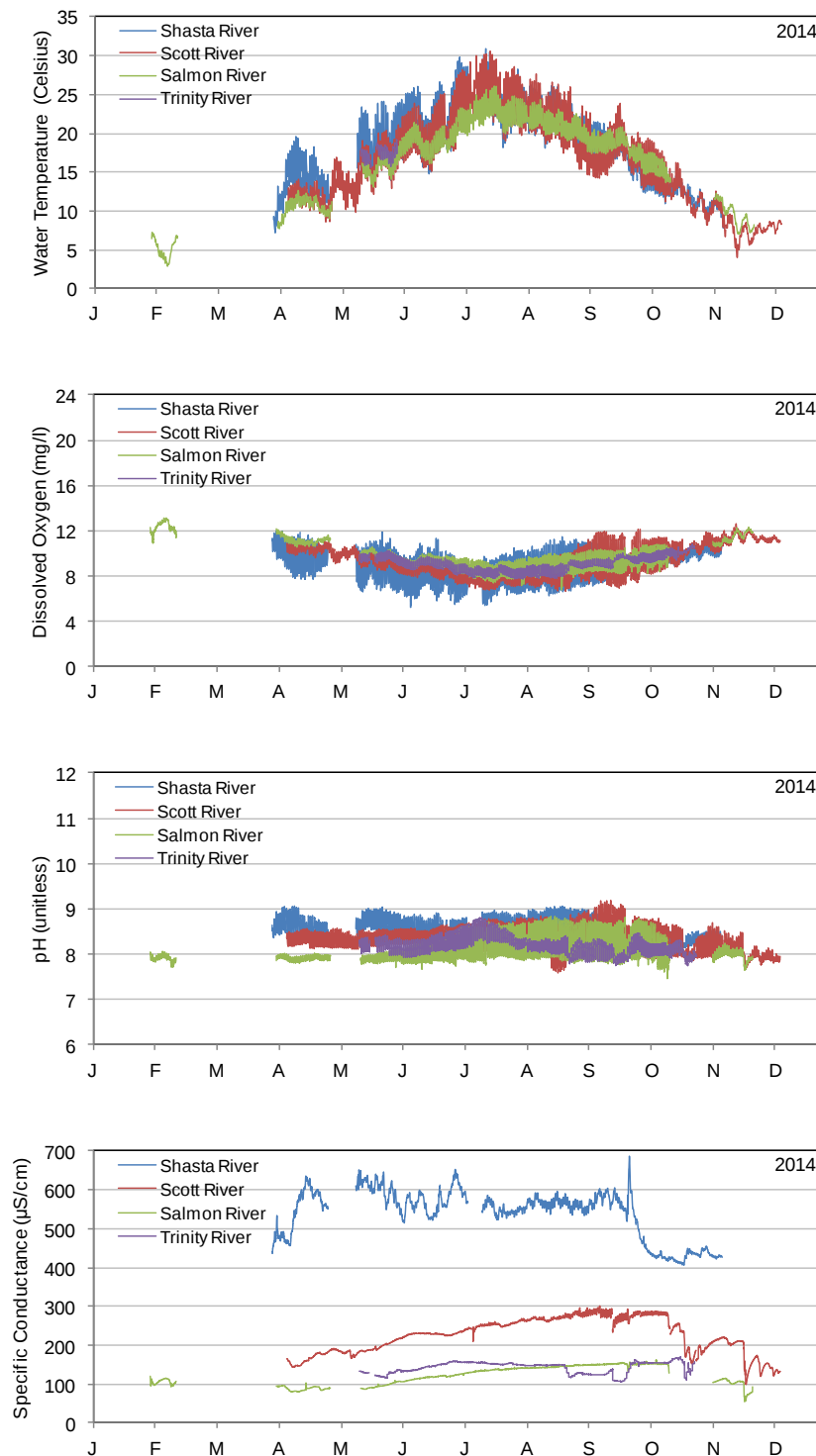


Figure 9. Continuous water temperature, dissolved oxygen, pH, specific conductance data (2014) for the Shasta River, Scott River, Salmon River, and Trinity River.

2.1.4. Mainstem Locations (Time Series)

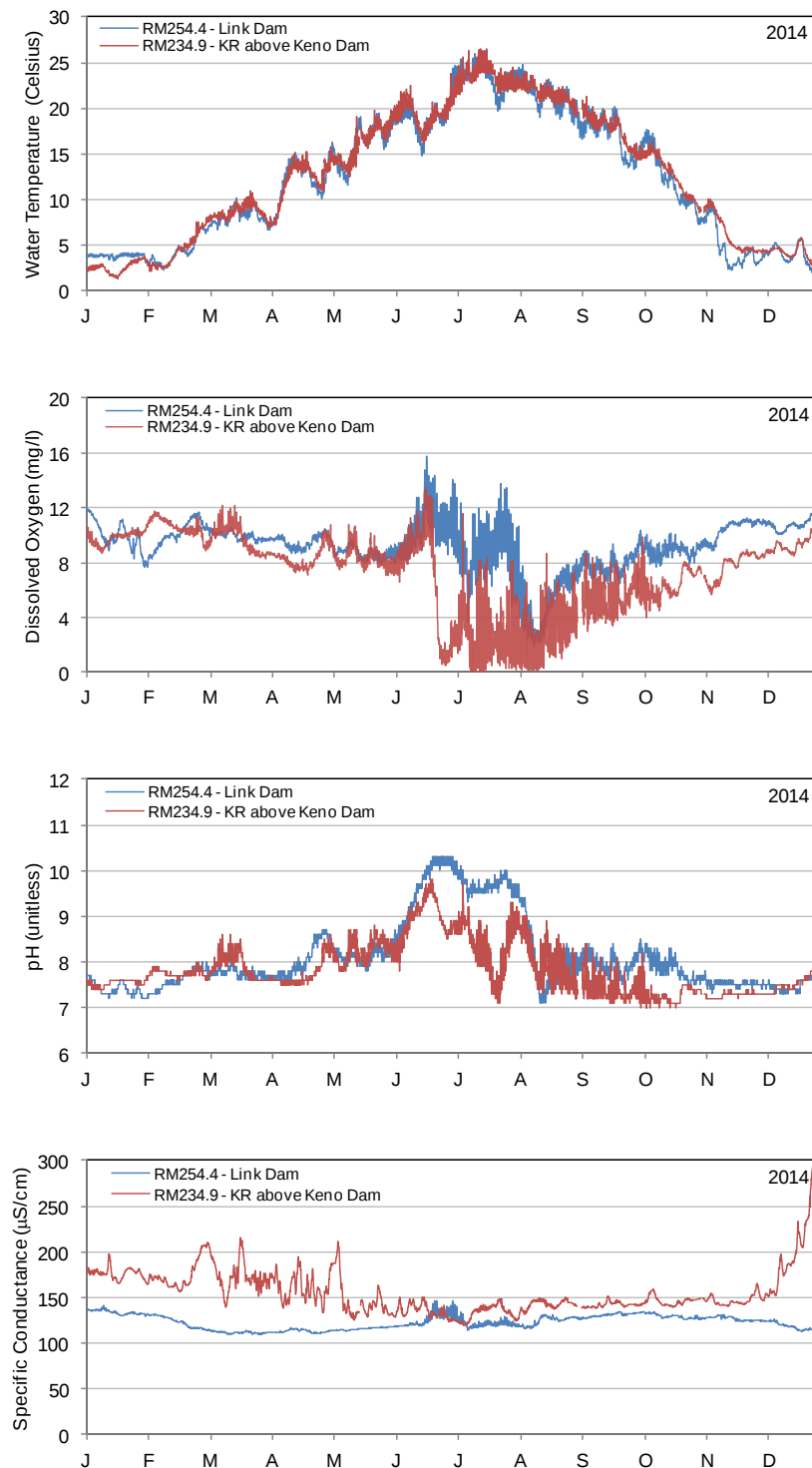


Figure 10. Continuous water temperature, dissolved oxygen, pH, specific conductance data (2014) for the upper Klamath River at Link Dam and Klamath River above Keno Dam (surface).

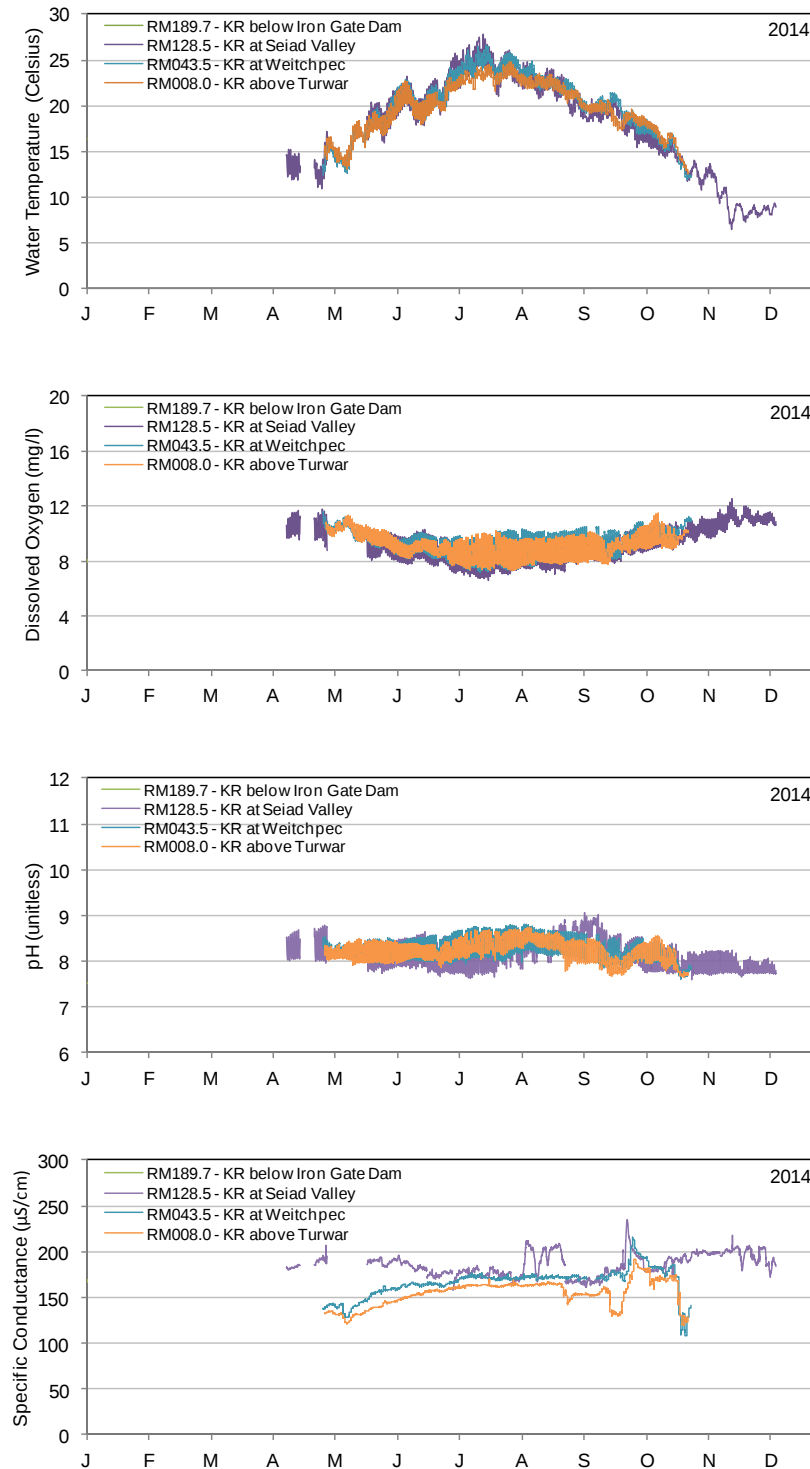


Figure 11. Continuous water temperature, dissolved oxygen, pH, specific conductance data (2014) for the lower Klamath River at Klamath River below Iron Gate Dam, Klamath River near Seiad Valley, Klamath River at Weitchpec, and Klamath River above Turwar.

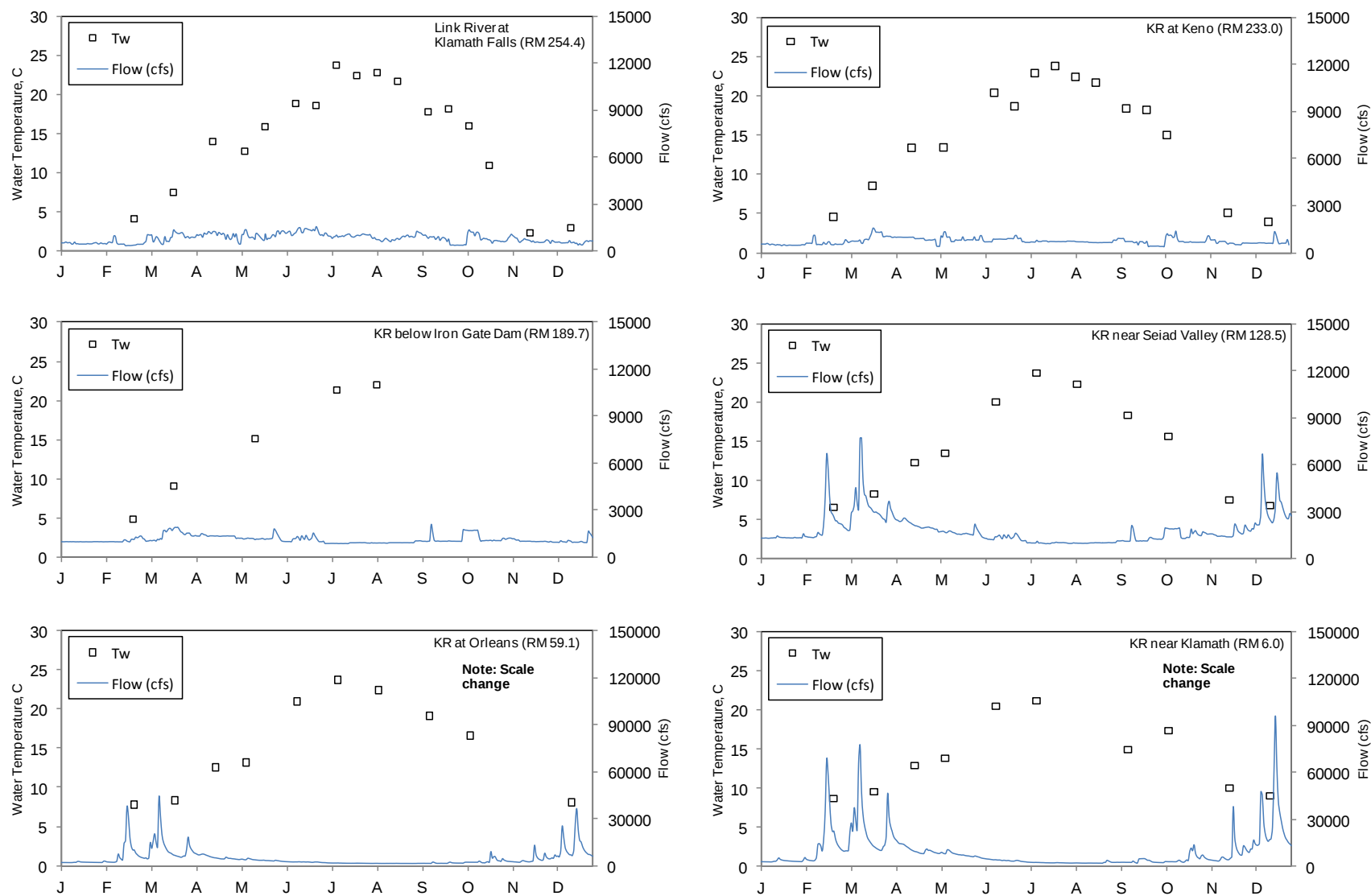


Figure 12. Water temperature (T_w) and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers. Note the scale change for the secondary y-axis at Orleans and near Klamath mouth.

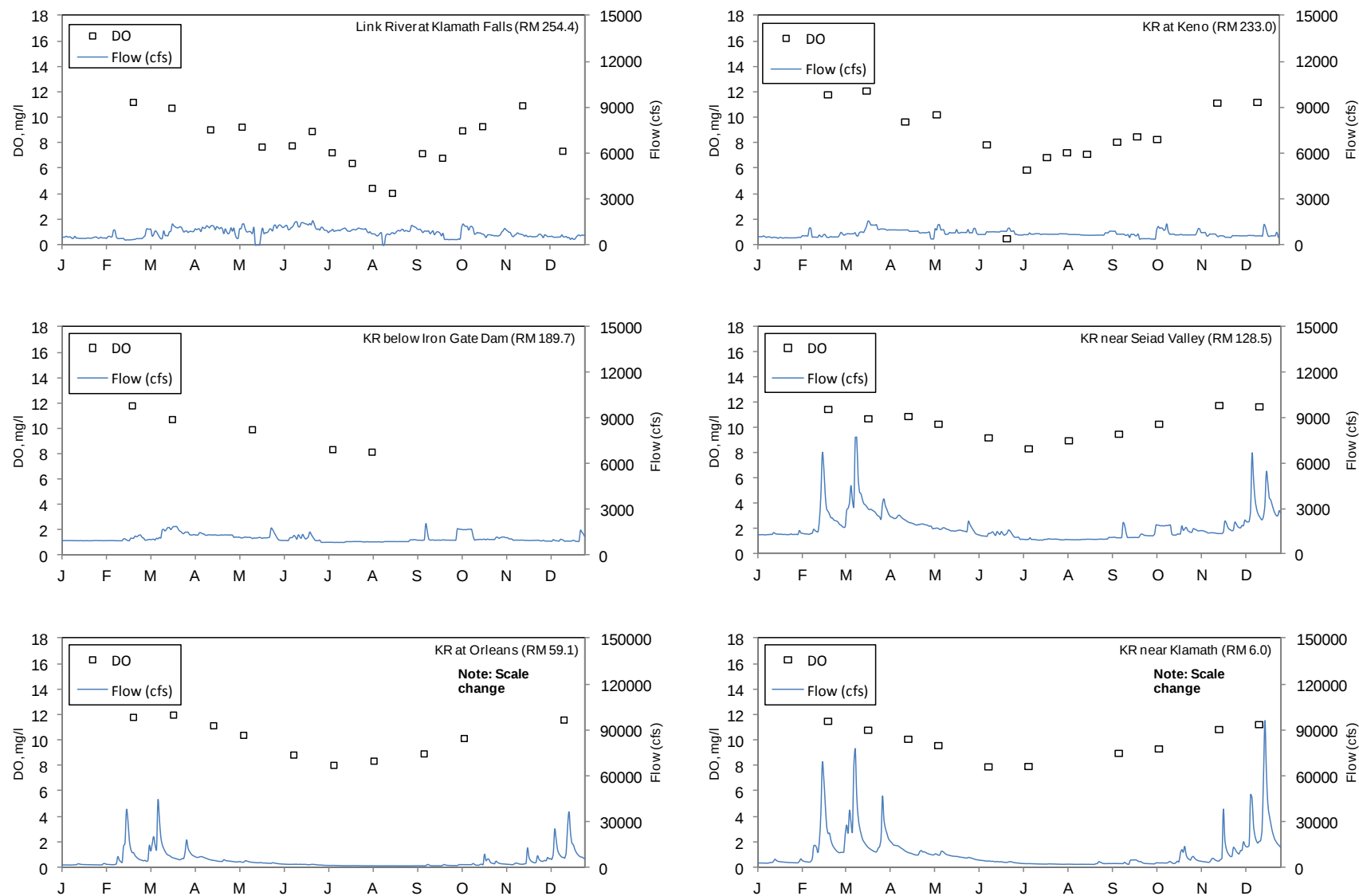


Figure 13. Dissolved oxygen (DO) and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers. Note the scale change for the secondary y-axis at Orleans and near Klamath mouth.

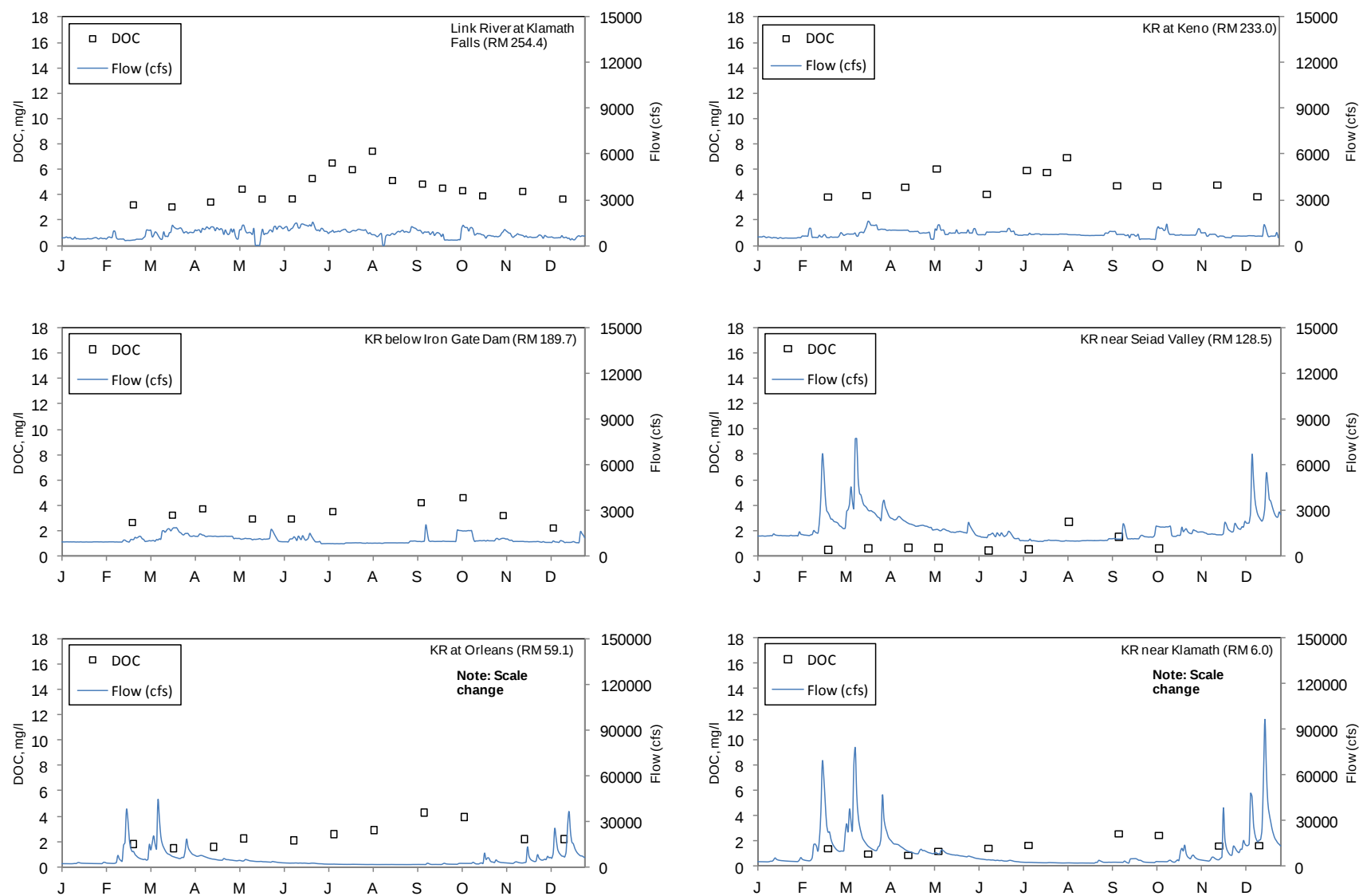


Figure 14. Dissolved organic carbon (DOC) and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers. Note the scale change for the secondary y-axis at Orleans and near Klamath mouth.

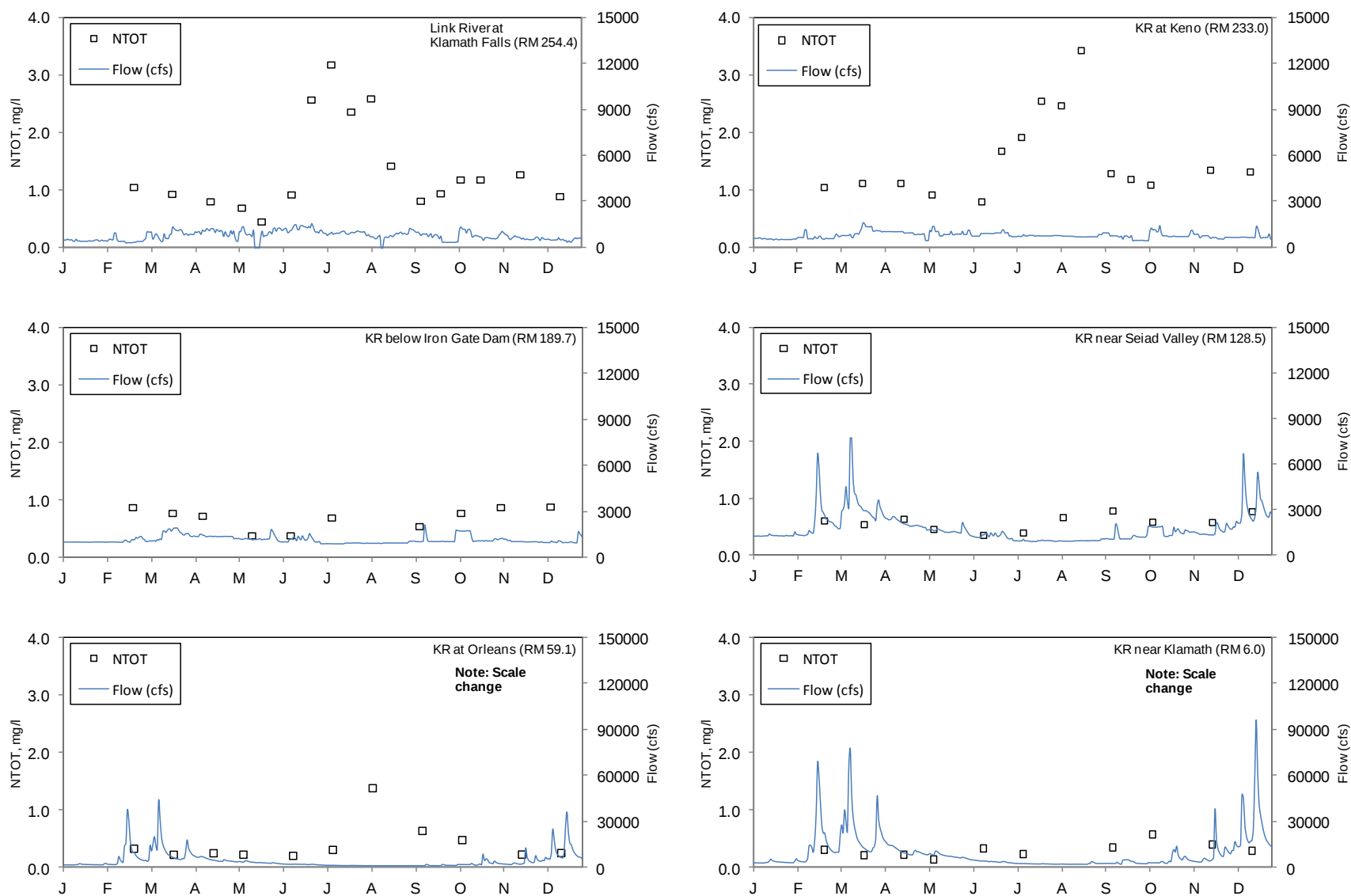


Figure 15. Total nitrogen (NTOT) and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers. Note the scale change for the secondary y-axis at Orleans and near Klamath mouth.

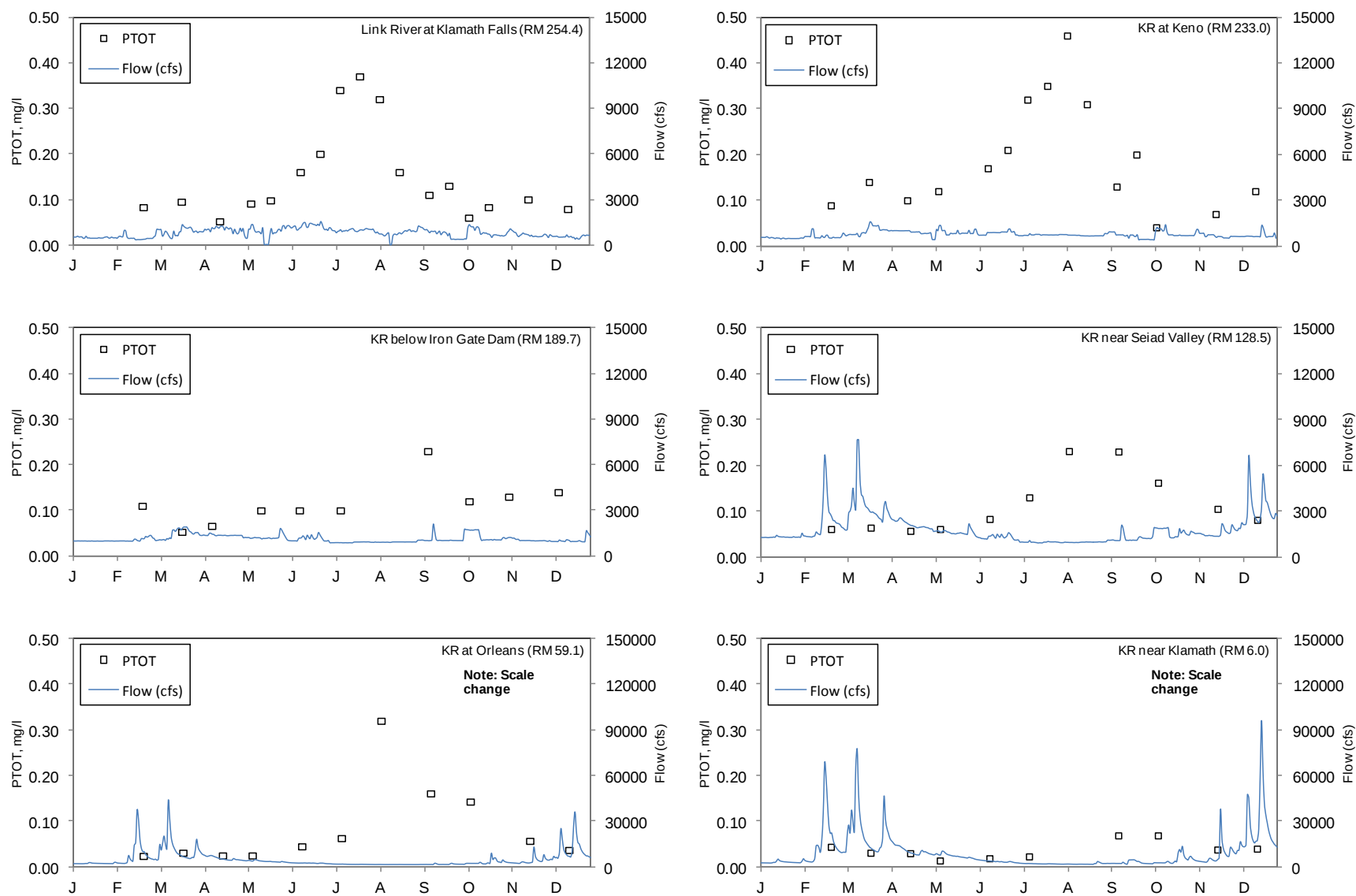


Figure 16. Total phosphorus (PTOT) and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers. Note the scale change for the secondary y-axis at Orleans and Klamath.

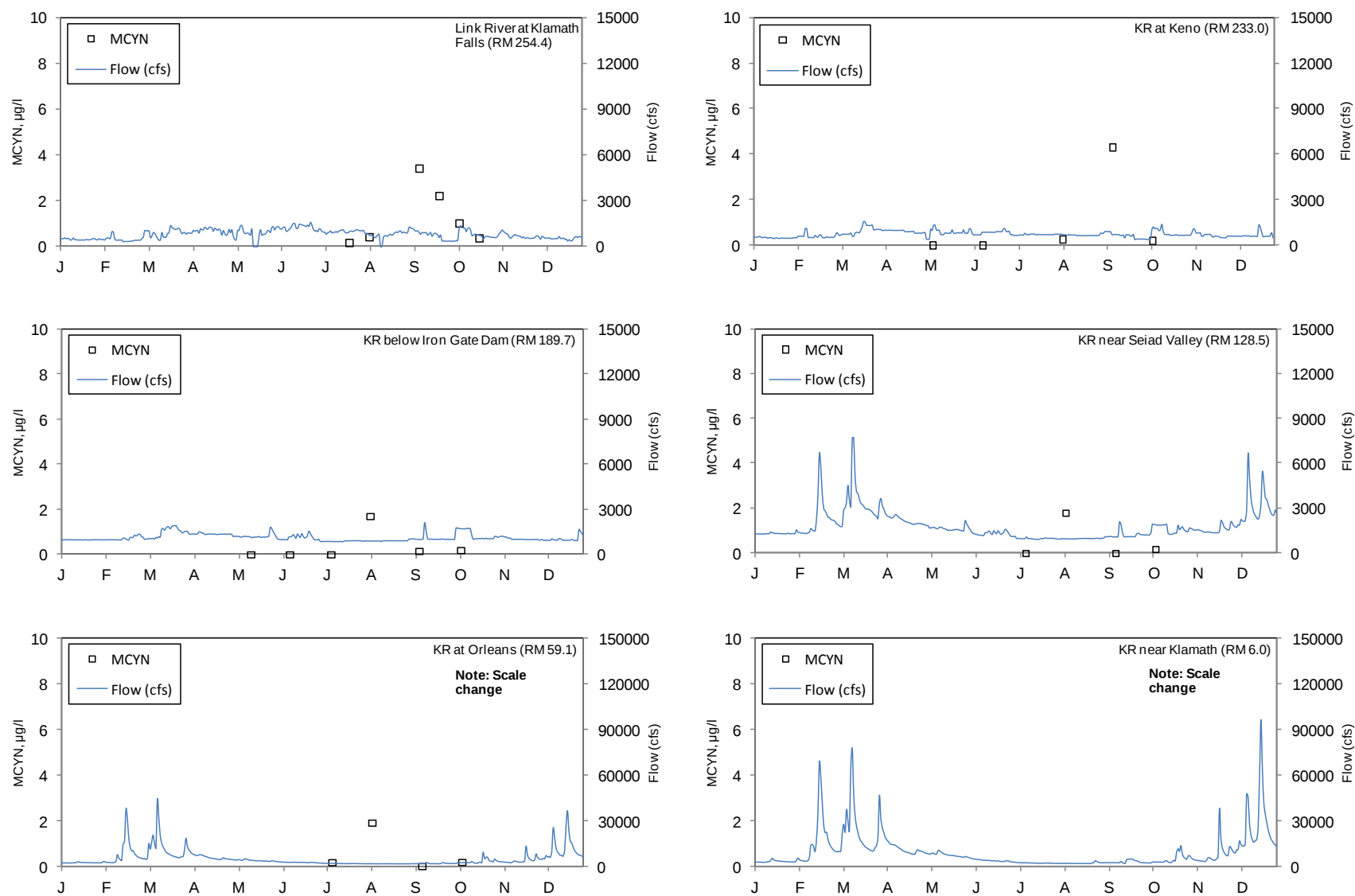


Figure 17. Microcystin (MCYN) and daily flow at USGS flow gage locations for the mainstem Klamath and Link Rivers. Only surface samples are taken in consideration. Non-detect values are presented as zeros. Note the scale change for the secondary y-axis at Orleans and Klamath.

3. Summary

The KHSA IM15 baseline water quality sampling program is an interagency cooperative effort to characterize water quality conditions in the Klamath Basin in support of ongoing and future measures pertaining to restoration, dam removal studies, public health, and other factors. The program was successfully implemented in 2010 and has been on-going. Quality assurance measures have been incorporated into the process and final data sets are available to all interested parties (<http://kbmp.net/>). Planning and monitoring effort has laid the groundwork for continued cooperation and quality data collection in the Klamath River basin. The 2014 KHSA Interim Measure 15 Monitoring Plan is available on the KBMP website.

4. References

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

United States Bureau of Reclamation (USBR). 2009. Standard Operating Procedures for Quality Assurance. Revision 2009-05. Prepared by Environmental Monitoring Branch. May.

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

Personal Communications

Kathy McKinley, CH2MHill Applied Sciences Laboratory. Mar 31, 2015.

Appendix A. Site Locations and Data Summary

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

Table A-1. 2014 Klamath River mainstem and major tributaries sampling locations.

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

Appendix B. Data Summary

The complete data set for the 2014 KHSa baseline sampling is presented. The four sampling entities are United States Bureau of Reclamation (USBR), PacifiCorp, the Karuk Tribe, and the Yurok Tribe.

Table B-1. 2014 Klamath River Data Summary (Mainstem).

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	C	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Phosphytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Nitrogen, Particulate Nitrogen	Demand, Chemical Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate-Nitrite	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Organic Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
2014KHSa-001	2/19/14	9:30	254.4	Link Dam	USBR	0.5	R	4.21	7.73	118	11.22	13.06	4.05	51.8	3.24	2.80	0.432	1.9j	-	0.300	0.68	1.05	0.0034j	0.083	0.0203	0.0077	17.7	17.40	3.4j	ug/l
2014KHSa-007	3/18/14	8:15	254.4	Link Dam	USBR	0.5	R	7.57	7.99	110	10.76	17.20	5.74	46	3.08	2.84	0.456	1.7j	0.018j	0.056	0.88	0.93	0.0026j	0.095	0.0344	0.0063	28.8	47.60	4.8j	
2014KHSa-013	4/14/14	9:20	254.4	Link Dam	USBR	0.5	R	14.07	7.84	114	9.06	9.70	3.33	48.1	3.46	1.60	0.294	2.4	0.038j	0.100		0.8	0.012	0.052	0.0184	0.0102	14.8	9.80	2.4j	
2014KHSa-019	5/6/14	9:00	254.4	Link Dam	USBR	0.5	R	12.83	7.79	113	9.27	11.77	2.63	48	4.48	2.36	0.306	2.0	-	0.007j		0.69	0.044	0.091	0.0331	0.0205	15.1	22.80	5.60	
2014KHSa-025	5/20/14	8:00	254.4	Link Dam	USBR	0.5	R	15.96	7.92	115	7.71	8.66	1.76	51.1	3.7	0.89	0.128		0.027j	0.0094j		0.45	0.058	0.098	0.0311	0.0099	9.8	7.40	2.4j	
2014KHSa-029	6/10/14	9:30	254.4	Link Dam	USBR	0.5	R	18.92	8.77	117	7.8	26.22	2.07	55.4	3.71	2.15	0.364	9.0	0.038j	0.0063j		0.92	0.063	0.16	0.0636	0.019	12.7	18.80	6.20	
2014KHSa-035	6/24/14	8:30	254.4	Link Dam	USBR	0.5	R	18.66	10.27	130	8.93	272.90	8.36	50.5	5.32	13.30	2.750	26.4	0.140	0.013	3.33	2.57	0.26	0.2	0.0975	0.0774	26.1	23.40	13.40	
2014KHSa-040	7/8/14	7:15	254.4	Link Dam	USBR	0.5	R	23.81	9.75	121	7.26	186.45	0.09	50.4	6.54	9.81	1.920	15.9	0.080	0.013		3.18	0.16	0.34	0.0743	0.0313	21.7	21.30	16.00	
2014KHSa-046	7/22/14	8:30	254.4	Link Dam	USBR	0.5	R	22.48	9.52	117	6.42	136.19	0.09	50.9	6.02	6.44	1.320	18.5	0.080	0.018		2.36	0.17	0.37	0.0788	0.047	38.3	19.20	12.40	0.15
2014KHSa-051	8/5/14	9:00	254.4	Link Dam	USBR	0.5	R	22.86	9.32	115	4.46	90.93	0.28	52.7	7.47	5.12	1.100	20.1	0.200	0.075		2.59	0.15	0.32	0.0626	0.0302	14.0	18.20	7.60	0.40
2014KHSa-057	8/19/14	9:40	254.4	Link Dam	USBR	0.5	R	21.75	7.37	128	4.07	12.92	2.27	54.8	5.16	0.12	0.025	1.6j	0.120	0.370		1.42	0.01	0.16	0.0161	0.0063	12.2	7.20	2j	
2014KHSa-062	9/9/14	9:15	254.4	Link Dam	USBR	0.5	R	17.86	8.16	129	7.19	9.88	2.89	52.9	4.88	1.83	0.288	4.1	0.058	0.012		0.81	0.029	0.11	0.022	0.0156	16.5	14.00	2.8j	3.40
2014KHSa-068	9/23/14	10:00	254.4	Link Dam	USBR	0.5	R	18.23	7.58	135	6.83	8.82	2.25	53.6	4.56	1.25	0.195	1.9j	0.090	0.0094j		0.94	0.029	0.13	0.0194	0.0026	8.4	7.20	2.8j	2.20
2014KHSa-073	10/7/14	10:20	254.4	Link Dam	USBR	0.5	R	16.06	8.14	132	8.98	24.97	1.97	54.9	4.36	2.21	0.398	5.8	0.067	0.035		1.18	0.016	0.06	0.0266	0.0157	8.3	6.60	2.6j	1.00
2014KHSa-079	10/21/14	10:20	254.4	Link Dam	USBR	0.5	R	11.02	7.82	128	9.31	34.29	2.08	57.3	3.95	2.97	0.579		0.059	0.110		1.18	0.021	0.083	0.0605	0.0364	9.3	8.60	4.6j	0.35
2014KHSa-083	11/18/14	9:30	254.4	Link Dam	USBR	0.5	R	2.41	7.29	127	10.95	16.90	5.77	54.8	4.3	2.96	0.431	2.7	0.190	0.290		1.27	0.012	0.1	0.0264	0.0062	38.2	68.00	5.30	
2014KHSa-089	12/16/14	10:00	254.4	Link Dam	USBR	0.5	R	3.06	7.38	117	7.38	21.29	5.75	49.9	3.7	2.97	0.473	4.1	0.110	0.400	1.14	0.89	0.0061j	0.079	0.0446	0.0099	37.8	63.30	6.70	
2014KHSa-004	2/19/14	11:10	246	Miller Island	USBR	0.5	R	5.28	7.81	194	10.41	11.51	4.09	81.5	3.45	1.14	0.165	1.7j	0.120	0.400	0.76	0.95	0.072	0.14			13.4	7.80	2.2j	
2014KHSa-010	3/18/14	10:00	246	Miller Island	USBR	0.5	R	8.09	8.09	133	11.1	26.44	4.17	52.3	2.8	1.81	0.304	1.7j	0.028j	0.110	0.97	1	0.0072j	0.12			15.4	14.00	1.8j	
2014KHSa-016	4/14/14	6:40	246	Miller Island	USBR	0.5	R	13.61	7.36	119	8.5	13.00	4.08	48.5	3.33	1.31	0.214	2.1	0.076	0.120		0.84	0.027	0.054			18.8	14.00	2.2j	
2014KHSa-022	5/6/14	10:10	246	Miller Island	USBR	0.5	R	14.21	8.11	120	9.3	15.54	2.88	49.5	4.09	1.22	0.175	4.2	0.006	0.013		0.64	0.058	0.093			10.1	9.80	2.2j	-
2014KHSa-032	6/10/14	10:10	246	Miller Island	USBR	0.5	R	20	9.05	123	10.51	60.10	0.09	54.8	3.72	3.59	0.660	14.1	0.036j	0.0031j		1.09	0.078	0.19			7.5	11.80	7.20	-
2014KHSa-043	7/8/14	8:40	246	Miller Island	USBR	0.5	R	23.82	9.19	128	2.48	161.53	4.42	54.4	6.51	10.70	2.270	13.6	0.690	0.0061j		4.17	0.21	0.44			14.3	25.10	19.70	

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophylla	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Nitrogen, Particulate Nitrogen	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate-Nitrite	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Organic Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin	
Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	ppm	ppm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	NTU	mg/l	mg/l		
2014KHSA-054	8/5/14	7:00	246	Miller Island	USBR	0.5	R	23.35	8.59	138	2.78	24.20	5.49	58.3	7.97	5.72	1.310	9.3	1.480	0.010		4	0.23	0.53			11.8	12.00	8.00	0.32	
2014KHSA-065	9/9/14	10:40	246	Miller Island	USBR	0.5	R	19.51	7.39	133	5.65	27.47	6.57	53.4	5.13	2.40	0.416	3.0	0.033j	0.086		0.98	0.015	0.1			15.7	13.40	4j	6.30	
2014KHSA-076	10/7/14	11:55	246	Miller Island	USBR	0.5	R	16.85	8.57	154	11.45	35.89	10.31	59.2	4.79	3.21	0.536	6.3	0.02i	0.0035i		1.16	0.0027i	0.05			8.1	10.00	5.00	1.10	
2014KHSA-086	11/18/14	11:40	246	Miller Island	USBR	0.5	R	4.2	7.08	140	8.76	11.95	4.53	56.7	5.1	1.76	0.272	1.9	0.260	0.400		1.39	0.026	0.092			26.8	31.70	2.8j		
2014KHSA-092	12/16/14	12:10	246	Miller Island	USBR	0.5	R	4.06	7.54	198	10.12	25.99	6.45	79.3	3.67	1.96	0.321	2.4	0.180	0.460	1.1	1.22	0.04	0.093			21.4	23.90	3j		
2014KHSA-005	2/19/14	8:30	233.4	Keno Dam	USBR	0.5	R	4.61	7.45	165	11.81	14.86	5.99	62.1	3.86	1.07	0.166	2.2	0.016i	0.380	0.74	1.05	0.03	0.089	0.0218	0.0045	15.9	9.00	1.8j		
2014KHSA-011	3/18/14	7:25	233.4	Keno Dam	USBR	0.5	R	8.57	8.19	177	12.11	33.92	7.55	68.6	3.97	2.19	0.388	6.7	0.019j	0.056	1.14	1.12	0.013	0.14	0.0424	0.0113	19.8	11.40	3.2j		
2014KHSA-017	4/14/14	7:30	233.4	Keno Dam	USBR	0.5	R	13.42	7.61	173	9.68	11.09	5.77	65.8	4.63	1.52	0.207	4.8	0.180	0.140		1.12	0.054	0.1	0.031	0.0103	26.1	23.60	4j		
2014KHSA-023	5/6/14	7:10	233.4	Keno Dam	USBR	0.5	R	13.47	7.55	192	10.24	11.70	4.99	66	6.07	1.48	0.212	1.3j	0.027j	0.017		0.92	0.073	0.12	0.0265	0.0129	12.8	15.00	3.8j	-	
2014KHSA-033	6/10/14	7:00	233.4	Keno Dam	USBR	0.5	R	20.45	8.79	129	7.88	16.66	0.92	56.5	4.07	1.40	0.274	4.0	0.065	0.009j		0.8	0.099	0.17	0.0235	0.0112	6.9	4.6j	2.8j	-	
2014KHSA-038	6/24/14	6:35	233.4	Keno Dam	USBR	0.5	R	18.72	9.21	133	6.29			57.3				12.2	0.250	0.023	1.76	1.68	0.1	0.21			10.3				
2014KHSA-044	7/8/14	6:30	233.4	Keno Dam	USBR	0.5	R	22.95	9.12	122	5.9	36.02	1.98	52.4	5.95	2.59	0.583	4.2	0.460	0.017		1.92	0.23	0.32	0.0328	0.0444	4.9	5.00	3j		
2014KHSA-049	7/22/14	7:30	233.4	Keno Dam	USBR	0.5	R	23.86	7.96	140	6.88			60.7	5.79			7.4	1.100	0.018		2.55	0.18	0.35			4.9				
2014KHSA-055	8/5/14	8:00	233.4	Keno Dam	USBR	0.5	R	22.47	8.7	125	7.26	55.90	3.22	54.1	6.96	3.37	0.735	8.9	0.650	0.013		2.47	0.29	0.46	0.0596	0.023	9.2	9.60	7.00	0.26	
2014KHSA-060	8/19/14	8:10	233.4	Keno Dam	USBR	0.5	R	21.74	7.14	144	7.14			61.1				12.7	1.290	0.030		3.43	0.11	0.31			8.2	6.80	2j		
2014KHSA-066	9/9/14	7:55	233.4	Keno Dam	USBR	0.5	R	18.44	7.4	140	8.09	33.80	17.24	56.2	4.74	2.50	0.451	3.0	0.120	0.043		1.29	0.013	0.13	0.0491	0.0378	18.1	16.00	5.60	4.30	
2014KHSA-071	9/23/14	8:30	233.4	Keno Dam	USBR	0.5	R	18.26	7.3	145	8.51			57.9				2.3	0.110	0.010		1.19	0.011	0.2			11.0	7.60			
2014KHSA-077	10/7/14	8:10	233.4	Keno Dam	USBR	0.5	R	15.05	7.07	143	8.3	19.67	14.90	55.9	4.73	2.10	0.342	-	0.062	0.026		1.09	0.0062i	0.041i	0.0365	0.0167	11.0	10.20	3.2i	0.20	
2014KHSA-087	11/18/14	8:35	233.4	Keno Dam	USBR	0.5	R	5.13	6.97	136	11.16	8.92	4.83	53.9	4.8	1.52	0.219	0.9j	0.130	0.460		1.35	0.031	0.07	0.0166	0.004	20.6	15.60	2.4j		
2014KHSA-093	12/16/14	8:50	233.4	Keno Dam	USBR	0.5	R	3.97	7.18	169	11.22	19.74	6.06	59.5	3.88	1.74	0.292	2.4	0.100	0.510	1.47	1.32	0.03	0.12	0.0312	0.014	22.3	19.70	3.4j		
KR14002	2/17/14	14:40	KR228.2	Above JCB reservoir	PacifiCorp	0.5	R	5.49	7.48	162	10.83	5.15	5.33	58.0	3.67	0.82	0.118		0.041i	0.480		1.25	0.061	0.110				6.00	0.8j		
KR14022	3/19/14	13:25	KR228.2	Above JCB reservoir	PacifiCorp	0.5	R	9.58	8.52	222	9.83	9.59	12.62	83.1	4.66	1.33	0.183		0.077	0.094		1.320	0.160	0.044j				27.10	7.70		
KR14042	4/7/14	16:30	KR228.2	Above JCB reservoir	PacifiCorp	0.5	R					4.87	5.23	63.1	5.01	2.19	0.238		0.150	0.320		1.190	0.099	0.100			25.0	26.00	2.9j		
KR14062	5/12/14	16:15	KR228.2	Above JCB reservoir	PacifiCorp	0.5	R	17.37	8.1	150	8.56	3.38	3.22	55	5.68	0.713	0.097		0.097	0.110		0.820	0.110	0.150				12.60	2.8j		
KR14085	6/17/14		KR228.2	Above JCB reservoir	PacifiCorp	0.5	R	17.49	8.9	147	8.13	3.11	2.65			0.88	0.128														
KR14108	7/7/14	17:30	KR228.2	Above JCB reservoir	PacifiCorp	0.5	R	24.86	8.01	130	6.53	1.19	1.51	47.2	5.85	0.301	0.040		0.097	0.870		2.41	0.29	0.29				6.00	2.4j		
KR14177	10/6/14	10:25	KR228.2	Above JCB reservoir	PacifiCorp	0.5	R	13.41	7.82	141	9.15	11.86	12.68	55.4	4.68	1.08	0.158		0.037j	0.290		1.06	0.043	0.072				12.00	1.8j		
KR14199	11/18/14	15:50	KR228.2	Above JCB reservoir	PacifiCorp	0.5	R	5.57		113	11.35	5.91	4.06	54.1	5.2	0.817	0.126		0.085	0.580		1.33	0.055	0.092				16.50	2.3j		
KR14219	12/4/14	13:15	KR228.2	Above JCB reservoir	PacifiCorp	0.5	R	4.98	7.8	118	7.8	DNP	DNP	55.8	5	1.1	0.171		0.082	0.640		1.43	0.047	0.16				17.20	4.2j		

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophylla	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Nitrogen, Particulate Nitrogen	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate-Nitrite	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Organic Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	ppm	ppm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	NTU	mg/l	mg/l		
KR14064	5/12/14	17:35	KR226.0	JCB reservoir	PacifiCorp	0.5	R	17.40	8.13	145	9.14																			-
KR14086	6/17/14	17:30	KR226.0	JCB reservoir	PacifiCorp	0.5	R	17.57	8.88	145	8.68	1.66	1.52	58.4	5.19	0.482	0.068		0.064	0.120		1.040	0.120	0.200				9.40	4.4j	0.28
KR14109	7/7/14	15:50	KR226.0	JCB reservoir	PacifiCorp	0.5	R	26.87	8.15	132	7.51	1.11	1.70			0.531	0.069													-
KR14155	9/9/14	14:40	KR226.0	JCB reservoir	PacifiCorp	0.5	R	19.40	8.10	140	7.66	6.58	7.11	54.8	5.76	0.915	0.122		0.063	0.290		1.350	0.065	0.180				14.20	3.6j	2.00
KR14178	10/6/14	11:15	KR226.0	JCB reservoir	PacifiCorp	0.5	R	14.73	8.41	141	9.75	15.31	10.65			1.14	0.184													0.19
KR14200	11/18/14	14:25	KR226.0	JCB reservoir	PacifiCorp	0.5	R	WSE	WSE	WSE	WSE	5.27	3.70	54.7	5.60	0.594	0.096		0.064	0.500		1.090	0.053	0.080				11.30	2j	
KR14001	2/17/14	15:30	KR224.0	KR bel JCB Dam	PacifiCorp	0.5	R	4.26	7.03	144.10	11.46	3.01	3.89	53.0	3.57	0.105	0.730		0.060	0.400		1.140	0.053	0.120				5.00	1.00	
KR14021	3/19/14	12:20	KR224.0	KR bel JCB Dam	PacifiCorp	0.5	R	8.95	8.42	183.50	10.35	1.73	4.79	65.3	4.79	0.128	0.965		0.069	0.140		1.060	0.097	0.042				9.60	2.00	
KR14041	4/7/14	17:00	KR224.0	KR bel JCB Dam	PacifiCorp	0.5	R	11.31	7.92	163.80	9.21	2.75	5.62	67.4	6.33	0.214	2.070		0.170	0.330		1.380	0.110	0.100				25.60	3.20	
KR14061	5/12/14	19:05	KR224.0	KR bel JCB Dam	PacifiCorp	0.5	R	14.62	8.01	144.10	9.04	2.78	4.11	54.8	7.69	0.129	0.801		0.110	0.092		0.750	0.110	0.190				9.00	1.60	
KR14084	6/17/14	18:55	KR224.0	KR bel JCB Dam	PacifiCorp	0.5	R	17.64	8.75	145.40	8.36	1.43	1.89	60.2	4.80	0.101	0.772		0.130	0.110		0.840	0.140	0.190				8.20	2.40	
KR14107	7/7/14	16:40	KR224.0	KR bel JCB Dam	PacifiCorp	0.5	R	23.82	7.87	132.10	7.21	0.42	2.26	49.1	5.79	0.0702	0.603		0.220	0.850		2.490	0.270	0.270				2.00	0.60	
KR14130			KR224.0	KR bel JCB Dam	PacifiCorp	0.5	R																							
KR14153	9/9/14	13:00	KR224.0	KR bel JCB Dam	PacifiCorp	0.5	R					3.82	6.21	56.2	5.22	0.145	1.010		0.120	0.270		1.270	0.078	0.170				9.40	3.80	
KR14176	10/6/14	12:45	KR224.0	KR bel JCB Dam	PacifiCorp	0.5	R	14.71	8.20	140.90	9.22	7.50	10.13	56.3	4.64	0.144	0.947		0.097	0.260		1.190	0.055	0.040				7.20	1.20	
KR14198	11/18/14	15:10	KR224.0	KR bel JCB Dam	PacifiCorp	0.5	R	4.57	-	114.60	11.91	4.44	4.19	55.8	5.10	0.168	0.992		0.089	0.540		1.300	0.056	0.083				12.60	1.40	
KR14218	12/4/14	12:35	KR224.0	KR bel JCB Dam	PacifiCorp	0.5	R	4.53	7.87	118.84	11.83			56.6	5.60	1.1	0.162		0.110	0.600		1.320	0.054	0.130				18.40	4.70	
KR14003	2/17/14	16:20	KR220.0	Spring Island	PacifiCorp	0.5	R	5.66	7.12	144	11.08	3.34	3.37	55.2	2.94	0.562	0.081		0.070	0.350		0.890	0.050	0.078			8.5	3.6j	0.6j	
KR14023	3/19/14	12:50	KR220.0	Spring Island	PacifiCorp	0.5	R	9.42	8.60	179	10.5	2.66	3.91	64.8	4.23	0.571	0.077		0.047j	0.150		0.950	0.120	0.042			9.2	8.60	1.6j	
KR14043	4/7/14	15:15	KR220.0	Spring Island	PacifiCorp	0.5	R	10.56	8.02	176	9.74	3.58	4.64	57.9	4.69	1.78	0.203		0.150	0.330		1.330	0.100	0.130				30.40	3.2j	
KR14063	5/12/14	18:30	KR220.0	Spring Island	PacifiCorp	0.5	R	18.26	8.05	144	9.10	5.41	4.10	56	4.38	0.753	0.106		0.058	0.100		0.660	0.093	0.140			9.1	8.80	1.6j	0.18
KR14087	6/17/14	18:20	KR220.0	Spring Island	PacifiCorp	0.5	R					2.19	1.84	61.1	4.53	0.413	0.058		0.130	0.120		0.78	0.12	0.19			6.9	4.6j	1.6j	-
KR14110	7/7/14	15:15	KR220.0	Spring Island	PacifiCorp	0.5	R	23.22	7.68	132	6.83	1.33	1.71	49.7	5.79	0.557	0.075		0.150	0.860		2.25	0.26	0.26			3.3	3j	1j	-
KR14156	9/9/14	12:40	KR220.0	Spring Island	PacifiCorp	0.5	R	18.27	7.89	140	8.42	5.46	6.84	56	5.19	0.868	0.120		0.070	0.250		1.09	0.071	0.2				8.60	2.6j	
KR14179	10/6/14	12:10	KR220.0	Spring Island	PacifiCorp	0.5	R	13.86	8.3	140	9.49			60.2	3.71				0.047j	0.250		0.88	0.051	0.06			7.1	5.20	0.8j	0.15
KR14220	12/4/14	11:20	KR220.0	Spring Island	PacifiCorp	0.5	R	5.28	7.81	117	10.56	DNP	DNP	64.2	1.2	0.525	0.078		0.082	0.640		1.43	0.047	0.16				17.20	4.2j	
KR14008	2/18/14	9:30	KR206.4	Abv Shovel creek	PacifiCorp	0.5	R	5.49	7.6	149	11.6	2.48	2.87	59.3	2.59	0.36	0.054	1.1j	-	0.390		0.97	0.054	0.08	0.0071	0.0021	7.0	3.4j	0.6j	
KR14028	3/19/14	10:25	KR206.4	Abv Shovel creek	PacifiCorp	0.5	R					1.88	2.60	61.7	3.61	0.436	0.058	3.9	0.054	0.220		0.85	0.12	0.043j	0.0087	0.003	11.0	5.60	1.4j	
KR14048	4/8/14	11:15	KR206.4	Abv Shovel creek	PacifiCorp	0.5	R	10.45	8.47	164	10.44	2.88	3.41	66.2	3.09	0.951	0.102	7.2	0.032j	0.390		0.78	0.086	0.082	0.0204	0.0057	13.0	15.60	2.2j	

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophylla	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Nitrogen, Particulate Nitrogen	Demand, Chemical Oxygen Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate-Nitrite	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Organic Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	ppm	ppm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	NTU	mg/l	mg/l	
KR14069	5/13/14	12:35	KR206.4	Abv Shovel creek	PacifiCorp	0.5	R					1.35	1.70	60	3.1	0.329	0.051		0.037j	0.130		0.54	0.079	0.12	0.0111	0.0049	7.1	6.40	0.8j	0.16
KR14092	6/10/14	0.458	KR206.4	Abv Shovel creek	PacifiCorp	0.5	R	15.55	8.62	149	10.26	2.46	0.75	62.4	3.28	0.361	0.047	2.9	0.039j	0.085		0.55	0.11	0.17			6.7	1.8j	1.4j	-
KR14105	6/24/14	12:30	KR206.4	Abv Shovel creek	PacifiCorp	0.5	R							63.9				3.1	0.033j	0.270		0.670	0.084	0.110				4j	1j	
KR14115	7/8/14	11:15	KR206.4	Abv Shovel creek	PacifiCorp	0.5	R	21.14	8.44	140	8.75	1.45	155	54.0	3.96	0.472	0.067	2.9	0.003j	0.940		1.840	0.220	0.220			2.6	2.8j	1j	-
KR14128	7/17/14	16:40	KR206.4	Abv Shovel creek	PacifiCorp	0.5	R	20.33	8.38	145	8.51							6.1	0.006j	0.780		1.310	0.230	0.170						
KR14151	8/19/14	10:40	KR206.4	Abv Shovel creek	PacifiCorp	0.5	R	20.46	8.03	136	9.94							8.9	0.064	1.710		2.590	0.250	0.300						
KR14161	9/8/14	13:05	KR206.4	Abv Shovel creek	PacifiCorp	0.5	R					2.70	2.98		3.13	0.394	0.055	2.9	-	0.270		0.510	0.065	0.110	0.008	0.007	3.9			1.20
KR14175	9/22/14	17:50	KR206.4	Abv Shovel creek	PacifiCorp	0.5	R	18.45	8.31	146	8.47							3.2	0.029	0.330		1.050	0.064	0.130				6.80	0.8j	
KR14184	10/6/14	13:10	KR206.4	Abv Shovel creek	PacifiCorp	0.5	R	13.18	8.56	143	10.37	3.74	3.19	63.1	2.01	0.408	0.058	4.9	-	0.210		0.49	0.054	0.041j	0.0097	0.0024	4.4	3.6j	1.8j	-
KR14205	11/3/14	17:20	KR206.4	Abv Shovel creek	PacifiCorp	0.5	R	10.03		111	10.4	1.77	236	60	3.57	0.597	0.084	3.3	0.02j	0.390		0.86	0.067	0.092	0.0062	0.0025	9.1	5.60	4.4j	
KR14225	12/9/14	10:00	KR206.4	Abv Shovel creek	PacifiCorp	0.5	R	7.06		119	11.43	DNP	DNP	64.2	1.2	0.623	0.088	-	0.066	0.450		0.72	0.053	0.096			8.2	5.60	1j	
KR14010	2/18/14	10:50	KR199.0	Copco 0.5 m grab	PacifiCorp	0.5	R	5.46	8.11	167	10.67	3.27	2.58	64.3	2.7	0.458	0.069		0.170	0.380		0.87	0.044	0.076				2.4j	0.6j	
KR14012	2/18/14	11:10	KR199.0	Copco 1.0 m from bottom	PacifiCorp	30	R					2.10	2.21	66	2.83	0.468	0.064		0.055	0.390		0.89	0.047	0.087				2.4j	0.6j	
KR14011	2/18/14	11:30	KR199.0	Copco Thermocline	PacifiCorp	15	R					2.97	2.58	64.0	2.81	0.451	0.067		0.290	0.370		0.780	0.046	0.083				2.6j	2.6j	
KR14030	3/18/14	15:40	KR199.0	Copco 0.5 m grab	PacifiCorp	0.5	R	9.77	8.19	168	10	0.71	1.09	65.0	3.30	0.25	0.037		0.085	0.270		0.790	0.110	0.053				1.8j	0.2j	
KR14032	3/18/14	16:00	KR199.0	Copco 1.0 m from bottom	PacifiCorp	25	R					1.16	1.98	63.9	2.77	0.0403	0.049		0.150	0.340		0.950	0.100	0.069				2.8j	1j	
KR14031	3/18/14	16:15	KR199.0	Copco Thermocline	PacifiCorp	13	R					0.74	1.17	65.7	3.03	0.297	0.041		0.060	0.290		0.790	0.093	0.055				2j	-	
KR14050	4/8/14	13:25	KR199.0	Copco 0.5 m grab	PacifiCorp	0.5	R	12.74	8.23	172	9.5	1.13	1.44	63.6	4.28	0.414	0.056		0.075	0.340		0.930	0.072	0.089				2.4j	0.2j	
KR14052	4/8/14	13:35	KR199.0	Copco 1.0 m from bottom	PacifiCorp	29	R							64.3	3.13				0.160	0.390		0.97	0.11	0.16				3.2j	0.8j	
KR14051	4/8/14	13:45	KR199.0	Copco Thermocline	PacifiCorp	8	R					0.74	0.92	61.6	3.86	0.322	0.037		0.086	0.330		0.89	0.071	0.073				1.6j	-	
KR14071	5/20/14	16:00	KR199.0	Copco 0.5 m grab	PacifiCorp	0.5	R	18.04	9	161	11.84	3.63	2.01	61.5	2.72	0.658	0.085		0.027j	0.0026j		0.44	0.066	0.086				6.80	2.4j	0.18
KR14073	5/20/14	16:15	KR199.0	Copco 1.0 m from bottom	PacifiCorp	29	R							63.1	2.8				0.050	0.540		0.89	0.13	0.11				4.8j	1.6j	
KR14072	5/20/14	16:30	KR199.0	Copco Thermocline	PacifiCorp	14	R					0.86	0.89	61.4	3.03	0.819	0.084		0.047j	0.340		0.69	0.099	0.1				4j	0.2j	
KR14094	6/9/14	12:50	KR199.0	Copco 0.5 m grab	PacifiCorp	0.5	R					0.53	0.71	61.7	3.40	0.184	0.022	9.4	0.015j	0.003		0.480	0.095	0.140				2.6j	1.8j	0.15
KR14096	6/9/14	13:15	KR199.0	Copco 1.0 m from bottom	PacifiCorp	30	R							64.5	2.92				0.080	0.490		0.900	0.120	0.140				4j	1.4j	
KR14095	6/9/14	13:30	KR199.0	Copco Thermocline	PacifiCorp	14	R							61.8	3.02			3.4	0.037j	0.200		0.530	0.120	0.150				1j	-	-
KR14117	7/9/14	13:30	KR199.0	Copco 0.5 m grab	PacifiCorp	0.5	R					1.54	0.65	57.8	3.98	0.584	0.084		0.027j	0.590		1.440	0.160	0.160				0.6j	0.4j	0.28
KR14118	7/9/14	14:05	KR199.0	Copco Thermocline	PacifiCorp	15	R					0.58	0.79	62.5	3.78	0.244	0.042		-	0.390		0.840	0.160	0.160				0.6j	0.6j	-
KR14119	7/9/14	14:15	KR199.0	Copco 1.0 m from bottom	PacifiCorp	28	R					0.47	0.79	66.9	3.34	0.36	0.057		0.180	0.350		0.950	0.210	0.210				3.6j	1j	

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Nitrogen, Particulate Nitrogen	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate-Nitrite	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Organic Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	ppm	ppm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	NTU	mg/l	mg/l	
KR14140	8/13/14	12:40	KR199.0	Copco 0.5 m grab	PacifiCorp	0.5	R					30.40	1.39	64.6	9.71	3.22	0.446		-	0.005		1.770	0.150	0.230				8.20	5.80	0.52
KR14142	8/13/14	13:00	KR199.0	Copco 1.0 m from bottom	PacifiCorp		R							66.6	3.98				-	0.610		1	0.14	0.18				3.2j	0.2j	
KR14141	8/13/14	13:30	KR199.0	Copco Thermocline	PacifiCorp		R					3.27	0.75	61.5	5.51	0.846	0.119		0.076	0.340		0.77	0.17	0.21				3.6j	0.8j	
KR14163	9/23/14	10:15	KR199.0	Copco 0.5 m grab	PacifiCorp	0.5	R					19.12	1.81	61.2	4.31	3.06	0.524		0.050	0.062		1.2	0.094	0.16				5.20	5.40	4.60
KR14165	9/23/14	10:30	KR199.0	Copco 1.0 m from bottom	PacifiCorp	29	R							77.4	3.71				0.760	0.011		1.19	0.6	0.7				6.80	2.8j	
KR14164	9/23/14	10:50	KR199.0	Copco Thermocline	PacifiCorp	15	R					13.74	1.16	62.8	4.31	1.19	0.196		0.046j	0.059		0.79	0.093	15				6.20	7.00	
KR14186	10/20/14	18:25	KR199.0	Copco 0.5 m grab	PacifiCorp	0.5	R	18.79	9.21	143	9.51	2.11	0.83	62.9	3.66	0.334	0.053		0.140	0.170		0.75	0.071	0.006j				1j	-	0.15
KR14207	11/4/14	9:40	KR199.0	Copco 0.5 m grab	PacifiCorp	0.5	R	11.7		114	8.24	8.56	0.99	64.2	3.24	0.604	0.099		0.150	0.280		1.05	0.083	0.11				5.00	3.6j	
KR14013	2/18/14	12:15	KR195.0	Below Copco 2	PacifiCorp	0.5	R	5.28	8.22	169	10.69	2.99	2.24	65.2	2.67	0.449	0.063		0.023j	0.390		0.84	0.047	0.087				2.8j	0.8j	
KR14053	4/8/14	14:55	KR195.0	Below Copco 2	PacifiCorp	0.5	R	11.24	8.16	175	9.23	0.91	1.20	62.8	3.89	0.391	0.047		0.084	0.340		0.92	0.11	0.096				3j	1j	
KR14074	5/20/14	15:20	KR195.0	Below Copco 2	PacifiCorp	0.5	R	16.18	8.49	168	8.88	2.01	1.23	62.3	3.00	0.296	0.040		0.034j	0.097		0.470	0.079	0.093				3.6j	0.8j	-
KR14097	6/9/14	14:45	KR195.0	Below Copco 2	PacifiCorp	0.5	R	19.15	8.4	157	8.2	2.95	1.56	60.9	2.99	0.339	0.051		0.02j	0.051		0.380	0.100	0.160				1.6j	1.2j	-
KR14120	7/9/14	15:00	KR195.0	Below Copco 2	PacifiCorp	0.5	R	21.26	8.06	154	6.7	0.78	0.60	57.7	3.76	0.445	0.074		0.053	0.500		1.140	0.150	0.150				1.2j	0.6j	0.15
KR14166	9/23/14	9:20	KR195.0	Below Copco 2	PacifiCorp	0.5	R	17.61	8.56	146	7.67	1.20	1.24	62.1	4.68	0.413	0.045		0.069	0.190		0.740	0.110	0.150				2.2j	2.2j	0.20
KR14189	10/7/14	9:15	KR195.0	Below Copco 2	PacifiCorp	0.5	R	15.71	8.07	149	7.3	1.17	1.29	63.3	3.96	0.449	0.066		0.084	0.230		0.800	0.100	0.070				2.4j	0.4j	0.19
KR14210	11/4/14	10:30	KR195.0	Below Copco 2	PacifiCorp	0.5	R	11.43		121	8.65	0.97	1.28	61.2	3.93	0.323	0.049		0.150	0.310		0.890	0.076	0.095				3j	2j	
KR14230	12/9/14	11:00	KR195.0	Below Copco 2	PacifiCorp	0.5	R	6.07	7.60	121	10.41	DNP	DNP	60.1	2.20	0.414	0.056		0.150	0.480		0.900	0.048	0.120				4.4j	0.8j	
KR14015	2/18/14	13:10	KR19019	Iron Gate 0.5 m grab	PacifiCorp	0.5	R	5.62	8.06	170	10.59	0.66	0.68	66.1	2.50	0.329	0.049		0.063	0.410		0.860	0.047	0.098				2i	1i	
KR14017	2/18/14	13:25	KR19019	Iron Gate 1.0 m from bottom	PacifiCorp	40	R					0.91	1.02	64.2	2.76	0.3	0.037		0.045j	0.450		0.870	0.050	0.083				1j	-	
KR14016	2/18/14	13:40	KR19019	Iron Gate Thermocline	PacifiCorp	21	R					1.13	0.93	65.6	2.48	0.26	0.036		0.053	0.450		0.830	0.049	0.089				0.6j	1.2j	
KR14035	3/18/14	12:50	KR19019	Iron Gate 0.5 m grab	PacifiCorp	0.5	R	9.03	7.82	165	10.01	0.42	0.66	67.0	3.15	0.324	0.050		0.038j	0.350		0.790	0.900	0.051				0.4j	1j	
KR14037	3/18/14	13:10	KR19019	Iron Gate 1.0 m from bottom	PacifiCorp	45	R					0.64	1.14	68.1	2.88	0.345	0.043		0.072	0.550		1.260	0.110	0.078				1.8j	2.6j	
KR14036	3/18/14	13:25	KR19019	Iron Gate Thermocline	PacifiCorp	24	R					0.53	0.81	66.8	3.04	0.12	0.038		0.0044j	0.470		0.850	0.054	0.048				1.4j	0.6j	
KR14055	4/8/14	15:45	KR19019	Iron Gate 0.5 m grab	PacifiCorp	0.5	R	13.59	8.34	177	9.78	0.44	0.56	65.9	3.47	0.234	0.033		0.027j	0.260		0.740	0.053	0.068				3j	1.4j	
KR14057	4/8/14	16:00	KR19019	Iron Gate 1.0 m from bottom	PacifiCorp	44	R							64.8	3.31				0.031j	0.560		0.950	0.079	0.082				2.8j	-	
KR14056	4/8/14	16:10	KR19019	Iron Gate Thermocline	PacifiCorp	3	R					0.40	0.48	65.6	3.56				0.042j	0.260		0.740	0.053	0.079				1j	0.2j	
KR14077	5/20/14	13:10	KR19019	Iron Gate 0.5 m grab	PacifiCorp	0.5	R	18.95	8.9	169	11.58	1.10	1.60	63.1	2.96	0.274	0.030		0.031j	0.0035j		0.460	0.035	0.050				5.40	2.2j	0.19
KR14079	5/20/14	13:30	KR19019	Iron Gate 1.0 m from bottom	PacifiCorp	45	R							65.3	2.00				0.021j	0.580		0.760	0.072	0.050				3j	2.8j	
KR14078	5/20/14	13:40	KR19019	Iron Gate Thermocline	PacifiCorp	15	R					1.01	1.07	62.1	2.46	0.322	0.031		0.021j	0.430		0.7	0.072	0.091				2.4j	1.4j	

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophylla	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Nitrogen, Particulate Nitrogen	Demand, Chemical Oxygen Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate-Nitrite	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Organic Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	ppm	ppm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	NTU	mg/l	mg/l	
KR14099	6/18/14	13:05	KR19019	Iron Gate 0.5 m grab	PacifiCorp	0.5	R	21.03	8.53	159	8.59	0.21	0.31	63.4	3.69	0.156	0.023		0.018j	0.0025j		0.52	0.079	0.11				2.8j	1j	0.16
KR14100	6/18/14	13:15	KR19019	Iron Gate Thermocline	PacifiCorp	10	R					3.35	0.93	65.5	3.03	0.133	0.021		0.019j	0.062		0.36	0.083	0.12				2.2j	0.8j	-
KR14101	6/18/14	13:30	KR19019	Iron Gate 1.0 m from bottom	PacifiCorp	44	R							67	2.46				0.025j	0.560		1.03	0.1	0.12				2j	0.2j	
KR14122	7/9/14	10:45	KR19019	Iron Gate 0.5 m grab	PacifiCorp	0.5	R	25.27	8.97	157	8.72	1.81	0.45	63.5	4.43	0.391	0.065		0.011j	0.010		0.53	0.072	0.072				0.2j	0.4j	0.51
KR14124	7/9/14	10:55	KR19019	Iron Gate 1.0 m from bottom	PacifiCorp	45	R							67.4	3.45				0.088	0.580		1.13	0.16	0.16			6.7	2.6j	0.6j	
KR14123	7/9/14	11:05	KR19019	Iron Gate Thermocline	PacifiCorp	13	R					0.80	0.57	62.6	3.08	0.402	0.070		0.012j	0.190		0.59	0.11	0.11				1.2j	1j	-
KR14168	9/8/14	10:00	KR19019	Iron Gate 0.5 m grab	PacifiCorp	0.5	R							63.4	5.51				-	-		2.9	0.16	0.43				37.60	32.80	0.35
KR14191	10/20/14	16:35	KR19019	Iron Gate 0.5 m grab	PacifiCorp	0.5	R					3.32	0.93	65	3.69	0.454	0.068		0.180	0.180		0.77	0.11	0.009j				2.4j	1j	-
KR14212	11/4/14	11:55	KR19019	Iron Gate 0.5 m grab	PacifiCorp	0.5	R	13.03		126	6.84	3.97	1.40	64.4	3.29	0.269	0.039		0.210	0.210		0.89	0.11	0.13				1.8j	1.2j	
KR14007	2/18/14	15:00	KR18973	Hatchery bridge	PacifiCorp	0.5	R	4.96	8.04	175	11.81	0.93	0.96	66.3	2.73	0.0401	0.283	1.1j	0.030	0.430		0.87	0.049	0.11			6.6	1.4j	1j	
KR14027	3/18/14	14:15	KR18973	Hatchery bridge	PacifiCorp	0.5	R	9.19	8.35	169	10.73	0.37	0.83	66.9	3.31	0.0401	0.271	0.8j	0.035	0.350		0.77	0.11	0.053	0.0044	0.0024	6.2	3.4j	0.6j	
KR14047	4/8/14	17:10	KR18973	Hatchery bridge	PacifiCorp	0.5	R					0.75	0.81	64.9	3.81	0.0301	0.219	0.9j	0.021	0.280		0.72	0.054	0.066	0.0043	0.0024	5.6	1j	-	
KR14068	5/13/14	10:30	KR18973	Hatchery bridge	PacifiCorp	0.5	R	15.24	8.55	166	9.93	1.74	3.22	63.3	3.78	0.0803	0.592	5.8	0.057	0.130		0.78	0.037	0.085	0.0119	0.003	7.2	6.40	1.4j	-
KR14083	5/26/14	11:40	KR18973	Hatchery bridge	PacifiCorp	0.5	R					1.83	2.63	65	3.07	0.0368	0.272		0.045	0.140		0.46	0.055	0.14			4.9	3.2j	0.8j	
KR14091	6/9/14	15:25	KR18973	Hatchery bridge	PacifiCorp	0.5	R					0.57	1.06	64	3.01	0.058	0.432	3.8	0.021	0.035		0.38	0.062	0.1			4.1	1.4j	1.2j	-
KR14106	6/24/14	11:05	KR18973	Hatchery bridge	PacifiCorp	0.5	R	19.96	8.63	163	9.35	0.79	1.45	63.4	3.36	0.029	0.198	2.5	0.018	0.037		0.48	0.091	0.12			3.1	2j	0.6j	
KR14114	7/8/14	13:35	KR18973	Hatchery bridge	PacifiCorp	0.5	R	21.45	8.25	155	8.36	0.98	0.53	62.2	3.59	0.0301	0.220	3.2	0.044	0.150		0.69	0.1	0.1			1.7	1.2j	1.2j	-
KR14129	7/17/14	18:30	KR18973	Hatchery bridge	PacifiCorp	0.5	R	18.42	8.53	151	7.88	4.81	1.73	59.9	3.44	0.141	0.844	5.2	0.023	0.240		0.59	0.13	0.17			2.4	2.8j	1.6j	1.20
KR14137	8/5/14		KR18973	Hatchery bridge	PacifiCorp	0.5	R	22.11	8.76	143	8.16	18.16	1.96			0.213	1.400								0.0212	0.0074				1.70
KR14152	8/19/14	12:45	KR18973	Hatchery bridge	PacifiCorp	0.5	R		9.27	141	9.25	14.37	1.10		4.66	0.262	1.690	4.6	0.046	0.033		1.68	0.18	0.25				6.60	4.6j	
KR14160	9/8/14	7:05	KR18973	Hatchery bridge	PacifiCorp	0.5	R					4.34	1.13		4.29	0.1	0.925	7.0	0.019	0.066		0.54	0.17	0.23	0.0062	0.0057	2.3			0.15
KR14174	9/22/14	16:40	KR18973	Hatchery bridge	PacifiCorp	0.5	R	16.46	9.12	142	9.65	4.60	0.76	62.1	4.76	0.098	0.705	9.5	0.025	0.068		0.66	0.14	0.2				3.6j	1.2j	0.17
KR14183	10/7/14	11:45	KR18973	Hatchery bridge	PacifiCorp	0.5	R					2.54	1.47	64.2	4.69	0.0646	0.418	4.3	0.096	0.180		0.77	0.12	0.12	0.0071	0.004	3.1	2j	1.6j	0.19
KR14197	10/20/14	15:00	KR18973	Hatchery bridge	PacifiCorp	0.5	R					1.64	0.84	65.9	3.52	0.0798	0.424		0.160	0.200		0.76	0.11	0.069			2.2	4.4j	0.2j	-
KR14204	11/4/14	12:45	KR18973	Hatchery bridge	PacifiCorp	0.5	R					2.79	1.19	66.4	3.28	0.0416	0.338	0.8j	0.160	0.260		0.87	0.11	0.13	0.0053	0.0047	3.7	2.8j	2.4j	
KR14224	12/9/14	12:00	KR18973	Hatchery bridge	PacifiCorp	0.5	R							61.6	2.3	0.414	0.063	0.1j	0.130	0.480		0.88	0.063	0.14			4.7	2.2j	-	
WA021914-OC	2/19/14	11:59	KR156.0	KR at Walker Bridge	Karuk	0.5	R	6.21	8.23	217	11.63	2.10	3.10		3.92	0.833			0.015	0.396		0.911	0.055	0.077				5.60	1.40	
WA031914-OC	3/19/14	11:56	KR156.0	KR at Walker Bridge	Karuk	0.5	R	8.20	8.20	196	10.81	1.60	4.80		3.29	0.686			<0.010	0.293		0.797	0.058	0.085				3.70	1.00	
WA041614-OC	4/16/14	12:03	KR156.0	KR at Walker Bridge	Karuk	0.5	R	12.80	8.29	188	10.79	2.10	5.30		3.74	0.732			0.013	0.257		0.979	0.053	0.080				4.30	1.80	

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae Chlorophylla	Algae Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Nitrogen, Particulate Nitrogen	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate-Nitrite	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Organic Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	ppm	ppm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	NTU	mg/l	mg/l	
WA050714-OC	5/7/14	11:33	KR156.0	KR at Walker Bridge	Karuk	0.5	R					11.00	9.50		4.22	0.778			0.023	0.193		0.703	0.050	0.095				6.50	2.00	
WA061114-OC	6/11/14	11:47	KR156.0	KR at Walker Bridge	Karuk	0.5	R	20.09	8.48	176	9.55	1.10	2.70		3.65	0.503			0.013	0.027		0.367	0.075	0.098				4.50	2.00	
WA070914-OC	7/9/14	12:24	KR156.0	KR at Walker Bridge	Karuk	0.5	R	23.24	8.31	160	9.13	1.10	1.50		3.94	0.386			<0.010	0.119		0.545	0.125	0.142			1.9	2.80	1.00	0.16
WA080614-OC	8/6/14	12:15	KR156.0	KR at Walker Bridge	Karuk	0.5	R					16.00	3.80		4.39	2.7			<0.010	0.047		0.719	0.183	0.264			4.5	8.00	5.50	1.10
WA091014-OC	9/10/14	11:17	KR156.0	KR at Walker Bridge	Karuk	0.5	R	19.53	9.39	162	9.08	9.90	4.70		6.11	2.06			0.019	0.018		0.886	0.186	0.252			3.0	8.70	4.70	-
WA100814-OC	10/8/14	11:42	KR156.0	KR at Walker Bridge	Karuk	0.5	R	15.70	8.32	173	10.09	1.90	3.20		4.73	0.633			0.030	0.210		0.68	0.138	0.171				6.30	2.80	
WA111914-OC	11/19/14	13:27	KR156.0	KR at Walker Bridge	Karuk	0.5	R	8.71	8.25	196	11.44	1.60	3.30		3.53	0.58			0.027	0.368		0.703	0.108	0.132				2.60	1.00	
WA121714-OC	12/17/14	12:18	KR156.0	KR at Walker Bridge	Karuk	0.5	R	6.99	8.11	229	11.71	1.30	2.00		3.71	0.724			0.022	0.506		1.07	0.08	0.114			4.0	5.00	1.50	
SV021914-OC	2/19/14	10:54	KR128.5	KR below Seiad Valley	Karuk	0.5	R	6.62	8.09	176	11.49	2.10	3.10		3.290	0.48	0.049	<2.00	<0.010	0.276		0.609	0.033	0.062	0.017	0.014	4.5	23.00	2.60	
SV031914-OC	3/19/14	10:55	KR128.5	KR below Seiad Valley	Karuk	0.5	R	8.33	8.15	181	10.75	2.10	3.50		2.79	0.597	0.070	<2.00	<0.010	0.252		0.544	0.037	0.065	0.012	0.004	4.6	6.20	1.50	
SV041614-OC	4/16/14	10:52	KR128.5	KR below Seiad Valley	Karuk	0.5	R	12.33	8.28	186	10.93	2.10	3.80	83.8	2.88	0.651	0.069	<2.00	0.010	0.161		0.639	0.035	0.058	0.012	0.005	4.1	4.00	1.50	
SV050714-OC	5/7/14	10:27	KR128.5	KR below Seiad Valley	Karuk	0.5	R	13.53	8.42	188	10.32	8.50	6.40		3.09	0.639	0.097	<2.00	<0.010	0.081		0.460	0.030	0.062	0.019	0.008	4.6	16.00	2.50	
SV061114-OC	6/11/14	10:42	KR128.5	KR below Seiad Valley	Karuk	0.5	R	20.08	8.37	183	9.24	1.10	1.90		3.48	0.432	0.058	<2.00	<0.010	0.030		0.356	0.062	0.084	0.011	0.002	4.5	4.00	1.30	
SV070914-OC	7/9/14	10:40	KR128.5	KR below Seiad Valley	Karuk	0.5	R	23.77	8.14	173	8.37	<0.1	1.90		3.95	0.526	0.073		<0.010	<0.010		0.398	0.116	0.131	0.011	0.003	1.5	2.00	1.00	-
SV080614-OC	8/6/14	10:50	KR128.5	KR below Seiad Valley	Karuk	0.5	R	22.34	8.37	168	9.01	15.00	4.70		3.94	2.69	0.423		0.011	0.025		0.667	0.182	0.232	0.033	0.013	4.4	8.50	5.50	1.80
SV091014-OC	9/10/14	10:12	KR128.5	KR below Seiad Valley	Karuk	0.5	R	18.37	8.94	167	9.53	4.80	3.00		5.45	1.51	0.250		0.011	0.024		0.783	0.183	0.231	0.027	0.011	2.4	28.00	4.00	-
SV100814-OC	10/8/14	10:11	KR128.5	KR below Seiad Valley	Karuk	0.5	R	15.68	8.26	178	10.32	2.10	3.70	84.3	4.82	0.593	0.071	<2.00	0.012	0.185		0.587	0.136	0.163	0.012	0.003	2.4	6.70	2.30	0.18
SV111914-OC	11/19/14	11:11	KR128.5	KR below Seiad Valley	Karuk	0.5	R	7.57	8.23	203	11.80	1.60	5.90		3.21	0.523		<2.00	<0.010	0.297		0.581	0.090	0.106	0.009	0.005	2.4	2.60	0.87	
SV121714-OC	12/17/14	11:11	KR128.5	KR below Seiad Valley	Karuk	0.5	R	6.85	8.04	204	11.70	1.30	1.80		3.05	0.551			0.015	0.383		0.771	0.052	0.082	0.017	0.015	3.8	13.00	1.70	
HC021914-OC	2/19/14	10:17	KR106.0	KR below Happy Camp	Karuk	0.5	R	6.85	8.02	145	11.52	1.10	3.00		8.21	0.506			<0.010	0.193		0.382	0.024	0.038				4.50	1.20	
HC031914-OC	3/19/14	10:18	KR106.0	KR below Happy Camp	Karuk	0.5	R	8.01	8.09	169	11.07	1.60	4.00		2.34	0.598			<0.010	0.192		0.511	0.033	0.055				7.00	1.80	
HC041614-OC	4/16/14	10:09	KR106.0	KR below Happy Camp	Karuk	0.5	R	12.28	8.10	172	10.59	1.90	5.00		2.57	0.666			<0.010	0.081		0.403	0.023	0.042				3.80	1.40	
HC050714-OC	5/7/14	9:40	KR106.0	KR below Happy Camp	Karuk	0.5	R	13.25	8.21	179	9.75	4.30	6.20		2.81	0.679			<0.010	0.052		0.484	0.026	0.053				6.00	2.80	
HC061114-OC	6/11/14	9:31	KR106.0	KR below Happy Camp	Karuk	0.5	R	20.36	8.14	184	8.80	1.10	2.30		2.97	0.462			0.015	0.022		0.306	0.055	0.080				3.30	1.80	
HC070914-OC	7/9/14	9:31	KR106.0	KR below Happy Camp	Karuk	0.5	R	23.01	7.90	174	8.15	<0.1	1.5		3.49	0.415			<0.010	<0.010		0.344	0.102	0.109		0.8	1.30	1.00	0.18	
HC080614-OC	8/6/14	9:51	KR106.0	KR below Happy Camp	Karuk	0.5	R	21.83	8.12	171	8.66	18.00	6.50		3.95	3.57			<0.010	0.011		0.609	0.139	0.243		5.0	10.00	4.50	1.80	
HC100814-OC	10/8/14	9:20	KR106.0	KR below Happy Camp	Karuk	0.5	R	14.47	8.46	153	10.43	4.00	4.60		4.56	0.548			0.016	0.147		0.603	0.133	0.176				13.00	4.00	0.16
HC111914-OC	11/19/14	10:28	KR106.0	KR below Happy Camp	Karuk	0.5	R	6.94	8.12	198	11.86	5.10	4.50		3.02	0.712			<0.010	0.229		0.54	0.069	0.094				7.30	2.30	
HC121714-OC	12/17/14	10:21	KR106.0	KR below Hapov Camp	Karuk	0.5	R	7.35	8.05	185	11.6	1.10	2.20		2.81	0.65			<0.010	0.275		0.612	0.038	0.059				5.60	1.40	

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Nitrogen, Particulate Nitrogen	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate-Nitrite	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Organic Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	ppm	ppm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	NTU	mg/l	mg/l	
OR021914-OC	2/19/14	9:00	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	7.80	7.98	108	11.82	1.60	2.10	54	1.82	0.617			<0.010	0.096		0.328	0.013	0.025			3.9	9.80	1.80	
OR031914-OC	3/19/14	8:55	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	8.35		137	12	1.10	1.90	65.7	1.49	0.336			<0.010	0.112		0.222	0.019	0.032			2.7	5.00	1.30	
OR041614-OC	4/16/14	8:52	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	12.56	8.13	137	11.16	1.10	2.30		1.6	0.445			<0.010	0.016		0.249	0.01	0.026			1.6	1.80	0.67	
OR050714-OC	5/7/14	8:06	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	13.18	8.33	137	10.41	3.20	3.90	68.4	2.26	0.384			<0.010	0.011		0.224	0.008	0.026			2.1	3.20	1.30	
OR061114-OC	6/11/14	7:53	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	20.97	8.18	166	8.86	<0.1	3.70	76	2.11	0.312			0.012	0.018		0.204	0.036	0.046			2.2	4.00	1.60	
OR070914-OC	7/9/14	7:58	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	23.72	8.01	164	8.05	0.80	1.30	81.7	2.6	0.338			<0.010	<0.010		0.307	0.059	0.064			0.5	1.20	0.67	0.17
OR080614-OC	8/6/14	8:03	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	22.41	8.27	169	8.38	33.00	22.00	76.7	2.92	7.71			<0.010	0.013		1.38	0.095	0.321			8.1	71.00	17.00	1.90
OR091014-OC	9/10/14	8:00	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	19.13	8.38	172	8.95	3.70	3.60	77.6	4.3	1.47			<0.010	<0.010		0.637	0.128	0.162			0.9	6.50	3.30	-
OR100814-OC	10/8/14	7:55	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	16.61	8.39	180	10.16	2.90	3.00		3.95	0.5			0.013	0.115		0.478	0.111	0.144			2.4	7.50	3.30	0.18
OR111914-OC	11/19/14	9:05	KR059.1	KR at Orleans (USGS)	Karuk	0.5	R					2.90	4.20	80	2.21	0.463			<0.010	0.124		0.226	0.044	0.058			1.5	2.10	0.63	
OR121714-OC	12/17/14		KR059.1	KR at Orleans (USGS)	Karuk	0.5	R	8.09	8.92	144	11.61	1.60	0.40	69	2.21	0.54			<0.010	0.158		0.252	0.22	0.038			2.5	3.50	0.75	
WE021419-OC	2/19/14	11:09	KR043.5	KR near Welchpec	Yurok	0.5	R	7.88	7.81	107	12.15	2.10	0.90	DNS	2.13	0.566			<0.010	0.079		0.179	0.015	0.031			4.7	12.00	1.00	
WE031419-OC	3/19/14	10:55	KR043.5	KR near Welchpec	Yurok	0.5	R	8.50	8.00	132	11.67	0.30	2.00	DNS	1.28	0.135			<0.010	0.096		0.240	0.019	0.032			2.5	3.50	0.75	
WE041614-OC	4/16/14	11:17	KR043.5	KR near Welchpec	Yurok	0.5	R	12.61	8.07	133	10.84	1.20	1.60	DNS	1.45	0.166	0.194		<0.010	0.015		0.196	0.011	0.025			1.6	1.70	0.67	
WE050714-OC	5/7/14	11:43	KR043.5	KR near Welchpec	Yurok	0.5	R	14.57	7.93	139	10.27	2.10	1.40	DNS	1.74	0.302			<0.010	<0.010		0.169	0.012	0.026			2.0	2.50	0.75	-
WE 061114-OC	6/11/14	11:34	KR043.5	KR near Welchpec	Yurok	0.5	R	21.02	8.29	163	9.16	1.87	0.75	DNS	2.12	0.406			<0.010	<0.010		0.214	0.029	0.044			2.6	3.00	1.13	-
WE 070914-OC	7/9/14	11:46	KR043.5	KR near Welchpec	Yurok	0.5	R	23.80	8.36	171	9.09	0.50	1.00	DNS	2.02	2.75			<0.010	<0.010		0.263	0.045	0.049			0.5	2.00	1.20	0.20
WE 080614-OC	8/6/14	11:19	KR043.5	KR near Welchpec	Yurok	0.5	R	22.86	8.44	170	9.52	11.00	1.40	DNS	2.63	2.4			<0.010	<0.010		0.515	0.085	0.128			4.4	8.50	7.00	1.20
WE091014-OC	9/10/14	10:54	KR043.5	KR near Welchpec	Yurok	0.5	R	19.04	8.27	168	9.78	2.70	2.00	DNS	4.46	0.686			<0.010	<0.010		0.553	0.094	0.145			0.7	2.50	1.30	-
WE100814-OC	10/8/14	11:01	KR043.5	KR near Welchpec	Yurok	0.5	R	17.05	7.99	183	9.45	2.94	3.04	DNS	3.63	0.861			0.010	0.098		0.679	0.111	0.132			2.1	5.75	2.25	0.18
WE111914-OC	11/19/14	11:07	KR043.5	KR near Welchpec	Yurok	0.5	R	DNS	DNS	DNS	DNS	1.60	1.00	DNS	2.06	0.334	0.038		<0.010	0.092		0.333	0.04	0.053			1.4	1.00	<0.50	
WE121714-OC	12/17/14	10:18	KR043.5	KR near Welchpec	Yurok	0.5	R	8.42	7.91	138	11.75	1.50	<0.1	DNS	2	0.232			<0.010	0.121		0.352	0.02	0.034			2.9	5.80	0.75	
TC021914-OC	2/19/14	10:22	KR038.5	KR below Trinity River	Yurok	0.5	R	8.09	7.78	111	11.96	1.10	2.30	DNS	2.61	0.603			<0.010	0.080		0.22	0.013	0.025			5.1	13.00	1.50	
TC031914-OC	3/19/14	10:13	KR038.5	KR below Trinity River	Yurok	0.5	R	8.95	8.04	136	11.45	0.50	1.50	DNS	1.18	0.254			<0.010	0.080		0.169	0.015	0.025			2.6	4.80	1.00	
TC041614-OC	4/16/14	10:26	KR038.5	KR below Trinity River	Yurok	0.5	R	12.93	8.00	138	10.57	2.40	1.10	DNS	1.15	0.0267	0.254		<0.010	0.014		0.144	0.008	0.020			1.5	1.80	<0.50	
TC050714-OC	5/7/14	10:17	KR038.5	KR below Trinity River	Yurok	0.5	R	14.00	8.06	139	10.17	1.30	1.70	DNS	1.35	0.296			<0.010	<0.010		0.090	0.007	0.019			2.0	2.40	0.75	-
TC 061114-OC	6/11/14	10:38	KR038.5	KR below Trinity River	Yurok	0.5	R	20.59	7.18	152	8.88	1.60	0.64	DNS	1.464	0.332			<0.010	<0.010		0.175	0.020	0.026			2.0	2.13	0.50	-
TC 070914-OC	7/9/14	10:07	KR038.5	KR below Trinity River	Yurok	0.5	R	23.80	8.27	167	8.26	1.10	1.20	DNS	1.81	0.227			<0.010	<0.010		0.220	0.032	0.034			0.5	2.00	0.50	0.15
TC 080614-OC	8/6/14	10:11	KR038.5	KR below Trinity River	Yurok	0.5	R	23.00	8.23	165	8.35	11.00	3.90	DNS	2.02	1.86			<0.010	<0.010		0.423	0.060	0.093			3.8	3.70	3.30	0.85

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophylla	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Nitrogen, Particulate Nitrogen	Demand, Chemical Oxygen Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Nitrate-Nitrite	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Organic Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	ppm	ppm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	NTU	mg/l	mg/l	
TC091014-OC	9/10/14	9:56	KR038.5	KR below Trinity River	Yurok	0.5	R	18.95	8.14	151	9.02	2.10	1.40	DNS	3.02	0.487			<0.010	<0.010		0.333	0.064	0.086			0.7	2.20	1.20	-
TC100814-OC	10/8/14	10:19	KR038.5	KR below Trinity River	Yurok	0.5	R	17.03	7.93	177	9.41	2.14	2.72	DNS	3.137	0.793			<0.010	0.074		0.332	0.083	0.101			1.5	5.00	2.00	-
TC111914-OC	11/19/14	10:14	KR038.5	KR below Trinity River	Yurok	0.5	R	DNS	DNS	DNS	DNS	1.40	0.60	DNS	1.83	0.508	0.053		<0.010	0.071		0.222	0.030	0.032			1.4	1.10	<0.50	
TC121714-OC	12/17/14	9:33	KR038.5	KR below Trinity River	Yurok	0.5	R	8.63	7.83	146	11.65	2.00	<0.1	DNS	1.8	0.792	0.061		<0.010	0.105		0.344	0.014	0.027	0.019	0.012	4.6	8.80	1.50	
TG021912-OC	2/19/14	8:22	KR006.0	KR near Klamath	Yurok	0.5	R	8.64	7.92	105	11.41	2.10	1.20	DNS	1.67	0.593	0.039		<0.010	0.126		0.230	0.013	0.029	0.012	0.009	7.5	14.00	1.60	
TG031912-OC	3/19/14	8:03	KR006.0	KR near Klamath	Yurok	0.5	R	9.65	7.95	131	10.86	0.50	1.70	DNS	1.04	0.189	0.011		<0.010	0.102		0.193	0.015	0.026	0.004	0.002	3.1	4.90	<0.50	
TG041614-OC	4/16/14	8:12	KR006.0	KR near Klamath	Yurok	0.5	R	12.95	7.87	138	10.1	6.10	4.10	DNS	0.827	0.179	2.500		<0.010	0.037		0.286	0.007	0.077	0.039	0.037	7.2	5.80	5.30	
TG050714-OC	5/7/14	8:05	KR006.0	KR near Klamath	Yurok	0.5	R	13.64	7.78	139	9.56	1.30	1.30	DNS	1.1	0.313	0.033		<0.010	0.047		0.194	0.005	0.018	0.009	0.002	1.6	1.90	0.63	0.15
TG 061114-OC	6/11/14	8:08	KR006.0	KR near Klamath	Yurok	0.5	R	18.75	7.65	160	8.12	0.53	1.15	DNS	1.37	0.204	0.037		<0.010	0.080		0.188	0.012	0.018	0.007	0.002	1.6	0.89	0.51	-
TG070914-OC	7/9/14	7:38	KR006.0	KR near Klamath	Yurok	0.5	R	20.55	7.72	168	7.07	0.50	1.90	DNS	1.58	1.34	0.184		<0.010	0.067		0.219	0.018	0.023	0.034	0.018	0.6	2.00	1.00	-
TG080614-OC	8/6/14	7:54	KR006.0	KR near Klamath	Yurok	0.5	R	20.71	7.84	170	6.95	9.10	4.40	DNS	1.57	1.68	0.242		<0.010	0.014		0.429	0.032	0.064	0.023	0.010	3.5	6.70	5.00	0.44
TG091014-OC	9/10/14	7:31	KR006.0	KR near Klamath	Yurok	0.5	R	17.94	7.87	160	7.75	5.10	4.60	DNS	2.49	1.32	0.208		<0.010	0.041		0.334	0.039	0.067	0.017	0.008	1.4	4.80	2.00	-
TG100814-OC	10/8/14	7:48	KR006.0	KR near Klamath	Yurok	0.5	R	17.50	7.97	183	8.62	6.68	2.86	DNS	2.446	0.394	0.050		<0.010	0.015		0.307	0.063	0.077	0.009	0.002	0.7	1.88	0.87	-
TG111914-OC	11/19/14	8:00	KR006.0	KR near Klamath	Yurok	0.5	R	10.36	7.59	167	9.91	1.40	1.70	DNS	1.36	0.37	0.022		<0.010	0.147		0.371	0.021	0.030	0.004	0.002	0.6	1.00	<0.50	
TG121714-OC	12/17/14	7:15	KR006.0	KR near Klamath	Yurok	0.5	R	9.04	7.70	138	11.27	2.10	0.60	DNS	1.47	0.288			<0.010	0.125		0.318	0.017	0.043			6.5	20.00	1.40	
LES021914-OC	2/19/14	7:35	KR000.5	KR Lower Estuary	Yurok	0.5	R	8.73	8.08	117	11.51	2.10	2.70	DNS	1.45	0.858			0.010	0.216		0.309	0.013	0.045			9.4	21.00	2.00	
LES031914-OC	3/19/14	7:13	KR000.5	KR Lower Estuary	Yurok	0.5	R	9.60	7.92	139	10.81	1.10	1.20	DNS	1.03	0.357			<0.010	0.110		0.215	0.015	0.032			3.8	7.90	0.75	
LES041614-OC	4/16/14	7:30	KR000.5	KR Lower Estuary	Yurok	0.5	R	12.94	7.86	136	10.1	1.90	1.90	DNS	0.924	0.037	0.401		0.010	0.034		0.223	0.008	0.031			2.4	6.20	1.20	
LES050714-OC	5/7/14	7:08	KR000.5	KR Lower Estuary	Yurok	0.5	R	13.87	7.62	139	9.6	1.90	0.70	DNS	1.24	0.24			<0.010	0.022		0.14	0.01	0.02			1.5	1.80	<0.50	0.16
LES061114-OC	6/11/14	7:12	KR000.5	KR Lower Estuary	Yurok	0.5	R	20.51	8.02	162	7.93	1.34	0.35	DNS	1.477	0.296			0.015	0.045		0.33	0.02	0.02			2.2	2.67	2.17	-
LES070914-OC	7/9/14	6:40	KR000.5	KR Lower Estuary	Yurok	0.5	R	21.20	8.14	2752	7.96	0.80	0.90	DNS	1.71	0.275			<0.010	0.017		0.24	0.02	0.02			0.5	1.30	0.83	0.15
LES080614-OC	8/6/14	7:05	KR000.5	KR Lower Estuary	Yurok	0.5	R	21.07	7.99	6041	7.16	11.00	2.6	DNS	1.66	1.42			<0.010	<0.010		0.43	0.03	0.06			2.6	4.70	2.30	0.47
LES091014-OC	9/10/14	6:58	KR000.5	KR Lower Estuary	Yurok	0.5	R	14.97	8.18	41436	8.99	1.30	1.80	DNS	2.62	0.326			0.020	0.010		0.35	0.05	0.07			0.8	2.20	1.00	-
LES100814-OC	10/8/14	7:22	KR000.5	KR Lower Estuary	Yurok	0.5	R	17.39	7.99	999	9.34	0.50	1.30	DNS	2.494	0.31			0.018	0.014		0.576	0.058	0.07			0.6	1.17	0.83	-
LES111914-OC	11/19/14	7:27	KR000.5	KR Lower Estuary	Yurok	0.5	R	10.07	7.52	691	10.86	0.70	1.40	DNS	1.66	0.316	0.031		0.029	0.126		0.40	0.03	0.04			1.7	2.00	0.75	
LES121714-OC	12/17/14	6:42	KR000.5	KR Lower Estuary	Yurok	0.5	R	9.07	6.99	1125	11.25	1.60	1.00	DNS	1.69	0.450			0.012	0.127		0.292	0.014	0.041			6.0	12.00	2.60	

Non-detect values were replaced with "-".
PacifiCorp and USBR values below the reporting limit (RL) but above the method detection limit (MDL) are j-flagged and italicized.
Karuk Tribe and Yurok Tribe values below the MDL are presented as "<" and the MDL value.
DNS = did not sample.
DNP = laboratory did not process.
WSE = low water surface elevation (did not sample/measure).

Table B-2. 2014 Klamath River Data Summary (Major Tributaries)

								Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Algae, Chlorophyll-a	Algae, Pheophytin	Alkalinity	Carbon, Dissolved Organic Carbon	Carbon, Particulate Carbon	Nitrogen, Nitrate+Nitrite	Nitrogen, Particulate Nitrogen	Demand, Carbonaceous Biological Oxygen Demand	Nitrogen, Ammonia	Nitrogen, Total Kjeldahl Nitrogen	Nitrogen, Total Nitrogen	Phosphorus, Phosphate	Phosphorus, Total Phosphorus	Phosphorus, Particulate Organic Phosphorus	Phosphorus, Particulate Inorganic Phosphorus	Turbidity	Solids, Total Suspended Solids	Solids, Volatile Suspended Solids	Toxins, Microcystin
Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	C	-	uS/cm	mg/l	ug/l	ug/l	mg/l	mg/l	ppm	mg/l	ppm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	NTU	mg/l	mg/l	ug/l
SA021914-OC	2/19/14	9:30	SA	Salmon River	Karuk	0.5	OC	7.16	7.89	74	11.87	0.50	0.60		1.960	0.394			<0.010	0.041		0.276	0.004	0.012			1.50	3.5	1.3	
SA031914-OC	3/19/14	9:33	SA	Salmon River	Karuk	0.5	OC	6.93	8.01	96	11.63	1.60	0.60		0.978	0.526			<0.010	0.030		0.317	0.004	0.030			2.50	3.4	2.1	
SA041614-OC	4/16/14	9:22	SA	Salmon River	Karuk	0.5	OC	10.64	7.96	90	11.23	1.50	<0.1		0.876	0.329			<0.010	<0.010		0.094	0.002	0.004			1.00	3.0	0.6	
SA050714-SG	5/7/14	8:33	SA	Salmon River	Karuk	0.5	OC	11.57	8.04	89	10.23	1.30	0.50		1.080	0.558			<0.010	<0.010		0.053	<0.001	0.019			1.30	15.0	3.1	
SA061114-OC	6/11/14	8:31	SA	Salmon River	Karuk	0.5	OC	18.41	7.86	115	9.06	1.10	1.20		0.863	0.234			0.022	0.011		0.117	0.002	0.013			1.60	12.0	2.2	
SA070914-OC	7/9/14	8:35	SA	Salmon River	Karuk	0.5	OC	20.44	8.00	129	8.59	0.80	0.10		0.837	0.201			<0.010	<0.010		0.114	0.005	0.005			0.21	0.8	<0.50	
SA080614-OC	8/6/14	8:31	SA	Salmon River	Karuk	0.5	OC	20.50	8.04	144	8.59	1.60	0.30		0.426	0.395			<0.010	0.012		<0.050	0.001	0.01			0.79	4.9	0.9	
SA091014-OC	9/10/14	15:00	SA	Salmon River	Karuk	0.5	OC					0.90	<0.1		1.050	0.402			<0.010	<0.010		0.058	0.004	0.007			0.65	<0.50	<0.50	
SA100814-OC	10/8/14	8:20	SA	Salmon River	Karuk	0.5	OC	14.47	8.46	153	10.43	1.80	<0.1		0.696	0.569			<0.010	<0.010		<0.050	0.002	0.007			0.31	2.7	1.3	
SA111914-OC	11/19/14	9:35	SA	Salmon River	Karuk	0.5	OC	7.16	8.38	110	8.38	1.60	<0.1		1.290	0.240			<0.010	<0.010		<0.050	0.003	0.005			0.34	0.8	0.6	
SA121714-OC	12/17/14	9:30	SA	Salmon River	Karuk	0.5	OC	7.72	8.24	96	11.89	1.20	<0.1		3.060	0.343			<0.010	0.071		0.086	0.003	0.008			0.60	3.1	1.0	
SC021914-OC	2/19/14	11:28	SC	Scott River	Karuk	0.5	OC	6.32	8.05	115	11.54	1.60	1.40		3.080	0.389			<0.010	0.142		0.328	0.007	0.019			4.30	6.5	1.2	
SC031914-OC	3/19/14	11:26	SC	Scott River	Karuk	0.5	OC	6.91	8.14	148	11.13	1.10	1.50		1.790	0.266			<0.010	0.184		0.241	0.006	0.012			1.50	2.8	0.7	
SC041614-OC	4/16/14	11:30	SC	Scott River	Karuk	0.5	OC	11.53	8.36	165	10.87	1.60	1.40		1.260	0.303			0.011	0.095		0.250	<0.001	0.003			1.00	1.3	0.6	
SC050714-OC	5/7/14	12:23	SC	Scott River	Karuk	0.5	OC	11.83	8.38	181	10.25	2.40	1.70		1.060	0.363			<0.010	0.014		0.193	<0.001	0.006			0.98	2.6	1.0	
SC061114-OC	6/11/14	11:14	SC	Scott River	Karuk	0.5	OC	19.53	8.45	230	8.95	1.60	1.00		1.370	0.242			<0.010	0.149		0.239	<0.001	0.009			1.70	6.3	1.0	
SC070914-OC	7/9/14	11:31	SC	Scott River	Karuk	0.5	OC	24.65	8.40	234	8.53	<0.1	0.90		1.360	0.248			<0.010	<0.010		0.166	0.001	0.003			0.41	<0.50	<0.50	
SC080614-OC	8/6/14	11:36	SC	Scott River	Karuk	0.5	OC	22.91	8.54	264	9.17	0.50	0.60		0.784	0.312			<0.010	0.012		0.086	0.001	0.008			0.66	0.6	0.5	
SC100814-OC	10/8/14	11:04	SC	Scott River	Karuk	0.5	OC	14.24	8.58	284	11.38	1.60	0.60		1.170	0.210			0.019	<0.010		0.091	0.005	0.01			0.31	<0.50	<0.50	
SC111914-OC	11/19/14	11:48	SC	Scott River	Karuk	0.5	OC	6.26	8.32	214	11.92	2.10	1.20		1.180	0.259			<0.010	0.021		<0.050	0.003	0.004			0.35	0.9	0.4	
SC121714-OC	12/17/14	11:41	SC	Scott River	Karuk	0.5	OC	6.41	7.98	148	11.64	2.80	2.40		2.530	1.220			0.011	0.207		0.518	0.007	0.058			3.80	24.0	4.5	
SH021914-OC	2/19/14	12:43	SH	Shasta River	Karuk	0.5	OC	8.91	8.71	480	11.29	4.30	8.10		4.180	1.930			<0.010	0.175		0.642	0.173	0.229			5.00	24.0	4.8	
SH031914-OC	3/19/14	12:53	SH	Shasta River	Karuk	0.5	OC	10.01	8.85	440	11.47	5.30	3.30		2.160	1.110			<0.010	<0.010		0.279	0.15	0.215			2.50	11.0	2.3	
SH041614-OC	4/16/14	12:45	SH	Shasta River	Karuk	0.5	OC	14.50	8.77	583	11.42	0.80	2.40	293	5.570	0.460			<0.010	<0.010		0.611	0.174	0.205			1.10	1.8	0.7	
SH050714-OC	5/7/14	14:24	SH	Shasta River	Karuk	0.5	OC	16.38	8.81	587	10.34	2.10	1.20		5.230	0.279			<0.010	<0.010		0.397	0.152	0.36			1.10	2.2	0.8	
SH061114-OC	6/11/14	12:50	SH	Shasta River	Karuk	0.5	OC	21.67	8.72	560	9.97	3.20	2.40		4.560	0.313			<0.010	0.012		0.407	0.188	0.246			2.60	5.0	1.2	
SH070914-OC	7/9/14	13:17	SH	Shasta River	Karuk	0.5	OC					1.10	0.40		5.200	0.504			0.016	0.017		0.490	0.21	0.236			0.45	2.5	1.0	
SH080614-OC	8/6/14	13:15	SH	Shasta River	Karuk	0.5	OC	24.00	8.72	573	10.12	1.80	<0.1		4.540	0.437			<0.010	<0.010		0.376	0.176	0.205			1.00	2.0	1.1	

Sample ID	Date	Time	Site ID	Site Name	Agency	Depth, m	Type	Water Temperature C	pH	Specific Conductivity uS/cm	Dissolved Oxygen mg/l	Algae, Chlorophyll-a ug/l	Algae, Pheophytin ug/l	Alkalinity mg/l	Carbon, Dissolved Organic Carbon mg/l	Carbon, Particulate Carbon ppm	Nitrogen, Nitrate+Nitrite mg/l	Nitrogen, Particulate Nitrogen ppm	Demand, Carbonaceous Biological Oxygen Demand mg/l	Nitrogen, Ammonia mg/l	Nitrogen, Total Kjeldahl Nitrogen mg/l	Nitrogen, Total Nitrogen mg/l	Phosphorus, Phosphate mg/l	Phosphorus, Total Phosphorus mg/l	Phosphorus, Particulate Organic Phosphorus mg/l	Phosphorus, Particulate Inorganic Phosphorus mg/l	Turbidity NTU	Solids, Total Suspended Solids mg/l	Solids, Volatile Suspended Solids mg/l	Toxins, Microcystin ug/l
SH091014-OC	9/10/14	12:02	SH	Shasta River	Karuk	0.5	OC	17.04	8.67	599	10.6	26.00	16.00		5.870	1.040			<0.010	<0.010		1.340	0.156	0.26			2.70	48.0	11.0	
SH100814-OC	10/8/14	12:31	SH	Shasta River	Karuk	0.5	OC	13.31	8.58	429	11.01	3.40	<0.1		1.780	1.060			<0.010	0.021		0.140	0.182	0.199			1.60	9.7	2.5	
SH111914-OC	11/19/14	13:11	SH	Shasta River	Karuk	0.5	OC	6.56	8.52	424	12.08	5.90	9.50		1.550	1.270			<0.010	0.116		0.321	0.156	0.191			1.30	7.3	2.0	
SH121714-OC	12/17/14	13:20	SH	Shasta River	Karuk	0.5	OC	6.39	8.31	501	11.5	2.40	0.60		4.500	0.603			0.025	0.512		9.440	0.171	0.229			2.60	6.0	1.6	
SB041614-OC	4/16/14	13:20	SH	Blank (Shasta)	Karuk	0.5	OC					<0.1	<0.1		<0.250	0.118			<0.010	0.058		0.193	<0.001	<0.002			0.58	<0.50	<0.50	
SD041614-OC	4/16/14	12:05	SH	Duplicate (Shasta)	Karuk	0.5	OC	14.50	8.77	583	11.42	<0.1	3.00	335	5.320	0.495			<0.010	<0.010		0.583	0.17	0.226			1.10	2.2	1.2	
SB121714-OC	12/17/14	11:30	SH	Blank (Shasta)	Karuk	0.5	OC					<0.1	<0.1		<0.250	0.053			<0.010	<0.010		<0.050	<0.001	<0.002			0.19	<0.50	<0.5	
SD121714-OC	12/17/14	12:22	SH	Duplicate (Shasta)	Karuk	0.5	OC	6.99	8.11	229	11.71	0.80	2.70		3.530	0.745			0.022	0.443		1.090	0.078	0.11			3.90	5.0	1.3	
TR021914-OC	2/19/14	11:25	TR	Trinity River	Yurok	0.5	OC	8.69	8.00	127	11.65	2.10	0.50		3.630	0.282			<0.010	0.041		0.178	0.007	0.016			3.50	5.8	1.0	
TR031914-OC	3/19/14	11:17	TR	Trinity River	Yurok	0.5	OC	9.62	8.03	150	11.24	0.30	1.00		0.813	0.294			<0.010	0.040		0.085	0.006	0.012			1.70	3.0	0.6	
TR041614-OC	4/16/14	11:37	TR	Trinity River	Yurok	0.5	OC	13.58	8.11	151	10.55	0.70	1.80		0.882	0.032	0.304		<0.010	<0.010		0.146	0.003	0.009			1.90	2.3	0.8	
TR050714-OC	5/7/14	12:04	TR	Trinity River	Yurok	0.5	OC	14.19	8.08	137	10.49	1.10	0.80		1.070	0.171			<0.010	<0.010		0.091	<0.001	0.0080			1.40	1.5	0.5	
TR 061114-OC	6/11/14	12:00	TR	Trinity River	Yurok	0.5	OC	20.83	8.06	135	8.98	1.34	0.16		0.998	0.178			<0.010	<0.010		0.071	0.0027	0.0059			1.10	1.0	<0.50	
TR 070914-OC	7/9/14	12:16	TR	Trinity River	Yurok	0.5	OC	24.46	8.29	155	8.7	1.60	0.60		1.040	0.147			<0.010	<0.010		0.148	0.0030	0.0030			0.25	0.8	0.7	
TR 080614-OC	8/6/14	11:47	TR	Trinity River	Yurok	0.5	OC	23.37	8.16	147	8.74	<0.1	0.70		0.726	0.129			<0.010	<0.010		0.088	0.002	0.0050			0.54	<0.50	<0.50	
TR091014-OC	9/10/14	11:17	TR	Trinity River	Yurok	0.5	OC	18.39	8.01	123	9.65	1.10	0.30		1.250	0.192			<0.010	0.015		0.131	0.002	0.0060			0.35	0.7	<0.50	
TR100814-OC	10/8/14	11:25	TR	Trinity River	Yurok	0.5	OC	17.06	8.16	153	10.09	0.53	0.34		0.875	0.151			<0.010	<0.010		<0.050	<0.001	0.0046			0.19	<0.50	<0.50	
TR111914-OC	11/19/14	11:25	TR	Trinity River	Yurok	0.5	OC	DNS	DNS	DNS	DNS	1.00	<0.1		1.110	0.120	0.011		<0.010	<0.010		0.104	0.003	0.0040			0.29	<0.50	<0.50	
TR121714-OC	12/17/14	10:33	TR	Trinity River	Yurok	0.5	OC	8.97	7.96	161	11.52	2.10	0.40		1.620	0.362			<0.010	0.073		0.096	0.004	0.0190			5.90	7.6	1.8	

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

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

Sample ID	Lab ID	Date	Time	Site Name	MC-RR	MC-Desmethyl-RR*	MC-LR	MC-Desmethyl-LR	MC-YR	MC-LA	MC-LW	MC-LF	MC-LY	Anatoxin A	Domoic acid	Okadaic acid	Nodularin
WE070914-OC	DFG	7/9/2014	12:05	WE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
WEDFG080614-OC	DFG	8/6/2014	11:40	WE	ND	ND	0.122	ND	ND	0.852	ND	ND	ND	ND	ND	ND	ND
WEDFG100814-OC	DFG	10/8/2014	11:02	WE	ND	ND	ND	ND	ND	0.140	ND	ND	ND	ND	ND	ND	ND

Appendix C. Phytoplankton Charts

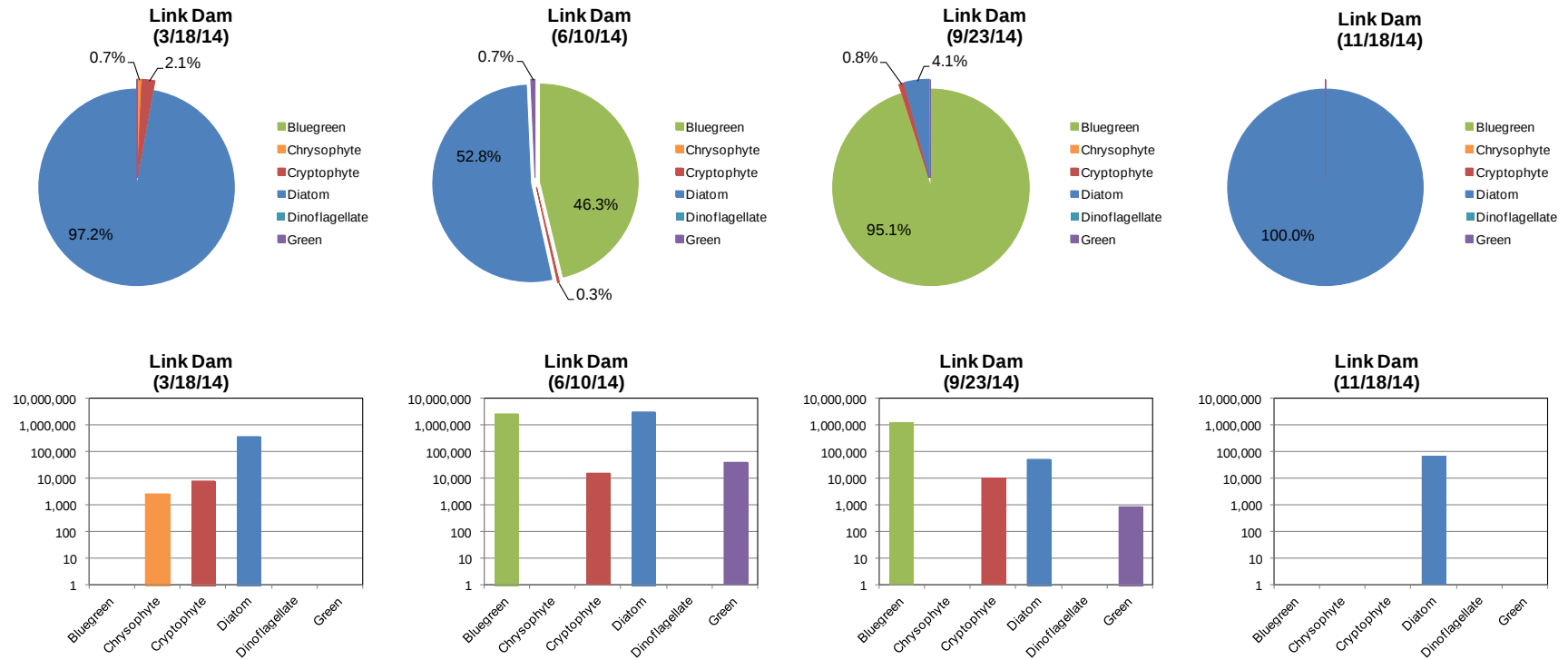


Chart C-1. Phytoplankton species (top) and biovolume (bottom) at Link River for 3/18/14, 6/10/14, 9/23/14, and 11/18/14. Note: y-axis in logarithmic scale.

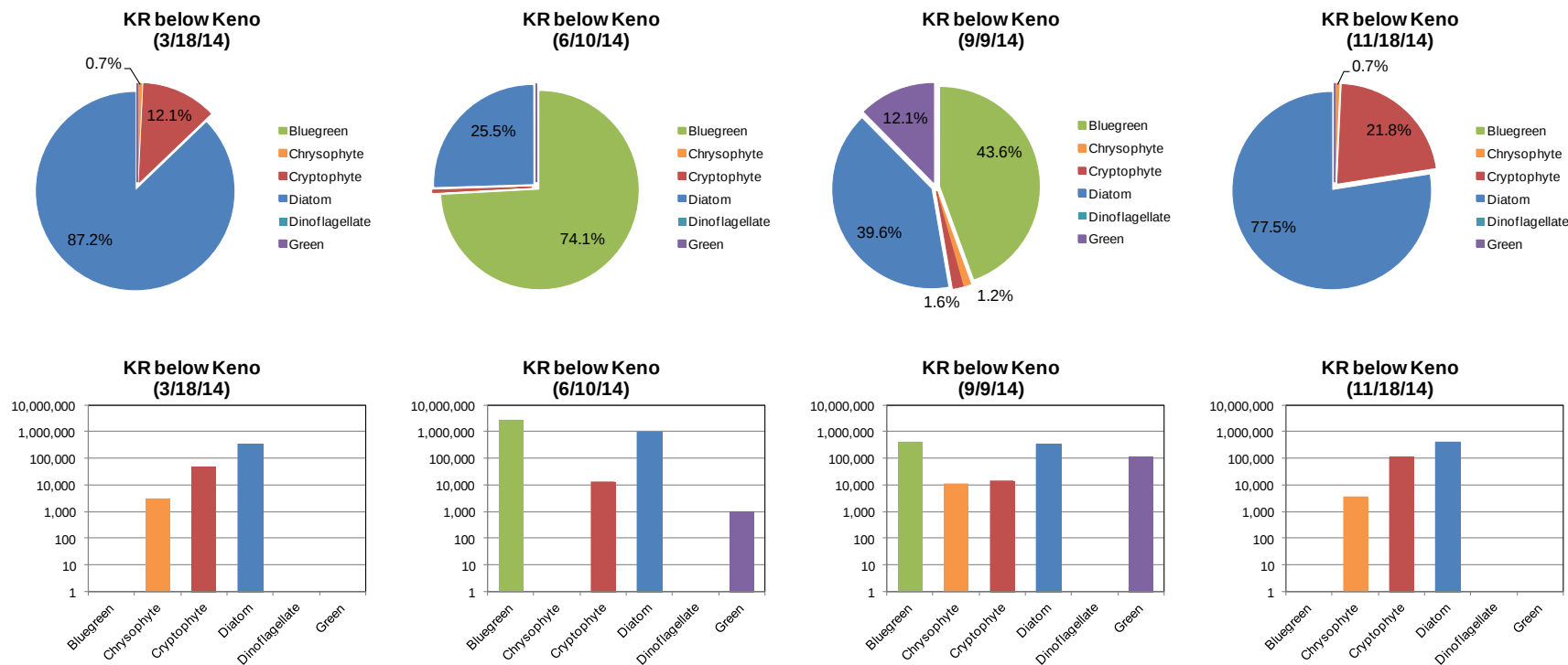


Chart C-2. Phytoplankton species (top) and biovolume (bottom) at Klamath River below Keno Dam for 3/18/14, 6/10/14, 9/9/14, and 11/18/14. Note: y-axis in logarithmic scale.

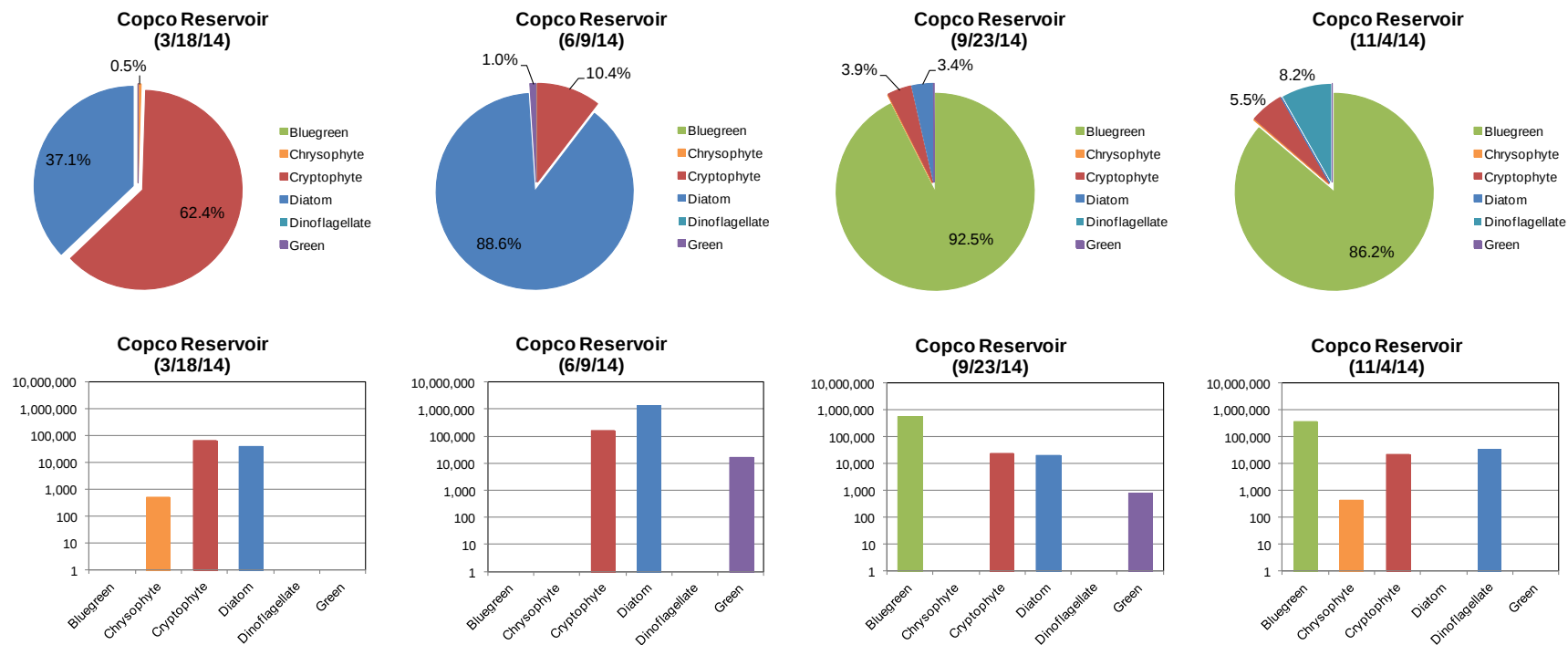


Chart C-3. Phytoplankton species (top) and biovolume (bottom) at Copco Reservoir near dam for 3/18/14, 6/9/14, 9/23/14, and 11/4/14. Note: y-axis in logarithmic scale.

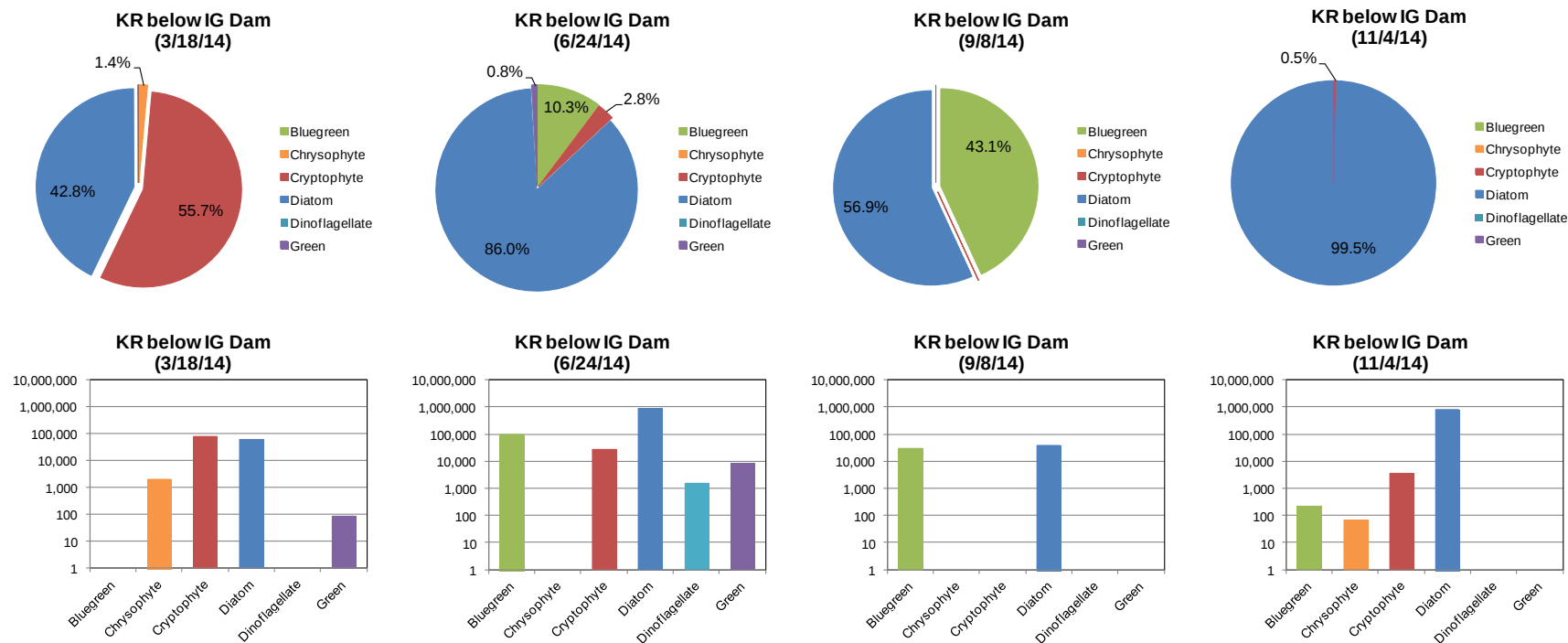


Chart C-4. Phytoplankton species (top) and biovolume (bottom) at Klamath River below Iron Gate Dam (near Hatchery Bridge) for 3/18/14, 6/24/14, 9/8/14, and 11/4/14. Note: y-axis in logarithmic scale.

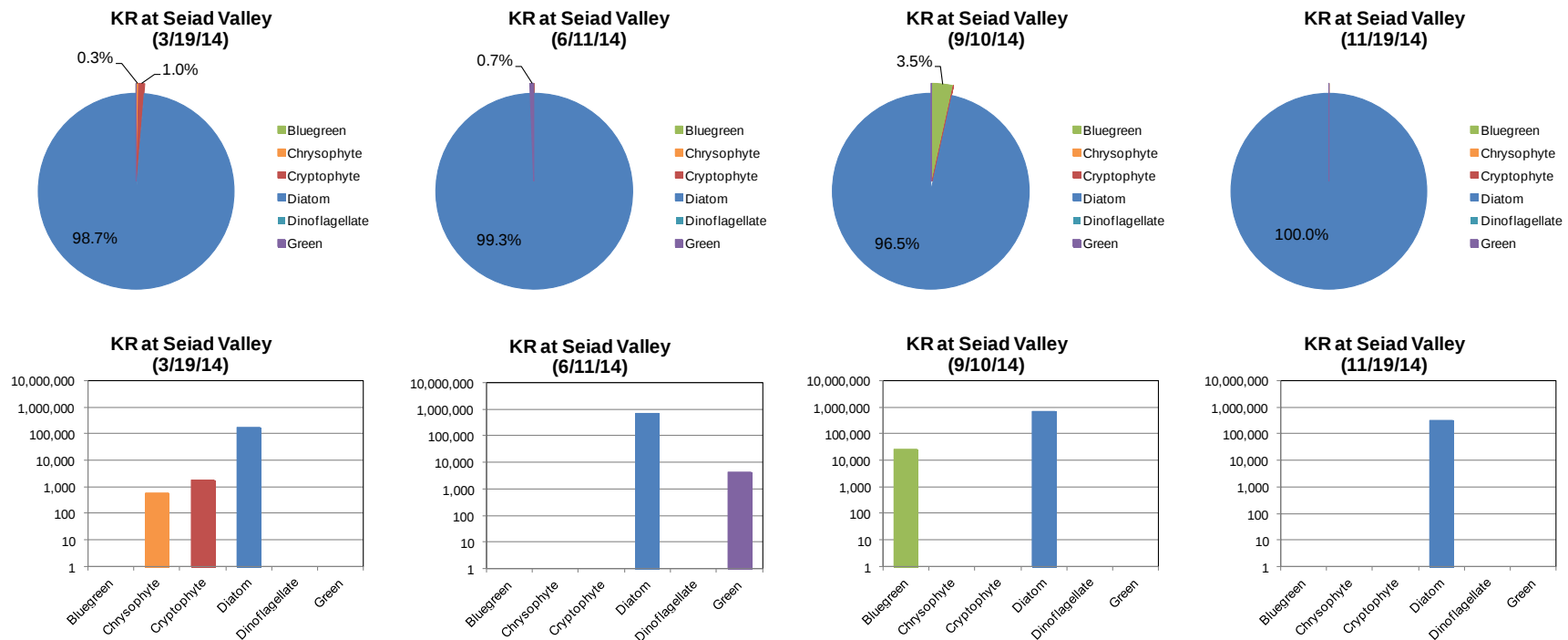


Chart C-5. Phytoplankton species (top) and biovolume (bottom) at Klamath River near below Seiad Valley for 3/19/14, 6/11/14, 9/10/14, and 11/19/14.
Note: y-axis in logarithmic scale.

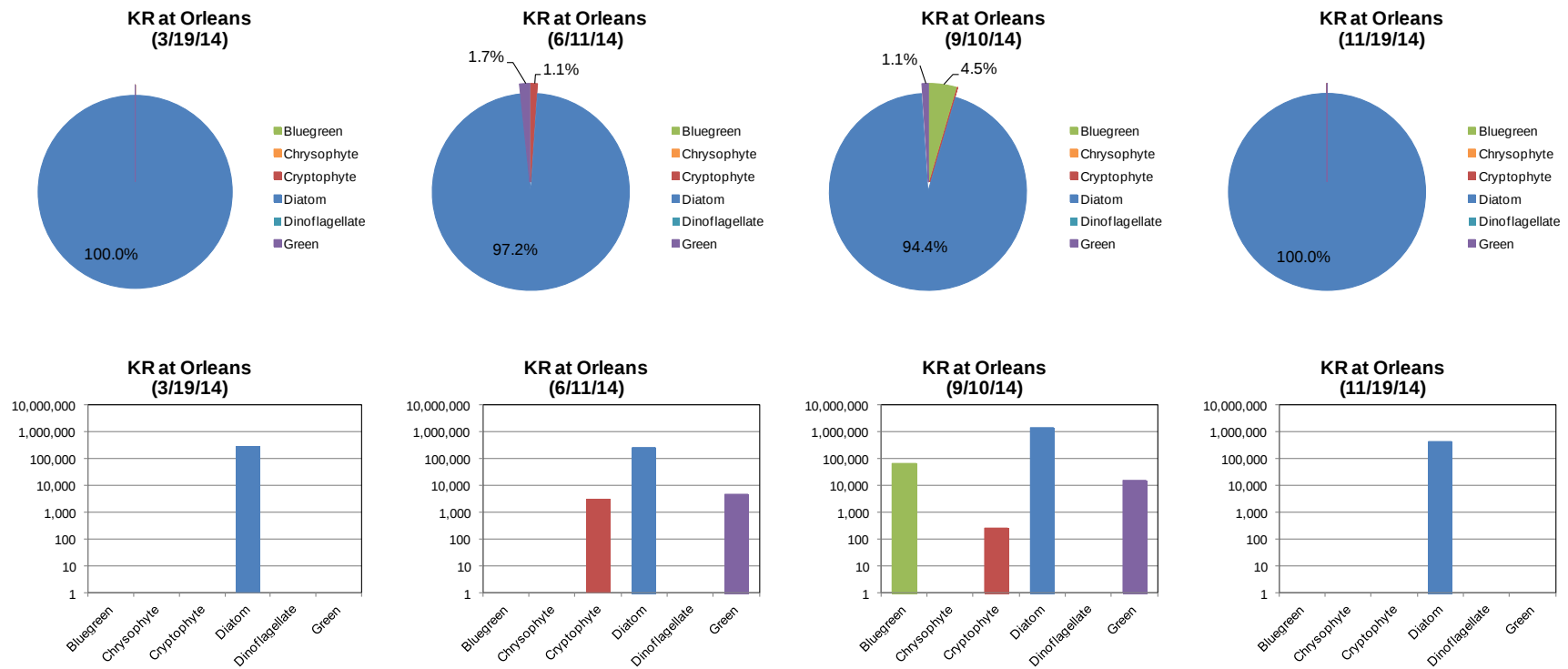


Chart C-6. Phytoplankton species (top) and biovolume (bottom) at Klamath River at Orleans for 3/19/14, 6/11/14, 9/10/14, and 11/19/14. Note: y-axis in logarithmic scale.

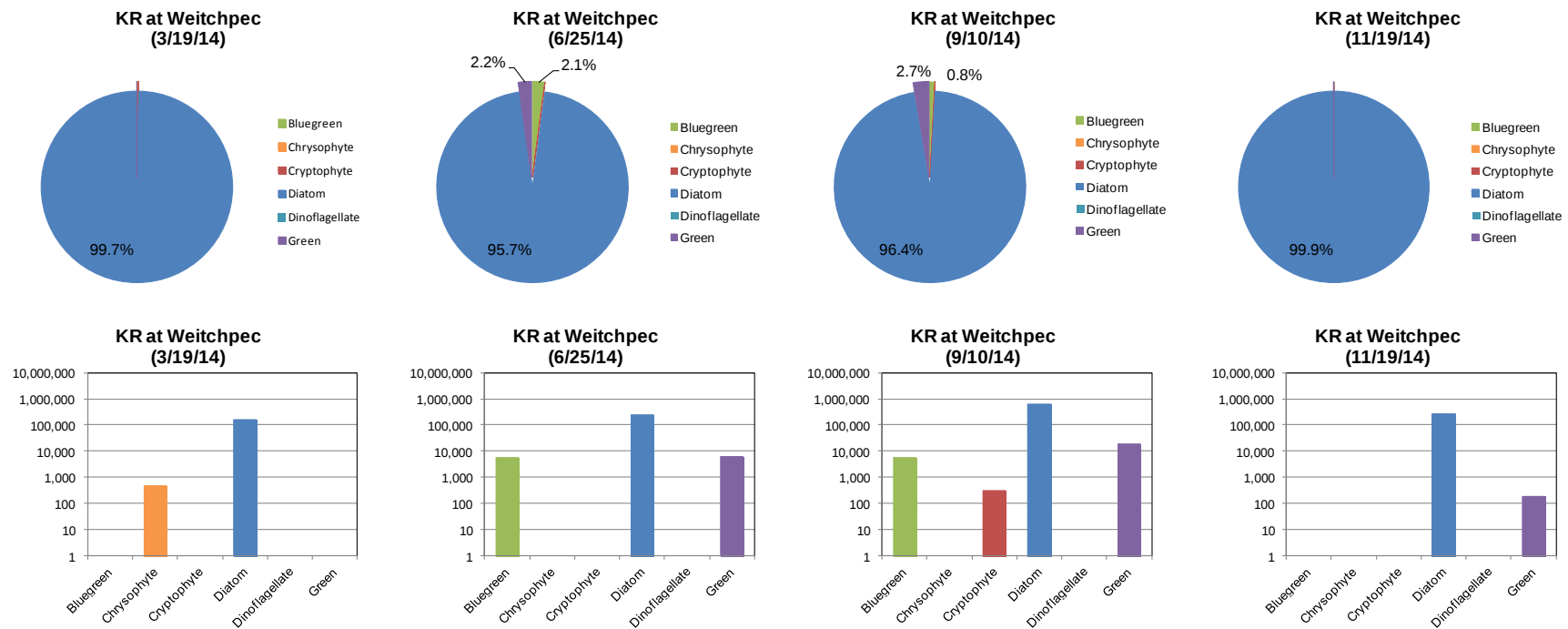


Chart C-7. Phytoplankton species (top) and biovolume (bottom) at Klamath River at Weitchpec for 3/19/14, 6/25/14, 9/10/14, and 11/19/14. Note: y-axis in logarithmic scale.

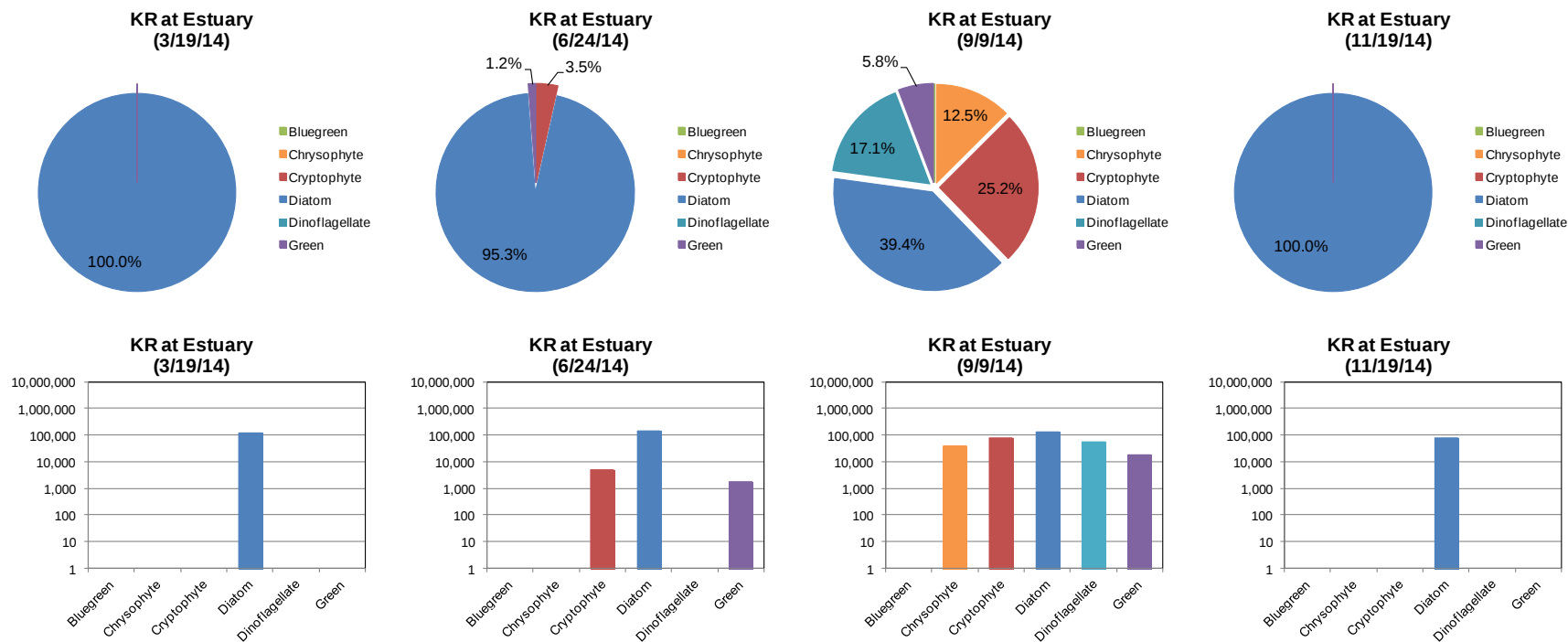


Chart C-8. Phytoplankton species (top) and biovolume (bottom) at Klamath River near Estuary 3/19/14, 6/24/14, 9/9/14, and 11/19/14. Note: y-axis in logarithmic scale.

Appendix D. 2014 Laboratory Cross Comparison



Technical Memorandum

Date: January 21, 2015

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

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

Re: 2014 Interim Measure 15 Inter-laboratory Comparison Memo

Introduction

Four laboratory cross comparisons sampling events occurred during the 2014 Klamath Hydroelectric Settlement Agreement (KHSA) Interim Measure 15 (IM 15) baseline monitoring program to provide insight into laboratory performance at the principal laboratories employed. Location of the sampling event has changed every two years since program inception, including: Link Dam near Klamath Falls (RM 254.4), Klamath River near the Estuary (RM 0.5) and Klamath River near Weitchpec (RM 43.5), and Klamath River below Seiad Valley (RM 128.5).

On March 31, 2014 several entities involved in the IM 15 baseline monitoring program held a meeting to discuss the progress of the inter-laboratory (henceforth, interlab) cross comparisons. From the meeting, several changes to the program were suggested and approved based on data collected from 2009 to 2013. These changes include:

- Continue laboratory analysis for constituents that were more variable (less consistent between laboratories), limited in data, or important for baseline monitoring program. These constituents include: dissolved organic carbon (DOC), total nitrogen (TN), orthophosphate (OPO₄), total phosphorus (TP), total suspended solids (TSS), volatile suspended solids (VSS), and total chlorophyll-a (CHLOR-A).

- Discontinue analyses for constituents that were consistent between laboratories, were often non-detect, or were cost prohibitive. These constituents include: alkalinity, nitrite+nitrate, ammonia, and five-day carbonaceous biological oxygen demand (CBOD5).
- Add another sampling event between August and October for comprehensive look at the Klamath River. Instead of three sampling events, another sampling event was added in 2014. The four sampling events include: April, July, September, and October.
- Basic Laboratory was dropped from the cross comparison, reducing the laboratories to: CH2M Hill Applied Sciences Laboratory (Corvallis, Oregon) and Aquatic Research, Inc. (Seattle, WA).

Given these changes, laboratory cross comparison for 2014 included collecting a single surface grab sample in the Klamath River below Seiad Valley on April 16, July 9, September 10, and October 8. Each sample was split into two separate bottles via churn-splitter and sent to the two laboratories: CH2M Hill and Aquatic Research.

Even for an identical sample, laboratories may present different results due to the analytical equipment differences, experience of technicians, and varying methods. The cross comparison exercise is not intended to rate the performance of each laboratory or to determine which laboratory is “best.” Such an undertaking would require a much more comprehensive study. Rather, the comparisons are intended to illustrate the range of results produced by CH2M Hill and Aquatic Research for the identified constituents over a sampling season. This memo presents background information on the inter-laboratory study, overview of each laboratory’s methods, detection limits and reporting limits, cross comparison methods, summary of sampling issues, summary of results, and plots for each constituent.

Background

The IM 15 laboratory comparison, which began in 2009, is now in its sixth year. To explore different water quality conditions as well as share the responsibilities in collecting the cross comparison samples, the IM 15 monitoring group decided to move sampling locations every two years among the four sampling entities. The sampling location for the cross comparison in 2009 and 2010 was Link Dam, near Klamath Falls (RM 254.4) by the United States Bureau of Reclamation. In 2011, three grab samples were collected at the Klamath River near the Estuary (RM 0.5) by the Yurok Tribe. Several constituents were below the detection level at this location. Therefore, the group decided to move the 2012 sampling site further upstream. In 2012, three grab samples were collected at the Klamath River near Weitchpec (RM 43.5) by the Yurok Tribe. In 2013, three grab samples were collected at the Klamath River below Seiad Valley (RM 128.5) by the Karuk Tribe. In 2014, four grab samples were collected at the Klamath

River below Seiad Valley (RM 128.5) by the Karuk Tribe. In 2015 and 2016 PacifiCorp will collect cross comparison samples at a location to be determined by the group.

Censored data samples refers to laboratory results with “less than” (<), “non-detect” (ND), and (j) flag data. Data sets with “less than” and “non-detect” are results below the method detection limit (MDL). When censored data is present for a constituent at two laboratories, then the pair is excluded from the cross comparisons. More information on this topic is discussed in the cross comparison methods section. The method detection limit (MDL) is explicitly defined in Standard Methods (APHA 2005) as “the constituent concentration that, when processed through the complete method, produces a signal with a 99 percent probability that it is different than the blank.” The RL is defined as the lowest constituent concentration in a sample that can be quantitatively determined with statistical rigor. Results greater than or equal to the laboratory MDL, but below the method reporting limit (RL)⁶ are referred to as (j) flag data.

Overview of Labs: Methods, Detection and Reporting Limits

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

Laboratory reporting values for constituents varied. Generally, the RL for each laboratory was within a factor of 5. For example, the RL for ammonia was 0.05 mg/l for CH2M Hill and 0.01 mg/l for Aquatic Research. For TSS and VSS, this maximum difference between the RL was a factor of 10. For several constituents, Aquatic Research did not provide a distinct RL, but set the RL as equal to the MDL.

Table D-1. Laboratory methods, method detection limits (MDL), and reporting limits (RL) for CH2M Hill (2014). N/A = not applicable

Constituent	units	Method	MDL	CH2M Hill
				RL
DOC	mg/l	SM5310B	0.12	0.5
TN	mg/l	SM4500-N C	0.048	0.2
OPO4	mg/l	E365.1	0.0014	0.01
TP	mg/l	E365.4	0.017	0.05
TSS	mg/l	SM2540D	0.6	5
VSS	mg/l	E160.4	N/A	5
CHLOR-A ^a	0µg/l	EPA 445.0	0.18	N/A

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

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

Table D-2. Laboratory methods, method detection limits (MDL), and reporting limits (RL) for Aquatic Research (2014).

Constituent	units	Method	MDL	Aquatic Research
				RL
DOC	mg/l	SM205310B	0.095	0.25
TN	mg/l	SM204500NC	0.03	0.05
OPO4 ^a	mg/l	SM18 4500PF	0.001	0.001
TP ^a	mg/l	SM18 4500PF	0.002	0.002
TSS	mg/l	SM20 2540D	0.1	0.5
VSS	mg/l	SM20 2540E	0.1	0.5
CHLOR-A ^a	µg/l	SM18 10200H	0.10	0.10

^a The MDL and RL values were set to same concentration.

Cross Comparison Method (RPD & AD)

To compare the results from each laboratory, relative percent difference (RPD) or absolute difference (AD) calculations were applied to paired samples for CH2M Hill and Aquatic Research. CH2M Hill and Aquatic Research reported different significant figures and the data presented herein are directly from respective laboratory reports. The RPD and AD, used for assessing a regular and duplicate sample are calculated as:

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

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

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

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

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

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

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

During each comparison, if the laboratories used different RLs, the larger RL value was selected as the criteria to determine whether to use the RPD or AD. Use of the larger RL value allows the comparison to encapsulate the largest possible uncertainty associated with the data.

If the sample result was equal to or greater than five times the selected reporting limit, the RPD was calculated. The RPD criteria of 20 percent was used to determine if two samples were similar (RPD of less than or equal to 20 percent) or dissimilar (RPD of greater than 20 percent) (USBR, 2009). If the RPD result was less than or equal to 20 percent, the two samples were deemed to be similar and the comparison was labeled with

an “OK” result. If the RPD result was greater than 20 percent, the results were termed dissimilar and the RPD was presented within the table.

If the sample result was less than five times the selected reporting limit, the AD was calculated and a different criteria of the reporting limit was used to determine if two samples were similar (AD less than or equal to the selected reporting limit) or dissimilar (AD greater than the selected reporting limit) (USB, 2009). If the AD was less than the selected reporting limit for the sample comparison, the comparison was labeled with an “OK” result. If the AD was greater than the selected reporting limit for the sample comparison, the results were termed dissimilar and the AD result was presented, along with a footnote of the laboratory reporting limit used. This process is illustrated in Figure D-1.

Censored data refers to sample results without a result (e.g. “<” value, non-detect, and (j) flagged). When censored data is present for a constituent, the sample pair is excluded from the cross comparison analysis. For example, a duplicate sample was sent to the laboratories to be analyzed for total phosphorus (TP). The results were 0.04(j) mg/l and 0.03(j) mg/l and CH2M Hill and Aquatic Research. Data below the laboratory RLs are replaced by the laboratory RLs in the data tables. Thus, both values at the two laboratories would be replaced by the RLs. Cross comparisons are not performed for paired data that consist of two RL values. These comparisons are labeled as “censored” and excluded from the cross comparison.

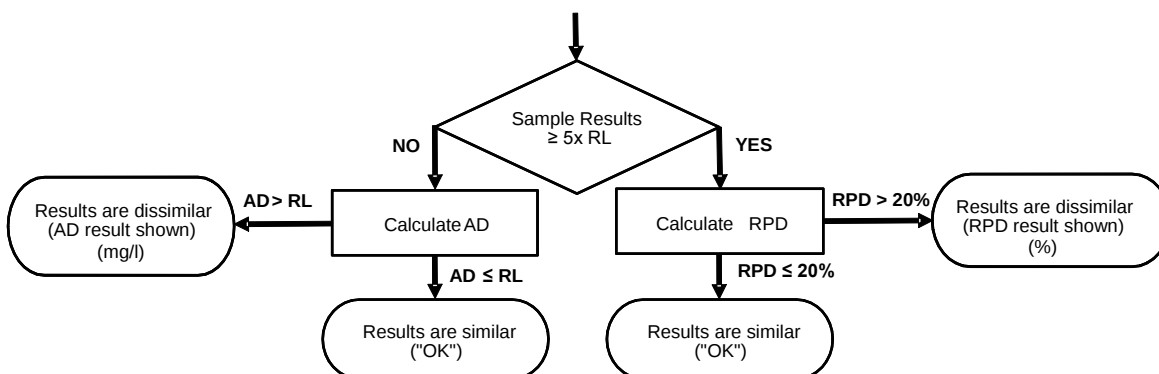


Figure D-1. Flow diagram of the comparison process. RPD = relative percent difference. RL = reporting limit. AD = absolute difference.

2014 Sampling

Sampling was scheduled for April 16, July 9, September 10, and October 8. Samples were collected, shipped, and processed by the laboratory for July 9 and October 8 sampling events. The April 16 sample sent to CH2MHill was lost due to a United Parcel Service (UPS) shipping error. To remedy this condition, the Karuk Tribe collected an additional interlab sample on August 6. On September 10 the interlab sample was not collected. The Karuk Tribe sent an email out on September 11, notifying several KHSA group members, and a new sample data of September 24 was selected.

The IM 15 baseline monitoring program, including the laboratory cross comparison element, is intended to be adaptive to accommodate challenges that face busy sampling crews, dynamic field conditions, shipping and laboratory issues, and other factors that can affect program results. The following recommendations are made to track samples and react to program problems in a timely manner:

- Shipping or tracking information should be maintained for all interlab samples
- Shipments should be confirmed with either a communication to the laboratory (email, phone call), or confirming via the shipping company website
- If a sampling date is missed, or a sample is lost in shipment, a communication (email, telephone call) to the group should be made as soon as feasible.
- The group, considering the number of remaining interlab samples and sampling dates can identify if there should be an additional sample collected and an appropriate date.

Chlorophyll-a

In 2014, chlorophyll-a was collected and analyzed for all four sampling events. CH2M Hill does not analyze for chlorophyll-a. Therefore, the samples were sent to Chesapeake Biological Laboratory (CBL) in Maryland for analysis. The RPD was applied to CH2M Hill and Aquatic Research when both concentrations were equal to or greater than 5 times the reporting limits. Otherwise, the cross comparison were censored as “non-applicable”.

Results

The comparison of the laboratory results from the two labs was completed as identified above (Figure D-1) based on laboratory data shown in Table D-3, Table D-5, Table D-7, and Table D-9. Data were not complete for the April 16 event and are not included. The cross comparison results for each sampling date are shown in Table D-4, Table D-6, Table D-8, and Table D-10.

Table D-3. Laboratory data used for lab cross comparison: July 9, 2014.

Constituent	Laboratory	CH2M Hill (CH2M)	Aquatic Research, Inc. (ARI)
	Units		
Dissolved Organic Carbon (DOC)	mg/l	3.27	3.95
Total Nitrogen (TN)	mg/l	0.69	0.398
Orthophosphate (OPO4)	mg/l	0.098	0.116
Total Phosphorus (TP)	mg/l	0.11	0.131
Total Suspended Solids (TSS)	mg/l	4.2	2
Volatile Suspended Solids (VSS)	mg/l	0.4	1
Chlorophyll-a (CHLOR-A)	µg/l	0.58	0.1 ^a

^a ARI result for CHLOR-A: "<0.1" mg/l. Value replaced with RL.

Table D-4. Results for paired laboratory comparisons: July 9, 2014.

Constituent	Units	CH2M Hill versus Aquatic Research, Inc.
Dissolved Organic Carbon (DOC)	mg/l	OK
Total Nitrogen (TN)	mg/l	(0.282 mg/l) ^a
Orthophosphate (OPO4)	mg/l	OK
Total Phosphorus (TP)	mg/l	OK
Total Suspended Solids (TSS)	mg/l	OK
Volatile Suspended Solids (VSS)	mg/l	OK
Chlorophyll-a (CHLOR-A)	µg/l	n/a

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

Table D-5. Laboratory data used for lab cross comparison: August 6, 2014.

Constituent	Laboratory	CH2M Hill (CH2M)	Aquatic Research, Inc. (ARI)
	Units		
Dissolved Organic Carbon (DOC)	mg/l	4.4	3.94
Total Nitrogen (TN)	mg/l	0.82	0.667
Orthophosphate (OPO4)	mg/l	0.15	0.182
Total Phosphorus (TP)	mg/l	0.22	0.232
Total Suspended Solids (TSS)	mg/l	11.6	8.5
Volatile Suspended Solids (VSS)	mg/l	5.4	5.5
Chlorophyll-a (CHLOR-A)	µg/l	19.34	15

Table D-6. Results for paired laboratory comparisons: August 6, 2014.

Constituent	Units	CH2M Hill versus Aquatic Research, Inc.
Dissolved Organic Carbon (DOC)	mg/l	OK
Total Nitrogen (TN)	mg/l	OK
Orthophosphate (OPO4)	mg/l	OK
Total Phosphorus (TP)	mg/l	OK
Total Suspended Solids (TSS)	mg/l	OK
Volatile Suspended Solids (VSS)	mg/l	OK
Chlorophyll-a (CHLOR-A)	µg/l	(25.3%) ^a

^a CH2M and ARI value for CHLOR-A greater than 20 percent RPD.

Table D-7. Laboratory data used for lab cross comparison: September 24, 2014.

Constituent	Laboratory	CH2M Hill (CH2M)	Aquatic Research, Inc. (ARI)
	Units		
Dissolved Organic Carbon (DOC)	mg/l	4.07	5.22
Total Nitrogen (TN)	mg/l	0.69	0.588
Orthophosphate (OPO4)	mg/l	0.13	0.15
Total Phosphorus (TP)	mg/l	0.18	0.199
Total Suspended Solids (TSS)	mg/l	6.2	7.5
Volatile Suspended Solids (VSS)	mg/l	4.6	2.8
Chlorophyll-a (CHLOR-A)	µg/l	3.81	2.9

Table D-8. Results for paired laboratory comparisons: September 24, 2014.

Constituent	Units	CH2M Hill versus Aquatic Research, Inc.
Dissolved Organic Carbon (DOC)	mg/l	(24.8%) ^a
Total Nitrogen (TN)	mg/l	OK
Orthophosphate (OPO4)	mg/l	OK
Total Phosphorus (TP)	mg/l	OK
Total Suspended Solids (TSS)	mg/l	OK
Volatile Suspended Solids (VSS)	mg/l	OK
Chlorophyll-a (CHLOR-A)	µg/l	(27.1%) ^b

^a CH2M and ARI value for DOC greater than 20 percent RPD.

^b CH2M and ARI value for CHLOR-A greater than 20 percent RPD.

Table D-9. Laboratory data used for lab cross comparison: October 8, 2014.

Constituent	Laboratory	CH2M Hill (CH2M)	Aquatic Research, Inc. (ARI)
	Units		
Dissolved Organic Carbon (DOC)	mg/l	3.66	4.82
Total Nitrogen (TN)	mg/l	0.78	0.587
Orthophosphate (OPO4)	mg/l	0.12	0.136
Total Phosphorus (TP)	mg/l	0.14	0.163
Total Suspended Solids (TSS)	mg/l	7.4	6.7
Volatile Suspended Solids (VSS)	mg/l	1.6	2.3
Chlorophyll-a (CHLOR-A)	µg/l	3.3	2.1

Table D-10. Results for paired laboratory comparisons: October 8, 2014.

Constituent	Units	CH2M Hill versus Aquatic Research, Inc.
Dissolved Organic Carbon (DOC)	mg/l	(27.4%) ^a
Total Nitrogen (TN)	mg/l	OK
Orthophosphate (OPO4)	mg/l	OK
Total Phosphorus (TP)	mg/l	OK
Total Suspended Solids (TSS)	mg/l	OK
Volatile Suspended Solids (VSS)	mg/l	OK
Chlorophyll-a (CHLOR-A)	µg/l	(44.4%) ^b

^a CH2M and ARI value for DOC greater than 20 percent RPD.

^a CH2M and ARI value for CHLOR-A greater than 20 percent RPD.

Summary

The 2014 interlab cross comparison, samples were collected in the Klamath River below Seiad Valley (RM 128.5). Comparisons were completed for dissolved organic carbon (DOC), total nitrogen (TN), orthophosphate (OPO4), total phosphorus (TP), total suspended solids (TSS), volatile suspended solids (VSS), and chlorophyll-a (CHLOR-A). 28 laboratory cross comparisons were considered.

In 2014, the study included: 21 similar pairs, 6 dissimilar pairs, 1 non-applicable pair, and no censored pairs. The 6 dissimilar pairs include: (2) DOC, (1) TN and (3) CHLOR-A (Table D-11). The comparisons of non-paired samples were labeled as non-applicable because the pair is not a similar, dissimilar, or censored paired.

Table D-11. Summary of cross comparisons for each constituent. Comparisons include: 71 similar pairs, 14 dissimilar pairs, 17 censored pairs, 6 non-applicable pairs.

	Similar Pairs	Dissimilar Pairs	Censored Pairs	Non-applicable*
DOC	2	2	-	-
TN	3	1	-	-
OPO4	4	-	-	-
TP	4	-	-	-
TSS	4	-	-	-
VSS	4	-	-	-
Chlorophyll-a	<u>0</u>	<u>3</u>	-	<u>1</u>
Total	21	6	0	1

*Data for sample pair not available (e.g. no lab data).

Based on suggestions from the water quality monitoring group, comparison pairs for each constituent are plotted. Trend lines and linear regression equations are included in the graphs which are presented in Appendix A (Figure A-1 through Figure A-7) for the 2014 sampling season.

Acknowledgement

We would like to thank everyone who provided insight and feedback during the project meetings and comments for this technical memorandum.

References

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

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

Appendix A. 2009-2014 Constituent Plots

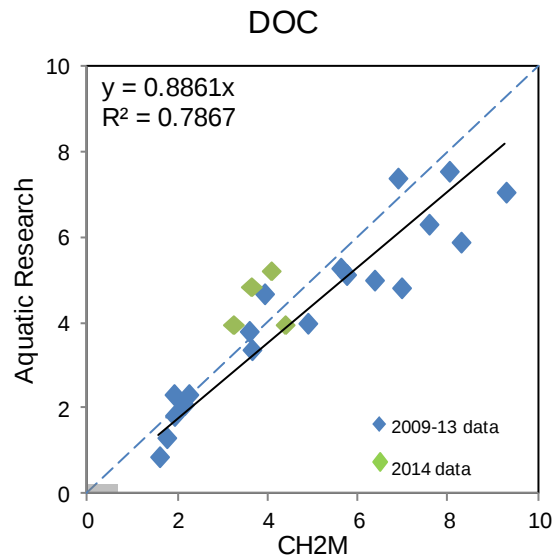


Figure A-1. KHSa inter-laboratory plots from 2009-2014 for Dissolved Organic Carbon (mg/l). Grey region in lower corner represents the region below the RL for the respective laboratories in 2014.

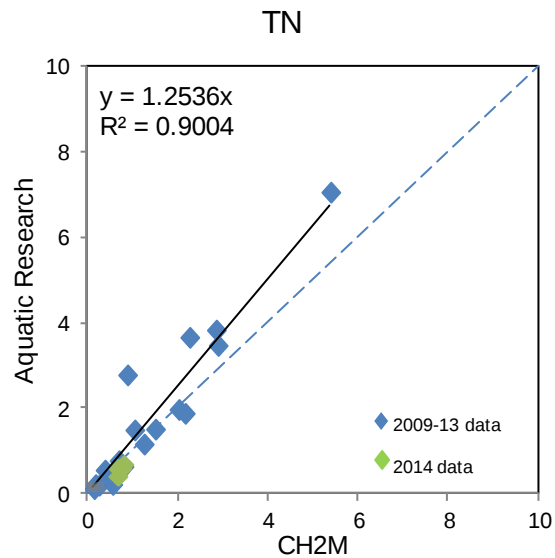


Figure A-2. KHSa inter-laboratory plots from 2009-2014 for Total Nitrogen (mg/l). Grey region in lower corner represents the region below the RL for the respective laboratories in 2014.

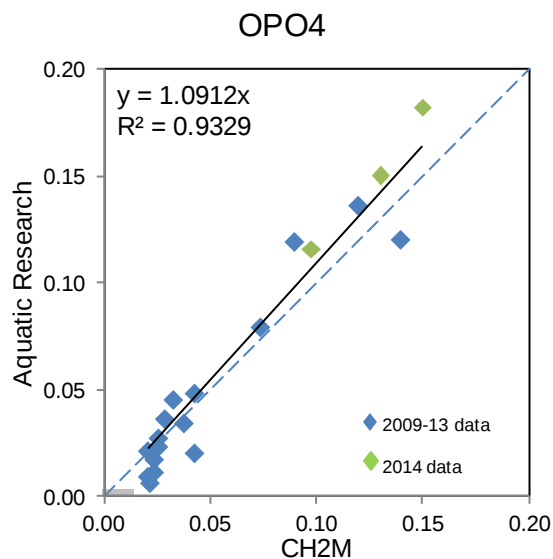


Figure A-3. KHSa inter-laboratory plots from 2009-2014 for Orthophosphate (mg/l). Grey region in lower corner represents the region below the RL for the respective laboratories in 2014.

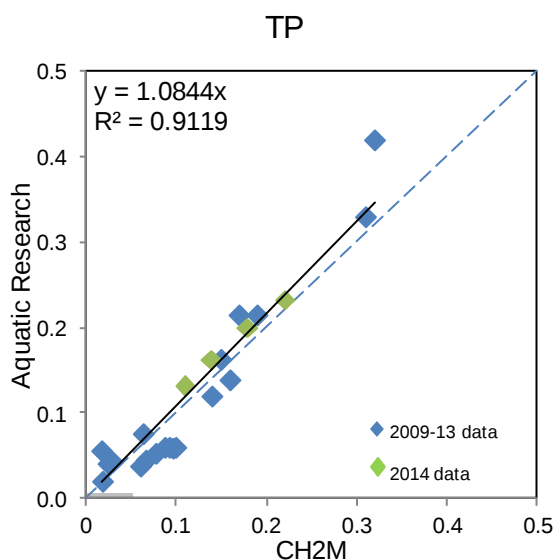


Figure A-4. KHSa inter-laboratory plots from 2009-2014 for Total Phosphorus (mg/l). Grey region in lower corner represents the region below the RL for the respective laboratories in 2014.

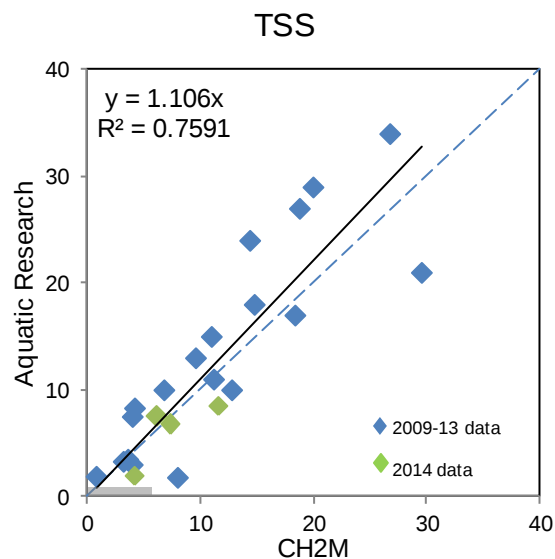


Figure A-5. KHSa inter-laboratory plots from 2009-2014 for Total Suspended Solids (mg/l). Grey region in lower corner represents the region below the RL for the respective laboratories in 2014.

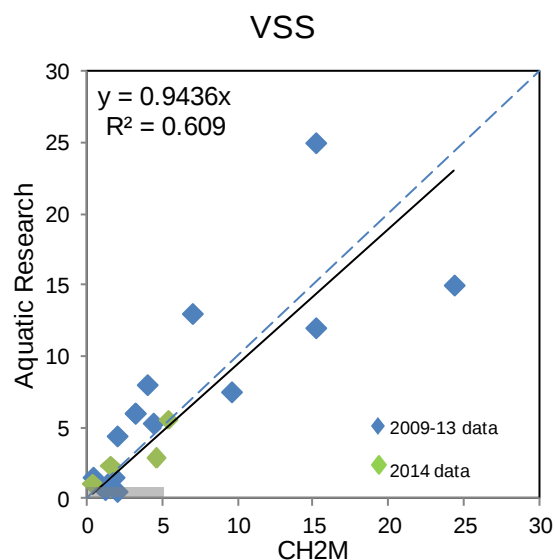


Figure A-6. KHSa inter-laboratory plots from 2009-2014 for Volatile Suspended Solids (mg/l). Grey region in lower corner represents the region below the RL for the respective laboratories in 2014.

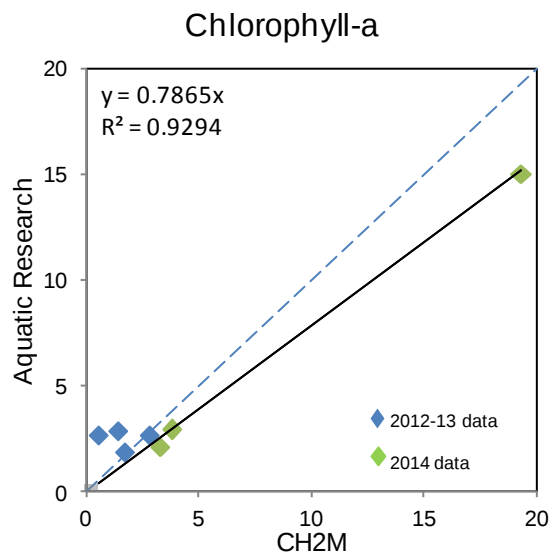


Figure A-7. KHSa inter-laboratory plots from 2009-2014 for Chlorophyll-a ($\mu\text{g/l}$). Grey region in lower corner represents the region below the RL for the respective laboratories in 2014. Note: Chlorophyll-a was not collected from 2009-2011.